WILDLIFE SPECIALIST REPORT
TOOLBOX FIRE RECOVERY PROJECT

SILVER LAKE RANGER DISTRICT
FREMONT NATIONAL FOREST

This Toolbox Fire Recovery Project specialist report was prepared during March, April and May of 2003. It will be used, along with specialist reports from multiple resource areas, to prepare a Draft Environmental Impact Statement (DEIS) for the Toolbox Fire Recovery project. This specialist report will become a part of the planning record for the project, filed under:

"Toolbx/ Planning Record/ E_Specialists_reports_data_inventory_and_collection"

This report will be filed both in the 'hard-copy' planning record binders, on file at the Silver Lake Ranger District, and on the Fremont National Forest "K-Drive". In the interest of planning process efficiency, particularly in light of time and budget constraints, editing that occurs to the content of this report during the preparation of the DEIS will be reflected in the DEIS and will not necessarily be entered back into the content of this report. To insure the accuracy of such edits, I will review the content of both the DEIS and the (Final) FEIS and certify that their content is consistent with the analytical conclusions in this report. If during DEIS or FEIS editing, substantially different conclusions or interpretations are reached or substantial additional analysis is prepared from that displayed in this report, an addendum to this report will be prepared.

Specialist: /s/ Amy L. Markus Title: Wildlife Biologist Date: 0731/03

INTRODUCTION

As stated in the 36 Code of Federal Regulations 219.19, wildlife habitat shall be managed to maintain viable populations of existing native species by identifying management indicator species whose population changes are believed to indicate the effects of management activities. To meet this CFR, the Land and Resource Management Plan for the Fremont National Forest (LRMP) identified species whose population changes may indicate impacts on other species found within a specific habitat type. The Endangered Species Act also requires Forests 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 or candidate species. The Forest Service manual also directs the Regional Forester to identify sensitive species for each National Forest where species viability may be a concern. The Sensitive Species List for the Fremont National Forest was updated in November of 2000.

This document will include an effects analysis on existing and projected management indicator species likely to be found within the proposed analysis area (Title 2634.1 USFS Manual), and a biological evaluation is to discuss and document the effects of this proposed project on threatened, endangered, and sensitive species (Title 2670.5 USFS Manual). Lastly, focal species identified for the Subprovince Central Oregon/Klamath Basin in the "Conservation Strategy for Landbirds of the East-Slope of the Cascade Mountains in Oregon and Washington" (Altman 2000), and other species and habitats of concern will be addressed if they are known to exist within the planning area. The following is a list of all the species or habitats discussed in this document:

Table 1: Fremont National Forest Indicator Species

I. Fremont National Forest Management Indicator Species	Representative of:
A. Goshawk	Overmature/Mature Ponderosa Pine; Mixed Conifer
B. Mule Deer	Hunted Species
C. Pileated Woodpecker	Overmature/Mature Mixed Conifer
D. American Marten	High Elevation Forests; Lodgepole Pine and Mixed Conifer Forests
E. Red-naped Sapsucker	Aspen and Deciduous Ecosystems
F. Snag and Down Wood Dependent Species	Snag and Down Wood
G. Black-backed Woodpecker	Overmature/Mature Lodgepole Pine

Table 2: Fremont National Forest Threatened, Endangered, and Sensitive Species

II. Threatened, Endangered, and Sensitive Species	Representative of:
H. Bald Eagle	Federally Listed Threatened Species
I. Canada Lynx	Federally Listed Threatened Species
J. Oregon Spotted Frog	Federally Listed Candidate Species R6 Sensitive Species List
K. Yellow-Billed Cuckoo	Federally Listed Candidate Species
L. Horned Grebe	R6 Sensitive Species List
M. Red-necked Grebe	R6 Sensitive Species List
N. Least Bittern	R6 Sensitive Species List
O. Bufflehead	R6 Sensitive Species List
P. Peregrine Falcon	R6 Sensitive Species List
Q. Western Sage Grouse	R6 Sensitive Species List
R. Yellow Rail	R6 Sensitive Species List
S. Upland Sandpiper	R6 Sensitive Species List
T. Gray Flycatcher	R6 Sensitive Species List
U. Tricolored Blackbird	R6 Sensitive Species List
V. California Wolverine	R6 Sensitive Species List

W. Pacific Fisher	R6 Sensitive Species List
X. Pygmy Rabbit	R6 Sensitive Species List
Y. Northern Leopard Frog	R6 Sensitive Species List
Z. Columbia Spotted Frog	R6 Sensitive Species List
AA. Northwestern Pond Turtle	R6 Sensitive Species List

Table 3: Species identified for the subprovince Central Oregon/Klamath Basin in the "*Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington*" (Altman 2000)

II. Focal Species Identified for the Subprovince Central Oregon/Klamath Basin in the "*Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington*" (Altman 2000) *species addressed for only those habitats found within the project area	**Representative of:**
BB. White-headed Woodpecker	Ponderosa Pine – large patches of old forest with large snags
CC. Pygmy Nuthatch	Ponderosa Pine – large trees
DD. Chipping Sparrow	Ponderosa Pine – open understory with regenerating pines
EE. Lewis' Woodpecker	Ponderosa Pine – patches of burned old Forest
FF. Brown Creeper	Mixed Conifer (Late Successional) – large trees
GG. Williamson's Sapsucker	Mixed Conifer (Late Successional) – large snags
HH. Flammulated Owl	Mixed Conifer (Late Successional) – interspersion grassy opening and dense thickets
II. Hermit Thrush	Mixed Conifer (Late Successional) – multi-layered/dense canopy
JJ. Olive-sided Flycatcher	Mixed Conifer (Late Successional) – Edges and openings created by wildfire
KK. Black-backed Woodpecker	Lodgepole Pine – old growth
LL. Sandhill Crane	Meadows
MM. Red-naped Sapsucker	Aspen

Table 4: Fremont National Forest "Other Species, Habitat, or Wildlife Issues of Concern"

IV. Other Species, Habitats, and Wildlife Issues of Concern
NN. Neotropical Migratory Birds and Songbirds
OO. Designated Old Growth
PP. Connectivity Corridors
QQ. Fragmentation
RR. Rocky Mountain Elk
SS. Wild Turkeys

I. Fremont National Forest Management Indicator Species

A. Goshawk

Goshawk - Existing condition

Ecology: The northern goshawk is the largest North American accipiter and was chosen as a MIS species due to its association with mature and LOS ponderosa and mixed conifer forest structural stages for nesting. The goshawk's home range encompasses about 6000 acres and is composed of a nest core area, post-fledging area (PFA), and a foraging area. Various forest structural stages are associated with the components of the home range. Nest areas often occur on north aspects, along stream zones or other areas where a dense forest canopy and LOS forest conditions are present. PFA's usually resemble the nest area, but also include a variety of forest types and conditions where hiding cover (for the young) and prey availability is present (Reynolds et. al. 1991). Foraging areas may be as closely tied to prey availability as to habitat structure and composition. These areas often contain a mixture of various forest structural stages with snags, downed logs, large trees, and small openings with an herbaceous and/or shrubby understory present.

Fremont National Forest LRMP standards and guidelines for goshawks are to protect a 30 acre nest core, and to delineate a 400-acre post fledging area with an emphasis of maintaining existing LOS stands and enhancing younger stands towards LOS condition.

Existing Condition: Goshawk surveys will be conducted in the early summer of 2003, and changes will be incorporate into the alternatives as needed between the DIES and FEIS. Surveys will be conducted to some degree within all known goshawk post fledging family areas (PFA's) and within areas of suitable habitat that burned light to moderate or <50% mortality. Due to the variability of vegetation mortality within the fire, viable nesting goshawk habitat remains in areas classified as 0-50% mortality. In these areas, the fire likely improved stand conditions by burning some of the dense understory, improving snag densities, and enabling flight assess for foraging. It is anticipated that the areas classified as >50% mortality experienced a high degree of burn and as a result, no longer provide the structure and canopy closure required for nesting.

The fire affected fourteen known PFA's. Each PFA was assessed to determined if is likely to remain functional as a goshawk nesting PFA and this was largely determined by the amount of area that burned in the 0-25%, 25-50%, 50-85%, and >85% vegetation mortality category. Other factors were considered including the degree of mortality in and adjacent to the nest stand. The following is a list of known goshawk PFA's within the planning area, the amount of areas burned in each mortality category, and the determination of functionality:

Table 5: Assessment of known goshawk PFA's within the project area

Goshawk PFA (acres)	Percent of Area 0-25% Mortality	Percent of Area 25-50% Mortality	Percent of Area 50-85% Mortality	Percent of Area >85% Mortality	Percent of Area *not* Burned	Percent of Area Private and Assumed Salvage Harvest	Functionality Determination	Comments
Graham Creek (570 acres)	0	4	8	6	82	0	Functional	Most of area did not burn.
Indian Creek (497 acres)	5	6	0	66	23	0	Non-functional	Majority of PFA including nest stand burned >85%
E. Trough Spring (285 acres)	15	4	0	28	0	53	Non-functional	Majority of PFA either private or >85%
E. Duncan (643 acres)	60	10	3	27	0	0	Non-functional	Nest stand and surrounding area burned >85%
Benny/Hawk (298 acres)	0	54	7	37	0	2	Non-functional	Majority of PFA burned >50%
Benny Creek (607 acres)	0	15	13	26	46	0	Non-functional	Nest stand and surrounding area burned >85%

Labrie Lake (589 acres)	9	13	1	54	23	0	Non-functional	Nest stand and surrounding area burned >85%
N. Labrie Lake (423 acres)	26	43	5	26	0	0	Functional	Majority of PFA burned <50% mortality
Buckaroo (107 acres)	0	0	13	87	0	0	Non-functional	All of PFA burned >50% mortality
Foster (300 acres)	0	29	3	68	0	0	Non-functional	Majority of PFA, including nest stand, burned >85% mortality
S. Hager Mountain (734 acres)	12	2	0	0	86	0	Functional	Majority of PFA, including the nest stand, did not burn
Frog Ponds (838 acres)	1	30	3	66	0	0	Non-functional	Majority of PFA, including nest stand, burned >85% mortality
N. Duncan Creek (269 acres)	0	38	14	48	0	0	Non-functional	Majority of PFA, including nest stand, burned >85% mortality
C/B (1244 acres)	43	11	0	5	41	0	Functional	Majority of PFA burned <50% mortality and nest stands did not burn

Goshawk – Environmental Consequences

Direct and Indirect Effects

Alternative A (No Action)
This alternative is expected to have the most beneficial effect on goshawk populations and habitat in the short term. No salvage harvest would result in a substantial increase in foraging habitat within and adjacent to any existing nesting habitat that remains within the fire. Bird species richness will increase as snag and down wood habitat increases, which should contribute to greater diversity of prey species. It is anticipated that existing goshawk populations will not be affected directly or indirectly by this alternative.

Although goshawk foraging habitat may flourish in the short term, no fuels treatment or planting could be detrimental to goshawk habitat on the long-term. This alternative has no proposed fuels treatment. Therefore areas that naturally regenerate and the remaining habitat the burned light to moderate have the potential to reburn in the future. No proposed planting will also result in a delayed advancement of future goshawk nesting and foraging habitat.

Alternative C, D, E, G, and H
Salvage harvest will reduce the short-term foraging habitat within and adjacent to any existing nesting habitat that remains within the fire. Overall however, it is expected that snags levels retained within all harvest units as described in Section F of this report should provide for the levels needed to maintain the foraging base necessary for nesting success. Harvest levels will vary within the four PFA's that are expected to remain functional post-fire (see Table 5). Alternative C proposes 196 acres, alternative D proposes 111 acres, alternative E proposes 148 acres, alternative G proposes 196 acres, and alternative H proposes 189 acres of harvest within the four PFA's identified in Table 5 as remaining functional. No harvest units are located within ½ mile of known nest sites.

As recommended by Reynolds and others, the proposed prescribed fire in ponderosa pine and mixed-species forests will perpetuate northern goshawk habitat and reduce fuel loading (1992). Alternative C and G propose 3572 acres of prescribed fire, and Alternative D and H propose 2450 acres of prescribed fire. Alternative E proposes 0 acres of prescribed fire and therefore does not offer the opportunity to improve goshawk habitat and reduce fuel loadings. Any aspen enhancement treatments located near goshawk habitat may improve foraging habitat by increasing bird species richness as the condition of aspen improves. Alternatives C, D, G, and H propose 690 acres of aspen protection and Alternative E proposes 0 acres of aspen protection.

Although goshawk foraging habitat may be reduced in the short term, this will result in many acres receiving fuels reduction treatments, planting, and plantation thinning. This is expected to reduce the likelihood of a reburn and accelerate development of future foraging and nesting habitat. Reducing fuel loadings should sustain the existing habitat that remains within the fire and protect future habitat from experiencing a large stand replacement fire, and planting will produce goshawk habitat much quicker into the future than natural regeneration under alternative A. The advantages of fuels reduction treatment will be the greatest with Alternative G, which proposes the greatest amount of these treatments, and the least with Alternative D, which proposes the least amount of these treatments. Alternative G proposes 16,950 acres of fuels treatment, Alternative C proposes 10,244 acres of fuels treatment, Alternative H proposes 9,070 acres of fuels treatment, Alternative E proposes 6,723 acres of fuels treatment, and Alternative D proposes 5,680 acres of fuels treatment. The advantages of planting will be the greatest with Alternative C, which proposes the greatest amount of planting, and the least with Alternative H, which proposes the least amount. Alternative C proposes 20,906 acres of planting, Alternative E proposes 20,753 acres of planting, Alternative D proposes 20,743 acres of planting, Alternative G proposes 20,728 acres of planting, and Alternative H proposes 20,721 acres of planting. All action alternatives proposed, except Alternative E, propose 2214 acres of plantation thinning.

Surveys will be conducted this spring and mitigations will be incorporated into this project as needed. Also, the mitigation measure in Table 6 should mitigate any direct effects associated with unknown nests. With no considerable change in existing and potential nesting habitat within the project area due to the maintenance of snags within and outside harvest units and with the above mitigations in place, it is anticipated that existing goshawk populations will not be greatly affected by any of these alternatives in the short-term. In the long-term, goshawk habitat will be perpetuated and maintained with planting and fuel treatments the greatest with Alternative G, and to a lesser degree with Alternatives C, H, E, and D respectively.

Table 6: Mitigation measure that applies to goshawks and raptors

If an active raptor nest is found during operation, LRMP Standards and Guidelines will be followed at a minimum. The LRMP states that "major activities such as logging and road construction adjacent (300 yards) to active raptor nests, should be postponed until young have fledged (usually around July 30)" (LRMP, page 180). Contact the Wildlife Biologist.	C,D,E,G,H

Cumulative Common To All Alternatives

All of the activities in Appendix A have been considered for their cumulative effects on goshawks and the following activities have the potential to produce a cumulative effect. Past management activities have likely decreased the potential habitat available for goshawks within the project area. Fire suppression and wildfires, as described in Table A-1 of Appendix A, have changes stand conditions providing more dense understories. This has reduced goshawk habitat overall by creating continuous dense ponderosa pine stands, instead of stands that provide a mosaic of thickets and openings preferred by goshawks for flight assess and foraging. Past timber harvest activities, as described in Table A-2 and A-13 of Appendix A, have changed overall stand conditions on federal and private lands. The management practices that include overstory removal and partial removal of ponderosa pine have converted many stands previously dominated by open large diameter pine, to stands now characterized as multi-storied stands with white fire and pine in the understory. Fuels reduction projects, as described in Table A-3 of Appendix A, have likely improved goshawk habitat by reducing understory stand densities and creating more of a diversity in habitat that includes openings for flight assess and foraging. Recreation activities, as described in Table A-5 of Appendix 2, may have some effect on goshawk productivity if nest sites are located near campgrounds or other recreational sites. Grazing, as described in Table A-8 of Appendix A, has had little effect on goshawk habitat or productivity. Wildlife and watershed improvement projects, as described in Table A-9 of Appendix 2, include aspen enhance projects. Aspen stands that were treated near goshawk habitat may improve foraging habitat by increasing bird species richness as the condition of aspen improves. Snag and down wood loss through personal use

firewood cutting, as described in Table A-12 of Appendix A, and through past timber management activities including salvage and hazard removal, as described in Table A-2 of Appendix A, have decreased snag and down wood levels. This has likely decreased overall foraging habitat for goshawks. Salvage harvest has occurred on several acres of private land as described in Table A-13 of Appendix A. This will likely reduce foraging habitat for goshawks by removing prey habitat.

Reasonably foreseeable future activities include treatments within the Bridge Creek Subshed and treatments displayed in Table A-16 of Appendix A within the project area subsheds. Silvicultural activities include restoration thinning and harvest that will promote open understory sustainable ponderosa pine stands. These activities in conjunction with prescribed fire are expected to improve habitat for goshawks. Prescribed fire will thin out understories in a mosaic fashion providing diversity in structure and increasing replacement snag and down wood numbers, and silvicultural treatments designed to promote open and variable ponderosa pine stands, will likely increase the abundance and distribution of goshawks. Cumulative, it is expected that goshawk populations will increase in the long-term.

B. Mule Deer

Mule Deer – Existing Condition

Ecology: Desired habitat conditions for mule deer will not necessarily reflect optimum conditions but should be within a range between LRMP standard and guidelines, which generally are stated as minimums, and optimal habitat conditions. Optimal mule deer habitat is generally described as a mix of hiding, thermal, fawning cover and foraging habitat. The optimum mix of cover should be 40-50% of the available habitat with 20% in hiding cover, 10% in thermal cover, 5% in fawning cover, and the remaining 5-15% in either hiding, thermal or fawning cover. LRMP standard and guidelines require a minimum of 30% cover on summer range, 30% cover on transition range, and 50% cover on winter range. A number of factors including road density, distance between sources of water, forage utilization by cattle and the amount and arrangement of cover and forage patches will effect habitat use by mule deer. Optimal conditions for these factors are those values as defined in Bienz, et al (1985), Thomas (1979), and others, where no effect on habitat use is anticipated. These include: road density – 1.4 mi/sq. mi; distance between water sources - 2.8 mi; forage utilization by cattle - 10-24%; cover - 40-50%; arrangement of cover and forage – optimal use within 600’ of a cover or forage patch. These factors are used to determine a Habitat Effectiveness (HE) value in which the LRMP standard is 50% on summer range, 60% on transition range, and 80% on winter range.

Mule Deer in Central Oregon are a migratory group of animals that roam a vast mountainous summer range and crowd into relatively small winter ranges (Dealy 1971). Mule deer are not believed to have been abundant prior to 1850 in this region, and remained at low numbers through the early 1900’s (Peek et al. 1999). Mule deer began to increase around 1915, probably because of increased shrublands (Salwasser 1979, Peek et al. 1999). Shrublands have since continued to mature across the western ranges (Urness 1990, Peek et al. 1999) and this is the case throughout much of the planning area. Public interest and use have initiated management of mule deer populations that are higher than historical numbers.

The following mule deer habitat factors remain important within the project area:

1.) Cover
Thermal cover is described as overstories that shelter an animal from microclimatic extremes (Black et al 1976, Demarchi and Bunnell 1993). Individuals can find lower ambient temperatures under thermal cover in hot weather and warmer temperatures in cold weather (Peek et al. 1982). Wind velocity is greatly reduced, and snow depth and condition are more favorable to animal movement in cover stands (Peek et al. 1982). All these factors combined can reduce energy loss by mule deer (Peek, et al. 1982). In harsh winters, animals lacking sufficient energy reserves are more vulnerable to winter-spring mortality (Demarchi and Bunnel 1993). Summer thermal cover minimizes metabolic and time costs associated with heat dissipation (Demarchi and Bunnel 1993). Lost foraging time or the energetic costs of increasing metabolism can translate into decreased summer weight gains (Demarchi and Bunnell 1993). Thermal cover can also be provided by shrubs, juniper woodlands, or physical objects such as boulders and ledges (Peek et al 1982). Gay also found that animals are as likely to bed in the shade of a single conifer, rock outcrop, or cut-bank in the midday, as in high canopy closures (1998).

Hiding cover habitat is used for escape and protection from predators and humans (Peek et al. 1982). Black et al. has suggested security or hiding cover is required even in the absence of humans and predators, implying a psychological need (1976, Peek et al. 1982). It has been observed that mule deer tend to bed down in hiding cover along ridgetops where they can view approaching predators. Although under current management, optimal habitat is defined as that which is within 600 feet (183m) of cover, Gay did not find concentrated deer use within 600 feet of hiding cover (1998). In fact, fewer than 20% of study animals concentrated habitat within 600 feet of hiding cover (Gay 1998). Although the LRMP requires that we manage by using the current definition of cover (a stand in which $\geq$60% of the area can hide 90% of a deer at 200 feet), this omits less dense vegetation types which deer also recognize as cover (Gay 1998).

2.) Grass and Forbs

Actual usage of grass and forbs by mule deer is difficult to determine because microhistological analysis is not credible because of near complete digestion of new and rapidly growing grasses and forbs (Zyzner and Urness 1969, Gay 1998). Grasses and forbs compose the bulk of spring diets. Gay's studies found that in April and May of 1995, when there was no snow cover and an abundance of new grasses and forbs, deer were seldom seen feeding on anything other then new herbaceous growth (1998). Forbs especially showed high use with 25-44% in June and July and 15-57% in August and September (Gay 1998).

Fire may affect the forage resource by changing both forage quality and quantity (Bunting 1998). Forage characteristics that may be affected by fire include: protein, phosphorus and fiber content, and subsequent changes in digestibility (Bunting 1998). Cook found substantial increases in crude protein of herbs after burning (1994). Fire-stimulated flowering is another phenomenon which increases seedling abundance in burned areas, as Walstad found increased flowering and seed vigor following fire for grasses in the pine forests and high desert regions east of the Cascades (1990). Small burned areas may also be more heavily utilized by herbivores than large areas because of the concentration of palatable regrowing forage (Bunting 1998).

3.) Mountain Mahogany

Mountain mahogany regeneration post fire can be variable. A curlleaf mountain-mahogany stand near MacKay, Idaho, had burned around 1900. In 1968, it contained plants ranging from 8 to 54 years of age (Scheldt and Tisdale, 1970). A stand that burned in 1965 showed no signs of regeneration by 1968. However, Collins described excellent seedling emergence in postfire year 1 of a 1979 wildfire in the Salmon National Forest, possibly due to an unusually wet growing season (1980).

Existing Condition: Wintering deer in 2003 for the Silver Lake Unit were estimated at about 69% of a management objective of 10,300 animals. In general, the mule deer population appears to be stable (M.J. Hedrick, pers. comm.) to slightly increasing.

The project area lies within mule deer winter, transition, and summer ranges. There is approximately 3736 acres of winter range, 14,879 acres of transition range, and 29,102 acres of summer range. Due to the degree of vegetation mortality within the fire, the area has been reduced to a condition of little cover, but grass and forb forage response is expected to greatly increase. The fire burned in a mosaic pattern, which modified the pre-existing cover and forage habitat conditions. Currently, plantations, riparian areas, and dense stands that burned with light intensity are continuing to provide hiding, thermal, and fawning cover where they provided them pre-fire. Areas that burned with a moderate or high intensity likely do not provide hiding cover, if they did pre-fire. Some extensive stands of curlleaf mountain mahogany, a highly palatable forage for big game and important source of hiding cover (Gruell et al. 1984), burned severely. Mule deer populations may increase as a result of the extensive amount of increased forage within the fire. Anecdotal evidence in local wildfires including the Alder Ridge Fire and Lone Pine Fire shows that mule deer use increases within wildfire areas.

Currently, LRMP standards for HE are not being met in any range on any of the subsheds, and percent cover standards are being met on the transition range of the Middle Silver Creek Subshed (30.4%), summer range of the Thompson Reservoir Subshed (37.7%), and summer range of the West Fork Subshed (47.6%).

Habitat mapping was performed within the mule deer winter range on both USFS and BLM within the fire perimeter to indicate shrub loss (conducted by Hedrick, ODFW 2002). Areas were mapped into 5 categories: 1. mix of live and dead shrubs with generally green trees in the overstory (5%), 2. shrubs and overstory trees burned (26%), 3. shrubs burned with generally green trees in the overstory (7%), 4. shrubs burned with live and dead trees in the overstory (41%), 5. shrubs burned in open scabflat (15%), and no burn (6%). Approximately 89% of the winter range within the fire perimeter on

USFS and BLM land lost the majority of the shrub component. As a result, in years with heavy snow loadings on the winter range, mule deer populations may decline until the bitterbrush becomes reestablished. Bitterbrush is not expected to become established to the height of effectiveness on the winter/transition range for 20+ years.

Mule Deer – Environmental Consequences

Direct and Indirect Effects

Mule deer cover/forage information was mapped during the fall of 2002. As currently directed by the LRMP, analysis of mule deer habitat was performed by using habitat effectiveness (HE) calculations based in the Southcentral Oregon mule deer habitat suitability index model. This is based on the principle that areas within 600 feet of an edge of cover are the most well-used and effective habitat within cover and forage areas. This habitat is mapped and acreages calculated to obtain a percent of the planning area that is effective from a forage/cover juxtaposition standpoint. Modifiers to this percent including road density, water availability, forage utilization by domestic livestock, and cover/forage to arrive at a final HE value. *Percent cover and HE were analyzed on USFS and other private lands within the portions of the Benny Creek, East Duncan Creek, Lower Duncan Creek, Middle Silver Creek, Thompson Reservoir, Upper Duncan Creek, Upper Silver Creek, and West Fork Silver Creek Subsheds that are within the Silver Lake Ranger District boundaries only. It was assumed that areas of scabflats and open meadows were not capable of producing cover and thus will not be considered cover deficient in this analysis.*

Mule Deer Analysis by Range

Table 7: Entire Summer Range Within the Project Area

Alternative	Cover (S&G = 30%)	Habitat Effectiveness (S&G = 50%)
A	29.8%	34.0%
C	29.7%	40.3%
D	29.8%	41.5%
E	29.8%	38.6%
G	29.7%	38.6%
H	29.8%	40.3%

Table 8: Entire Transition Range Within the Project Area

Alternative	Cover (S&G = 30%)	Habitat Effectiveness (S&G = 60%)
A	10.5%	6.3%
C	10.5%	8.0%
D	10.5%	8.0%
E	10.5%	7.3%
G	10.5%	7.3%
H	10.5%	8.0%

Table 9: Entire Winter Range Within the Project Area

Alternative	Cover (S&G = 40-50%)	Habitat Effectiveness (S&G = 80%)
A	18.8%	5.4%
C	18.8%	10.0%
D	18.8%	10.0%
E	18.8%	7.7%
G	18.8%	7.7%
H	18.8%	10.0%

Mule Deer Analysis By Range Within Each Subshed

Table 10: **Benny Creek Subshed** - Summer Range

Alternative	Cover (S&G = 30%)	Habitat Effectiveness (S&G = 50%)
A	29.0%	40.0%
C	29.0%	44.0%
D	29.0%	44.0%
E	29.0%	40.6%
G	29.0%	40.6%
H	29.0%	44.0%

Table 11: **Benny Creek Subshed** - Transition Range

Alternative	Cover (S&G = 30%)	Habitat Effectiveness (S&G = 60%)
A	13.3%	5.3%
C	13.3%	5.3%
D	13.3%	5.3%
E	13.3%	5.3%
G	13.3%	5.3%
H	13.3%	5.3%

Benny Creek – No winter range in this subshed.

Table 12: **East Duncan Creek** - Summer Range

Alternative	Cover (S&G = 30%)	Habitat Effectiveness (S&G = 50%)
A	11.0%	2.3%
C	9.4%	2.7%
D	11.0%	3.1%
E	11.0%	2.9%
G	9.4%	2.5%
H	11.0%	3.1%

Table 13: **East Duncan Creek** - Transition Range

Alternative	Cover (S&G = 30%)	Habitat Effectiveness (S&G = 60%)
A	5.9%	1.9%
C	5.6%	4.1%
D	5.9%	4.1%
E	5.9%	3.7%
G	5.6%	3.7%
H	5.9%	4.1%

Table 14: **East Duncan Creek** - Winter Range

Alternative	Cover (S&G = 40-50%)	Habitat Effectiveness (S&G = 80%)
A	0%	0%
C	0%	0%
D	0%	0%
E	0%	0%
G	0%	0%
H	0%	0%

Table 15: **Lower Duncan Creek -** Summer Range

Alternative	Cover (S&G = 30%)	Habitat Effectiveness (S&G = 50%)
A	5.4%	1.8%

C	4.4%	1.7%
D	5.4%	3.1%
E	5.4%	1.9%
G	4.4%	1.5%
H	5.4%	2.1%

Table 16: **Lower Duncan Creek -** Transition Range

Alternative	Cover (S&G = 30%)	Habitat Effectiveness (S&G = 60%)
A	0.9%	0.3%
C	0.9%	0.4%
D	0.9%	0.4%
E	0.9%	0.3%
G	0.9%	0.3%
H	0.9%	0.4%

Table 17: **Lower Duncan Creek -** Winter Range

Alternative	Cover (S&G = 40-50%)	Habitat Effectiveness (S&G = 80%)
A	1.9%	0.4%
C	1.9%	0.5%
D	1.9%	0.5%
E	1.9%	0.4%
G	1.9%	0.4%
H	1.9%	0.5%

Table 18: **Middle Silver Creek** - Summer Range

Alternative	Cover (S&G = 30%)	Habitat Effectiveness (S&G = 50%)
A	0%	0%
C	0%	0%
D	0%	0%
E	0%	0%
G	0%	0%
H	0%	0%

Table 19: **Middle Silver Creek -** Transition Range

Alternative	Cover (S&G = 30%)	Habitat Effectiveness (S&G = 60%)
A	30.4%	35.0%
C	30.4%	36.2%
D	30.4%	36.2%
E	30.4%	36.2%
G	30.4%	36.2%
H	30.4%	36.2%

Table 20: **Middle Silver Creek -** Winter Range

Alternative	Cover (S&G = 40-50%)	Habitat Effectiveness (S&G = 80%)
A	28.9%	0%
C	28.9%	0%
D	28.9%	0%
E	28.9%	0%
G	28.9%	0%
H	28.9%	0%

Table 21: **Thompson Reservoir** - Summer Range

Alternative	Cover (S&G = 30%)	Habitat Effectiveness (S&G = 50%)
A	37.7%	42.6%
C	37.7%	48.5%
D	37.7%	50.0%
E	37.7%	46.3%
G	37.7%	46.3%
H	37.7%	48.5%

Table 22: **Thompson Reservoir** - Transition Range

Alternative	Cover (S&G = 30%)	Habitat Effectiveness (S&G = 60%)
A	12.5%	8.1%
C	12.5%	8.1%
D	12.5%	8.1%
E	12.5%	8.1%
G	12.5%	8.1%
H	12.5%	8.1%

Thompson Reservoir – No winter range in this subshed

Table 23: **Upper Duncan Creek -** Summer Range

Alternative	Cover (S&G = 30%)	Habitat Effectiveness (S&G = 50%)
A	19.8%	7.3%
C	19.6%	9.0%
D	19.8%	9.0%
E	19.8%	8.1%
G	19.6%	8.1%
H	19.8%	9.0%

Table 24: **Upper Duncan Creek -** Transition Range

Alternative	Cover (S&G = 30%)	Habitat Effectiveness (S&G = 60%)
A	5.5%	1.2%
C	5.5%	1.9%
D	5.5%	1.9%
E	5.5%	1.7%
G	5.5%	1.7%
H	5.5%	1.9%

Table 25: **Upper Duncan Creek -** Winter Range

Alternative	Cover (S&G = 40-50%)	Habitat Effectiveness (S&G = 80%)
A	0%	0%
C	0%	0%
D	0%	0%
E	0%	0%
G	0%	0%
H	0%	0%

Table 26: **Upper Silver Creek -** Summer Range

Alternative	Cover (S&G = 30%)	Habitat Effectiveness (S&G = 50%)
A	20.1%	9.4%

C	20.1%	10.1%
D	20.1%	10.1%
E	20.1%	9.7%
G	20.1%	9.7%
H	20.1%	10.1%

Table 27: **Upper Silver Creek -** Transition Range

Alternative	Cover (S&G = 30%)	Habitat Effectiveness (S&G = 60%)
A	8.7%	3.3%
C	8.7%	3.9%
D	8.7%	3.9%
E	8.7%	3.7%
G	8.7%	3.7%
H	8.7%	3.9%

Table 28: **Upper Silver Creek –** Winter Range

Alternative	Cover (S&G = 40-50%)	Habitat Effectiveness (S&G = 80%)
A	11.2%	1.1%
C	11.2%	3.4%
D	11.2%	3.4%
E	11.2%	2.2%
G	11.2%	2.2%
H	11.2%	3.4%

Table 29: **West Fork Silver Creek -** Summer Range

Alternative	Cover (S&G = 30%)	Habitat Effectiveness (S&G = 50%)
A	47.6%	40.5%
C	47.6%	49.5%
D	47.6%	49.5%
E	47.6%	47.3%
G	47.6%	47.3%
H	47.6%	49.5%

Table 30: **West Fork Silver Creek -** Transition Range

Alternative	Cover (S&G = 30%)	Habitat Effectiveness (S&G = 60%)
A	9.6%	4.1%
C	9.6%	5.0%
D	9.6%	5.0%
E	9.6%	4.7%
G	9.6%	4.7%
H	9.6%	5.0%

Table 31: **West Fork Silver Creek -** Winter Range

Alternative	Cover (S&G = 40-50%)	Habitat Effectiveness (S&G = 80%)
A	20.6%	3.7%
C	20.6%	8.7%
D	20.6%	8.7%
E	20.6%	8.7%
G	20.6%	8.7%
H	20.6%	8.7%

Effects Common to all Alternatives

Overall, percent cover is extremely low in all alternatives. Cover for mule deer will be minimal for many years until conifers are re-established through natural regeneration (Alternative A) or planting (Alternatives C, D, E, G, and H). The few small patches of cover that remain in the fire are likely to get heavy use from mule deer. Forage production in the form of grasses, forbs, and snowbrush ceanothus is expected to increase. Although forage may improve, cover may be limited to the point of ineffectiveness in much of the interior of the burn. Increased down wood levels in the future is expected to improve fawning habitat by increasing fawn protection.

Mountain mahogany stands that burned severely will be monitored for natural regeneration. If it appears that natural regeneration is not occurring within the next 5-10 years, mountain mahogany planting or seeding may be considered under another NEPA decision.

Alternative A (No Action)
No harvest will allow the burned area to recover at a natural rate. This will result in a delayed return of cover than with Alternatives C, D, E, G, and H. This alternative does not offer the opportunity to close or decommission any existing roads, which would increase mule deer security. Although population numbers are expected to remain stable with this alternative, distribution and use as a result of the project activities may change.

Alternatives C and G
Although cover will remain limited for many years, planting under these alternatives is expected to provide cover at a much quicker rate (approximately 10-15 years) than Alternative A. To provide long-term cover in conjunction with shrub development, planting is not planned at a rate to develop cover in the immediate future. With a diversity in planting with variable spacing and trees per acre, some areas will recover as hiding cover quicker while some areas will remain open for forage longer. This treatment is expected to provide a distribution of cover to forage in the long-term that is favorable to mule deer. The few small patches of cover that remain in the fire are likely to get heavy use from mule deer. Forage should remain plentiful within the plantations until the stands begin to close-in in 30-40 years. Planting at lower densities of 130-250 trees per acres will provide foraging habitat longer into the future. The silvicultural prescription for the plantation thinning will be designed to maintain cover. This should open up plantations and improve forage production, thereby producing a mix of cover and forage that is optimal for mule deer.

These alternatives will have a slight effect on cover. It is estimated that the proposed prescribed burning may reduce cover within exiting cover stands by 35%. This drops the overall percent cover calculation slightly for the summer range in Lower Duncan Creek, Upper Duncan Creek and East Duncan Creek subwatersheds and transition range in East Duncan Creek subwatershed (see Table 32), and the overall Habitat Effectiveness calculation slightly for the summer range in the Lower Duncan subwatershed (see Table 15). Although the result in acreage and percent cover is marginal, overall cover loss due to the fire was significant and further loss may have a negative effect on mule deer habitat.

Table 32: Effects of Cover Loss in Alternatives C and G

	Lower Duncan Creek Subshed Summer Range	Upper Duncan Creek Subshed Summer Range	East Duncan Creek Subshed Summer Range	East Duncan Creek Subshed Transition Range
Acres of existing cover stands proposed for prescribed fire	96 acres	100 acres	231 acres	33 acres
Existing percent cover	5.4%	19.8%	11.0%	5.9%
Percent cover as a result of prescribed fire	4.4%	19.6%	9.4%	5.6%

Alternative C has a greater impact on mule deer security than Alternative G by closing 141.9 miles of road versus 82 miles of road in alternative G. Road closures and percent cover are the primary reasons for the difference in HE between Alternative C and G. Overall, HE remains very low due to the lack of cover within the project area. With the exception of a slight decrease in HE in the Lower Duncan subwatershed, HE increases slightly in these alternatives due to road closures. Salvage alternatives may result in a delayed or slower rate of response for some forage species. For example, studies show that naturally regenerated bitterbrush growth is 41% lower on salvaged sites (Sexton 1998). However, it is recognized that this study began salvage logging in the first winter post-fire which may lead to different effects in the bitterbrush response than if salvage logging begins the second year post-fire when plants may have a better opportunity to become established. This would produce the largest impact where harvest is proposed on the winter range. Although population numbers are

expected to remain stable with these alternatives, distribution and use as a result of the project activities in the local area may change.

Alternatives D, E, and H
Although cover will remain limited for many years, planting under these alternatives is expected to provide cover at a much quicker rate (approximately 10-15 years) than Alternative A. To provide long-term cover in conjunction with shrub development, planting is not planned at a rate to develop cover in the immediate future. With a diversity in planting with variable spacing and trees per acre, some areas will recover as hiding cover quicker while some areas will remain open for forage longer. This treatment is expected to provide a distribution of cover to forage in the long-term that is favorable to mule deer. The few small patches of cover that remain in the fire are likely to get heavy use from mule deer. Forage should remain plentiful within the plantations until the stands begin to close-in in 30-40 years. Planting at lower densities of 130-250 trees per acres will provide foraging habitat longer into the future. The silvicultural prescription for the plantation thinning will be designed to maintain cover. This should open up plantations and improve forage production, thereby producing a mix of cover and forage that is optimal for mule deer.

Alternative D and H have a greater impact on mule deer security than alternative E by closing 147.1 and 144.5 miles of road respectively, versus 82 miles of road in alternative E. The difference in road closures generates the difference in HE between alternative D, E, and H. Overall, HE remains very low due to the lack of cover within the project area, but increases slightly in these alternatives due to road closures. Salvage alternatives may result in a delayed or slower rate of response for some forage species. For example, studies show that naturally regenerated bitterbrush growth is 41% lower on salvaged sites (Sexton 1998). However, it is recognized that this study began salvage logging in the first winter post-fire which may lead to different effects in the bitterbrush response than if salvage logging begins the second year post-fire when plants may have a better opportunity to become established. This would produce the largest impact where harvest is proposed on the winter range. Although population numbers are expected to remain stable with these alternatives, distribution and use as a result of the project activities in the local area may change.

Table 33: Mitigation measures that apply to mule deer

Mitigation Measure	Alternative(s)
Restrict all activities during fawning season between May 1 – June 30 except for a short-term entry for planting which may occur between May 1 – May 15. Units 129, 130, 131, 195, 196, 197	C,G,H
Restrict all activities during fawning season between May 1 – June 30 except for a short-term entry for planting which may occur between May 1 – May 15. Units 129, 131, 197	D
Restrict all activities during fawning season between May 1 – June 30 except for a short-term entry for planting which may occur between May 1 – May 15. Units 130, 131	E
Should any listed endangered, threatened, or sensitive species be found during project activities within, adjacent, or near enough to the project that that activities could be a disturbance, activities will be halted until their effects can be determined and their significance assessed.	C,D,E,G,H

Cumulative Effects Common to All Alternatives
All of the activities in Appendix A have been considered for their cumulative effects on mule deer and the following activities have the potential to produce a cumulative effect. Past management activities have likely increased the potential habitat for mule deer within the project area. Fire suppression and wildfires, as described in Table A-1 of Appendix A, and timber harvest activities, as described in Table A-2 and A-13 of Appendix A, have changed overall stand conditions on federal and private lands. Commercial harvest that included overstory removal and fire suppression significantly increased desirable shrub species above historical levels. Over the long-term, this has also led to a condition of decadent, less nutrient rich browse species and overstocked dense stands of timber in which forage is becoming limited. Fuels reduction projects, as described in Table A-3 of Appendix A, have likely improved mule deer habitat by burning some of the decadent shrubs and creating more of a mosaic of grass, forbs, and shrubs. Recreation activities, as described in Table A-5 of Appendix 2, may have some effect on mule deer security near campgrounds or other recreational sites. Grazing, as described in Table A-8 of Appendix A, has created competition with mule deer for early green-ups, forbs, and winter browse. However, the current management plans and operating plans currently in place appear to be adequate to maintain shrubs and grass/forbs in the project area. Noxious weed treatments, as described in Table A-4 of Appendix A, has reduced the spread of noxious weeds which maintains native vegetation for mule deer forage. Wildlife and watershed improvement projects, as described in Table A-9 of Appendix 2, include aspen enhancement and juniper thinning projects. Aspen

enhancement increases regeneration, valuable forage for mule deer, and juniper thinning increases forage and shrub production in areas where the juniper is out-competing the native vegetation. Down wood loss through personal use firewood cutting, as described in Table A-12 of Appendix A, and through past timber management activities, as described in Table A-2 of Appendix A, have decreased fawning habitat and protection. Road construction, as displayed in Table A-6 of Appendix A, has reduced mule deer security, although efforts to close and decommission roads (approximately 60 miles in the West Fork Silver Creek, Upper Silver Creek, Thompson Reservoir, and Benny Creek Subsheds), as displayed in Table A-9 of Appendix A, is reducing this effect. Although mule deer populations have increased from pre-settlement times, populations have declined from the high numbers experienced during the middle 1900's.

Reasonably foreseeable future activities include treatments within the Bridge Creek Subshed and treatments displayed in Table A-16 of Appendix A within the project area subsheds. Silvicultural activities including restoration thinning and harvest are expected to improve mule deer habitat if a landscape level approach is applied to the planned distribution of cover to forage placement that is desirable to mule deer. It is anticipated that prescribed fire and silvicultural treatments that move dense stands to a more open condition will increase forage. Prescribed fire frequencies and placement need to be considered if shrub establishment, most notably bitterbrush, is to be maintained. Cover needs to remain distributed across the subshed, but the current definition (hiding 90% of a deer at 200 feet) and size of cover patches may need to be reconsidered. Riparian improvements including the large woody debris placement projects in the West Fork Silver Creek (Table A-16 of Appendix A) and in the Bridge Creek Subshed will likely increase riparian vegetation and likely improve fawning habitat and success. Grazing, as displayed in Table A-17 of Appendix A, will continue to occur, and would continue to allow competition with deer for forage resources habitat. Dispersed recreation and hunting will continue to occur, and would directly affect mule deer. Also increases during hunting season contribute to altering movement patterns and habitat use. Cumulatively, all present and future cumulative activities including the activities proposed with this project, will likely maintain local mule deer populations and habitat.

C. Pileated Woodpecker

Pileated Woodpecker – Existing Condition

Ecology: Highly suitable pileated woodpecker habitat, characterized by Bull and Holthausen 1993, Aney and McClelland 1985, Schroeder 1982, and others, includes large trees and snags greater than 20" dbh for nesting and roosting, snags and downed logs greater than 15" dbh for foraging, relatively high canopy closure (≥60%), except in ponderosa pine (≥30%), and the presence of carpenter or other species of ants for feeding. The number of downed logs recommended by Bull and Holthausen 1993 (40.5/acre) exceeds, by far, current LRMP standard and guidelines.

Pileated woodpeckers are the largest woodpeckers in North America and were chosen as a MIS species because of its close association with old growth conifer forests. Of the woodpeckers, the pileated is the most likely to be affected by timber management practices due to its large size and resultant need for large dead trees for nesting, large hollow trees for roosting, and dead woody material for foraging (Bull et. al. 1986). The pileated is also responsible for creating nest holes for numerous larger secondary cavity nesters. Approximately 90% of the diet of these birds consists of carpenter ants, which are associated with large standing and downed wood.

Existing Condition: There are no specific standards and guides related to the pileated woodpecker or its habitat. There is a requirement to provide sufficient habitat quality, quantity, and diversity to maintain self-sustaining populations across the Forest. There are no known pileated woodpecker nests within or adjacent to the project area. General reconnaissance following the Toolbox and Silver Fires resulted in one pileated woodpecker sighting within the project area.

The habitat components necessary to attract pileated woodpeckers are not present in much of the burned area. Where the fire experienced moderate to high vegetation mortality all the live trees were killed. Although many woodpecker species are found within burned areas, none of the literature about species presence mentions the pileated as a species found among dead trees. In the areas that experienced low vegetation mortality, where most of the canopy is alive with occasional individual or small patches of dead trees, the habitat for pileated woodpeckers may be ideal. Pileated woodpeckers occupying the mosaic of low vegetation mortality areas may forage into the edges of the higher vegetation mortality areas as the insect population increase. Foraging habitat was more greatly impacted, and has been reduced in the short-term as a result of the fire by reducing pre-existing down wood and snags, and creating a larger number of hardened snags and

hardened future down wood which reduces the likelihood of carpenter ants colonizing the area. No formal pileated woodpecker surveys have been conducted in the area of the Tooolbox and Silver Fires.

Pileated Woodpecker – Environmental Consequences

Direct and Indirect Effects

Alternative A (No Action)
Minimal impacts to pileated woodpecker habitat or their populations are anticipated under this alternative. In the long-term, as snags and down wood begin to decay and desirable insects including carpenter ants are available, adjacent populations of pileated woodpeckers may forage within the planning area. Within the mixed conifer stands that burned light to moderate, potential habitat may improve with increased snag and down wood levels and use may increase in the long-term.

No fuels treatment or planting could be detrimental to pileated woodpecker habitat in the long-term. This alternative has no proposed fuels treatment. Therefore areas that naturally regenerate and the remaining habitat the burned light to moderate have the potential to reburn in the future. No proposed planting will also result in a delayed advancement of future pileated woodpecker habitat.

Alternative C, D, E, G, H
Minimal impacts to pileated woodpecker habitat or their populations are anticipated under these alternatives. In the long-term, as snags and down wood begin to decay and desirable insects including carpenter ants are available, adjacent populations of pileated woodpeckers may forage within the planning area. Within the mixed conifer stands that burned light to moderate, potential habitat may improve with increased snag and down wood levels and use may increase in the long-term. It is expected that snags levels retained within the harvest units should provide for the levels needed to maintain pileated woodpecker foraging and nesting habitat. Snag levels overall would be the greatest with alternative D that proposes the least amount of harvest and the least with Alternative C that proposed the greatest amount of harvest. Alternative C proposes 14,441 acres of salvage, Alternative G proposes 14,419 acres of salvage, Alternative H proposes 13,031 acres of salvage, Alternative E proposes 11,490 acres of salvage, and Alternative D proposes 6,367 acres of salvage. Any harvest or activity during the breeding season may have a direct effect on nesting.

Reducing fuel loadings should sustain the existing habitat that remains within the fire and protect future habitat from experiencing a large stand replacement fire. The advantages of fuels reduction treatment will be the greatest with Alternative G that proposes the greatest amount of these treatments, and the least with Alternative D that proposes the least amount of these treatments. Alternative G proposes 16,950 acres of fuels treatment, Alternative C proposes 10,244 acres of fuels treatment, Alternative H proposes 9,070 acres of fuels treatment, Alternative E proposes 6,723 acres of fuels treatment, and Alternative D proposes 5,680 acres of fuels treatment. Planting is expected to accelerate development of future foraging and nesting habitat and produce pileated woodpecker habitat much quicker into the future than natural regeneration under alternative A. The advantages of planting will be the greatest with alternative C that proposes the greatest amount of planting, and the least with alternative H that proposes the least amount. Alternative C proposes 20,906 acres of planting, Alternative E proposes 20,753 acres of planting, Alternative D proposes 20,743 acres of planting, Alternative G proposes 20,728 acres of planting, and Alternative H proposes 20,721 acres of planting.

Although pileated woodpecker habitat will remain stable under all alternatives, populations have the greatest potential to increase with the alternatives that provide for the greatest amount of snag habitat for nesting and foraging. This is directly related to salvage and therefore, Alternative D has the greatest potential for pileated woodpecker populations to increase followed by Alternative E, H, C, and G respectively.

Cumulative Effects Common to All Alternatives
All of the activities in Appendix A have been considered for their cumulative effects on pileated woodpeckers and the following activities have the potential to produce a cumulative effect. Past management activities have likely decreased the potential habitat available for pileated woodpeckers within the project area. Past timber harvest activities, as described in Table A-2 and A-13 of Appendix A, have changed overall stand conditions on federal and private lands. These activities have removed large diameter trees, snags and down wood, reduced patch sizes and connectivity, and diminished the amount of high quality LOS interior habitat and overstory canopy cover all required for pileated woodpecker habitat. Fire suppression, as described in Table A-1 of Appendix A, have changed stand conditions providing more dense understories

and have converted many stands previously dominated by open large diameter pine, to stands now characterized as multi-storied stands with white fire and pine in the understory. The succession of true ponderosa pine sites towards a mixed conifer composition as a result of fire suppression has likely increased habitat for pileated woodpecker across the landscape. Fuels reduction projects, as described in Table A-3 of Appendix A, have increased habitat slightly in areas where small blowouts have occurred within pileated woodpecker habitat such as on Hager Mountain. Recreation activities, as described in Table A-5 of Appendix 2, may have some effect on pileated woodpecker productivity if nest sites are located near campgrounds or other recreational sites. Grazing, as described in Table A-8 of Appendix A, has had little effect on pileated woodpecker habitat or productivity. Snag and down wood loss through personal use firewood cutting, as described in Table A-12 of Appendix A, and through past timber management activities including salvage and hazard removal, as described in Table A-2 of Appendix A, and through salvage harvest on several acres of private land as described in Table A-13 of Appendix A, have decreased snag and down wood levels. This has likely decreased overall nesting and foraging habitat for pileated woodpeckers.

Reasonably foreseeable future activities include treatments within the Bridge Creek Subshed and treatments displayed in Table A-16 of Appendix A within the project area subsheds. Silvicultural activities include restoration thinning and harvest that will promote open understory sustainable ponderosa pine stands. These activities in conjunction with prescribed fire are expected to decrease habitat for pileated woodpeckers by reducing the encroaching white fir and density of ponderosa pine stands. It is expected that the true ponderosa pine stands that have moved toward a mixed conifer composition will be converted back to true ponderosa pine forests thereby decreasing what may have been future habitat for pileated woodpeckers. Cumulatively, it is expected that pileated woodpecker populations would return to historical levels in the long-term (150-200 years) as snag and down wood levels increase and continuous mixed conifer LOS habitat develops across the landscape.

D. American Marten

American Marten - Existing condition

Ecology: Preferred habitat as described in Freel, 1991 is characterized by dense (60 –100% canopy closure), multi-storied, multi-species late seral coniferous forests with a high number of large (> 24” dbh) snags and down logs. Habitat is generally within ½ mile of dense riparian corridors used as travelways and has an interspersion of small (< 1-2 acres) openings for foraging.

The American marten was chosen as a MIS species due to its close association with late successional mixed conifer and lodgepole pine forests. Dense, multistoried, multi-species climax coniferous forests characterize preferred habitat with a high number of large snags and down wood. These areas also include close proximity to dense riparian corridors used as travelways, and an interspersion of small openings with good ground cover used for foraging. They also require forested travel corridors for maintaining links among individuals and populations (Witmer 1998). Martens particularly prefer forests with complex physical structure near the ground (Ruggiero et. al. 1994) that provides thermoneutral resting sites and access to subnivian prey (Chapin, 1997). Diets include shrews, deer mice, red squirrels, heather voles, northern flying squirrels, and Douglas Squirrels (Witmer et al. 1998). Large openings are avoided due to their susceptibility to predators and the lack of forest structure for maintenance of prey species.

Optimal habitat includes a home range of 1900 acres which includes mature stands that are >120 acres, >70% canopy closure, >3 snags per acre in resting/denning and foraging habitat, >9 live tree snag replacements, and >20 down logs per acre. Travel corridors should provide 60-80% canopy closure and >300 feet within mature stands or >600 feet when there are adjacent openings.

Existing Condition: There are no known marten sightings within the proposed project area. The nearest sightings of pine marten are located approximately 3 miles west of the project area within the Yamsey Semi-primitive Non-motorized Recreation Area discovered during winter track surveys. There are no specific standards and guides related to the marten or its habitat. There is a requirement to provide sufficient habitat quality, quantity, and diversity to maintain self-sustaining populations across the Forest. General reconnaissance following the Toolbox and Silver Fires resulted in no pine marten sightings. No formal surveys were conducted for this project. Marginal habitat does exist within the Toolbox and Silver Fires on Federal lands.

American Marten – Environmental Consequences

Direct and Indirect Effects

Alternative A (No Action)
It is anticipated that within the interior of the fire in large patches of high vegetation mortality, pine marten use is not expected due to the entire loss of LOS character and because pine marten tend to avoid very large openings. Pine marten use may continue on the edges between areas of high vegetation mortality and low to moderate vegetation mortality, and foraging opportunities may become optimal on these edges when down wood becomes abundant in 20-30 years. Research has shown they are unlikely to be present in burned areas for 20 or more years post-fire (Strickland and Douglas 1987). Large numbers of jackstraw down wood will provide for the complex physical structure near the ground needed for nesting sites and access to subnivian prey. Although habitat quality may increase, other factors may preclude the future use of this habitat by pine martens including the lack of connectivity for travel corridors most notably within the area of the fire. No proposed planting will result in a delayed advancement of future pine marten habitat. Pine marten use is expected to continue at current levels.

Alternative C, D, E, G, and H
Salvage harvest will not affect marten habitat in the short-term because burned over areas are not likely to be used by marten before forest cover is re-established. In the long-term, salvage activities proposed under these alternatives may reduce the likelihood of pine marten use within the planning area due to decreased future down wood levels. The effects would be the greatest with Alternative C that proposes the greatest amount of salvage and the least with Alternative D that proposes the least amount of salvage. Alternative C proposes 14,441 acres of salvage, Alternative G proposes 14,419 acres of salvage, Alternative H proposes 13,031 acres of salvage, Alternative E proposes 11,490 acres of salvage, and Alternative D proposes 6,367 acres of salvage. Units proposed for fuels treatment will likely diminish pine marten habitat due to the loss of all non-commercial down wood that would provide the complex structure needed for nesting sites and access to subnivian prey. This would have the greatest effect where fuels treatment is proposed along the edges of high vegetation mortality areas and low to moderate vegetation mortality areas. However, reducing fuel loadings should sustain the existing habitat that remains within the fire and protect future habitat from experiencing a large stand replacement fire and 10-30% of the slash piles will be retained for pine marten habitat. The effects of fuels treatment would be the greatest with Alternative G that proposes the greatest amount of fuels treatment and the least with Alternative D that proposes the least amount of fuels treatment. Alternative G proposes 16,950 acres of fuels treatment, Alternative C proposes 10,244 acres of fuels treatment, Alternative H proposes 9,070 acres of fuels treatment, Alternative E proposes 6,723 acres of fuels treatment, and Alternative D proposes 5,680 acres of fuels treatment.

It is anticipated that within the interior of large patches where the vegetation mortality was very high, pine marten use is not expected due to the entire loss of LOS character and because pine marten tend to avoid very large openings. Pine marten use may continue along the edges of lightly burned and severely burned stands. Foraging opportunities may increase within riparian corridors where salvage is not proposed. Although foraging quality may slightly increase within the riparian corridors, other factors may preclude the future use of this habitat by pine martens including the lack of connectivity for travel corridors most notably within the area of the fire.

Planting is expected to accelerate development of future pine marten at a much quicker rate than natural regeneration under alternative A. The advantages of planting will be the greatest with alternative C that proposes the greatest amount of planting, and the least with alternative H that proposes the least amount. Alternative C proposes 20,906 acres of planting, Alternative E proposes 20,753 acres of planting, Alternative D proposes 20,743 acres of planting, Alternative G proposes 20,728 acres of planting, and Alternative H proposes 20,721 acres of planting.

Although pine marten habitat will remain stable under all alternatives, populations have the greatest potential to increase with the alternatives that provide for the greatest amount of down wood habitat for denning and nesting. This is directly related to salvage and therefore, Alternative D has the greatest potential for pine marten populations to increase followed by Alternative E, H, C, and G respectively.

Table 34: Mitigation measure that apply to pine marten

Mitigation Measure	Alternatives
Where hand piling is the prescribed fuel treatment method, leave 10-30% of the piles unburned and	C,D,E,G,H

distributed throughout the units where visual quality objectives can be met.	

Cumulative Effects of Common to All Alternatives
All of the activities in Appendix A have been considered for their cumulative effects on pine marten and the following activities have the potential to produce a cumulative effect. Past management activities have likely decreased the potential habitat available for pine marten within the project area. Past timber harvest activities, as described in Table A-2 and A-13 of Appendix A, have changed overall stand conditions on federal and private lands. These activities have removed large diameter trees, snags and down wood, reduced patch sizes and connectivity, and diminished the amount of high quality LOS interior habitat and overstory canopy cover all required for pine marten habitat. Fire suppression, as described in Table A-1 of Appendix A, have changed stand conditions providing more dense understories and have converted many stands previously dominated by open large diameter pine, to stands now characterized as multi-storied stands with white fire and pine in the understory. Recreation activities, as described in Table A-5 of Appendix 2, and grazing, as described in Table A-8 of Appendix A, likely have had little affect on pine marten. Snag and down wood loss through personal use firewood cutting, as described in Table A-12 of Appendix A, and through past timber management activities including salvage and hazard removal, as described in Table A-2 of Appendix A, and through salvage harvest on several acres of private land as described in Table A-13 of Appendix A have decreased snag and down wood levels. This has likely decreased overall denning and foraging habitat for pine marten.

Reasonably foreseeable future activities include treatments within the Bridge Creek Subshed and treatments displayed in Table A-16 of Appendix A within the project area subsheds. Silvicultural activities include restoration thinning and harvest that will promote open understory sustainable ponderosa pine stands. These activities in conjunction with prescribed fire are expected to increase habitat for pine marten by creating more contiguous future LOS. Cumulatively, it is expected that pine marten populations would return to historical levels in the long-term (150-200 years) as down wood and snag levels increase and continuous mixed conifer LOS habitat develops across the landscape.

E. Red-naped Sapsuckers

Red-naped Sapsuckers - Existing condition

Ecology: Red-naped sapsuckers are closely associated with aspen and deciduous riparian or forested stands. Sapsucker species require older trees with heart rot for nesting as well as adjacent conifers or mountain mahogany for sapwell feeding. Habitat recommendations include >10% cover of aspen saplings in the understory to provide adequate representation of younger seral stages for replacement, >14 trees and >4 snags per 1.5 acres that are >39 feet in height and 10 inches DBH, and a mean canopy closure of 40-80% (Altman and Holmes 2000).

The conservation issues identified in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are (Altman 2000):
1. Lack of recruitment of aspen due to livestock grazing and fire suppression.
2. Reduced presence of large aspen trees and snags due to limited replacement.
3. The encroachment of conifer trees in aspen stands.

Red-naped sapsuckers are primary excavators, providing cavities for many other bird species (Neel 1999). Breeding Bird Survey trend analysis has reported a 13% decline for red-naped sapsuckers in the Basin and Range Province between 1966 and 1996 (Neel 1999). Other species that benefit from large aspen trees and snags are the house wren, mountain bluebird, Williamson's sapsucker, tree swallow, and northern flicker.

Aspen stands provide ecological as well as aesthetic diversity to the landscape, forage and cover for ungulates, nesting, feeding and migratory habitat for a variety of avian species, and habitat for a wide variety of small mammals. Generally, aspen stands are declining throughout the western U.S. and may be currently at only 5% of pre-settlement occurrence (Wall et al. 1999).

Existing Condition: There are no specific standards and guides related to the red-naped sapsucker or its habitat. There is a requirement to provide sufficient habitat quality, quantity, and diversity to maintain self-sustaining populations across the

Forest. Sapsucker surveys have not been conducted within the project area. Aspen stands experienced a variation in burning from partially burned stands resulting in a mix of live and dead aspen, to stand replacement burns.

No specific red-naped sapsucker surveys were conducted for this project. Neotropical point count surveys were conducted on the Silver Lake Ranger District at designated locations from 1994-2001. Four of the locations are within the project area located at Bottle Springs, Graham Creek, Guyer Creek, and West Fork Silver Creek. Red-naped sapsuckers were only detected at Graham Creek and West Fork Silver Creek. Below is the total number of detections of red-naped sapsuckers at Graham Creek and West Fork Silver Creek from 1994-2001:

Table 35: Total number of detections of red-naped sapsuckers at Graham Creek and West Fork Silver Creek from 1994-2001:

	1994	1995	1996	1997	1998	1999	2000	2001
Graham Creek	2	0	0	0	1	0	0	1
West Fork Silver Creek	0	0	0	0	0	1	0	1

Red-naped Sapsuckers – Environmental Consequences

Direct and Indirect Effects

Effects Common to All Alternatives
It is expected that aspen would respond positively to the effects of the fire with an increase in regeneration. Distribution of livestock is expected to improve as new foraging areas are created due to fire-created open and favorable conditions. This would relieve grazing pressure on riparian areas and other areas of concern. Aspen stands that experienced stand replacement fire, may experience browsing from livestock and big game.

Alternative A (no action) and E
There will be no affect on mature aspen that provides for current red-naped sapsucker habitat. With little to no affect on aspen in these alternatives, it expected there would be no effects on existing red-naped sapsuckers within the project area.

Alternative E
There will be no affect on mature aspen that provides for current red-naped sapsucker habitat. With little to no affect on aspen in these alternatives, it expected there would be no effects on existing red-naped sapsucker habitat or populations within the project area. Any harvest or activity during the breeding season may have a direct effect on nesting. With little to no affect on aspen in these alternatives, it expected there would be no effects on existing red-naped sapsucker habitat or populations within the project area.

Alternative C, D, G, H
There will be no affect on mature aspen that provides for current red-naped sapsucker habitat. 690 acres of aspen treatments designed to protect aspen regeneration are incorporated into Alternatives C, D, G, and H. These treatments would be designed to protect aspen from browsing by felling live and dead conifers and junipers within the stand to deter livestock and big game. This will help to mitigate the effects of grazing on young regenerating aspen and to protect future red-naped sapsucker habitat. With little to no affect on mature aspen in these alternatives, it expected there would be no effects on existing red-naped sapsuckers within the project area. Any harvest or activity during the breeding season may have a direct effect on nesting.

Table 36: Mitigation measure that applies to red-naped sapsuckers and aspen

To the extent possible, no planting will occur within 50-150 feet of deciduous vegetation.	C,D,E,G,H

Cumulative Effects Common to All Alternatives
All of the activities in Appendix A have been considered for their cumulative effects on red-naped sapsuckers and aspen, and the following activities have the potential to produce a cumulative effect. Within the project area, aspen has gradually been replaced by conifers over time as a result of the change in forest structure to dense conifer stands from fire suppression and timber management. Past timber harvest activities, as described in Table A-2 and A-13 of Appendix A, and fire suppression, as described in Table A-1 of Appendix A, have changed overall stand conditions on federal and private lands

providing more dense understories, and have converted many aspen stands previously dominated by mature aspen with scattered large ponderosa pine, to stands now characterized as multi-storied stands with juniper, white fir, and ponderosa pine in the understory. Aspen stands historically were fire dependent systems that relied on fire for periodic thinning and regeneration. Grazing, as displayed in Table A-8 of Appendix A, has likely reduced aspen regeneration, especially in allotments that receive late season grazing. The aspen enhancement treatments, as displayed in Table A-9 of Appendix A, have likely improved the long-term health of the aspen that has been treated.

Reasonably foreseeable future activities include treatments within the Bridge Creek Subshed and treatments displayed in Table A-16 of Appendix A within the project area subsheds. Silvicultural activities include restoration thinning and harvest within aspen stands to promote aspen dominated stands. These activities in conjunction with prescribed fire are expected to improve aspen health and regeneration thereby increasing red-naped sapsucker habitat. Projects designed to thin encroaching conifers within aspen will open up stands and allow for expansion and growth, prescribed fire will stimulate regeneration, and improved riparian conditions will eventually improve water tables. Grazing, as displayed in Table A-17 of Appendix A, may some effect on aspen regeneration post fire. Total AUM's are being reduced from traditional levels due to the fire in the allotments that burned with high severity, and these allotments will not experience late season grazing when there tends to be heavy browsing on aspen. Large scale prescribed burning in the Bridge Creek Subshed is also likely to improve the distribution of cattle and big game with increased foraging opportunities. Cumulatively, it is expected that red-naped sapsucker populations will increase in the long-term as aspen is protected and treated in the future.

F. Snag and Down Wood Dependent Species

Snag and Down Wood Dependent Species including Black-backed Woodpeckers and Lewis' Woodpeckers - Existing Condition

Ecology of Snag Dependent Species: LRMP standard and guidelines as amended by the Regional Foresters Amendment #2, require that "all sale activities (including regeneration, select cutting, thinning, or salvage) will maintain snag and green tree replacement/roost trees ≥15 inches dbh at 100% population potential levels of primary cavity excavators, and this should be determined using the best available data on species requirements as applied through current snag models or other documented procedures." The best available science at the time determined this to be 4 snags per acre; 3 snags >15 inches dbh (>20 inches dbh preferred) and 1 snag >10 inches dbh (12 inches dbh preferred). Down wood requirements are to manage for 80 lineal feet of down wood in ponderosa pine communities, and 120 lineal feet of down wood in mixed conifer communities. In keeping with the direction to use the best available information on species requirements, the data available in DecAID, or "the decayed wood advisor for managing snags, partially dead trees, and down wood for biodiversity in Washington and Oregon" (Mellen et al. 2003) was used as the primary tool for snag and down wood recommendations for this project.

As stated in Johnson and O'Neil, several major lessons have been learned in the period 1979-1999 that have tested critical assumptions of earlier management advisory models (2001), including some of the assumptions used to develop the current recommendations in the LRMP standard and guidelines as amended by the Regional Foresters Amendment #2. Some assumptions include:

- calculations of numbers of snags required by woodpeckers is based on assessing their "biological (population) potential" is a flawed technique (Johnson and O'Neil 2001). Empirical studies are suggesting that snag numbers in areas used and selected by some wildlife species are far higher that those calculated by this technique (Johnson and O'Neil 2001).
- numbers and sizes (dbh) of snags used and selected by secondary cavity nesters often exceed those of primary excavators (Johnson and O'Neil 2001).

This suggests the current direction of managing for 100% population potential levels of primary excavators may not represent the most meaningful measure of managing for cavity-nesters and that these snag levels under certain conditions may not be adequate for some species. In addition, the current direction provides recommendations for green stand conditions only when studies show that cavity-nesting birds require higher densities of snags in post-fire condition versus green stand conditions for nesting and productivity. This is likely due to the fact that in post-fire conditions, cavity-nesting birds require more snags for foraging, cover, and protection from predators.

The use of DecAID is a culmination of the most recent science and data available. As stated by Johnson and O'Neil, DecAID is based on a thorough review of the literature, available research and inventory data, and expert judgment (2001). These recommendations will be compared to the current LRMP standard and guidelines, as Amended by the Regional Forester's Amendment #2, for this project.

Primary excavators, such as woodpeckers and nuthatches, are forest dwelling birds that are specialized for foraging on and nesting in decaying wood. They require trees with rotted heartwood for excavating nest holes and for a foraging substrate (Jackman 1974). This foraging substrate consists of insects such as bark and wood boring beetles on the surface of trees. Their impact is sometimes great enough to prevent insect outbreaks (Jackman 1974). The most significant role primary excavators play in the forest community is the provision of nest holes for small mammals or for cavity nesting birds that do not excavate their own holes (Jackman 1974). Approximately 31% of the total bird fauna use snags for nesting and denning, foraging, roosting, communicating, and as hunting and resting perches (Raphael and White 1984). Rose et. al. identifies 96 wildlife species associated with snags and 86 species associated with down wood (2001). Most snag using wildlife species are associated with snags >14.2" dbh with about a third of these using snags >29.1" dbh.

Morrison and Raphael found that snags created by fire decayed rapidly and fell quicker than those on unburned forests, and that larger snags had greater longevity than smaller snags (1993). Bull found that the average rate of fall of ponderosa pine snags 10-20" dbh was 23% and of snags >20" dbh was 3% (1980). Raphael and White estimated that 4.2 suitable soft snags per acre were required to support maximum burned densities on burned forests, and that taking into account fall rates, 4 hard snags were required to produce one soft snag (1984). To achieve a density of 4.2 soft snags per acre at year 15, if only hard snags were marked, would require 16-17.2 snags per acre depending on forest type to support maximum bird densities limited by territorial behavior. This closely agrees with Saab and Dudley who found that seven species of cavity nesters using burned stands just 2-4 years after a wildfire selected nest sites with more than 20 snags per acre where snags were distributed in clumps (1997). Another finding of Raphael and White (1984) and Saab (1997) was that birds preferred to nest in patches of snags. Their foraging studies suggested that closely spaced large trees allowed maximum energy intake, partly by reducing inter-tree flight time. They recommended snags be managed as dispersed clumps rather than as isolated individuals to meet both nesting and feeding requirements.

Several authors suggest that the presence of unlogged, severely burned forests in forested landscapes, may be critical for maintaining populations of certain cavity-nesting birds (Hutto 1995, Caton 1996, Saab and Dudley 1998). Many cavity-nesting birds exhibit marked increases in abundance after the occurrence of stand-replacement fires (Blackford 1955, Koplin 1969, Taylor and Barmore 1980, Harris 1982, Raphael and White 1984, Hutto 1995, Caton 1996, Hitchcox 1996, Hoffman 1997, Murphy and Lehnhausen 1988, Saab and Dudley 1998). The most dramatic increases are for species that are timber drillers and aerial foragers. Cavity-nesters likely respond positively to stand-replacement burns for a number of reasons. Bark beetles (Amman and Ryan 1991) and wood-boring beetles (Zhang et al. 1993, Hart 1998) often colonize fire-killed or injured trees in high densities. Subsequently, this is followed by an increase in the abundance of *Picoides* woodpeckers, which are strongly associated with dying or recently killed trees. Bark- and wood-boring insects form the prey base for certain woodpeckers. Indeed, the appearance of *Picoides* woodpeckers in stand-replacement burns typically coincides with the emergence of adult wood-borers (Harris 1982, Hoffman 1997, Murphy and Lehnhausen 1998). Also, stand-replacement fires create large expanses of standing dead trees in an open setting which is important for secondary cavity-nesters that are aerial foragers (Taylor and Barmore 1980, Hutto 1995, Sallabanks 1995, Johnson and Wauer 1996). Finally, stand-replacement fires provide a multitude of potential nesting sites as snags soften with decay introduced by the multitude of insects (Raphael and White 1984, Hughes 2000). Although temporary, stand-replacement fires create a rich and concentrated foraging resource in areas where nest site potential also increases. It is thought that many cavity-nesting species are dependent upon both the spatial and temporal occurrence of severe burns to maintain their populations (Hutto 1995, Caton 1996, Hoffman 1997, Machmer 2000).

As indicated in DecAID, the work of Saab and Dudley (1998) and Saab et al. (2002) should be consulted when planning management activities in post-fire habitats (Mellen et al. 2003). This research recommends that managing for a range of post-fire habitat conditions, characteristic of black-backed and Lewis' woodpeckers, would likely incorporate habitat features necessary for nest occurrence of other cavity-nesting birds (Saab et al. 2002). In addition, habitat should be managed at multiple spatial scales to incorporate the continuum of habitat used by black-backed and Lewis's woodpeckers (Johnson, et al. 2000, Saab et al. 2002). This suggests that developing salvage logging prescriptions that maintain habitat characteristics for both black-backed and Lewis' woodpeckers, while considering both the microhabitat and landscape scale, would likely retain habitat for the entire assemblage of cavity-nesting birds.

Ecology of Black-backed Woodpeckers: Numerous authors have associated black-backed woodpeckers with disturbances that provide for a large number of dead and dying trees such as fire or insect outbreaks (Bock and Bock, 1974; Marshall 1992; Raphael and White 1984). Black-backed woodpeckers are associated with mature and overmature forested stands that have a high incidence of disease, decay, and mortality (Goggans et al. 1988). They are an irruptive species, meaning they respond to local, temporary, abundance of food as a result of wind, fire, or insect-killed timber that support bark beetles in above normal numbers (Marshall 1992). Black-backed woodpeckers are often dependent upon stand-replacement wildfires occurring on the landscape, despite the fact that their use of a recently burned forest may be short-term (1-4 years) (Sallabanks and Mclver 1998). Although fires are an ephemeral source of habitat for black-backed woodpeckers, nesting success and productivity is higher in burned areas and therefore are critical for their long-term persistence.

Black-backed woodpeckers forage on trees that generally have been dead for less then three years by "scaling" or prying off layers of bark to get at the insects. Goggans et al. (1988) has suggested that a reproductive pair of black-backed woodpeckers require a minimum of 956 acres of continuous or interconnected pine in a mature to overmature condition. They excavate a new cavity for nesting each year and it can often be identified by bark that has been peeled from the entrance hole (Marshall 1992). Little use of downed material has been observed, although Goggans, et al. (1987) observed that black-backed woodpeckers used logs four percent of the time in central Oregon. It is assumed that these logs had retained at least some bark. This is a relatively rare species because of the removal of mature and insect-infested timber from otherwise suitable habitat and from the conversion of mature and old growth forests to young fast growing stands that are relatively free of heartrot and bark beetles (Marshall 1992).

Black-backed woodpeckers have consistently selected unlogged conditions of high snag densities for both nesting and foraging habitat in burned forests (Caton 1996, Hitchcox 1996, Hoffman 1997, Hutto 1995, Kreisel and Stein 1999, Saab et al. 2002). High snag densities most likely provide greater foraging opportunities for black-backed woodpeckers, which feed primarily on bark and wood-boring beetles (Dixon and Saab 1998). In a burned ponderosa pine forest of western Idaho, the highest probability of nest occurrence for black-backed woodpeckers was found in Douglas-fir cover types with pre-fire crown closures of >70% and where stand size averaged 30-50 hectares or 74-124 acres (Saab et al. 2002). Additionally, black-backed woodpeckers selected landscapes where large stands of Douglas-fir/high crown closure occurred in closer proximity than at random points within the surrounding landscapes.

Figure 1: Example of black-backed woodpecker habitat within the project area

Ecology of Lewis' Woodpeckers: A common characteristic of Lewis' woodpecker habitat is openness due to their foraging method of aerial insect feeding and in some instances, brushy undergrowth is necessary to support insect populations (Sousa 1983). Burned old ponderosa pine forests created by stand replacement fires are highly productive source habitats compared to unburned ponderosa pine forests (Tobalski 1997). Lewis' woodpeckers also require large snags in an advanced state of decay or trees with soft sapwood for ease of cavity excavation (Bock 1970, Rapheal and White 1984, Saab and Dudley 1995).

The biological objectives for habitat recommended in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are where ecologically and socially appropriate, through natural events or management, maintain >1% of the landscape as post-fire old ponderosa pine forest habitat or >50% of a post-fire landscape unsalvaged (Altman 2000). Where salvage logging is occurring in post-fire old ponderosa pine forests, maintain or provide in burns >100 acres, >50% of the standing and down wood, in all burns retain all snags >20 inches and >50% of those 12-20 inches dbh, and snags should be clumped rather than evenly spaced with both hard and soft decay classes to lengthen the period that stands are suitable nesting habitat (Altman 2000). Where ecologically appropriate, initiate actions in old forest habitat to maintain or provide approximately 24 snags/acre >9 inches dbh of which 6 should be >20 inches, provide recruitment snags particularly in areas with high risk of stand-replacement fires, and provide shrub understory with >13% cover (Altman 2000).

Some of the conservation issues identified in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are (Altman 2000):
1. Fire suppression policies that have reduced the extent of this habitat condition across the landscape.
2. Salvage logging of burned ponderosa pine forests.
3. Extensive high-grade harvest of individual old ponderosa pine trees before decay and snag formation occur.

The Lewis' woodpecker is listed by the US Fish and Wildlife Service as a bird of conservation concern, meaning that without additional conservation actions, it is likely to become a candidate for listing under the Endangered Species Act of 1973 (2002).

Lewis's woodpeckers were most abundant in partially logged burned forests and relatively rare in unlogged units of western Idaho (Saab and Dudley 1998). This species favors open woodlands, especially burned pine forests (Tonasket 1997, Saab and Vierling 2001). Lewis's woodpeckers are primarily aerial flycatchers during the breeding season (Saab and Vierling 2001) and post-fire conditions likely provide source habitats for Lewis's Woodpeckers because of increases in shrubby understories and associated arthropods, open canopies, and snags for nesting (Saab and Veiling 2001). In western Idaho, ponderosa pine/Douglas-fir cover type with moderate pre-fire crown closure (40-70%) was the best landscape predictor of nest occurrence for Lewis's woodpecker (Saab et al. 2002). Stands were smaller (0 = 6.63 hectares $\pm$ 0.16 or 16-17 acres) and in closer proximity than those stands surrounding random locations (Saab et al. 2002).

Figure 2: Example of Lewis' woodpecker habitat within the project area

Ecology of Down Wood Dependent Species: Dead wood is also a fundamental feature of healthy forests. Logs contribute to the hydrology of a site and provide microhabitats that protect wood-dwelling organisms with moist, thermally stable, predator protected niches in which to live (Torgersen unpub.). Logs can be considered either places in which animals like the pine marten forage, or places in which animals like fawns or black bear use for hiding cover and protection. Down wood provides physically complex structures where animals find stable temperatures and moisture for denning, nesting, feeding, and food storage (Torgersen unpub.).

Snag Retention Strategy Within Harvest Units: The data in DecAID was used extensively to design snag retention guidelines for this project. DecAID is an advisory tool to help managers evaluate the effects of forest conditions and existing or proposed management activities on wildlife that use snags and down wood (Mellen et al. 2003). DecAID also can help managers decide on snag and down wood sizes and levels needed to help meet wildlife management objectives for a particular project or area (Mellen et al. 2002). DecAID is a summary, synthesis, and integration of published scientific literature, research data, wildlife databases, forest inventory databases, and expert judgment and experience (Mellen et al. 2003). DecAID presents information on wildlife use of snag diameter, snag density, down wood diameter, and down wood percent cover, and on the range of "natural conditions" (unharvested) and current (all) conditions of snag density and down wood percent cover by diameter classes, and it is mostly is a statistical summary of published research data on wildlife and forest inventory data (Mellen et al. 2003).

The following is a definition of the terminology and the three sources of data provided in DecAID that were used to develop recommendations for this project (*Throughout this document the three sources of data,* wildlife data, inventory data, and distribution data*, will appear in bold to allow for the reader to return to the descriptions below for definitions of what the data means and how is can be applied):*

1. Tolerance Level

The information in DecAID is presented at three statistical tolerance levels that may be interpreted as three levels of "assurance:" 30% tolerance level, 50% tolerance level, and 80% tolerance level (Mellen et al. 2002). For example, if a 30% tolerance level of snag dbh used by wildlife species in a specific vegetation condition is, say, 20 inches dbh, this means that 30% of all individuals of the wildlife populations used less than or equal to that size snag (Mellen et al. 2003). An 80% tolerance level would correspond to 80% of the individuals using that corresponding size snag (Mellen et al. 2003). A 100% tolerance level means all of the individuals would use that size snag (100% tolerance intervals correspond to the maximum observed values, such as the largest dbh snag observed to be used by a wildlife species) (Mellen et al.

2003).

2. Down Wood Percent Cover
Down wood percent cover is the total percent of any given area that is covered by down wood. Down wood measured include all down wood that is 5 inches dbh on the small end, at least 10 feet long, and includes down wood in all decay classes. For DecAID, this method of measure was used because it best describes the abundance of down wood as it relates to wildlife use (Carey 1995), percent cover was the most common measure used in studies showing wildlife selection of areas with higher amounts of down wood, and percent cover is one of the most precise and efficient means of recording down wood. As an example, 1.1% down wood cover on an acre would equal one 30 inch dbh ponderosa pine tree, two 20 inch dbh ponderosa pine trees, two 15 inch dbh ponderosa pine trees, and eight 10 inch dbh ponderosa pine trees.

3. Wildlife Data
For the **wildlife data** provided in DecAID, "tolerance level" means that either 30%, 50%, or 80% of the population were found under certain conditions such as snag density, diameter, or down wood percent cover at a nest site. For example, a post-fire research study in Idaho which provided a sample size of 35 black-backed woodpeckers nests, discovered that 30% of the nest sites had 62.2 snags/acre $\geq$10 in. dbh, 50% of the nest sites had 88.3 snags/acre $\geq$10 in. dbh, and 80% of the nest sites had 126.1 snags/acre $\geq$ 10 in. dbh (Mellen et al. 2003). It is important to consider that the wildlife data provided in DecAID for post-fire habitats is from one wildlife study located in Idaho. The vegetative conditions and the habitat selected by cavity-nesters may be different in this project area.

4. Inventory Data
For the **inventory data** provided in DecAID, the sample is the set of inventory plots and the population from which those plots are taken from is the total landscape represented by the sample of plots (Mellen et al. 2003). Forest inventory plots include: the Current Vegetation Survey (CVS), conducted by USDA Forest Service, Pacific Northwest Region, on National Forest lands; the Forest Inventory and Analysis (FIA), conducted by USDA Forest Service, Pacific Northwest Research Station, on nonfederal lands; and the Natural Resource Inventory (NRI), conducted by USDI Bureau of Land Management (BLM) on BLM lands in western Oregon (Mellen et al. 2003). The inventory data is summarized by data for unharvested inventory plots only, and by data for all the plots under current conditions including those that have been harvested. Furthermore, the data is summarized by data that contained, for example, measurable snags, and by data for all plots including the plots that contained measurable snags and the plots that did not contain measurable snags.

The inventory tolerance levels describe sizes and amounts of dead wood at the population level or the total landscape, not just for the inventory plot sample (Mellen et al 2002). In other words, the tolerance levels describe dead wood conditions across the total area within the vegetation condition (Mellen et al. 2003). It is important to consider that the estimates represent average conditions within a vegetation condition at the regional level, rather than conditions around specific nest sites (Mellen et al. 2003). Therefore, it is important to consider vegetation conditions that are present in your local project area. A map of harvested and unharvested plot locations can be found on the following website: http://wwwnotes.fs.fed.us:81/pnw/DecAID/DecAID.nsf.

The **inventory data** tolerance levels describe proportions of the area within a given vegetation condition that have specific sizes or amounts of dead wood (Mellen et al. 2003). The 50% tolerance level more closely represents the median value (the middle value in a distribution above and below which lie an equal number of values), than the mean (average) (Mellen et al. 2003). For example at the 80% tolerance level, 80% of the plots in the *Ponderosa Pine/Douglas-fir Forest, Larger Trees Vegetation Condition that are unharvested and contain measurable snags* have $\leq$13.3 snags/acre; 20% of the plots have >13.2 snags/acre.

It is very important to recognize that the unharvested inventory data is represented as vegetation conditions from plots measured at a single point in time and the current conditions express events that have occurred over the past decades to centuries (Mellen et al.2002). Johnson and O'Neil recommend that caution must be exercised in using this regional plot data or **inventory data** to describe the estimated historical range of conditions in dead wood because it is a sample of only current conditions and lack data on site history (2001). Even if the plots in a "natural" forest could be identified, snags and down wood have been altered to an unknown degree by fire suppression and other human influences (Johnson and O'Neil 2001). On the eastside in particular, current levels of snags and down wood may be elevated above historical conditions due to fire suppression and increased mortality, and may be depleted below historical levels in local areas burned by intense fire or subjected to repeated salvage and firewood cutting (Johnson and O'Neil 2001).

5. Distribution Data
DecAID also provides inventory **distribution data** on the percent of the plot-sized areas of a given vegetation condition that have various amounts of dead wood, density of snags, or percent cover of down wood (Mellen et al. 2003). The density of snags, down wood, or percent cover of down wood corresponds to a percent of the area (Mellen et al. 2003).

How the data in DecAID was applied to this project
The Toolbox and Silver Fires are extremely variable ranging from a low-intensity underburn to a high-intensity stand replacement burn. Vegetation mortality mapping was conducted using aerial photos followed up by some ground verification. Vegetation mortality was mapped by four categories: 0-25%, 25-50%, 50-85%, and >85% and is largely characteristic of the overstory vegetation because of the limitations involved in using aerial photos.

As per discussion with the District Silviculturist, the areas mapped as <50% mortality are considered to be stands that are generally considered to be intact functional forests that include a mosaic of unburned or lightly burned patches that are likely within or possibly still above the historic range for stocking levels, interspersed with small patches of localized mortality greater than a few acres in size. The areas mapped as >50% mortality are considered to be areas in which the fire was predominately stand replacement and therefore are well below the historic range for stocking levels. Studies show that cavity-nesting birds require higher densities of snags in post-fire conditions versus green conditions for nesting. This is likely due to the fact that in post-fire conditions, cavity-nesting birds require more snags for foraging, cover, and protection from predators. Therefore, different snag retention prescriptions were developed for areas <50% mortality (green stand conditions) versus areas of >50% mortality (post-fire conditions).

1. Snag Retention in Areas Mapped as <50% mortality:
For the areas mapped as <50% mortality, the **unharvested inventory data** provided in DecAID was utilized to develop prescriptions that mimic the landscape distribution and quantity of snags in "natural conditions" for the *Ponderosa Pine/Douglas-fir Forest, Larger Trees Vegetation Condition* (Mellen et al. 2003). It is assumed that the unharvested inventory data provides the best picture available of "natural conditions." However, it is recognized that the unharvested inventory data is represented as vegetation conditions from plots measured at a single point in time and the current conditions express events that have occurred over the past decades to centuries (Mellen et al.2002). Therefore, snag levels do not provide true estimated historical conditions, but this is the best data available to attempt at discovering an appropriate level and distribution of snags across a landscape in green stand conditions or <50% mortality areas. **Inventory data and distribution data** for the *Ponderosa Pine/Douglas-fir Forest, Larger Trees Vegetation Condition* (Mellen et al. 2003) were used to develop snag retention guidelines within harvest units that are <50% mortality.

The Toolbox and Silver Fires are primarily dry ponderosa pine communities. The average rainfall is low and the overall productivity of the area is low. The low elevation sites are adjacent to the desert fringe and are often mixed with juniper, open sagebrush flats, and mountain mahogany vegetation types. Overall, these sites have very low productivity and historically averaged 5-20 large trees per acre. These areas can be classified as either:

1. <5000' elevation
2. 5000-5500' elevation and Hopkins ecoclass CP-S2-11 - Ponderosa Pine/bitterbrush/fescue communities (1979)

The higher elevation ponderosa pine communities become more productive and generally receive more moisture. These sites historically averaged of 15-25 large trees per acre. These areas can be classified as either:

1. >5500' elevation
2. 5000-5500' elevation and *not* Hopkins ecoclass CP-S2-11 - Ponderosa Pine/bitterbrush/fescue communities (1979)

As stated in DecAID, it is important to consider that the estimates of snag densities, snag diameters and down wood percent cover represent average conditions within a vegetation condition at the regional level, rather than conditions around specific nest sites (Mellen et al. 2003). The inventory plots represent a range of habitat types from low elevation ponderosa pine communities with lower snag densities and overall stocking levels, to higher elevation ponderosa pine communities with higher snag densities and overall stocking levels. **Therefore, it was determined that the 50% tolerance level was**

appropriate for the low elevation ponderosa pine/<50% mortality communities in the project area, and the 80% tolerance level was appropriate for the higher elevation ponderosa pine/<50% mortality communities in project area.

With the data available in DecAID for the *Ponderosa Pine/Douglas-fir Forest, Larger Trees Vegetation Condition* (Mellen et al. 2003), the average number of snags per acre recommended for harvest units was developed following this process:

Low elevation ponderosa pine/<50% mortality communities - Snags

1. The 50% tolerance level for *unharvested* ***inventory plots*** *that contained measurable snags* is 6.3 snags/ac >10"dbh. This is data for only those *unharvested inventory plots that contained measurable snags*.
2. Considering that 6.3 snags/acre >10" dbh is for only those plots that *contained measurable snags*, it is likely not appropriate to manage for this level across the landscape because not all plots contained measurable snags. This is consistent with Johnson and O'Neil's prediction that clumping of snags may be a natural pattern in the ponderosa pine communities (2001). Therefore, the **distribution data** was used as a guide to determine how snags were distributed under "natural condition" and to determine what approximate percentage of the landscape provide measurable snags and what approximate percent of the landscape did not provide measurable snags. The **distribution data** demonstrates that of *all the unharvested inventory plots*, 54% contained 0 snags and 46% had measurable snags >10" dbh.
3. Averaging 6.3 snags across the landscape with 54% of the landscape containing 0 snags and 46% of the landscape containing measurable snags, the average number of snags across the total landscape is approximately **2.9 snags/acre**.
4. The **distribution data** of snag sizes on *all unharvested inventory plots* demonstrates that 66% of snags measured are 10-19.9" dbh, 27% are 20-29.9" dbh, and 7% are >30"dbh. Therefore, if 2.9 snags are retained on the average across a landscape, 66% or 1.9 snags are 10-19.9" dbh, 27% or 0.8 snags are 20-29.9" dbh, and 7% or 0.2 snags are >30" dbh.

****In addition to the 2.9 snags per acre within harvest units, some areas <50% mortality will receive no harvest (43-81% of the project area depending upon alternative), and will provide the opportunity to provide for higher levels of snags across the landscape.**

Table 37: Average number of snags/acre within harvest units that are low elevation ponderosa pine/<50% mortality

Snag Size	**Average # snags/acre** 1. < 5000' elevation 2. 5000-5500' elevation and ecoclass CP-S2-11
10-14.9"	0.9
15-19.9"	1.0
20-29.9"	0.8
>30"	0.2
Total Snags/Acre	**2.9**

Low elevation ponderosa pine/<50% mortality communities – Percent Down Wood

1. The 50% tolerance level for *unharvested* ***inventory plots*** *that contained measurable down wood* is 1.8 down wood percent cover. This is data for only those *unharvested inventory plots that contained measurable down wood*.
2. Considering that 1.8 down wood percent cover is for only those plots that *contained measurable percent down wood*, it is likely not appropriate to manage for this level across the landscape because not all plots contained measurable down wood. This is consistent with Johnson and O'Neil's prediction that clumping of down wood may be a natural pattern in the ponderosa pine communities (2001). Therefore, the **distribution data** was used as a guide to determine how down wood were distributed under "natural conditions" and to determine what approximate percentage of the landscape provide measurable down wood and what approximate percent of the landscape did not provide measurable down wood. The

distribution data demonstrates that of *all the unharvested inventory plots*, 38% contained 0 down wood and 62% had measurable down wood.

3. Averaging 1.8 down wood percent cover across the landscape with 38% of the landscape containing 0 down wood and 62% of the landscape containing measurable down wood, the average down wood percent cover across the total landscape is approximately **1.1 down wood percent cover**.

****In addition to the 1.1 down wood percent cover within harvest units, some areas <50% mortality will receive no harvest (43-81% of the project area depending upon alternative), and will provide the opportunity to provide for a higher down wood percent cover across the landscape.**

<u>High elevation ponderosa pine/<50% mortality communities - Snags</u>

1. The 80% tolerance level for *unharvested **inventory plots** that contained measurable snags* is 13.3 snags/ac >10"dbh. This is data for only those *unharvested inventory plots that contained measurable snags*.
2. Considering that 13.3 snags/acre >10" dbh is for only those plots that *contained measurable snags*, it is likely not appropriate to manage for this level across the landscape because not all plots contained measurable snags. This is consistent with Johnson and O'Neil's prediction that clumping of snags may be a natural pattern in the ponderosa pine communities (2001). Therefore, the **distribution data** was used as a guide to determine how snags were distributed under "natural condition" and to determine what approximate percentage of the landscape provide measurable snags and what approximate percent of the landscape did not provide measurable snags. The **distribution data** demonstrates that of *all the unharvested inventory plots*, 54% contained 0 snags and 46% had measurable snags >10" dbh.
3. Averaging 13.3 snags across the landscape with 54% of the landscape containing 0 snags and 46% of the landscape containing measurable snags, the average number of snags across the total landscape is approximately **6.1 snags/acre**.
4. The **distribution data** of snag sizes on *all unharvested inventory plots* demonstrates that 66% of snags measured are 10-19.9" dbh, 27% are 20-29.9" dbh, and 7% are >30"dbh. Therefore, if 6.1 snags are retained on the average across a landscape, 66% or 4.0 snags are 10-19.9" dbh, 27% or 1.7 snags are 20-29.9" dbh, and 7% or 0.4 snags are >30" dbh.

****In addition to the 6.1 snags per acre within harvest units, some areas <50% mortality will receive no harvest (43-81% of the project area depending upon alternative), and will provide the opportunity to provide for higher levels of snags across the landscape.**

Table 38: Average number of snags/acre within harvest units that are high elevation ponderosa pine/<50% mortality

Snag Size	**Average # of snags/acre** 1. > 5500' elevation 2. 5000-5500' elevation and *not* ecoclass CP-S2-11
10-14.9"	2.0
15-19.9"	2.0
20-29.9"	1.7
>30"	0.4
Total Snags/Acre	**6.1**

<u>High elevation ponderosa pine/<50% mortality communities – Percent Down Wood</u>

1. The 80% tolerance level for *unharvested **inventory plots** that contained measurable down wood* is 4.1 down wood percent cover. This is data for only those *unharvested inventory plots that contained measurable down wood*.
2. Considering that 4.1 down wood percent cover is for only those plots that *contained measurable down wood*, it is likely not appropriate to manage for this level across the landscape because not all plots contained measurable down wood. This is consistent with Johnson and O'Neil's prediction that clumping of down wood may be a natural pattern in the ponderosa pine communities (2001). Therefore, the **distribution data** was used as a guide to determine how down wood were distributed under "natural conditions" and to determine what approximate percentage of the landscape provide measurable down wood and what approximate percent of the landscape did not provide measurable down wood. The **distribution data**

demonstrates that of *all the unharvested inventory plots*, 38% contained 0 down wood and 62% had measurable down wood.

3. Averaging 4.1 down wood percent cover across the landscape with 38% of the landscape containing 0 down wood and 62% of the landscape containing measurable down wood, the average down wood percent cover across the total landscape is approximately **2.5 down wood percent cover**.

****In addition to the 2.5 down wood percent cover within harvest units, some areas <50% mortality will receive no harvest (43-81% of the project area depending upon alternative), and will provide the opportunity to provide for a higher down wood percent cover across the landscape.**

Clumping and distribution would vary within harvest units to manage for the clump size, snag requirements, and distribution required for different cavity-dependent species. Within a 10-acre area, a *minimum* of 1 snag clump of 20 snags is required, with the exception of narrow units or portions of units (see below, project implementation). Snag clumps would range from 2 to 30 snags per clump. In areas where snags are intermixed within a green overstory, smaller clumps are encouraged to provide for a better distribution of snags across the unit. In areas of localized mortality greater than 5 acres, larger snag clumps are encouraged. Pre-fire snags would be protected to the extent possible. Groups of snags should be focused in the area around pre-fire snags where the opportunity exists. Clumps would be located as least 200 feet from any road. If snag clumps are located within 200 feet from a road to mitigate visual qualities, snags would be selectively marked to ensure they are not tall enough to fall the road.

The snag levels recommended for this project in the <50% mortality areas, are within the range estimated in research conducted by Harrod et al. (1998) and Agee (2002) and described in DecAID (Mellen et al. 2002). Harrod et al. (1998) estimated historical snags densities in ponderosa pine dominated, dry forests. They estimated that densities of snags >6 in dbh ranged from 5.9-14.1/acre in pre-European settlement landscapes. The derived their estimates by calculating growth in basal area from pre-1930 growth rates, holding forest stand structure relatively constant (i.e. as a new live is recruited another one becomes a mortality), and applying published snag fall rates (Bull 1983, Keen 1929, Raphael and Morrison 1987, Schmid et al. 1985) to calculate basal area of snags every 10 years. They assumed the historic frequent, low-intensity fires did not accelerate snag fall rates.

Agee (2002) estimated lower snag densities than Harrod et al. for the Ponderosa Pine/Douglas-fir forest series by estimating number of trees in 0.1ha clumps of 16 age classes and assuming that the oldest patch is killed by insects every 25 years. He assumed fire helped to decompose snag patches and that after 5 fires at 10-year intervals the snags would be completely consumed. His estimated historical snag density was 2/acre. Agee (2002) compares his estimates to Harrod et al. (1998) but states a different assumption about dbh of snags; Agee (2002) assumes and average snag dbh of 75 cm (30 in) when calculating biomass, while Harrod et al. (1998) estimated densities for size classes as small as 15 cm (6 in) dbh.

2. Snag Retention in Areas Mapped as >50% mortality:

For areas mapped as >50% mortality, the wildlife data in DecAID was utilized to develop snag retention guidelines within harvest units for post-fire habitats for the *Ponderosa Pine/Douglas-fir, Open Canopy Condition* (Mellen et al. 2003). The **wildlife data** was used to assure we are providing the habitat necessary for nesting habitat for cavity dependent species in post-fire conditions.

The data in DecAID indicates that:

> "the best available **wildlife data** indicate that to maintain snag densities in this vegetation condition at the 30% tolerance level in post-fire habitats, manage for a variety of snag densities across the burned area. The highest density clumps of snags, when extrapolated to a per acre basis, should average up to 61/acre ≥10 in dbh with about 2/acre of those snags ≥20 in dbh. Some snag clumps should be of lower density averaging 10/acre ≥ 10 in dbh, with about 2/acre of those snags ≥20 in dbh. The zero values in the wildlife data for larger snags are a result of variability in the data; actual nest sites for these species consist of at least the nest snag."

In summary, the wildlife data in DecAID suggests retaining a variation in snag densities ranging from 10 snags/acres ≥ 10 in dbh to 61 snags/acre ≥10 in dbh. According to the data in DecAID, 10 snags/acre ≥ 10 in dbh would be to manage for the 30% tolerance level for Lewis' woodpeckers and 61 snags/acre ≥10 in dbh would be to manage for the 30% tolerance level for black-backed woodpeckers. Black-backed woodpeckers have consistently selected unlogged conditions of high snag densities for both nesting and foraging habitat in burned forests (Caton 1996, Hitchcox 1996, Hoffman 1997, Hutto 1995, Kreisel and Stein 1999, Saab et al. 2002), and Lewis' woodpeckers were most abundant in partially logged burned

forests and relatively rare in unlogged units of western Idaho (Saab and Dudley 1998). **Because Lewis' woodpeckers were most abundant in harvested conditions and because a large part of the project area will remain unharvested (42-70% of the project area depending upon alternative), it was determined that the 30 percent tolerance level for Lewis' woodpeckers (10 snags/acre ≥ 10 in dbh) was appropriate for harvest units that are greater than 50 percent mortality.**

Table 39: Average number of snags/acre in harvest units that are >50% mortality

Snag Size	Average # snags/acre
10-14.9"	6.0
15-19.9"	2.0
20-29.9"	1.6
>30"	0.4
Total Snags/Acre	**10.0**

Clumping and distribution would vary within harvest units to manage for the clump size, snag requirements, and distribution required for different cavity-dependent species. Within a 10-acre area, a *minimum* of one snag clump is required, with the exception of narrow units or portions of units (see below, project implementation). Pre-fire snags would be protected to the extent possible. Groups of snags should be focused in the area around pre-fire snags where the opportunity exists. Snag clumps would range from 50-100 snags per clump, and clumps would be distributed every 5 to 10 acres. Clumps would be located as least 200 feet from any road. If snag clumps are located within 200 feet from a road to mitigate visual qualities, snags would be selectively marked to ensure they are not tall enough to fall the road.

Project Implementation

The level of mortality within the project area is expected to increase through time in response to both the direct effects of fire or the effects of insects. Eventual implementation and layout of units will be based on the mortality at the time of layout. Although the acreage outputs discussed in this wildlife section may change, this does not change the type of effect on cavity-nesting birds because the snag retention guidelines as described above are based on the expected biological needs of cavity-nesters under green stand conditions versus post-fire conditions. Because units include a combination of all three vegetation types (low elevation ponderosa pine/<50% mortality, high elevation ponderosa pine/<50% mortality, and >50% mortality), the percent of the unit in each type will determine the total number of snags required per unit. A snag is defined as a dead or fire damaged tree meeting the criteria described in Chapter 2 "Actions Common to All Fully Analyzed Action Alternatives" - "Commercial Salvage."

Snag clumps would be retained every 5 to 10 acres. The category of mortality would be based on the overstory mortality within a 5 to 10 acre area. This would be used to determine the total number of snags that would be needed to comprise a clump. Within a 10-acre area, a minimum of one snag clump would be required, with the exception of narrow units or narrow portions of units (see below). It is recognized that the snag diameter classes, as described in the above tables, may not be present in all snag clumps due to the variation within a stand. For example, in a pure lodgepole stand, trees greater than 15 in dbh may not be available. To account for this, snag clumps would be representative of the area for which they are retained, while retaining the largest available snags. If larger snags are not available within a snag clump, they would be made up for in other snag clumps, where possible. All snags counted as retention would be 10 inches dbh or greater. Snag clumps would not exceed 2 acres. If the needed snag numbers cannot be achieved within a 2-acre area, the numbers will be made up within another snag clump within the same harvest unit. See wildlife mitigation measures in Chapter 2 for further information on snag retention within harvest units. In some cases, snag clumps may need to be retained on the edge of a unit, or in strips, preferably near an area that is devoid of snags (i.e. scabflats or green stands without snags).

To ensure implementation of fuels treatment and reforestation, work areas for contract workers must meet Oregon OSHA standards. Workers cannot work within 1.5 tree lengths of high hazard trees. Snags retained within the project area may be considered high hazard trees at some time during implementation. This can present a logistical problems in particularity narrow portions of salvage units. Snag retention in salvage units or parts of salvage units that are less than 500 feet wide would apply a specific exception to the snag clumping strategy described above. In these narrow units, or parts of units, dead trees that are adjacent to, but outside of, the unit will "count" toward meeting snag retention within the unit or parts of the unit, if the adjacent stand is not proposed for salvage and if at least 50% of the larger than 10 inch dbh trees are dead. In

this case, snags would not be retained within the narrow portion of the unit. See wildlife mitigation measures in Chapter 2 for further information on snag retention within harvest units.

Selection of Areas for No Harvest: Black-backed woodpecker areas were identified by selecting areas that meet the habitat qualities that black-backed woodpeckers select for as discovered in the research conducted by Saab et al. (2002). Using GIS and ground verification, areas were identified that had high pre-fire crown closure and that experienced high mortality. Stands range in size between 67-287 acres. This totals approximately 1789 acres of *identified* optimal black-backed nesting habitat in 12 locations distributed across the project area. Six are located in the Silver Fire and six are located in the Toolbox Fire. Some subsheds did not provide *identified* optimal habitat. The black-backed woodpecker habitat available within the project area is not limited to these areas only. See "Existing Condition for Black-backed Woodpeckers" in this report for more information.

Lewis' woodpecker areas were also identified by selecting areas that meet the habitat qualities that Lewis' woodpeckers select for as discovered in the research conducted by Saab et al. (2002). Using GIS, stand data, and ground verification, areas were located that were low to moderate crown closure pre-fire and have high densities of large ponderosa pine. Stands range in size between 5-43 acres in size. This totals approximately 900 acres of *identified* optimal Lewis' woodpecker nesting habitat in approximately 50 different locations well distributed across the Toolbox and Silver Fires. The Lewis' woodpecker habitat available within the project area is not limited to these areas only. See "Existing Condition for Lewis' Woodpeckers" in this report for more information.

In addition, some areas were recommend for no harvest within a 500m buffer of the black-backed areas for a monitoring study that will be conducted from 2003-2007. This study will monitor the effectiveness of salvage logging prescriptions designed to maintain habitat for sensitive woodpecker species. To determine if there is a landscape influence of the salvage harvest, some areas within the 500m buffer were recommended for no harvest. Total wildlife leave areas identified for this project is 3690 acres.

Existing Condition for Snag Dependent Species

<50% Mortality:
Although formal surveys have not been conducted within the project area, it can be assumed that the areas mapped as <50% mortality are likely well above snag levels in "natural conditions" for the ponderosa pine communities found within the project area and well above LRMP standard and guidelines as amended by the Regional Forester's Amendment #2.

>50% Mortality
Although formal surveys have not been conducted within the project area, it can be assumed that the areas mapped as >50% mortality are likely well above snag levels in "natural conditions" for the ponderosa pine communities found within the project area and well above LRMP standard and guidelines as amended by the Regional Forester's Amendment #2.

The **wildlife data** in DecAID for post fire habitats provides snag densities for the 30%, 50%, and 80% tolerance levels for 7 cavity nesting species studied in Idaho. As per discussion with the District Silviculturist, with limited data available across all areas for this project, snag size classes and densities can best be determined through volume estimates that were developed using the best available data from stand exams, post fire stand exam plots, aerial photo interpretation, and past silvicultural activities information. The following data will be used to determine the approximate tolerance level for each species in each alternative.

***The approximate tolerance levels are intended to be a comparative measure between alternatives*. It is important to consider that on the Silver Lake Ranger District, the ponderosa pine communities are generally drier sites with lower stand densities. Therefore, the tolerance levels and respective snag densities may not be the same as what the species were selecting for in Idaho where the research was conducted. It is expected that cavity-nesters here locally may select for areas with lower snags densities than what was selected for in Idaho, and therefore the tolerance levels overall would be lower.**

The approximate number of trees >10 inches dbh and >20 inches dbh found in the low, moderate, high, and very high volume categories are displayed in Table 42. Using these estimates, the tolerance level for each species based upon the snag densities around nest sites as displayed in DecAID can be determined.

Table 42: Estimated snag density numbers based on volume in the >50% mortality areas:

Estimated Volume	**Approximate number of trees >10 inches dbh**	**Approximate number of trees >20 inches dbh**
Low (L)	<35	0-3
Moderate (M)	36-70	4-5
High (H)	71-99	6-10
Very High (VH)	100+	11+

Table 43: The wildlife data in DecAID demonstrates the following snags densities for 7 different cavity nesting species at the 30%, 50%, and 80% tolerance level (Mellen et al. 2003):

Species		**30% Tolerance level (#snags/acre) based on wildlife data in DecAID**		**Estimated volume that provide these snag densities**		**50% Tolerance level (#snags/acre) based on wildlife data in DecAID**		**Estimated volume that provide these snag densities**		**80% Tolerance level (#snags/acre) based on wildlife data in DecAID**		**Estimated volume that provide these snag densities**
		>10" dbh	**>20" dbh**			**>10" dbh**	**>20" dbh**			**>10" dbh**	**>20" dbh**	
Black-backed Woodpecker		62.2	0	M		88.3	0	H		126.1	0	VH
Hairy Woodpecker		12.7	0	L		41.8	0	M		85.3	0	H,VH
Lewis' Woodpecker		9.5	0	L,M		24.8	6.2	H		48.1	16.1	VH
Mountain Bluebird		6.8	0	L,M,H		29.7	12.4	VH		63.9	38.0	**
Northern Flicker		5.4	2.2	L,M,H		29.8	17.4	VH		66.4	39.6	**
Western Bluebird		9.2	0			32.1	0	L,M		66.5	0	H,VH
White-headed Woodpecker		20.0	0	L		51.4	0	M		95.5	0	H,VH

** 80% tolerance level for mountain bluebird and northern flicker cannot be achieved on this District. The ponderosa pine types on the Fremont are generally drier sites than found in Idaho, and stand densities of large trees >20" dbh do not reach these densities.

Based on the wildlife data in DecAID and the total acres of low, moderate, high, and very high volume levels in the project area, the average tolerance level for each of the cavity-nesting species can be determined.

1. The percent of the project area at each tolerance level for each species is calculated by:

$$\frac{\text{Total acres of the L, M, H, and/or VH volume that meet the snag densities for each species as displayed in Table 43}}{\text{Total Acres >50\% mortality}}$$

2. The approximate average tolerance level across the project area for each individual cavity-nesting species is calculated by:

(percent of area at 30%)(30) + (percent of area at 50%)(50) + (percent of area at 80%)(80)

Total acres >50% mortality = 14,897 acres
1. Total acres of >50% mortality and low volume (L) = 2318 acres
2. Total acres of >50% mortality and moderate volume (M) = 4336 acres
3. Total acres of >50% mortality and high volume (H) = 5724 acres
4. Total acres of >50% mortality and very high volume (VH) = 2519 acres

Table 44: Existing tolerance level for cavity nesting species within the project area*

		Percent of Total	Percent of Total	Percent of Total	Percent of Total		Approximate

		Project Area at Less than 30% Tolerance Level	Project Area at the 30% Tolerance Level	Project Area at the 50% Tolerance Level	Project Area at the 80% Tolerance Level		Average Tolerance Level Across the Project Area
Black-backed Woodpecker		16%	29%	38%	17%		41%
Hairy Woodpecker		0%	16%	29%	55%		63%
Lewis' Woodpecker		0%	45%	38%	17%		46%
Mountain Bluebird		0%	83%	17%	0%		33%
Northern Flicker		0%	83%	17%	0%		33%
Western Bluebird		0%	0%	16%	84%		75%
White-headed Woodpecker		0%	16%	29%	55%		67%

***The approximate tolerance levels are intended to be a comparative measure between alternatives*. It is important to consider that on the Silver Lake Ranger District, the ponderosa pine communities are generally drier sites with lower stand densities. Therefore, the tolerance levels and respective snag densities may not be the same as what the species were selecting for in Idaho where the research was conducted. It is expected that cavity-nesters here locally may select for areas with lower snags densities than what was selected for in Idaho, and therefore the tolerance levels overall would be lower.**

Existing Condition for Black-backed Woodpeckers

There are no specific standards and guides related to the black-backed woodpecker or its habitat. There is a requirement to provide sufficient habitat quality, quantity, and diversity to maintain self-sustaining populations across the Forest. The project area currently provides optimal foraging and nesting habitat for black-backed woodpeckers. Although specific surveys have not been conducted for black-backed woodpeckers within the planning area, several sighting have been documented during field reconnaissance.

The Toolbox and Silver Fires have created optimal habitat for black-backed woodpeckers in areas of high canopy closure pre-fire with high densities of smaller trees. Due to past harvest and the local ponderosa pine communities being dry sites with generally lower canopy closures, the average existing tolerance level for black-backed woodpeckers within the project area is approximately 41%.

On the Silver Lake Ranger District, the ponderosa pine communities are generally drier sites with lower canopy closure than found at the study site in Idaho where the wildlife data and recommendations were developed for DecAID. Therefore for this project, areas >40% pre-fire canopy closure were estimated to be suitable habitat for black-backed woodpeckers. Based on this criteria, 12 areas were located that were >40% canopy closure, with the greatest amount of >56% canopy within the area available, and that experienced heavy mortality. Although there is approximately 4147 total acres of >40% canopy closure that is also >50% mortality within the fire (see Table 46), only 1789 acres were selected as *identified* optimal habitat based on the contiguous size of area, the amount within the areas >56% canopy closure, and the amount of area >50% mortality (see Table 45). These areas make up 12 separate and well-distributed black-backed areas within the project area, six located in the Silver Fire and 6 located in the Toolbox Fire.

Table 45: Total acres of *identified* optimal black-backed woodpecker habitat by subshed

Subshed	Total Acres of Identified Optimal Black-backed Woodpecker Habitat
Benny Creek	325
East Duncan Creek	5
Lower Duncan Creek	123
Thompson Reservoir	555
Upper Duncan Creek	250
Upper Silver Creek	0
Middle Silver Creek	0

West Fork Silver Creek	531
Total Acre	1789

In addition to the *identified* optimal habitat listed above in Table 45, areas of high canopy closure, or >40% canopy closure and >50% mortality, within the project area may provide for limited black-backed woodpecker habitat within the project area. Although much of these acres do not meet the contiguous size as defined in the literature by Saab et al. (2002) (74-124 acres), they likely do provide the high densities of trees that black-backed woodpeckers select for. Within the project area, there is only 36 acres of habitat available >70% canopy closure and >50% mortality, 864 acres of habitat available 56-70% canopy closure and >50% mortality, and 3247 acres of habitat available 40-56% canopy closure and >50% mortality.

Table 46: Total acres within the project area that are high canopy closure (>40% canopy closure) and >50% mortality by subshed (These acres overlap with the acres in Table 45)

Subshed	Total Acres		
	>70% Canopy Closure	56-70% Canopy Closure	40-56% Canopy closure
Benny Creek	0	238	655
East Duncan Creek	0	131	211
Lower Duncan Creek	0	146	569
Thompson Reservoir	1	105	645
Upper Duncan Creek	11	114	551
Upper Silver Creek	1	8	113
Middle Silver Creek	0	0	35
West Fork Silver Creek	23	122	468
Total Acres	36	864	3247
Total Acres	4147		

No specific black-backed woodpecker surveys were conducted for this project. Neotropical point count surveys were conducted on the Silver Lake Ranger District at designated locations from 1994-2001. Four of the locations are within the project area located at Bottle Springs, Graham Creek, Guyer Creek, and West Fork Silver Creek. Black-backed woodpeckers were not detected at any of these locations.

Existing Condition for Lewis' Woodpeckers

The Toolbox and Silver Fires have created optimal habitat for Lewis' woodpeckers in areas with high densities of large ponderosa pine. There have been several sightings of Lewis' woodpeckers on the Silver Lake Ranger District, however Lewis' woodpeckers were not detected during field reconnaissance for this project. Due to past overstory harvest of large ponderosa pine and generally low densities of large ponderosa pine in the dry fringe communities, the average existing tolerance level for Lewis' woodpeckers within the project area is approximately 46%.

Lewis' woodpecker areas were also identified as indicated by the research conducted by Saab et al. (2002). On the Silver Lake Ranger District, the ponderosa pine communities are generally drier sites with lower canopy closure than found at the study site in Idaho where the wildlife data and recommendations were developed for DecAID. Therefore for this project, areas that are 11-40% pre-fire canopy closure with high densities of large ponderosa pine snags were estimated to be suitable habitat for Lewis' woodpeckers. Based on this criteria, areas were identified using GIS, stand data, and ground verification (see Table 47). This totals approximately 900 acres of *identified* optimal Lewis' woodpecker nesting habitat in approximately 50 different locations well distributed across the Toolbox and Silver Fires.

Table 47: Total acres of *identified* optimal Lewis' woodpecker habitat by subshed

Subshed	Total Acres of Identified Optimal Lewis' Woodpecker Habitat
Benny Creek	78
East Duncan Creek	128
Lower Duncan Creek	20
Thompson Reservoir	169
Upper Duncan Creek	226

Upper Silver Creek	58
Middle Silver Creek	39
West Fork Silver Creek	182
Total Acre	900

Although 900 acres have been identified as optimal Lewis' woodpecker habitat, Lewis' woodpecker habitat is not limited to these areas within the project area. As per the District Silviculturist, volume can be an indicator of areas that likely provide high densities of large ponderosa pine. Areas mapped as high or very high volume likely provide high densities of large ponderosa pine. Volume in addition to mortality, ecoclass, and canopy closure can assist in identifying potential Lewis' woodpecker habitat. Although much of these acres do not meet the contiguous size as defined in the literature by Saab et al. (2002) (16-17 acres), they likely do provide the high densities of large ponderosa pine that Lewis' woodpeckers select for.

Table 48: Total acres within the project area that are low to moderate canopy closure (11-40%), >50% mortality, ponderosa pine or ponderosa pine dominated mixed conifer communities, and high or very high volume by subshed (These acres overlap with the acres in Table 47)

Subshed	Total Acres
Benny Creek	379
East Duncan Creek	253
Lower Duncan Creek	285
Thompson Reservoir	1064
Upper Duncan Creek	854
Upper Silver Creek	298
Middle Silver Creek	207
West Fork Silver Creek	1598
Total Acre	4938

No specific Lewis' woodpecker surveys were conducted for this project. Neotropical point count surveys were conducted on the Silver Lake Ranger District at designated locations from 1994-2001. Four of the locations are within the project area located at Bottle Springs, Graham Creek, Guyer Creek, and West Fork Silver Creek. Lewis' woodpeckers were only detected at Bottle Springs. Below is the total number of detections of Lewis' woodpeckers at Bottle Springs from 1994-2001:

Table 49: Total number of detections of Lewis' woodpeckers at Bottle Springs from 1994-2001:

	1994	1995	1996	1997	1998	1999	2000	2001
Bottle Springs	0	0	0	0	1	0	0	0

Existing Condition for Down Wood Dependent Species
Although formal down wood surveys have not been completed for the project area, it is expected based on field reconnaissance that down wood levels are currently deficient due to consumption during the fire. There may be localized areas within the project area that meet down wood levels, but overall across the landscape, levels are likely below LRMP standard and guidelines as amended by the Regional Forester's Amendment #2 and the down wood percent cover recommendations developed using the data in DecAID (1.1-2.5 down wood percent cover).

Snags and Down Wood Dependent Species – Environmental Consequences

Direct and Indirect Effects

Alternative A (No Action)

Snag Dependent Species
This alternative will provide for the greatest number of snags for primary and secondary excavators and for the highest tolerance level or assurance for all cavity dependent species. All existing snags would be available in several size classes with differing densities. This alternative will provide for the maintenance of existing condition in the short-term as described earlier in this report and displayed in Tables 44-48. Some opportunistic birds, such as Hairy Woodpeckers, are

capable of excavating nests in harder snags (Raphael and White 1984) and it is expected that they will rapidly invade the fire. Other species, such as the Lewis' woodpecker or the Northern flicker, require softer snags for excavating nest sites (Raphael and White 1984) and will expand into the fire as snags begin to decay. The likelihood of meeting snag levels into the future with increased snag longevity and retention would be the greatest under this alternative, with large diameter snags expected to last 20-30 years. Snag recruitment is forgone for many years until natural regeneration occurs and trees develop into functioning mature stands in which natural snag recruitment occurs. However, in areas of low to moderate vegetation mortality, it is expected that snags will continue to increase as the beetles move into these areas. Snag levels would greatly exceed LRMP standard and as amended by the Regional Forester's Amendment #2, and the recommendation described above developed using the data in DecAID (see Tables 37, 38, and 39). This alternative provides the greatest opportunity to provide snag numbers that would likely lead to increases in populations in the short term and the persistence of populations in the long-term (15+ years).

Black-backed Woodpeckers
This alternative provides for optimal conditions and the highest tolerance level or assurance for black-backed woodpeckers. With increased nesting opportunities and foraging habitat as bark beetles populations increase, an irruption in the black-blacked woodpecker population within the burned areas is expected. Of four studies conducted on the effects of post-fire salvage on bird species, only the black-backed woodpecker showed a consistent response to logging with significantly more nests found on unlogged sites (Mclver 2000). As the insect population declines in the high mortality areas (within 1-3 years), woodpecker numbers would show a corresponding decrease back to pre-fire numbers. However, after the beetle population decreases in stands that experienced high vegetation mortality in 2-4 years, it is expected that the beetles will begin to enter the stands that experienced low to moderate vegetation mortality, and black-backed woodpeckers would follow the foraging source. Black-backed woodpecker populations and viability are expected to show the greatest increase under this alternative.

Lewis' Woodpeckers
This alternative provides optimal conditions and the highest tolerance level or assurance for Lewis' woodpeckers. With increased nesting opportunities as snags begin to soften and foraging opportunities as the aerial insect population increase, an increase in Lewis' woodpecker population within the burned area in expected until the large trees begin to fall (20-30 years). Lewis' woodpeckers are found to be most abundant in partially logged burned forests (Saab and Dudley 1998). With no salvage logging to make for more open favorable conditions, the increase may not occur until the smaller trees begin to fall in 1-10 years. Lewis' woodpecker populations and viability are expected to show the greatest decrease under this alternative in the short-term (1-10 years) due to dense snag conditions, but the greatest increase in the long-term (10-30 years) due to the maintenance of all large ponderosa pine snags.

Down Wood Dependent Species
As snags begin to fall, down wood levels will significantly increase thereby increasing denning, nesting, and feeding habitat for down wood dependent species. Down wood levels will greatly exceed LRMP standard and guidelines as amended by the Regional Forester's Amendment #2, and the down wood percent cover recommendations developed using the data in DecAID (1.1-2.5 down wood percent cover).

Alternative C

Areas <50% Mortality: Harvest would occur on approximately 5801 acres. Approximately 1125 acres are low elevation ponderosa pine type in which an average of 2.9 snags per area would be retained within harvest units (see Table 37). Approximately 4676 acres are high elevation ponderosa pine type in which an average of 6.1 snags per area would be retained within harvest units (see Table 38). Seven percent of the snags retained would be larger snags (30+ inches) to provide for the long-term persistence of snag habitat. Snags would be retained in clumps and clumps will be well distributed across the harvest units. Snag clumps would range from 2-30 snags per clump, which should be within the size range that Agee estimates for historical conditions (2002). Agee predicts that in forests dominated by ponderosa pine, mature clumps of trees occurred in patches ranging from 0.05-0.87 acres in size (Agee 2002). Snag densities and diameter requirements are designed to mimic estimated historical levels, or "natural conditions," and therefore should be adequate for the species dependent upon this type of vegetation type under estimated historical conditions. Harvest would not occur on approximately 4381 acres where snag levels are likely above estimated historical conditions. Therefore overall across the landscape, snag levels are likely well above estimated historical conditions and provide sufficient habitat for cavity dependent species. In addition, in the stands that experienced low to moderate vegetation mortality, it is expected that snags will continue to increase, even post salvage, as the beetles move into these areas.

Areas >50% Mortality:

1. **Total acres >50% mortality** = 14,897 acres
2. **No Harvest Acres**
    1. Total acres of >50% mortality and low volume (L) = 947 acres
    2. Total acres of >50% mortality and moderate volume (M) = 1481 acres
    3. Total acres of >50% mortality and high volume (H) = 2460 acres
    4. Total acres of >50% mortality and very high volume (VH) = 1368 acres
3. **Total acres of Harvest >50% mortality retaining 8 trees/acre 10-20" dbh and 2 trees/acre >20" dbh =** 8641 acres. Within harvest units, 30% tolerance level will be provided for Lewis' woodpeckers, mountain bluebirds, northern flickers, and western bluebirds.

Table 50: Tolerance level for cavity nesting species within the project area for Alternative C*

		Percent of Total Project Area at Less than 30% Tolerance Level	Percent of Total Project Area at the 30% Tolerance Level	Percent of Total Project Area at the 50% Tolerance Level	Percent of Total Project Area at the 80% Tolerance Level		Approximate Average Tolerance Level Across the Project Area
Black-backed Woodpecker		64%	10%	17%	9%		19%
Hairy Woodpecker		58%	6%	10%	26%		28%
Lewis' Woodpecker		0%	74%	17%	9%		38%
Mountain Bluebird		0%	91%	9%	0%		32%
Northern Flicker		0%	91%	9%	0%		32%
Western Bluebird		0%	58%	16%	26%		46%
White-headed Woodpecker		58%	6%	10%	26%		28%

***The approximate tolerance levels are intended to be a comparative measure between alternatives*. It is important to consider that on the Silver Lake Ranger District, the ponderosa pine communities are generally drier sites with lower stand densities. Therefore, the tolerance levels and respective snag densities may not be the same as what the species were selecting for in Idaho where the research was conducted. It is expected that cavity-nesters here locally may select for areas with lower snags densities than what was selected for in Idaho, and therefore the tolerance levels overall would be lower.**

Snag Dependent Species

This alternative provides for cavity-nesting habitat in the short-term. In the long-term (10-30 years), snags are expected to fall and cavity-nesting habitat will not be available. This alternative proposes to salvage 8641 acres of dead material within the areas mapped as >50% mortality. This would result in a lower tolerance level or assurance for all cavity-nesting species as displayed in Table 50. Most cavity-nesters show consistent patterns of decrease after logging, including the mountain bluebird, black-backed woodpecker, hairy woodpecker, and three-toed woodpecker (Mclver 2000). Snags would all be retained in clumps and if possible, would be located around pre-existing snags to provide for diversity in decay classes. Clump sizes were designed to be large enough that they provide effective nesting habitat for cavity-nesters, but small enough that the area retained a good distribution of snags across the harvest units. Studies show that bird species selected nest sites with higher tree densities and cavity nesters as a group selected clumps of snags as opposed to snags retained in uniform, evenly spaced distribution (Johnson and O'Neil 2001). Larger snags (30+ inches) would be retained to provide for the long-term persistence of snag habitat. Any harvest or activity during the breeding season may have a direct effect on nesting.

Due to safety (site prep for reforestation) and fuels hazard concerns, many acres of harvest will require the felling and treatment of fuels (all trees <13 inches dbh) through various methods including lop and scatter, jackpot burning, crushing, etc. This treatment is proposed within approximately 8642 acres of harvest units and would occur outside of designated snag clumps. The use of snag clumps by cavity-nesting species could be reduced due to the loss of foraging habitat in the

surrounding landscape. Use for some species, particularly timber-drilling woodpeckers and bark gleaners, may be limited due to the large amount of foraging habitat lost around the snag clumps. Bates (2001) summarized this as follows:

"Most studies on cavity-nesters that have focused on nest site availability have suggested that cavity-nesters increase in burned habitats as nest site potential also increases (Taylor and Barmore 1980, Raphael and White 1984). In a five-year study that looked at both nesting and foraging use of cavity-nesters in both a stand-replacement burn and adjacent unburned forests in Montana, Caton (1996) concluded 'differences in abundances of most species were probably due to differences in foraging opportunities rather than differences in nest-site availability.' She observed 'nests were placed in sites with characteristics that corresponded to bird species' foraging habits (pg. 78).' That is, timber-drilling woodpeckers and bark gleaners placed their nests in areas with greater basal area, mean dbh, and live canopy compared to ground or aerial foragers."

Approximately 5816 acres of harvest units will not require this type of treatment within the first 3-4 years. The <13 inch dbh material would be retained providing ample amounts of foraging habitat around the snag clumps. These areas are expected to receive greater use overall by cavity-nesters than the areas that will receive site-prep and fuels reduction treatments. If site prep is required within these 5816 acres, it would occur in year 4 or 5 when the snags have begun to fall and the foraging habitat is less effective.

Outside of the areas proposed for salvage, approximately 4301 acres will require site prep. These areas can be described as areas that have received heavy amounts of past harvest and are now post and pole stands, or generally do not contain enough material to be considered an economically viable salvage area. Therefore, these areas likely contain low levels of cavity nesting habitat. These areas are likely providing foraging habitat due to the smaller overall tree size. Within these areas, a one acre snag clump will be retained every 5 acres to retain some foraging habitat and continuity in snags, and all snags outside of the leave clumps will likely be felled in 2004 or 2005 and therefore will decrease foraging habitat for cavity nesting species. Snag recruitment is forgone for many years until planted trees develop into functioning mature stands in which natural snag recruitment occurs. Planting of approximately 20,906 acres under this alternative will accelerate this process.

Black-backed Woodpeckers

The tolerance level, or assurance of retaining habitat for black-backed woodpeckers is reduced from an average of 41% to 19% across the landscape. However, of the 12 areas considered to be the most optimal *identified* habitat selected for black-backed woodpeckers within the project area based on the following criteria: 1.) areas of high canopy closure pre-fire ranging generally between 75-120 acres and 2.) high densities of smaller trees, at least part of all twelve areas are being retained under this alternative and will remain large enough that they will be effective habitat. Although the total amount of acres of *identified* optimal black-backed habitat is reduced from 1789 acres to 1620 acres, all 12 areas would still meet the criteria as described in the literature by Saab et al. (2002). Therefore, the majority of the most optimal *identified* habitat will be retained within the project area (see Table 51).

In addition to the *identified* optimal habitat listed above in Table 51, areas of high canopy closure within the project area may provide for limited black-backed woodpecker habitat within the project area. Although much of these acres do not meet the contiguous size as defined in the literature by Saab et al. (2002) (74-124 acres), they likely do provide the high densities of trees that black-backed woodpeckers select for (see Table 52). Approximately 2349 acres or 57% of these areas will remain unharvested.

Table 51: Total acres of *identified* optimal black-backed woodpecker by subshed for Alternative C

Subshed	Total Acres Proposed for Harvest	Total Acres *Not* Proposed for Harvest
Benny Creek	39	286
East Duncan Creek	0	5
Lower Duncan Creek	0	123
Thompson Reservoir	95	460
Upper Duncan Creek	13	238
Upper Silver Creek	0	0
Middle Silver Creek	0	0
West Fork Silver Creek	22	508
Total Acre	169	1620

Table 52: Total acres within the project area that have high canopy closure (>40% canopy closure) and >50% mortality by subshed for Alternative C (These acres overlap with the acres in Table 51)

Subshed	Total Acres Proposed for Harvest			Total Acres *Not* Proposed for Harvest		
	>70% Canopy Closure	56-70% Canopy Closure	40-56% Canopy closure	>70% Canopy Closure	56-70% Canopy Closure	40-56% Canopy closure
Benny Creek	0	84	424	0	154	231
East Duncan Creek	0	60	153	0	71	58
Lower Duncan Creek	0	57	328	0	89	241
Thompson Reservoir	0	28	206	1	77	439
Upper Duncan Creek	7	28	107	4	86	444
Upper Silver Creek	1	2	32	0	6	81
Middle Silver Creek	0	0	32	0	0	3
West Fork Silver Creek	1	9	239	22	113	229
Total Acres	9	268	1521	27	596	1726
Total Acres	1798			2349		

In the first year after the fire (2003), no logging would occur and all potential existing habitat would be available for black-backed nesting and foraging. After the beetle population decreases in the stands that experienced high vegetation mortality in 2-4 years, it is expected that the beetles will begin to enter the stands that experienced low to moderate vegetation mortality, and black-backed woodpeckers would follow the foraging source. The 8641 acres of harvest within the >50% mortality category will likely not provide nesting habitat for black-backed woodpeckers.

Any harvest or activity during the breeding season may have a direct effect on nesting. It is likely that sufficient habitat is being retained to provide for viable populations of black-backed woodpeckers.

Lewis' Woodpeckers

The tolerance level, or assurance of retaining habitat for Lewis' woodpeckers is reduced from an average of 46% to 38% across the landscape. Lewis's woodpeckers are most abundant in partially logged burned forests and relatively rare in unlogged units of western Idaho (Saab and Dudley 1998). Within the harvest units >50% mortality, snags will be retained at the 30% tolerance level or assurance for Lewis' woodpeckers and should provide for suitable nesting habitat. Of the areas considered to be the most optimal *identified* habitat selected for Lewis' woodpeckers within the project area based on the following criteria: 1.) areas of low to moderate canopy closure pre-fire ranging generally between 16-17 acres and 2.) high densities of large ponderosa pine trees, 683 acres will be retained as unlogged leave areas under this alternative distributed across the project area (see Table 53).

Lewis' woodpecker habitat may also be identified by selecting areas of low to moderate canopy closure (11-40%), high mortality (>50%), ponderosa pine or ponderosa pine dominated mixed conifer communities, and areas of high or very high volume (see Table 54). Although much of these acres do not meet the contiguous size as defined in the literature by Saab et al. (2002) (16-17 acres), they likely do provide the high densities of large ponderosa pine that Lewis' woodpeckers select for. Approximately 1974 acres or 40% of these areas will remain unharvested.

Table 53: Total acres of *identified* optimal Lewis' woodpecker habitat by subshed for Alternative C

Subshed	Total Acres Proposed for Harvest	Total Acres *Not* Proposed for Harvest
Benny Creek	27	51
East Duncan Creek	18	109
Lower Duncan Creek	11	9
Thompson Reservoir	57	111
Upper Duncan Creek	64	163
Upper Silver Creek	17	41
Middle Silver Creek	1	38
West Fork Silver Creek	22	161
Total Acre	217	683

Table 54: Total acres within the project area that are low to moderate canopy closure (11-40%), >50% mortality, ponderosa pine or ponderosa pine dominated mixed conifer communities, and high or very high volume by subshed for Alternative C (These acres overlap with the acres in Table 53)

Subshed	Total Acres Proposed for Harvest	Total Acres *Not* Proposed for Harvest
Benny Creek	272	107
East Duncan Creek	99	154
Lower Duncan Creek	193	93
Thompson Reservoir	829	235
Upper Duncan Creek	511	344
Upper Silver Creek	177	122
Middle Silver Creek	158	49
West Fork Silver Creek	728	870
Total Acre	2967	1974

The biological objectives for habitat recommended in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are where ecologically and socially appropriate, through natural events or management, maintain >50% of a post-fire landscape unsalvaged (Altman 2000). Under this alternative, including all acres in all mortality classes, 42% of the areas proposed for salvage will remain unlogged. In addition, 1974 acres or 40% of the total acres that are >50% mortality, with low to moderate canopy closure, and high to very high volume will remain unharvested (see Table 54).

Any harvest or activity during the breeding season may have a direct effect on nesting. Although this is the least desirable alternative for Lewis' woodpecker habitat, it is likely that sufficient habitat is being retained to provide for viable populations of Lewis' woodpeckers.

Down Wood Dependent Species

It is expected that as snags begin to fall, down wood levels will increase thereby increasing denning, nesting, and feeding habitat for down wood dependent species. Levels will vary across the landscape due to the variation in snag retention and fuels treatments prescribed. Some areas of no harvest will greatly exceed the recommendations, while areas of harvest and fuels treatments may be at or below the recommendations. Within all harvest units, the snags retained as described in Tables 37, 38, and 39 alone would equal a minimum of 0.70 down wood percent cover. Therefore, it is estimated that:

1. Down wood levels would be slightly below 1.1 – 2.5 percent down wood cover within approximately 8642 acres of harvest units that will receive site-prep and fuels treatment. Down wood levels would be a minimum of 0.70 percent down wood cover.
2. Down wood levels would be at or above 1.1 – 2.5 percent down wood cover on approximately 5816 acres of harvest units will not receive site-prep and fuels reductions. Down wood levels would be a minimum of 0.70 percent down wood cover **plus** all snags <13 inches dbh.
3. Down wood levels would greatly exceed 1.1 – 2.5 percent down wood cover on approximately 10,637 acres that will receive no harvest.

In the long-term, down wood levels should exceed the levels recommended to meet estimated historical or "natural conditions" as developed with the data in DecAID of 1.1 – 2.5 percent cover *across the landscape*, and should greatly exceed LRMP standard and guidelines as amended by the Regional Forester's Amendment #2.

<u>Conclusion for Alternative C</u>

Table 55: Summary of harvest and no harvest for Alternative C

	Total Acres of Harvest	Total Acres of No Harvest
<50% Mortality Low Elevation Ponderosa Pine	1125	4381
<50% Mortality High Elevation Ponderosa Pine	4676	
>50% Mortality	8641	6256
Total	14,442	10,637

Table 56: Summary of site prep and fuel reduction (felling of all material <13 inches dbh) and reforestation for Alternative C

	Total acres
Total acres of harvest with site-prep and fuels reduction	8642
Total acres of harvest without site-prep and fuels reduction	5816
Total acres of site-prep in areas outside of harvest	4301
Total acres of reforestation	20,906

Table 57: Summary of the total acres of identified and suitable habitat for black-backed woodpeckers and Lewis' woodpeckers for Alternative C

	Total Acres of Harvest	Total Acres of No Harvest
Total acres of *identified* optimal black-backed woodpecker habitat	169	1620
Total acres of suitable black-backed woodpecker habitat	1798	2349
Total acres of *identified* optimal Lewis' woodpecker habitat	217	683
Total acres of suitable Lewis' woodpecker habitat	2697	1974

Table 58: Summary of the tolerance levels for black-backed and Lewis' woodpeckers for Alternative C

	Existing Condition	Alternative C
Tolerance level for black-backed woodpeckers	41%	19%
Tolerance level for Lewis' woodpeckers	46%	38%

Although the tolerance level will be reduced for all cavity nesters including a reduction from 41% to 19% for black-backed woodpeckers and from 46% to 38% for Lewis' woodpeckers, it is important to consider that on the Silver Lake Ranger District, the ponderosa pine communities are generally drier sites with lower stand densities. Therefore, the tolerance levels and respective snag densities may not be the same as what the species were selecting for in Idaho where the research was conducted. It is expected that cavity-nesters here locally may select for areas with lower snags densities than what was selected for in Idaho, and therefore the tolerance levels overall would be lower. Also, 91% of the *identified* optimal habitat and 57% of the total suitable habitat for black-backed woodpecker habitat will remain unharvested, and 76% of the *identified* optimal habitat and 40% of the total suitable habitat for Lewis' woodpeckers will remain unharvested. And overall, 42% of the project area will remain unharvested.

Based on the most recent science and information available in DecAID, habitat will be retained under this alternative to provide for viable populations of all cavity nesting and down wood dependent species. Snag retention was based on the snag levels needed for cavity nesting species in: 1.)green stand conditions (<50% mortality) based on the **inventory data and distribution data** available in DecAID, and 2.) post-fire conditions (>50% mortality) based on the **wildlife data** available in DecAID most notably for black-backed woodpeckers and Lewis' woodpeckers. By taking the approach of managing for estimated historical or "natural conditions" in the green stands, and for both black-backed woodpeckers and Lewis' woodpecker that require the opposite extremes for snag densities and size requirements in the post-fire conditions, we are likely providing habitat for the entire assemblage of woodpecker species.

Snag levels overall across the landscape including both harvest and unharvested areas, are well above LRMP standard and guidelines as amended by the Regional Forester's Amendment #2 and well above levels suggested by Agee (2002) and Harrod et al. (1998) for estimated historical levels. Within all harvest units or 58% of the project area, snags would be retained at an average of approximately 8.2 snags per acre, and 42% of the project area would remain unharvested and likely contain high levels of snags. In the areas that require site-prep and fuels reduction, use may be limited to the aerial insect feeders as the foraging habitat will largely be lost for the timber-drilling and bark gleaner woodpeckers, however ample habitat should be provided within the unharvested areas and within the harvested areas that will not require site-prep in which all snags <13 inches dbh will be retained. In the long-term, down wood levels should meet or exceed the levels recommended to meet estimated historical or "natural conditions" *across the landscape*, and should greatly exceed LRMP standard and guidelines as amended by the Regional Forester's Amendment #2.

Alternative D

Areas <50% Mortality: Harvest would occur on approximately 1947 acres. Approximately 195 acres are low elevation ponderosa pine type in which an average of 2.9 snags per area would be retained within harvest units (see Table 37). Approximately 1752 acres are high elevation ponderosa pine type in which an average of 6.1 snags per area would be retained within harvest units (see Table 38). Seven percent of the snags retained would be larger snags (30+ inches) to provide for the long-term persistence of snag habitat. Snags would be retained in clumps and clumps will be well distributed across the harvest units. Snag clumps would range from 2-30 snags per clump, which should be within the size range that Agee estimates for historical conditions (2002). Agee predicts that in forests dominated by ponderosa pine, mature clumps of trees occurred in patches ranging from 0.05-0.87 acres in size (Agee 2002). Snag densities and diameter requirements are designed to mimic estimated historical levels, or "natural conditions," and therefore should be adequate for the species dependent upon this type of vegetation type under estimated historical conditions. Harvest would not occur on approximately 8164 acres where snag levels are likely above estimated historical conditions. Therefore overall across the landscape, snag levels are likely well above estimated historical conditions and provide sufficient habitat for cavity dependent species. In addition, in the stands that experienced low to moderate vegetation mortality, it is expected that snags will continue to increase, even post salvage, as the beetles move into these areas.

Areas >50% Mortality:

1. **Total acres >50% mortality** = 14,897 acres
2. **No Harvest Acres**
    1. Total acres of >50% mortality and low volume (L) = 1552 acres
    2. Total acres of >50% mortality and moderate volume (M) = 2907 acres
    3. Total acres of >50% mortality and high volume (H) = 4116 acres
    4. Total acres of >50% mortality and very high volume (VH) = 1892 acres
3. **Total acres of Harvest >50% mortality retaining 8 trees/acre 10-20" dbh and 2 trees/acre >20" dbh =** 4430 acres. Within harvest units, 30% tolerance level will be provided for Lewis' woodpeckers, mountain bluebirds, northern flickers, and western bluebirds.

Table 59: Tolerance level for cavity nesting species within the project area for Alternative D*

		Percent of Total Project Area at Less than 30% Tolerance Level	Percent of Total Project Area at the 30% Tolerance Level	Percent of Total Project Area at the 50% Tolerance Level	Percent of Total Project Area at the 80% Tolerance Level		Approximate Average Tolerance Level Across the Project Area
Black-backed Woodpecker		39%	20%	28%	13%		30%
Hairy Woodpecker		29%	10%	20%	41%		46%
Lewis' Woodpecker		0%	59%	28%	13%		42%
Mountain Bluebird		0%	87%	13%	0%		33%
Northern Flicker		0%	87%	13%	0%		32%
Western Bluebird		0%	29%	30%	41%		57%
White-headed Woodpecker		29%	10%	20%	41%		46%

***The approximate tolerance levels are intended to be a comparative measure between alternatives*. It is important to consider that on the Silver Lake Ranger District, the ponderosa pine communities are generally drier sites with lower stand densities. Therefore, the tolerance levels and respective snag densities may not be the same as what the species were selecting for in Idaho where the research was conducted. It is expected that cavity-nesters here locally may select for areas with lower snags densities than what was selected for in Idaho, and therefore the tolerance levels overall would be lower.**

Snag Dependent Species

This alternative provides for cavity-nesting habitat in the short-term. In the long-term (10-30 years), snags are expected to fall and cavity-nesting habitat will not be available. This alternative proposes to salvage 4430 acres of dead material within

the areas mapped as >50% mortality. This would result in a lower tolerance level or assurance for all cavity-nesting species as displayed in Table 59. Most cavity-nesters show consistent patterns of decrease after logging, including the mountain bluebird, black-backed woodpecker, hairy woodpecker, and three-toed woodpecker (Mclver 2000). Snags would all be retained in clumps and if possible, would be located around pre-existing snags to provide for diversity in decay classes. Clump sizes were designed to be large enough that they provide effective nesting habitat for cavity-nesters, but small enough that the area retained a good distribution of snags across the harvest units. Studies show that bird species selected nest sites with higher tree densities and cavity nesters as a group selected clumps of snags as opposed to snags retained in uniform, evenly spaced distribution (Johnson and O'Neil 2001). Larger snags (30+ inches) would be retained to provide for the long-term persistence of snag habitat. Any harvest or activity during the breeding season may have a direct effect on nesting.

Due to safety (site prep for reforestation) and fuels hazard concerns, many acres of harvest will require the felling and treatment of fuels (all trees <13 inches dbh) through various methods including lop and scatter, jackpot burning, crushing, etc. This treatment is proposed within approximately 4776 acres of harvest units and would occur outside of designated snag clumps. The use of snag clumps by cavity-nesting species could be reduced due to the loss of foraging habitat in the surrounding landscape. Use for some species, particularly timber-drilling woodpeckers and bark gleaners, may be limited due to the large amount of foraging habitat lost around the snag clumps. Bates (2001) summarized this as follows:

"Most studies on cavity-nesters that have focused on nest site availability have suggested that cavity-nesters increase in burned habitats as nest site potential also increases (Taylor and Barmore 1980, Raphael and White 1984). In a five-year study that looked at both nesting and foraging use of cavity-nesters in both a stand-replacement burn and adjacent unburned forests in Montana, Caton (1996) concluded 'differences in abundances of most species were probably due to differences in foraging opportunities rather than differences in nest-site availability.' She observed 'nests were placed in sites with characteristics that corresponded to bird species' foraging habits (pg. 78).' That is, timber-drilling woodpeckers and bark gleaners placed their nests in areas with greater basal area, mean dbh, and live canopy compared to ground or aerial foragers."

Approximately 1598 acres of harvest units will not require this type of treatment within the first 3-4 years. The <13 inch dbh material would be retained providing ample amounts of foraging habitat around the snag clumps. These areas are expected to receive greater use overall by cavity-nesters than the areas that will receive site prep and fuels reduction treatments. If site prep is required within these 5818 acres, it would occur in year 4 or 5 when the snags have begun to fall and the foraging habitat is less effective.

Outside of the areas proposed for salvage, approximately 9603 acres will require site prep. These areas can be described as areas that have received heavy amounts of past harvest and are now post and pole stands, or generally do not contain enough material to be considered an economically viable salvage area. Therefore, these areas likely contain low levels of cavity nesting habitat. These areas are likely only providing foraging habitat due to the smaller overall tree size. Within these areas, a one acre snag clump will be retained every 5 acres to retain some foraging habitat and continuity in snags, and all snags outside of the snag clumps will likely be felled on approximately 1500 acres in 2004, 3000 acres in 2005, 2500 acres in 2006, and 2603 acres in 2007 and therefore will decrease foraging habitat for cavity nesting species. The areas receiving site prep in 2006-2007 will have a lesser effect because the small tree component that will provide the foraging habitat will have already begun to fall. Snag recruitment is forgone for many years until planted trees develop into functioning mature stands in which natural snag recruitment occurs. Planting of approximately 20,743 acres under this alternative will accelerate this process.

Black-backed Woodpeckers

The tolerance level, or assurance of retaining habitat for black-backed woodpeckers is reduced from an average of 41% to 30% across the landscape. However, of the 12 areas considered to be the most optimal *identified* habitat selected for black-backed woodpeckers within the project area based on the following criteria: 1.) areas of high canopy closure pre-fire ranging generally between 75-120 acres and 2.) high densities of smaller trees, at least part of all twelve areas are being retained under this alternative and will remain large enough that they will be effective habitat. Although the total amount of acres of *identified* optimal black-backed habitat is reduced from 1789 acres to 1712 acres, all 12 areas would still meet the criteria as described in the literature by Saab et al. (2002). Therefore, the majority of the most optimal *identified* habitat will be retained within the project area (see Table 60).

In addition to the *identified* optimal habitat listed above in Table 60, areas of high canopy closure within the project area may provide for limited black-backed woodpecker habitat within the project area. Although much of these acres do not meet the contiguous size as defined in the literature by Saab et al. (2002), they likely do provide the high densities of trees that black-backed woodpeckers select for (see Table 61). Approximately 3354 acres or 81% of these areas will remain unharvested.

Table 60: Total acres of *identified* optimal black-backed woodpecker habitat by subshed for Alternative D

Subshed	Total Acres Proposed for Harvest	Total Acres *Not* Proposed for Harvest
Benny Creek	23	301
East Duncan Creek	0	5
Lower Duncan Creek	0	123
Thompson Reservoir	21	534
Upper Duncan Creek	11	239
Upper Silver Creek	0	0
Middle Silver Creek	0	0
West Fork Silver Creek	22	510
Total Acre	77	1712

Table 61: Total acres within the project that are high canopy closure (>40% canopy closure) and >50% mortality by subshed for Alternative D (These acres overlap with the acres in Table 60)

Subshed	Total Acres Proposed for Harvest			Total Acres *Not* Proposed for Harvest		
	>70% Canopy Closure	56-70% Canopy Closure	40-56% Canopy closure	>70% Canopy Closure	56-70% Canopy Closure	40-56% Canopy closure
Benny Creek	0	4	112	0	234	544
East Duncan Creek	0	27	79	0	103	131
Lower Duncan Creek	0	37	182	0	109	388
Thompson Reservoir	0	4	67	1	101	578
Upper Duncan Creek	6	26	80	4	89	471
Upper Silver Creek	0	0	19	1	8	96
Middle Silver Creek	0	0	0	0	0	36
West Fork Silver Creek	1	8	142	22	113	325
Total Acres	7	106	681	28	757	2569
Total Acres	794			3354		

In the first year after the fire (2003), no logging would occur and all potential existing habitat would be available for black-backed nesting and foraging. After the beetle population decreases in the stands that experienced high vegetation mortality in 2-4 years, it is expected that the beetles will begin to enter the stands that experienced low to moderate vegetation mortality, and black-backed woodpeckers would follow the foraging source. The 4430 acres of harvest within the >50% mortality category will likely not provide nesting habitat for black-backed woodpeckers.

Any harvest or activity during the breeding season may have a direct effect on nesting. Alternative D is the most desirable action alternative for black-backed woodpecker habitat and it is likely that sufficient habitat is being retained to provide for viable populations of black-backed woodpeckers.

Lewis' Woodpeckers

The tolerance level, or assurance of retaining habitat for Lewis' woodpeckers is reduced from an average of 46% to 42% across the landscape. Lewis's woodpeckers are most abundant in partially logged burned forests and relatively rare in unlogged units of western Idaho (Saab and Dudley 1998). Within the harvest units >50% mortality, snags will be retained at the 30% tolerance level or assurance for Lewis' woodpeckers and should provide for suitable nesting habitat. Of the areas considered to be the most optimal *identified* habitat selected for Lewis' woodpeckers within the project area based on the following criteria: 1.) areas of low to moderate canopy closure pre-fire ranging generally between 16-17 acres and 2.) high densities of large ponderosa pine trees, 770 acres will be retained as unlogged leave areas under this alternative distributed across the project area (see Table 62).

Lewis' woodpecker habitat may also be identified by selecting areas of low to moderate canopy closure (11-40%), high mortality (>50%), ponderosa pine or ponderosa pine dominated mixed conifer communities, and areas of high or very high volume (see Table 63). Although much of these acres do not meet the contiguous size as defined in the literature by Saab et al. (2002) (16-17 acres), they likely do provide the high densities of large ponderosa pine that Lewis' woodpeckers select for. Approximately 3313 acres or 67% of these areas will remain unharvested.

Table 62: Total acres of *identified* optimal Lewis' woodpecker habitat by subshed for Alternative D

Subshed	Total Acres Proposed for Harvest	Total Acres *Not* Proposed for Harvest
Benny Creek	1	77
East Duncan Creek	0	127
Lower Duncan Creek	10	10
Thompson Reservoir	36	133
Upper Duncan Creek	51	176
Upper Silver Creek	13	46
Middle Silver Creek	1	38
West Fork Silver Creek	18	163
Total Acre	130	770

Table 63: Total acres within the project area that are low to moderate canopy closure (11-40%), >50% mortality, ponderosa pine or ponderosa pine dominated mixed conifer communities, and high or very high volume by subshed for Alternative D (These acres overlap with the acres in Table 62)

Subshed	Total Acres Proposed for Harvest	Total Acres *Not* Proposed for Harvest
Benny Creek	184	194
East Duncan Creek	50	203
Lower Duncan Creek	160	125
Thompson Reservoir	344	720
Upper Duncan Creek	364	490
Upper Silver Creek	49	249
Middle Silver Creek	46	161
West Fork Silver Creek	427	1171
Total Acre	1624	3313

The biological objectives for habitat recommended in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are where ecologically and socially appropriate, through natural events or management, maintain >50% of a post-fire landscape unsalvaged (Altman 2000). Under this alternative, including all acres in all mortality classes, 75% of the areas proposed for salvage will remain unlogged. In addition, 3313 acres or 67% of the total acres that are >50% mortality, with low to moderate canopy closure, and high to very high volume will remain unharvested (see Table 63).

Any harvest or activity during the breeding season may have a direct effect on nesting. There is a very high assurance that sufficient habitat is being retained to provide for viable populations of Lewis' woodpeckers.

Down Wood Dependent Species

It is expected that as snags begin to fall, down wood levels will increase thereby increasing denning, nesting, and feeding habitat for down wood dependent species. Levels will vary across the landscape due to the variation in snag retention and fuels treatments prescribed. Some areas of no harvest will greatly exceed the recommendations, while areas of harvest and fuels treatments may be at or below the recommendations. Within all harvest units, the snags retained as described in Tables 37, 38, and 39 alone would be a minimum of 0.73 down wood percent cover. Therefore, it is estimated that:

1. Down wood levels would be slightly below 1.1 – 2.5 percent down wood cover within approximately 4776 acres of harvest units that will receive site-prep and fuels treatment. Down wood levels would be a minimum of 0.73 percent down wood cover.
2. Down wood levels would be at or above 1.1 – 2.5 percent down wood cover on approximately 1598 acres of harvest units will not receive site-prep and fuels reductions. Down wood levels would be a minimum of 0.73 percent down wood cover **plus** all snags <13 inches dbh.

3. Down wood levels would greatly exceed 1.1 – 2.5 percent down wood cover on approximately 18,631 acres that will receive no harvest.

In the long-term, down wood levels should exceed the levels recommended to meet estimated historical or "natural conditions" as developed with the data in DecAID of 1.1 – 2.5 percent cover *across the landscape,* and should greatly exceed LRMP standard and guidelines as amended by the Regional Forester's Amendment #2.

Conclusion for Alternative D

Table 64: Summary of harvest and no harvest for Alternative D

	Total Acres of Harvest	Total Acres of No Harvest
<50% Mortality Low Elevation Ponderosa Pine	195	8164
<50% Mortality High Elevation Ponderosa Pine	1752	
>50% Mortality	4430	10,467
Total	6377	18,631

Table 65: Summary of site prep and fuel reduction (felling of all material <13 inches dbh) and reforestation for Alternative D

	Total acres
Total acres of harvest with site-prep and fuels reduction	4776
Total acres of harvest without site-prep and fuels reduction	1598
Total acres of site-prep in areas outside of harvest	9603
Total acres of reforestation	20,743

Table 66: Summary of the total acres of identified and suitable habitat for black-backed woodpeckers and Lewis' woodpeckers for Alternative D

	Total Acres of Harvest	Total Acres of No Harvest
Total acres of *identified* optimal black-backed woodpecker habitat	77	1712
Total acres of suitable black-backed woodpecker habitat	794	3354
Total acres of *identified* optimal Lewis' woodpecker habitat	130	770
Total acres of suitable Lewis' woodpecker habitat	1624	3313

Table 67: Summary of the tolerance levels for black-backed and Lewis' woodpeckers for Alternative D

	Existing Condition	Alternative D
Tolerance level for black-backed woodpeckers	41%	30%
Tolerance level for Lewis' woodpeckers	46%	42%

Although the tolerance level will be reduced for all cavity nesters including a reduction from 41% to 30% for black-backed woodpeckers and from 46% to 42% for Lewis' woodpeckers, it is important to consider that on the Silver Lake Ranger District, the ponderosa pine communities are generally drier sites with lower stand densities. Therefore, the tolerance levels and respective snag densities may not be the same as what the species were selecting for in Idaho where the research was conducted. It is expected that cavity-nesters here locally may select for areas with lower snags densities than what was selected for in Idaho, and therefore the tolerance levels overall would be lower. Also, 96% of the *identified* optimal habitat and 81% of the total suitable habitat for black-backed woodpecker habitat will remain unharvested, and 86% of the *identified* optimal habitat and 67% of the total suitable habitat for Lewis' woodpeckers will remain unharvested. And overall, 75% of the project area will remain unharvested.

Based on the most recent science and information available in DecAID, habitat will be retained under this alternative to provide for viable populations of all cavity nesting and down wood dependent species. Snag retention was based on the snag levels needed for cavity nesting species in: 1.)green stand conditions (<50% mortality) based on the **inventory data and distribution data** available in DecAID, and 2.) post-fire conditions (>50% mortality) based on the **wildlife data**

available in DecAID most notably for black-backed woodpeckers and Lewis' woodpeckers. By taking the approach of managing for estimated historical or "natural conditions" in the green stands, and for both black-backed woodpeckers and Lewis' woodpecker that require the opposite extremes for snag densities and size requirements in the post-fire conditions, we are likely providing habitat for the entire assemblage of woodpecker species.

Snag levels overall across the landscape including both harvest and unharvested areas, are well above LRMP standard and guidelines as amended by the Regional Forester's Amendment #2 and well above levels suggested by Agee (2002) and Harrod et al. (1998) for estimated historical levels. Within all harvest units or 25% of the project area, snags would be retained at an average of approximately 8.7 snags per acre, and 75% of the project area would remain unharvested and likely contain high levels of snags. In the areas that require site-prep and fuels reduction, use may be limited to the aerial insect feeders as the foraging habitat will largely be lost for the timber-drilling and bark gleaner woodpeckers, however ample habitat should be provided within the unharvested areas and within the harvested areas that will not require site-prep in which all snags <13 inches dbh will be retained. In the long-term, down wood levels should meet or exceed the levels recommended to meet estimated historical or "natural conditions" *across the landscape*, and should greatly exceed LRMP standard and guidelines as amended by the Regional Forester's Amendment #2.

Alternative E

Areas <50% Mortality: Harvest would occur on approximately 3991 acres. Approximately 592 acres are low elevation ponderosa pine type in which an average of 2.9 snags per area would be retained within harvest units (see Table 37). Approximately 3399 acres are high elevation ponderosa pine type in which an average of 6.1 snags per area would be retained within harvest units (see Table 38). Seven percent of the snags retained would be larger snags (30+ inches) to provide for the long-term persistence of snag habitat. Snags would be retained in clumps and clumps will be well distributed across the harvest units. Snag clumps would range from 2-30 snags per clump, which should be within the size range that Agee estimates for historical conditions (2002). Agee predicts that in forests dominated by ponderosa pine, mature clumps of trees occurred in patches ranging from 0.05-0.87 acres in size (Agee 2002). Snag densities and diameter requirements are designed to mimic estimated historical levels, or "natural conditions," and therefore should be adequate for the species dependent upon this type of vegetation type under estimated historical conditions. Harvest would not occur on approximately 6169 acres where snag levels are likely above estimated historical conditions. Therefore overall across the landscape, snag levels are likely well above estimated historical conditions and provide sufficient habitat for cavity dependent species. In addition, in the stands that experienced low to moderate vegetation mortality it is expected that snags will continue to increase, even post salvage, as the beetles move into these areas.

Areas >50% Mortality:

1. **Total acres >50% mortality** = 14,897 acres
2. **No Harvest Acres**
    1. Total acres of >50% mortality and low volume (L) = 1890 acres
    2. Total acres of >50% mortality and moderate volume (M) = 1519 acres
    3. Total acres of >50% mortality and high volume (H) = 2537 acres
    4. Total acres of >50% mortality and very high volume (VH) = 1448 acres
3. **Total acres of Harvest >50% mortality retaining 8 trees/acre 10-20" dbh and 2 trees/acre >20" dbh =** 7503 acres. Within harvest units, 30% tolerance level will be provided for Lewis' woodpeckers, mountain bluebirds, northern flickers, and western bluebirds.

Table 68: Tolerance level for cavity nesting species within the project area for Alternative E*

		Percent of Total Project Area at Less than 30% Tolerance Level	Percent of Total Project Area at the 30% Tolerance Level	Percent of Total Project Area at the 50% Tolerance Level	Percent of Total Project Area at the 80% Tolerance Level		Approximate Average Tolerance Level Across the Project Area
Black-backed Woodpecker		63%	10%	17%	10%		20%
Hairy Woodpecker		50%	13%	10%	27%		69%
Lewis' Woodpecker		0%	73%	17%	10%		38%

Mountain Bluebird		0%	90%	10%	0%		32%
Northern Flicker		0%	90%	10%	0%		32%
Western Bluebird		0%	50%	23%	27%		48%
White-headed Woodpecker		50%	13%	10%	27%		31%

***The approximate tolerance levels are intended to be a comparative measure between alternatives*. It is important to consider that on the Silver Lake Ranger District, the ponderosa pine communities are generally drier sites with lower stand densities. Therefore, the tolerance levels and respective snag densities may not be the same as what the species were selecting for in Idaho where the research was conducted. It is expected that cavity-nesters here locally may select for areas with lower snags densities than what was selected for in Idaho, and therefore the tolerance levels overall would be lower.**

Snag Dependent Species

This alternative provides for cavity-nesting habitat in the short-term. In the long-term (10-30 years), snags are expected to fall and cavity-nesting habitat will not be available. This alternative proposes to salvage 7503 acres of dead material within the areas mapped as >50% mortality. This would result in a lower tolerance level or assurance for all cavity-nesting species as displayed in Table 68. Most cavity-nesters show consistent patterns of decrease after logging, including the mountain bluebird, black-backed woodpecker, hairy woodpecker, and three-toed woodpecker (Mclver 2000). Snags would all be retained in clumps and if possible, would be located around pre-existing snags to provide for diversity in decay classes. Clump sizes were designed to be large enough that they provide effective nesting habitat for cavity-nesters, but small enough that the area retained a good distribution of snags across the harvest units. Studies show that bird species selected nest sites with higher tree densities and cavity nesters as a group selected clumps of snags as opposed to snags retained in uniform, evenly spaced distribution (Johnson and O'Neil 2001). Larger snags (30+ inches) would be retained to provide for the long-term persistence of snag habitat. Any harvest or activity during the breeding season may have a direct effect on nesting.

Due to safety (site prep for reforestation) and fuels hazard concerns, many acres of harvest will require the felling and treatment of fuels (all trees <13 inches dbh) through various methods including lop and scatter, jackpot burning, crushing, etc. This treatment is proposed within approximately 5759 acres of harvest units and would occur outside of designated snag clumps. The use of snag clumps by cavity-nesting species could be reduced due to the loss of foraging habitat in the surrounding landscape. Use for some species, particularly timber-drilling woodpeckers and bark gleaners, may be limited due to the large amount of foraging habitat lost around the snag clumps. Bates (2001) summarized this as follows:

"Most studies on cavity-nesters that have focused on nest site availability have suggested that cavity-nesters increase in burned habitats as nest site potential also increases (Taylor and Barmore 1980, Raphael and White 1984). In a five-year study that looked at both nesting and foraging use of cavity-nesters in both a stand-replacement burn and adjacent unburned forests in Montana, Caton (1996) concluded 'differences in abundances of most species were probably due to differences in foraging opportunities rather than differences in nest-site availability.' She observed 'nests were placed in sites with characteristics that corresponded to bird species' foraging habits (pg. 78).' That is, timber-drilling woodpeckers and bark gleaners placed their nests in areas with greater basal area, mean dbh, and live canopy compared to ground or aerial foragers."

Approximately 5734 acres of harvest units will not require this type of treatment within the first 3-4 years. The <13 inch dbh material would be retained providing ample amounts of foraging habitat around the snag clumps. These areas are expected to receive greater use overall by cavity-nesters than the areas that will receive site-prep and fuels reduction treatments. If site prep is required within these 5818 acres, it would occur in year 4 or 5 when the snags have begun to fall and the foraging habitat is less effective.

Outside of the areas proposed for salvage, approximately 4330 acres will require site prep. These areas can be described as areas that have received heavy amounts of past harvest and are now post and pole stands, or generally do not contain enough material to be considered an economically viable salvage area. Therefore, these areas likely contain low levels of cavity nesting habitat. These areas are likely providing foraging habitat due to the smaller overall tree size. Within these areas, a one acre snag clump will be retained every 5 acres to retain some foraging habitat and continuity in snags, and all snags outside of the snag clumps will likely be felled on approximately 1000 acres in 2004, 1530 acres in 2005, and 1800 acres in 2006 and therefore will decrease foraging habitat for cavity nesting species. The areas receiving site prep in 2006

will have a lesser effect because the small tree component that will provide the foraging habitat will have already begun to fall.

Snag recruitment is forgone for many years until planted trees develop into functioning mature stands in which natural snag recruitment occurs. Planting of approximately 20,753 acres under this alternative will accelerate this process.

Black-backed Woodpeckers

The tolerance level, or assurance of retaining habitat for black-backed woodpeckers is reduced from an average of 41% to 20% across the landscape. However, of the 12 areas considered to be the most optimal *identified* habitat selected for black-backed woodpeckers within the project area based on the following criteria: 1.) areas of high canopy closure pre-fire ranging generally between 75-120 acres and 2.) high densities of smaller trees, at least part of all twelve areas are being retained under this alternative and will remain large enough that they will be effective habitat. Although the total amount of acres of *identified* optimal black-backed habitat is reduced from 1789 acres to 1651 acres, all 12 areas would still meet the criteria as described in the literature by Saab et al. (2002). Therefore, the majority of the most optimal *identified* habitat will be retained within the project area (see Table 69).

In addition to the *identified* optimal habitat listed above in Table 69, areas of high canopy closure within the project area may provide for limited black-backed woodpecker habitat within the project area. Although much of these acres do not meet the contiguous size as defined in the literature by Saab et al. (2002), they likely do provide the high densities of trees that black-backed woodpeckers select for (see Table 70). Approximately 2509 acres or 61% of these areas will remain unharvested.

Table 69: Total acres of *identified* optimal black-backed woodpecker habitat by subshed for Alternative E

Subshed	Total Acres Proposed for Harvest	Total Acres *Not* Proposed for Harvest
Benny Creek	39	286
East Duncan Creek	0	5
Lower Duncan Creek	0	123
Thompson Reservoir	65	490
Upper Duncan Creek	13	238
Upper Silver Creek	0	0
Middle Silver Creek	0	0
West Fork Silver Creek	21	509
Total Acre	138	1651

Table 70: Total acres within the project area that are high canopy closure (>40% canopy closure) and >50% mortality by subshed for Alternative E (These acres overlap with the acres in Table 69)

Subshed	Total Acres Proposed for Harvest			Total Acres *Not* Proposed for Harvest		
	>70% Canopy Closure	56-70% Canopy Closure	40-56% Canopy closure	>70% Canopy Closure	56-70% Canopy Closure	40-56% Canopy closure
Benny Creek	0	67	357	0	171	298
East Duncan Creek	0	59	151	0	72	60
Lower Duncan Creek	0	46	295	0	100	275
Thompson Reservoir	0	28	206	1	77	439
Upper Duncan Creek	7	28	95	4	86	457
Upper Silver Creek	1	2	33	0	6	81
Middle Silver Creek	0	0	32	0	0	3
West Fork Silver Creek	1	8	224	22	113	244
Total Acres	9	238	1393	27	625	1857
Total Acres	1640			2509		

In the first year after the fire (2003), no logging would occur and all potential existing habitat would be available for black-backed nesting and foraging. After the beetle population decreases in the stands that experienced high vegetation mortality in 2-4 years, it is expected that the beetles will begin to enter the stands that experienced low to moderate vegetation

mortality, and black-backed woodpeckers would follow the foraging source. The 7503 acres of harvest within the >50% mortality category will likely not provide nesting habitat for black-backed woodpeckers.

Any harvest or activity during the breeding season may have a direct effect on nesting. It is likely that sufficient habitat is being retained to provide for viable populations of black-backed woodpeckers.

Lewis' Woodpeckers

The tolerance level, or assurance of retaining habitat for Lewis' woodpeckers is reduced from an average of 46% to 38% across the landscape. Lewis's woodpeckers are most abundant in partially logged burned forests and relatively rare in unlogged units of western Idaho (Saab and Dudley 1998). Within the harvest units >50% mortality, snags will be retained at the 30% tolerance level or assurance for Lewis' woodpeckers and should provide for suitable nesting habitat. Of the areas considered to be the most optimal *identified* habitat selected for Lewis' woodpeckers within the project area based on the following criteria: 1.) areas of low to moderate canopy closure pre-fire ranging generally between 16-17 acres and 2.) high densities of large ponderosa pine trees, 697 acres will be retained as unlogged leave areas under this alternative distributed across the project area (see Table 71).

Lewis' woodpecker habitat may also be identified by selecting areas of low to moderate canopy closure (11-40%), high mortality (>50%), ponderosa pine or ponderosa pine dominated mixed conifer communities, and areas of high or very high volume (see Table 72). Although much of these acres do not meet the contiguous size as defined in the literature by Saab et al. (2002) (16-17 acres), they likely do provide the high densities of large ponderosa pine that Lewis' woodpeckers select for. Approximately 2108 acres or 43% of these areas will remain unharvested.

Table 71: Total acres of *identified* optimal Lewis' woodpecker habitat by subshed for Alternative E

Subshed	Total Acres Proposed for Harvest	Total Acres *Not* Proposed for Harvest
Benny Creek	27	51
East Duncan Creek	18	110
Lower Duncan Creek	11	9
Thompson Reservoir	49	120
Upper Duncan Creek	60	167
Upper Silver Creek	17	41
Middle Silver Creek	1	38
West Fork Silver Creek	20	161
Total Acre	203	697

Table 72: Total acres within the project area that are low to moderate canopy closure (11-40%), >50% mortality, ponderosa pine or ponderosa pine dominated mixed conifer communities, and high or very high volume by subshed for Alternative E (These acres overlap with the acres in Table 71)

Subshed	Total Acres Proposed for Harvest	Total Acres *Not* Proposed for Harvest
Benny Creek	263	116
East Duncan Creek	91	161
Lower Duncan Creek	192	93
Thompson Reservoir	829	235
Upper Duncan Creek	445	409
Upper Silver Creek	148	150
Middle Silver Creek	158	49
West Fork Silver Creek	703	895
Total Acre	2829	2108

The biological objectives for habitat recommended in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are where ecologically and socially appropriate, through natural events or management, maintain >50% of a post-fire landscape unsalvaged (Altman 2000). Under this alternative, including all acres in all mortality classes, 54% of the areas proposed for salvage will remain unlogged. In addition, 2108 acres or 43% of the total acres that are >50% mortality, with low to moderate canopy closure, and high to very high volume will remain unharvested (see Table 72).

Any harvest or activity during the breeding season may have a direct effect on nesting. There is a very high assurance that sufficient habitat is being retained to provide for viable populations of Lewis' woodpeckers.

Down Wood Dependent Species
It is expected that as snags begin to fall, down wood levels will increase thereby increasing denning, nesting, and feeding habitat for down wood dependent species. Levels will vary across the landscape due to the variation in snag retention and fuels treatments prescribed. Some areas of no harvest will greatly exceed the recommendations, while areas of harvest and fuels treatments may be at or below the recommendations. Within all harvest units, the snags retained as described in Tables 37, 38, and 39 alone would be a minimum of 0.72 down wood percent cover. Therefore, it is estimated that:

1. Down wood levels would be slightly below 1.1 – 2.5 percent down wood cover within approximately 5759 acres of harvest units that will receive site-prep and fuels treatment. Down wood levels would be a minimum of 0.72 percent down wood cover.
2. Down wood levels would be at or above 1.1 – 2.5 percent down wood cover on approximately 5734 acres of harvest units will not receive site-prep and fuels reductions. Down wood levels would be a minimum of 0.72 percent down wood cover **plus** all snags <13 inches dbh.
3. Down wood levels would greatly exceed 1.1 – 2.5 percent down wood cover on approximately 13,563 acres that will receive no harvest.

In the long-term, down wood levels should exceed the levels recommended to meet estimated historical or "natural conditions" as developed with the data in DecAID of 1.1 – 2.5 percent cover *across the landscape,* and should greatly exceed LRMP standard and guidelines as amended by the Regional Forester's Amendment #2.

Conclusion for Alternative E

Table 73: Summary of harvest and no harvest for Alternative E

	Total Acres of Harvest	Total Acres of No Harvest
<50% Mortality Low Elevation Ponderosa Pine	592	6169
<50% Mortality High Elevation Ponderosa Pine	3399	
>50% Mortality	7503	7394
Total	11,494	13,563

Table 74: Summary of site prep and fuel reduction *(*felling of all material <13 inches dbh) and reforestation for Alternative E

	Total acres
Total acres of harvest with site-prep and fuels reduction	5759
Total acres of harvest without site-prep and fuels reduction	5734
Total acres of site-prep in areas outside of harvest	4330
Total acres of reforestation	20,753

Table 75: Summary of the total acres of identified and suitable habitat for black-backed woodpeckers and Lewis' woodpeckers for Alternative E

	Total Acres of Harvest	Total Acres of No Harvest
Total acres of *identified* optimal black-backed woodpecker habitat	138	1651
Total acres of suitable black-backed woodpecker habitat	1640	2509
Total acres of *identified* optimal Lewis' woodpecker habitat	203	697
Total acres of suitable Lewis' woodpecker habitat	2829	2108

Table 76: Summary of the tolerance levels for black-backed and Lewis' woodpeckers for Alternative E

	Existing Condition	Alternative E
Tolerance level for black-backed woodpeckers	41%	20%
Tolerance level for Lewis'	46%	38%

woodpeckers		

Although the tolerance level will be reduced for all cavity nesters including a reduction from 41% to 20% for black-backed woodpeckers and from 46% to 38% for Lewis' woodpeckers, it is important to consider that on the Silver Lake Ranger District, the ponderosa pine communities are generally drier sites with lower stand densities. Therefore, the tolerance levels and respective snag densities may not be the same as what the species were selecting for in Idaho where the research was conducted. It is expected that cavity-nesters here locally may select for areas with lower snags densities than what was selected for in Idaho, and therefore the tolerance levels overall would be lower. Also, 92% of the *identified* optimal habitat and 61% of the total suitable habitat for black-backed woodpecker habitat will remain unharvested, and 77% of the *identified* optimal habitat and 43% of the total suitable habitat for Lewis' woodpeckers will remain unharvested. And overall, 54% of the project area will remain unharvested.

Based on the most recent science and information available in DecAID, habitat will be retained under this alternative to provide for viable populations of all cavity nesting and down wood dependent species. Snag retention was based on the snag levels needed for cavity nesting species in: 1.)green stand conditions (<50% mortality) based on the **inventory data and distribution data** available in DecAID, and 2.) post-fire conditions (>50% mortality) based on the **wildlife data** available in DecAID most notably for black-backed woodpeckers and Lewis' woodpeckers. By taking the approach of managing for estimated historical or "natural conditions" in the green stands, and for both black-backed woodpeckers and Lewis' woodpecker that require the opposite extremes for snag densities and size requirements in the post-fire conditions, we are likely providing habitat for the entire assemblage of woodpecker species.

Snag levels overall across the landscape including both harvest and unharvested areas, are well above LRMP standard and guidelines as amended by the Regional Forester's Amendment #2 and well above levels suggested by Agee (2002) and Harrod et al. (1998) for estimated historical levels. Within all harvest units or 46% of the project area, snags would be retained at an average of approximately 8.5 snags per acre, and 54% of the project area would remain unharvested and likely contain high levels of snags. In the areas that require site-prep and fuels reduction, use may be limited to the aerial insect feeders as the foraging habitat will largely be lost for the timber-drilling and bark gleaner woodpeckers, however ample habitat should be provided within the unharvested areas and within the harvested areas that will not require site-prep in which all snags <13 inches dbh will be retained. In the long-term, down wood levels should meet or exceed the levels recommended to meet estimated historical or "natural conditions" *across the landscape*, and should greatly exceed LRMP standard and guidelines as amended by the Regional Forester's Amendment #2.

Alternative G

Areas <50% Mortality: Harvest would occur on approximately 5795 acres. Approximately 1123 acres are low elevation ponderosa pine type in which an average of 2.9 snags per area would be retained within harvest units (see Table 37). Approximately 4672 acres are high elevation ponderosa pine type in which an average of 6.1 snags per area would be retained within harvest units (see Table 38). Seven percent of the snags retained would be larger snags (30+ inches) to provide for the long-term persistence of snag habitat. Snags would be retained in clumps and clumps will be well distributed across the harvest units. Snag clumps would range from 2-30 snags per clump, which should be within the size range that Agee estimates for historical conditions (2002). Agee predicts that in forests dominated by ponderosa pine, mature clumps of trees occurred in patches ranging from 0.05-0.87 acres in size (Agee 2002). Snag densities and diameter requirements are designed to mimic estimated historical levels, or "natural conditions," and therefore should be adequate for the species dependent upon this type of vegetation type under estimated historical conditions. Harvest would not occur on approximately 4387 acres where snag levels are likely above estimated historical conditions. Therefore overall across the landscape, snag levels are likely well above estimated historical conditions and provide sufficient habitat for cavity dependent species. In addition, in the stands that experienced low to moderate vegetation mortality, it is expected that snags will continue to increase, even post salvage, as the beetles move into these areas.

Areas >50% Mortality:

1. **Total acres >50% mortality** = 14,897 acres
2. **No Harvest Acres**
    1. Total acres of >50% mortality and low volume (L) = 947 acres
    2. Total acres of >50% mortality and moderate volume (M) = 1481 acres
    3. Total acres of >50% mortality and high volume (H) = 2469 acres
    4. Total acres of >50% mortality and very high volume (VH) = 1375 acres

3. **Total acres of Harvest >50% mortality retaining 8 trees/acre 10-20" dbh and 2 trees/acre >20" dbh =** 8625 acres. Within harvest units, 30% tolerance level will be provided for Lewis' woodpeckers, mountain bluebirds, northern flickers, and western bluebirds.

Table 77: Tolerance level for cavity nesting species within the project area for Alternative G*

		Percent of Total Project Area at Less than 30% Tolerance Level	Percent of Total Project Area at the 30% Tolerance Level	Percent of Total Project Area at the 50% Tolerance Level	Percent of Total Project Area at the 80% Tolerance Level		Approximate Average Tolerance Level Across the Project Area
Black-backed Woodpecker		64%	10%	17%	9%		19%
Hairy Woodpecker		58%	6%	10%	26%		28%
Lewis' Woodpecker		0%	74%	17%	9%		38%
Mountain Bluebird		0%	91%	9%	0%		32%
Northern Flicker		0%	91%	9%	0%		32%
Western Bluebird		0%	58%	16%	26%		46%
White-headed Woodpecker		58%	6%	10%	26%		28%

***The approximate tolerance levels are intended to be a comparative measure between alternatives*. It is important to consider that on the Silver Lake Ranger District, the ponderosa pine communities are generally drier sites with lower stand densities. Therefore, the tolerance levels and respective snag densities may not be the same as what the species were selecting for in Idaho where the research was conducted. It is expected that cavity-nesters here locally may select for areas with lower snags densities than what was selected for in Idaho, and therefore the tolerance levels overall would be lower.**

Snag Dependent Species

This alternative provides for cavity-nesting habitat in the short-term. In the long-term (10-30 years), snags are expected to fall and cavity-nesting habitat will not be available. This alternative proposes to salvage 8625 acres of dead material within the areas mapped as >50% mortality. This would result in a lower tolerance level or assurance for all cavity-nesting species as displayed in Table 77. Most cavity-nesters show consistent patterns of decrease after logging, including the mountain bluebird, black-backed woodpecker, hairy woodpecker, and three-toed woodpecker (Mclver 2000). Snags would all be retained in clumps and if possible, would be located around pre-existing snags to provide for diversity in decay classes. Clump sizes were designed to be large enough that they provide effective nesting habitat for cavity-nesters, but small enough that the area retained a good distribution of snags across the harvest units. Studies show that bird species selected nest sites with higher tree densities and cavity nesters as a group selected clumps of snags as opposed to snags retained in uniform, evenly spaced distribution (Johnson and O'Neil 2001). Larger snags (30+ inches) would be retained to provide for the long-term persistence of snag habitat. Any harvest or activity during the breeding season may have a direct effect on nesting.

Due to safety (site prep for reforestation) and fuels hazard concerns, many acres of harvest will require the felling and treatment of fuels (all trees <13 inches dbh) through various methods including lop and scatter, jackpot burning, crushing, etc. This treatment is proposed within approximately 8859 acres of harvest units and would occur outside of designated snag clumps. In addition, forested areas outside of harvest units that are within a ¼ mile of private land will receive fuels treatment in which all snags <9 inches dbh will be felled. The use of snag clumps by cavity-nesting species could be reduced due to the loss of foraging habitat in the surrounding landscape. Use for some species, particularly timber-drilling woodpeckers and bark gleaners, may be limited due to the large amount of foraging habitat lost around the snag clumps. Bates (2001) summarized this as follows:

"Most studies on cavity-nesters that have focused on nest site availability have suggested that cavity-nesters increase in burned habitats as nest site potential also increases (Taylor and Barmore 1980, Raphael and White 1984). In a five-year study that looked at both nesting and foraging use of cavity-nesters in both a stand-replacement burn and adjacent unburned

forests in Montana, Caton (1996) concluded 'differences in abundances of most species were probably due to differences in foraging opportunities rather than differences in nest-site availability.' She observed 'nests were placed in sites with characteristics that corresponded to bird species' foraging habits (pg. 78).' That is, timber-drilling woodpeckers and bark gleaners placed their nests in areas with greater basal area, mean dbh, and live canopy compared to ground or aerial foragers."

Approximately 5569 acres of harvest units will not require this type of treatment within the first 3-4 years. The <13 inch dbh material would be retained providing ample amounts of foraging habitat around the snag clumps. These areas are expected to receive greater use overall by cavity-nesters than the areas that will receive site-prep and fuels reduction treatments. If site prep is required within these 5818 acres, it would occur in year 4 or 5 when the snags have begun to fall and the foraging habitat is less effective.

Outside of the areas proposed for salvage, approximately 3180 acres will require site prep. These areas can be described as areas that have received heavy amounts of past harvest and are now post and pole stands, or generally do not contain enough material to be considered an economically viable salvage area. Therefore, these areas likely contain low levels of cavity nesting habitat. These areas are likely providing foraging habitat due to the smaller overall tree size. Within these areas, a one acre snag clump will be retained every 5 acres to retain some foraging habitat and continuity in snags, and all snags outside of the snag clumps will likely be felled in 2004 or 2005 and therefore will decrease foraging habitat for cavity nesting species.

Snag recruitment is forgone for many years until planted trees develop into functioning mature stands in which natural snag recruitment occurs. Planting of approximately 20,728 acres under this alternative will accelerate this process.

Black-backed Woodpeckers

The tolerance level, or assurance of retaining habitat for black-backed woodpeckers is reduced from an average of 41% to 19% across the landscape. Of the 12 areas considered to be the most optimal *identified* habitat selected for black-backed woodpeckers within the project area based on the following criteria: 1.) areas of high canopy closure pre-fire ranging generally between 75-120 acres and 2.) high densities of smaller trees, 5 areas (4 in the Silver Fire and 1 in the Toolbox Fire) will remain large enough that they will be effective habitat. This is due to the increased amount of fuels treatments proposed in Alternative G within ¼ mile of private land. Although the 7 areas that do not meet the contiguous size that black-backed woodpeckers selected for in the research conducted by Saab et al. (2002) of 75-120 acres, they may still provide habitat for black-backed woodpeckers and they range in size from 16-60 acres. The total amount of acres of *identified* optimal black-backed habitat retained, regardless of size, is reduced from 1789 acres to 1218 acres (see Table 78).

In addition to the *identified* optimal habitat listed above in Table 78, areas of high canopy closure within the project area may provide for limited black-backed woodpecker habitat within the project area. Although much of these acres do not meet the contiguous size as defined in the literature by Saab et al. (2002), they likely do provide the high densities of trees that black-backed woodpeckers select for (see Table 79). Approximately 2351 acres or 57% of these areas will remain unharvested.

Table 78: Total acres of *identified* optimal black-backed woodpecker habitat by subshed for Alternative G

Subshed	Total Acres Proposed for Harvest and Fuels Treatment within ¼ mile Buffer of Private Land	Total Acres *Not* Proposed for Harvest
Benny Creek	180	145
East Duncan Creek	5	0
Lower Duncan Creek	3	120
Thompson Reservoir	206	350
Upper Duncan Creek	155	95
Upper Silver Creek	0	0
Middle Silver Creek	0	0
West Fork Silver Creek	22	508
Total Acre	571	1218

Table 79: Total acres within the project area that are high canopy closure (>40% canopy closure) and >50% mortality by subshed for Alternative G (These acres overlap with the acres in Table 78)

Subshed	Total Acres Proposed for Harvest			Total Acres *Not* Proposed for Harvest		
	>70% Canopy Closure	56-70% Canopy Closure	40-56% Canopy closure	>70% Canopy Closure	56-70% Canopy Closure	40-56% Canopy closure
Benny Creek	0	84	424	0	154	231
East Duncan Creek	0	60	153	0	71	58
Lower Duncan Creek	0	57	329	0	89	241
Thompson Reservoir	0	28	206	1	77	438
Upper Duncan Creek	7	28	107	4	86	445
Upper Silver Creek	1	2	33	0	6	81
Middle Silver Creek	0	0	32	0	0	3
West Fork Silver Creek	1	8	236	22	113	231
Total Acres	9	267	1520	27	596	1728
Total Acres	1796			2351		

In the first year after the fire (2003), no logging would occur and all potential existing habitat would be available for black-backed nesting and foraging. After the beetle population decreases in the stands that experienced high vegetation mortality in 2-4 years, it is expected that the beetles will begin to enter the stands that experienced low to moderate vegetation mortality, and black-backed woodpeckers would follow the foraging source. The 8625 acres of harvest within the >50% mortality category will likely not provide nesting habitat for black-backed woodpeckers.

Any harvest or activity during the breeding season may have a direct effect on nesting. Although this is the least desirable alternative for black-backed woodpecker habitat, it is likely that sufficient habitat is being retained to provide for viable populations of black-backed woodpeckers.

Lewis' Woodpeckers

The tolerance level, or assurance of retaining habitat for Lewis' woodpeckers is reduced from an average of 46% to 38% across the landscape. Lewis's woodpeckers are most abundant in partially logged burned forests and relatively rare in unlogged units of western Idaho (Saab and Dudley 1998). Within the harvest units >50% mortality, snags will be retained at the 30% tolerance level or assurance for Lewis' woodpeckers and should provide for suitable nesting habitat. Of the areas considered to be the most optimal *identified* habitat selected for Lewis' woodpeckers within the project area based on the following criteria: 1.) areas of low to moderate canopy closure pre-fire ranging generally between 16-17 acres and 2.) high densities of large ponderosa pine trees, 684 acres will be retained as unlogged leave areas under this alternative distributed across the project area (see Table 80). Fuels treatments proposed within a ¼ mile of private land within *identified* Lewis' woodpecker areas will not have an effect on Lewis' woodpecker habitat.

Lewis' woodpecker habitat may also be identified by selecting areas of low to moderate canopy closure (11-40%), high mortality (>50%), ponderosa pine or ponderosa pine dominated mixed conifer communities, and areas of high or very high volume (see Table 81). Although much of these acres do not meet the contiguous size as defined in the literature by Saab et al. (2002) (16-17 acres), they likely do provide the high densities of large ponderosa pine that Lewis' woodpeckers select for. Approximately 1986 acres or 40% of these areas will remain unharvested.

Table 80: Total acres of *identified* optimal Lewis' woodpecker habitat by subshed for Alternative G

Subshed	Total Acres Proposed for Harvest	Total Acres *Not* Proposed for Harvest
Benny Creek	25	53
East Duncan Creek	18	109
Lower Duncan Creek	11	9
Thompson Reservoir	57	111
Upper Duncan Creek	64	163
Upper Silver Creek	17	41
Middle Silver Creek	1	38
West Fork Silver Creek	23	160
Total Acre	216	684

Table 81: Total acres within the project area that are low to moderate canopy closure (11-40%), >50% mortality, ponderosa pine or ponderosa pine dominated mixed conifer communities, and high or very high volume by subshed for Alternative G (These acres overlap with the acres in Table 80)

Subshed	Total Acres Proposed for Harvest	Total Acres *Not* Proposed for Harvest
Benny Creek	272	107
East Duncan Creek	99	154
Lower Duncan Creek	193	92
Thompson Reservoir	829	235
Upper Duncan Creek	511	343
Upper Silver Creek	168	130
Middle Silver Creek	158	49
West Fork Silver Creek	722	876
Total Acre	2952	1986

The biological objectives for habitat recommended in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are where ecologically and socially appropriate, through natural events or management, maintain >50% of a post-fire landscape unsalvaged (Altman 2000). Under this alternative, including all acres in all mortality classes, 43% of the areas proposed for salvage will remain unlogged. In addition, 1986 acres or 40% of the total acres that are >50% mortality, with low to moderate canopy closure, and high to very high volume will remain unharvested (see Table 81).

Any harvest or activity during the breeding season may have a direct effect on nesting. There is a very high assurance that sufficient habitat is being retained to provide for viable populations of Lewis' woodpeckers.

Down Wood Dependent Species

It is expected that as snags begin to fall, down wood levels will increase thereby increasing denning, nesting, and feeding habitat for down wood dependent species. Levels will vary across the landscape due to the variation in snag retention and fuels treatments prescribed. Some areas of no harvest will greatly exceed the recommendations, while areas of harvest and fuels treatments may be at or below the recommendations. Within all harvest units, the snags retained as described in Tables 37, 38, and 39 alone would be a minimum of 0.70 down wood percent cover. Therefore, it is estimated that:

1. Down wood levels would be slightly below 1.1 – 2.5 percent down wood cover within approximately 8859 acres of harvest units that will receive site-prep and fuels treatment. Down wood levels would be a minimum of 0.70 percent down wood cover.
2. Down wood levels would be at or above 1.1 – 2.5 percent down wood cover on approximately 5569 acres of harvest units will not receive site-prep and fuels reductions. Down wood levels would be a minimum of 0.70 percent down wood cover **plus** all snags <13 inches dbh.
3. Down wood levels would likely be slightly below or at 1.1 – 2.5 percent down wood cover on approximately 5596 acres where fuels treatment is proposed within ¼ mile of private land. Only dead material <9 inches dbh will be treated and all material > 9 inches dbh will remain.
4. Down wood levels would greatly exceed 1.1 – 2.5 percent down wood cover on approximately 10,659 acres that will receive no harvest.

In the long-term, down wood levels should exceed the levels recommended to meet estimated historical or "natural conditions" as developed with the data in DecAID of 1.1 – 2.5 percent cover *across the landscape*, and should greatly exceed LRMP standard and guidelines as amended by the Regional Forester's Amendment #2.

<u>Conclusion for Alternative G</u>

Table 82: Summary of harvest and no harvest for Alternative G

	Total Acres of Harvest	Total Acres of No Harvest
<50% Mortality Low Elevation Ponderosa Pine	1123	4387
<50% Mortality High Elevation Ponderosa Pine	4672	

>50% Mortality	8625	6272
Total	14,420	10,659

Table 83: Summary of site prep and fuel reduction *(*felling of all material <13 inches dbh) and reforestation for Alternative G

	Total acres
Total acres of harvest with site-prep and fuels reduction	8859
Total acres of harvest without site-prep and fuels reduction	5569
Total acres of site-prep in areas outside of harvest	3180
Total acres of reforestation	20,728

Table 84: Summary of the total acres of identified and suitable habitat for black-backed woodpeckers and Lewis' woodpeckers for Alternative G

	Total Acres of Harvest (including ¼ mile fuels treatment buffer in Alternative G)	Total Acres of No Harvest
Total acres of *identified* optimal black-backed woodpecker habitat	571	1218
Total acres of suitable black-backed woodpecker habitat	1796	2351
Total acres of *identified* optimal Lewis' woodpecker habitat	216	684
Total acres of suitable Lewis' woodpecker habitat	2952	1986

Table 85: Summary of the tolerance levels for black-backed and Lewis' woodpeckers for Alternative G

	Existing Condition	Alternative G
Tolerance level for black-backed woodpeckers	41%	19%
Tolerance level for Lewis' woodpeckers	46%	38%

Although the tolerance level will be reduced for all cavity nesters including a reduction from 41% to 19% for black-backed woodpeckers and from 46% to 38% for Lewis' woodpeckers, it is important to consider that on the Silver Lake Ranger District, the ponderosa pine communities are generally drier sites with lower stand densities. Therefore, the tolerance levels and respective snag densities may not be the same as what the species were selecting for in Idaho where the research was conducted. It is expected that cavity-nesters here locally may select for areas with lower snags densities than what was selected for in Idaho, and therefore the tolerance levels overall would be lower. Also, 68% of the *identified* optimal habitat and 57% of the total suitable habitat for black-backed woodpecker habitat will remain unharvested, and 76% of the *identified* optimal habitat and 40% of the total suitable habitat for Lewis' woodpeckers will remain unharvested. And overall, 43% of the project area will remain unharvested.

Based on the most recent science and information available in DecAID, habitat will be retained under this alternative to provide for viable populations of all cavity nesting and down wood dependent species. Snag retention was based on the snag levels needed for cavity nesting species in: 1.)green stand conditions (<50% mortality) based on the **inventory data and distribution data** available in DecAID, and 2.) post-fire conditions (>50% mortality) based on the **wildlife data** available in DecAID most notably for black-backed woodpeckers and Lewis' woodpeckers. By taking the approach of managing for estimated historical or "natural conditions" in the green stands, and for both black-backed woodpeckers and Lewis' woodpecker that require the opposite extremes for snag densities and size requirements in the post-fire conditions, we are likely providing habitat for the entire assemblage of woodpecker species.

Snag levels overall across the landscape including both harvest and unharvested areas, are well above LRMP standard and guidelines as amended by the Regional Forester's Amendment #2 and well above levels suggested by Agee (2002) and Harrod et al. (1998) for estimated historical levels. Within all harvest units or 57% of the project area, snags would be retained at an average of approximately 8.2 snags per acre, and 43% of the project area would remain unharvested and likely contain high levels of snags. In the areas that require site-prep and fuels reduction, use may be limited to the aerial insect feeders as the foraging habitat will largely be lost for the timber-drilling and bark gleaner woodpeckers, however

ample habitat should be provided within the unharvested areas and within harvested the areas that will not require site-prep in which all snags <13 inches dbh will be retained. In the long-term, down wood levels should meet or exceed the levels recommended to meet estimated historical or "natural conditions" *across the landscape,* and should greatly exceed LRMP standard and guidelines as amended by the Regional Forester's Amendment #2.

Alternative H

Areas <50% Mortality: Harvest would occur on approximately 5198 acres. Approximately 966 acres are low elevation ponderosa pine type in which an average of 2.9 snags per area would be retained within harvest units (see Table 37). Approximately 4232 acres are high elevation ponderosa pine type in which an average of 6.1 snags per area would be retained within harvest units (see Table 38). Seven percent of the snags retained would be larger snags (30+ inches) to provide for the long-term persistence of snag habitat. Snags would be retained in clumps and clumps will be well distributed across the harvest units. Snag clumps would range from 2-30 snags per clump, which should be within the size range that Agee estimates for historical conditions (2002). Agee predicts that in forests dominated by ponderosa pine, mature clumps of trees occurred in patches ranging from 0.05-0.87 acres in size (Agee 2002). Snag densities and diameter requirements are designed to mimic estimated historical levels, or "natural conditions," and therefore should be adequate for the species dependent upon this type of vegetation type under estimated historical conditions. Harvest would not occur on approximately 4949 acres where snag levels are likely above estimated historical conditions. Therefore overall across the landscape, snag levels are likely well above estimated historical conditions and provide sufficient habitat for cavity dependent species. In addition, in the stands that experienced low to moderate vegetation mortality, it is expected that snags will continue to increase, even post salvage, as the beetles move into these areas.

Areas >50% Mortality:

1. **Total acres >50% mortality** = 14,897 acres
2. **No Harvest Acres**
    1. Total acres of >50% mortality and low volume (L) = 986 acres
    2. Total acres of >50% mortality and moderate volume (M) = 1550 acres
    3. Total acres of >50% mortality and high volume (H) = 2886 acres
    4. Total acres of >50% mortality and very high volume (VH) = 1658 acres
3. **Total acres of Harvest >50% mortality retaining 8 trees/acre 10-20" dbh and 2 trees/acre >20" dbh =** 7817 acres. Within harvest units, 30% tolerance level will be provided for Lewis' woodpeckers, mountain bluebirds, northern flickers, and western bluebirds.

Table 86: Tolerance level for cavity nesting species within the project area for Alternative H*

		Percent of Total Project Area at Less than 30% Tolerance Level	Percent of Total Project Area at the 30% Tolerance Level	Percent of Total Project Area at the 50% Tolerance Level	Percent of Total Project Area at the 80% Tolerance Level		Approximate Average Tolerance Level Across the Project Area
Black-backed Woodpecker		60%	10%	19%	11%		21%
Hairy Woodpecker		53%	7%	10%	30%		31%
Lewis' Woodpecker		0%	70%	19%	11%		39%
Mountain Bluebird		0%	89%	11%	0%		32%
Northern Flicker		0%	89%	11%	0%		32%
Western Bluebird		0%	53%	17%	30%		48%
White-headed Woodpecker		53%	7%	10%	30%		31%

***The approximate tolerance levels are intended to be a comparative measure between alternatives*. It is important to consider that on the Silver Lake Ranger District, the ponderosa pine communities are generally drier sites with lower stand densities. Therefore, the tolerance levels and respective snag densities may not be the same as what the species were selecting for in Idaho where the research was conducted. It is expected**

that cavity-nesters here locally may select for areas with lower snags densities than what was selected for in Idaho, and therefore the tolerance levels overall would be lower.

Snag Dependent Species

This alternative provides for cavity-nesting habitat in the short-term. In the long-term (10-30 years), snags are expected to fall and cavity-nesting habitat will not be available. This alternative proposes to salvage 7817 acres of dead material within the areas mapped as >50% mortality. This would result in a lower tolerance level or assurance for all cavity-nesting species as displayed in Table 86. Most cavity-nesters show consistent patterns of decrease after logging, including the mountain bluebird, black-backed woodpecker, hairy woodpecker, and three-toed woodpecker (Mclver 2000). Snags would all be retained in clumps and if possible, would be located around pre-existing snags to provide for diversity in decay classes. Clump sizes were designed to be large enough that they provide effective nesting habitat for cavity-nesters, but small enough that the area retained a good distribution of snags across the harvest units. Studies show that bird species selected nest sites with higher tree densities and cavity nesters as a group selected clumps of snags as opposed to snags retained in uniform, evenly spaced distribution (Johnson and O'Neil 2001). Larger snags (30+ inches) would be retained to provide for the long-term persistence of snag habitat. Any harvest or activity during the breeding season may have a direct effect on nesting.

Due to safety (site prep for reforestation) and fuels hazard concerns, many acres of harvest will require the felling and treatment of fuels (all trees <13 inches dbh) through various methods including lop and scatter, jackpot burning, crushing, etc. This treatment is proposed within approximately 7535 acres of harvest units and would occur outside of designated snag clumps. The use of snag clumps by cavity-nesting species could be reduced due to the loss of foraging habitat in the surrounding landscape. Use for some species, particularly timber-drilling woodpeckers and bark gleaners, may be limited due to the large amount of foraging habitat lost around the snag clumps. Bates (2001) summarized this as follows:

"Most studies on cavity-nesters that have focused on nest site availability have suggested that cavity-nesters increase in burned habitats as nest site potential also increases (Taylor and Barmore 1980, Raphael and White 1984). In a five-year study that looked at both nesting and foraging use of cavity-nesters in both a stand-replacement burn and adjacent unburned forests in Montana, Caton (1996) concluded 'differences in abundances of most species were probably due to differences in foraging opportunities rather than differences in nest-site availability.' She observed 'nests were placed in sites with characteristics that corresponded to bird species' foraging habits (pg. 78).' That is, timber-drilling woodpeckers and bark gleaners placed their nests in areas with greater basal area, mean dbh, and live canopy compared to ground or aerial foragers."

Approximately 6885 acres of harvest units will not require this type of treatment within the first 3-4 years. The <13 inch dbh material would be retained providing ample amounts of foraging habitat around the snag clumps. These areas are expected to receive greater use overall by cavity-nesters than the areas that will receive site-prep and fuels reduction treatments. If site prep is required within these 5818 acres, it would occur in year 4 or 5 when the snags have begun to fall and the foraging habitat is less effective.

Outside of the areas proposed for salvage, approximately 4295 acres will require site prep. These areas can be described as areas that have received heavy amounts of past harvest and are now post and pole stands, or generally do not contain enough material to be considered an economically viable salvage area. Therefore, these areas likely contain low levels of cavity nesting habitat. These areas are likely providing foraging habitat due to the smaller overall tree size. Within these areas, a one acre snag clump will be retained every 5 acres to retain some foraging habitat and continuity in snags, and all snags outside of snag clumps will likely be felled on approximately 1000 acres in 2004, 2295 acres in 2005 and 1000 acres in 2006 and therefore will decrease foraging habitat for cavity nesting species. The areas receiving site prep in 2006 will have a lesser effect because the small tree component that will provide the foraging habitat will have already begun to fall.

Snag recruitment is forgone for many years until planted trees develop into functioning mature stands in which natural snag recruitment occurs. Planting of approximately 20,906 acres under this alternative will accelerate this process.

Black-backed Woodpeckers

The tolerance level, or assurance of retaining habitat for black-backed woodpeckers is reduced from an average of 41% to 21% across the landscape. However, of the 12 areas considered to be the most optimal *identified* habitat selected for black-backed woodpeckers within the project area based on the following criteria: 1.) areas of high canopy closure pre-fire ranging generally between 75-120 acres and 2.) high densities of smaller trees, at least part of all twelve areas are being

retained under this alternative and will remain large enough that they will be effective habitat. Although the total amount of acres of *identified* optimal black-backed habitat is reduced from 1789 acres to 1699 acres, all 12 areas would still meet the criteria as described in the literature by Saab et al. (2002). Therefore, the majority of the most optimal *identified* habitat will be retained within the project area (see Table 87).

In addition to the identified optimal habitat listed above in Table 87, areas of high canopy closure within the project area may provide for limited black-backed woodpecker habitat within the project area. Although much of these acres do not meet the contiguous size as defined in the literature by Saab et al. (2002), they likely do provide the high densities of trees that black-backed woodpeckers select for (see Table 88). Approximately 2579 acres or 62% of these areas will remain unharvested.

Table 87: Total acres of *identified* optimal black-backed woodpecker habitat by subshed for Alternative H

Subshed	Total Acres Proposed for Harvest	Total Acres *Not* Proposed for Harvest
Benny Creek	24	301
East Duncan Creek	0	5
Lower Duncan Creek	0	123
Thompson Reservoir	33	523
Upper Duncan Creek	11	239
Upper Silver Creek	0	0
Middle Silver Creek	0	0
West Fork Silver Creek	22	508
Total Acre	90	1699

In addition to the identified optimal habitat listed above in Table 87, areas of high canopy closure within the project area may provide for limited black-backed woodpecker habitat within the project area. Although much of these acres do not meet the contiguous size as defined in the literature by Saab et al. (2002), they likely do provide the high densities of trees that black-backed woodpeckers select for.

Table 88: Total acres within the project area that are high canopy closure (>40% canopy closure) and >50% mortality by subshed for Alternative H (These acres overlap with the acres in Table 87)

Subshed	Total Acres Proposed for Harvest			Total Acres *Not* Proposed for Harvest		
	>70% Canopy Closure	56-70% Canopy Closure	40-56% Canopy closure	>70% Canopy Closure	56-70% Canopy Closure	40-56% Canopy closure
Benny Creek	0	80	408	0	158	247
East Duncan Creek	0	57	148	0	73	62
Lower Duncan Creek	0	51	197	0	96	373
Thompson Reservoir	0	29	187	1	77	457
Upper Duncan Creek	6	25	86	4	89	465
Upper Silver Creek	1	2	18	0	6	97
Middle Silver Creek	0	0	32	0	0	3
West Fork Silver Creek	1	9	231	22	113	236
Total Acres	8	253	1307	27	612	1940
Total Acres	1568			2579		

In the first year after the fire (2003), no logging would occur and all potential existing habitat would be available for black-backed nesting and foraging. After the beetle population decreases in the stands that experienced high vegetation mortality in 2-4 years, it is expected that the beetles will begin to enter the stands that experienced low to moderate vegetation mortality, and black-backed woodpeckers would follow the foraging source. The 7817 acres of harvest within the >50% mortality category will likely not provide nesting habitat for black-backed woodpeckers.

Any harvest or activity during the breeding season may have a direct effect on nesting. Although the tolerance level for black-baked woodpeckers will be reduced, it is likely that sufficient habitat is being retained to provide for viable populations of black-backed woodpeckers.

Lewis' Woodpeckers
The tolerance level, or assurance of retaining habitat for Lewis' woodpeckers is reduced from an average of 46% to 39% across the landscape. Lewis's woodpeckers are most abundant in partially logged burned forests and relatively rare in unlogged units of western Idaho (Saab and Dudley 1998). Within the harvest units >50% mortality, snags will be retained at the 30% tolerance level or assurance for Lewis' woodpeckers and should provide for suitable nesting habitat. Of the areas considered to be the most optimal *identified* habitat selected for Lewis' woodpeckers within the project area based on the following criteria: 1.) areas of low to moderate canopy closure pre-fire ranging generally between 16-17 acres and 2.) high densities of large ponderosa pine trees, 785 acres will remain as unlogged leave areas under this alternative distributed across the project area (see Table 89).

Lewis' woodpecker habitat may also be identified by selecting areas of low to moderate canopy closure (11-40%), high mortality (>50%), ponderosa pine or ponderosa pine dominated mixed conifer communities, and areas of high or very high volume (see Table 90). Although much of these acres do not meet the contiguous size as defined in the literature by Saab et al. (2002) (16-17 acres), they likely do provide the high densities of large ponderosa pine that Lewis' woodpeckers select for. Approximately 2348 acres or 48% of these areas will remain unharvested.

Table 89: Total acres of *identified* optimal Lewis' woodpecker habitat by subshed for Alternative H

Subshed	Total Acres Proposed for Harvest	Total Acres *Not* Proposed for Harvest
Benny Creek	27	51
East Duncan Creek	3	124
Lower Duncan Creek	0	20
Thompson Reservoir	29	140
Upper Duncan Creek	33	193
Upper Silver Creek	5	53
Middle Silver Creek	1	38
West Fork Silver Creek	17	166
Total Acre	115	785

Table 90: Total acres within the project area that are low to moderate canopy closure (11-40%), >50% mortality, ponderosa pine or ponderosa pine dominated mixed conifer communities, and high or very high volume by subshed for Alternative H (These acres overlap with the acres in Table 89)

Subshed	Total Acres Proposed for Harvest	Total Acres *Not* Proposed for Harvest
Benny Creek	252	127
East Duncan Creek	65	188
Lower Duncan Creek	60	225
Thompson Reservoir	802	262
Upper Duncan Creek	407	447
Upper Silver Creek	168	130
Middle Silver Creek	154	53
West Fork Silver Creek	682	916
Total Acre	2590	2348

The biological objectives for habitat recommended in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are where ecologically and socially appropriate, through natural events or management, maintain >50% of a post-fire landscape unsalvaged (Altman 2000). Under this alternative, including all acres in all mortality classes, 48% of the areas proposed for salvage will remain unlogged. In addition, 2348 acres or 48% of the total acres that are >50% mortality, with low to moderate canopy closure, and high to very high volume will remain unharvested (see Table 90).

Any harvest or activity during the breeding season may have a direct effect on nesting. There is a very high assurance that sufficient habitat is being retained to provide for viable populations of Lewis' woodpeckers.

Down Wood Dependent Species
It is expected that as snags begin to fall, down wood levels will increase thereby increasing denning, nesting, and feeding habitat for down wood dependent species. Levels will vary across the landscape due to the variation in snag retention and

fuels treatments prescribed. Some areas of no harvest will greatly exceed the recommendations, while areas of harvest and fuels treatments may be at or below the recommendations. Within all harvest units, the snags retained as described in Tables 37, 38, and 39 alone would a minimum of 0.70 down wood percent cover. Therefore, it is estimated that:

1. Down wood levels would be slightly below 1.1 – 2.5 percent down wood cover within approximately 7535 acres of harvest units that will receive site-prep and fuels treatment. Down wood levels would be a minimum of 0.70 percent down wood cover.
2. Down wood levels would be at or above 1.1 – 2.5 percent down wood cover on approximately 6885 acres of harvest units will not receive site-prep and fuels reductions. Down wood levels would be a minimum of 0.70 percent down wood cover **plus** all snags <13 inches dbh.
3. Down wood levels would greatly exceed 1.1 – 2.5 percent down wood cover on approximately 12,029 acres that will receive no harvest.

In the long-term, down wood levels should exceed the levels recommended to meet estimated historical or "natural conditions" as developed with the data in DecAID of 1.1 – 2.5 percent cover *across the landscape*, and should greatly exceed LRMP standard and guidelines as amended by the Regional Forester's Amendment #2.

Conclusion for Alternative H

Table 91: Summary of harvest and no harvest for Alternative H

	Total Acres of Harvest	Total Acres of No Harvest
<50% Mortality Low Elevation Ponderosa Pine	966	4949
<50% Mortality High Elevation Ponderosa Pine	4232	
>50% Mortality	7817	7080
Total	13,015	12,029

Table 92: Summary of site prep and fuel reduction (felling of all material <13 inches dbh) and reforestation for Alternative H

	Total acres
Total acres of harvest with site-prep and fuels reduction	7535
Total acres of harvest without site-prep and fuels reduction	6885
Total acres of site-prep in areas outside of harvest	4295
Total acres of reforestation	20,906

Table 93: Summary of the total acres of identified and suitable habitat for black-backed woodpeckers and Lewis' woodpeckers for Alternative H

	Total Acres of Harvest	Total Acres of No Harvest
Total acres of *identified* optimal black-backed woodpecker habitat	90	1699
Total acres of suitable black-backed woodpecker habitat	1568	2579
Total acres of *identified* optimal Lewis' woodpecker habitat	115	785
Total acres of suitable Lewis' woodpecker habitat	2590	2348

Table 94: Summary of the tolerance levels for black-backed and Lewis' woodpeckers for Alternative H

	Existing Condition	Alternative H
Tolerance level for black-backed woodpeckers	41%	21%
Tolerance level for Lewis' woodpeckers	46%	39%

Although the tolerance level will be reduced for all cavity nesters including a reduction from 41% to 21% for black-backed woodpeckers and from 46% to 39% for Lewis' woodpeckers, it is important to consider that on the Silver Lake Ranger District, the ponderosa pine communities are generally drier sites with lower stand densities. Therefore, the tolerance levels and respective snag densities may not be the same as what the species were selecting for in Idaho where the research was

conducted. It is expected that cavity-nesters here locally may select for areas with lower snags densities than what was selected for in Idaho, and therefore the tolerance levels overall would be lower. Also, 95% of the *identified* optimal habitat and 62% of the total suitable habitat for black-backed woodpecker habitat will remain unharvested, and 87% of the *identified* optimal habitat and 48% of the total suitable habitat for Lewis' woodpeckers will remain unharvested. And overall, 48% of the project area will remain unharvested.

Based on the most recent science and information available in DecAID, habitat will be retained under this alternative to provide for viable populations of all cavity nesting and down wood dependent species. Snag retention was based on the snag levels needed for cavity nesting species in: 1.)green stand conditions (<50% mortality) based on the **inventory data and distribution data** available in DecAID, and 2.) post-fire conditions (>50% mortality) based on the **wildlife data** available in DecAID most notably for black-backed woodpeckers and Lewis' woodpeckers. By taking the approach of managing for estimated historical or "natural conditions" in the green stands, and for both black-backed woodpeckers and Lewis' woodpecker that require the opposite extremes for snag densities and size requirements in the post-fire conditions, we are likely providing habitat for the entire assemblage of woodpecker species.

Snag levels overall across the landscape including both harvest and unharvested areas, are well above LRMP standard and guidelines as amended by the Regional Forester's Amendment #2 and well above levels suggested by Agee (2002) and Harrod et al. (1998) for estimated historical levels. Within all harvest units or 52% of the project area, snags would be retained at an average of approximately 8.0 snags per acre, and 48% of the project area would remain unharvested and likely contain high levels of snags. In the areas that require site-prep and fuels reduction, use may be limited to the aerial insect feeders as the foraging habitat will largely be lost for the timber-drilling and bark gleaner woodpeckers, however ample habitat should be provided within the unharvested areas and within the harvested areas that will not require site-prep in which all snags <13 inches dbh will be retained. In the long-term, down wood levels should meet or exceed the levels recommended to meet estimated historical or "natural conditions" *across the landscape*, and should greatly exceed LRMP standard and guidelines as amended by the Regional Forester's Amendment #2.

Table 95: Mitigation measures that apply to snag dependent species

Mitigation Measure	Alternatives
Distribution – Retain snags in groups of varying size distributed across a treatment area. **<50% Mortality Areas:** Within a 10 acre area, a *minimum* of 1 snag clump with 20 trees is required, with the exception of narrow units or parts of units that are less than 500 feet wide and are surrounded on one side of the 500 foot band by a stand in which 50% of the trees >10 inches are dead. Snag clumps would range from 2-30 snags per clump. In areas where snags are intermixed within a green overstory, smaller clumps are encouraged to provide for a better distribution of snags across the unit. In areas of localized mortality >5 acres, larger snag clumps are encouraged. **>50% Mortality Areas:** Within a 10 acre area, a *minimum* of 1 snag clump with 20 trees is required, with the exception of narrow units or parts of units that are less than 500 feet wide and are surrounded on one side of the 500 foot band by a stand in which 50% of the trees >10 inches are dead. Snag clumps would range from 50-100 snags per clump, and clumps would be distributed every 5-10 acres. Approximately 50% of the clumps would be distributed every 5 acres and approximately 50% would be distributed every 10 acres. **Areas requiring site-prep outside of harvest units and plantations:** Leave a one acre snag clump every 5 acres.	C,D,E,G,H
Shape – Groups of snags should vary in size (see above), shape (circle, oblong, etc.), orientation (vertical – parallel to slope or horizontal - across slope), and snag stocking.	C,D,E,G,H
Species – The desired species of snags in order of preference is: ponderosa pine, lodgepole pine, and white fir. However, tree species in snag clumps should be representative of the stand.	C,D,E,G,H
Size of Individuals – The size in terms of diameter at breast height should reflect the size classes present in the stand, favoring larger diameter snags where available.	C,D,E,G,H
Placement –No area greater than 10 acres should be left completely deficient of snags. Generally, snag groups should be located greater than 200' from a road. If snag groups are located within 200' of a road for visual qualities, snags should be selectively marked to ensure they are not tall enough to fall on a road.	C,D,E,G,H
Older snags - Older snags (snags which existed as snags prior to the fires) and broken top trees will be protected to the extent practicable. Groups of new snags should be focused in the area around older snags where the opportunity exists. OSHA standards for providing safety from falling snags	C,D,E,G,H

shall be adhered to. Where conflicts between logging systems, safety, and the need to retain snags exist, a wildlife biologist will be consulted.	

Table 96: Mitigation measure that applies to down wood dependent species

Mitigation Measure	Alternatives
All trees cut during fire suppression activities shall be left on the ground to provide for dead and down woody material habitat, except for those needing to be removed for road maintenance purposes.	C,D,E,G,H

Cumulative Effects Common to all Alternatives for Snag Dependent Species

All of the activities in Appendix A have been considered for their cumulative effects on snag dependent species, and the following activities have the potential to produce a cumulative effect. Due to past harvest management including roadside hazard, fire suppression, snag removal, and overstory removal, snag numbers have declined from pre-fire historical levels. Excavators associated with open late/old ponderosa pine, such as the white-headed woodpecker and Lewis' woodpecker, have likely experienced a decline in habitat suitability, bird distribution, and populations. Past timber harvest activities, as described in Table A-2 and A-13 of Appendix A, and fire suppression, as described in Table A-1 of Appendix A, have changed overall stand conditions on federal and private lands resulting in the forest succession from an open pine forest to a dense mixed conifer dominated forest, and from the direct removal of snag habitat. Although higher stocking levels may be creating more snags through competition and insects, the overall loss of snags through harvest has resulted in lower than historical levels. Prescribed fire has also likely increases snag levels locally with individual snag creation and small 1-10 acre blowouts. Wildfires, as displayed in Table A-1 of Appendix 2, have increased snag number in the short-term, but for the most part past wildfires have experienced some level of salvage. The snag felling involved in the 2002 suppression activities, as displayed in Table A-1 of Appendix A, involved the felling of approximately 300-400 trees which reduced snag levels, but increased down wood levels. The snag felling involved in the 2002 suppression activities, as displayed in Table A-1 of Appendix A, involved the felling of approximately 300-400 trees which reduced snag levels, but increased down wood levels. Road developments, as displayed in Table A-6 of Appendix A, have had an influence in snag levels by increasing the amount of area considered to be a hazard resulting in the felling and harvest of road-side hazard snags. Personal use firewood cutting, as displayed in Table A-12 of Appendix 2, have decreased snag levels across the District. The salvage on BLM land, as displayed in Table A-15 of Appendix A, is so small in comparison to the fire that there is likely no cumulative impact.

The Winter Fire is directly adjacent to the Toolbox and Silver Fires to the east. This fire was approximately 34,000 acres and currently only approximately 3000 acres is proposed for salvage harvest. This fire is a mix of conditions including forested, unforested, and plantations. Within the forested conditions and outside of the areas proposed for salvage, ample amounts of snags are available for cavity dependent species habitat. The area includes a mix of snag densities and sizes classes required by cavity-dependent species. Within the 3000 acres proposed for salvage, snags retention guidelines will assure the retention of snags to meet cavity dependent species habitat. Also, approximately 1500 acres of the Toolbox and Silver Fires located in the Bridge Creek and Anna Reservoir Subshed will not be proposed for salvage and will provide additional habitat for cavity dependent species.

Current trends indicate that snag and down wood numbers are increasing due to reduced harvest of snags and increased required levels according to the Regional Foresters Amendment #2 standard and guidelines. Activities that are expected to be implemented in the Bridge Creek Subshed, including prescribed fire and silvicultural treatments designed to promote the development of LOS habitat with a snag and down wood component and those activities displayed in Table A-16 of Appendix A including prescribed fire and thinning, are expected to improve habitat for cavity dependent species. Prescribed fire is expected to increase replacement snag and down wood numbers and reduce the fuel loading thereby protecting stands from wildfire.

In conclusion, considering all cumulative activities, snags will be retained at levels assumed to meet standard and guidelines as amended by the Regional Forester's Amendment #2 in the short term under all alternatives. Snags will also be retained at levels assumed to support viable populations of cavity nesting species under all alternatives. Alternative A provides the greatest opportunity of maintaining snags in the long-term (15+ years), and this opportunity becomes less likely respectively with Alternative D, E, H, C, and G. Virtually all burned trees are expected to fall in the next 30 years, resulting in an abundance of down wood habitat and a shortage of snags (Gobar 1996). Once the majority of snags fall, cavity excavators would not likely occupy the area.

Cumulative Effects Common to all Alternatives for Black-backed Woodpeckers

All of the activities in Appendix A have been considered for their cumulative effects on black-backed woodpeckers, and the following activities have the potential to produce a cumulative effect. Due to past harvest management including roadside hazard, fire suppression, snag removal, and overstory removal, snag numbers have declined from pre-fire historical levels. Past timber harvest activities, as described in Table A-2 and A-13 of Appendix A, and fire suppression, as described in Table A-1 of Appendix A, have changed overall stand conditions on federal and private lands resulting in the forest succession from an open pine forest to a dense mixed conifer dominated forest, and from the direct removal of snag habitat. Although higher stocking levels may be creating more snags through competition and insects, the overall loss of snags through harvest has resulted in lower than historical levels. However, this condition has lead to stand replacement fires with high stand densities preferred by black-backed woodpeckers. Prescribed fire has also likely increased snag levels locally with individual snag creation and small 1-10 acre blowouts, and understory thinning through fire has likely increased foraging habitat for black-backed woodpeckers. Wildfires, as displayed in Table A-1 of Appendix 2, have increased snag number in the short-term, but for the most part past wildfires have experienced some level of salvage will little retention suitable habitat required by black-backed woodpeckers. The snag felling involved in the 2002 suppression activities, as displayed in Table A-1 of Appendix A, involved the felling of approximately 300-400 trees which reduced snag levels, but increased down wood levels. Road developments, as displayed in Table A-6 of Appendix A, have had an influence in snag levels by increasing the amount of area considered to be a hazard resulting in the felling and harvest of road-side hazard snags. Personal use firewood cutting, as displayed in Table A-12 of Appendix 2, have decreased snag levels across the District. The salvage on BLM land, as displayed in Table A-15 of Appendix A, is so small in comparison to the fire that there is likely no cumulative impact.

The Winter Fire is directly adjacent to the Toolbox and Silver Fires to the east. This fire was approximately 34,000 acres and currently only approximately 3000 acres is proposed for salvage harvest. This fire is a mix of conditions including forested, unforested, and plantations. Within the forested conditions and outside of the areas proposed for salvage, large areas of suitable black-backed woodpecker habitat are available. Within the 3000 acres proposed for salvage, snags retention guidelines will assure the retention of snags to meet cavity dependent species habitat, including the retention of approximately 160 acres for black-backed woodpeckers. Also, approximately 1500 acres of the Toolbox and Silver Fires located in the Bridge Creek and Anna Reservoir Subshed will not be proposed for salvage and will provide additional habitat for black-backed woodpeckers.

Current trends indicate that snag and down wood numbers are increasing due to reduced harvest of snags and increased required levels according to the Regional Foresters Amendment #2 standard and guidelines. Activities that are expected to be implemented in the Bridge Creek Subshed, including prescribed fire and silvicultural treatments designed to promote the development of LOS habitat with a snag and down wood component and those activities displayed in Table A-16 of Appendix A including prescribed fire and thinning, are expected to improve habitat for black-backed woodpeckers. Prescribed fire is expected to increase replacement snag and down wood numbers and create understory foraging habitat. Due to the uncertainty of disturbance and what kind of activities will result from future disturbance, it is unknown how black-backed woodpeckers populations will cumulatively be affected over time. Fire suppression continues to intensify and intensive salvage logging continues to occur following fires, local and regional black-backed woodpecker populations may consequently decline (Murphy and Lenhausen 1998; Johnson and O'Neil 2001). However, ample amounts of black-backed woodpecker habitat will be available in the short-term that will assure population viability.

In conclusion, considering all cumulative activities, snags will be retained at levels assumed to meet standard and guidelines as amended by the Regional Forester's Amendment #2 in the short term under all alternatives. Snags will also be retained at levels assumed to support viable populations of black-backed woodpeckers under all alternatives. Alternative A provides the greatest opportunity of habitat (tolerance level = 41%), and this opportunity becomes less likely respectively with Alternative D (tolerance level = 30%), H (tolerance level = 21%), E (tolerance level = 20%), C (tolerance level = 19%), and G (tolerance level = 19%). Virtually all burned trees are expected to fall in the next 30 years, resulting in an abundance of down wood habitat and a shortage of snags (Gobar 1996). Once the majority of snags fall and the beetle population decreases, black-backed woodpeckers would not likely occupy the area.

Cumulative Effects Common to all Alternatives for Lewis' Woodpeckers

All of the activities in Appendix A have been considered for their cumulative effects on Lewis' woodpeckers, and the following activities have the potential to produce a cumulative effect. Due to past harvest management including roadside hazard, fire suppression, snag removal, and overstory removal, snag numbers have declined from pre-fire historical levels. Past timber harvest activities, as described in Table A-2 and A-13 of Appendix A, and fire suppression, as described in

Table A-1 of Appendix A, have changed overall stand conditions on federal and private lands resulting in the forest succession from an open pine forest to a dense mixed conifer dominated forest, and from the direct removal of snag habitat. Prescribed fire has also likely increases snag levels locally with individual snag creation and small 1-10 acre blow-outs, and understory thinning through fire has likely opened stand conditions preferred by Lewis' woodpeckers. Wildfires, as displayed in Table A-1 of Appendix 2, have increased snag number in the short-term, but for the most part past wildfires have experienced some level of salvage, although Lewis' populations has experienced in increase in salvage conditions if adequate snag levels are retained. The snag felling involved in the 2002 suppression activities, as displayed in Table A-1 of Appendix A, involved the felling of approximately 300-400 trees which reduced snag levels, but increased down wood levels. Road developments, as displayed in Table A-6 of Appendix A, have had an influence in snag levels by increasing the amount of area considered to be a hazard resulting in the felling and harvest of road-side hazard snags. Personal use firewood cutting, as displayed in Table A-12 of Appendix 2, have decreased snag levels across the District. The salvage on BLM land, as displayed in Table A-15 of Appendix A, is so small in comparison to the fire that there is likely no cumulative impact.

The Winter Fire is directly adjacent to the Toolbox and Fires to the east. This fire was approximately 34,000 acres and currently only approximately 3000 acres is proposed for salvage harvest. This fire is a mix of conditions including forested, unforested, and plantations. Within the forested conditions and outside of the areas proposed for salvage, large areas of suitable black-backed woodpecker habitat are available. Within the 3000 acres proposed for salvage, snags retention guidelines will assure the retention of snags to meet cavity dependent species habitat, including the retention of approximately 140 acres for Lewis' woodpeckers. Also, approximately 1500 acres of the Toolbox and Silver located in the Bridge Creek and Anna Reservoir Subshed will not be proposed for salvage and will provide additional habitat for Lewis' woodpeckers

Current trends indicate that snag and down wood numbers are increasing due to reduced harvest of snags and increased required levels according to the Regional Foresters Amendment #2 standard and guidelines. Activities that are expected to be implemented in the Bridge Creek Subshed, including prescribed fire and silvicultural treatments designed to promote the development of LOS habitat with a snag and down wood component and those activities displayed in Table A-16 of Appendix A including prescribed fire and thinning, are expected to improve habitat for Lewis' woodpeckers by creating more open ponderosa pine conditions.

In conclusion, considering all cumulative activities, snags will be retained at levels assumed to meet standard and guidelines as amended by the Regional Forester's Amendment #2 in the short term under all alternatives. Snags will also be retained at levels assumed to support viable populations of Lewis' woodpeckers under all alternatives. Alternative A provides the greatest opportunity of habitat in the long-term (tolerance level = 46%), and this opportunity becomes less likely respectively with Alternative D (tolerance level = 42%), H (tolerance level = 39%), E (tolerance level = 38%), G (tolerance level = 38%), and C (tolerance level = 38%). Virtually all burned trees are expected to fall in the next 30 years, resulting in an abundance of down wood habitat and a shortage of snags (Gobar 1996). Once the majority of snags fall and the beetle population decreases, Lewis' woodpeckers would not likely occupy the area.

Cumulative Effects Common to all Alternatives for Down Wood Dependent Species

All of the activities in Appendix A have been considered for their cumulative effects on down wood dependent species, and the following activities have the potential to produce a cumulative effect. Due to past harvest management including roadside hazard, fire suppression, down wood removal, and overstory removal, down wood numbers have declined from pre-fire historical levels. Wildlife associated with high levels of down wood, have likely experienced a decline in habitat suitability, bird distribution, and populations. Past timber harvest activities including salvage, as described in Table A-2 and A-13 of Appendix A, and fire suppression, as described in Table A-1 of Appendix A, have resulted in the removal of down wood habitat. Fire suppression has also likely increases snag levels locally with individual snag creation and small 1-10 acre blowouts. Wildfires, as displayed in Table A-1 of Appendix 2, have increased snag number in the short-term, but for the most part past wildfires have experienced some level of salvage which minimizes the amount of future down wood. The snag felling involved in the 2002 suppression activities, as displayed in Table A-1 of Appendix A, have increased down wood levels slightly. Personal use firewood cutting, as displayed in Table A-12 of Appendix 2, have decreased down wood levels across the District. The salvage on BLM land, as displayed in Table A-15 of Appendix A, is so small in comparison to the fire that there is likely no cumulative impact on future down wood.

The Winter Fire is directly adjacent to the Toolbox and Silver Fires to the east. This fire was approximately 34,000 acres and currently only approximately 3000 acres is proposed for salvage harvest. This fire is a mix of conditions including

forested, unforested, and plantations. Within the forested conditions and outside of the areas proposed for salvage, ample amounts of snags will remain on site and will result in heavy down wood loading in the future. Within the 3000 acres proposed for salvage, snags retention guidelines will assure the retention of down wood habitat in the future as snags fall. Also, approximately 1500 acres of the Toolbox and Silver Fires located in the Bridge Creek and Anna Reservoir Subshed will not be proposed for salvage and will provide additional habitat for down wood dependent species.

Current trends indicate that own wood numbers are increasing due to reduced harvest of down wood and increased required levels according to the Regional Foresters Amendment #2 standard and guidelines. Activities that are expected to be implemented in the Bridge Creek Subshed, including prescribed fire and silvicultural treatments designed to promote the development of LOS habitat with a snag and down wood component and those activities displayed in Table A-16 of Appendix A including prescribed fire and thinning, are expected to improve habitat for cavity dependent species. Prescribed fire is expected to increase replacement snag and down wood numbers and reduce the fuel loading thereby protecting stands from wildfire.

In conclusion, considering all cumulative activities, down wood will be retained at levels assumed to meet standard and guidelines as amended by the Regional Forester's Amendment #2 in the long term under all alternatives. Down wood will also be retained at levels assumed to support viable populations of down wood dependent species under all alternatives. Alternative A provides the greatest opportunity of maintaining future down wood, and this opportunity becomes less likely respectively with Alternative D, E, H, C, and G.

G. Black-backed Woodpeckers

Black-backed Woodpecker - Existing condition

Refer to the Section F of this report.

II. Threatened, Endangered, and Sensitive Species

Table 97: Threatened, endangered, and sensitive species affected by this project

January 13, 2003 list

		Effects *			
		No Action		***Action Alts***	
Species Name	**Status**	**Species**	**Habitat**	**Species**	**Habitat**
Bald eagle *(Haliaeetus leucocephalus)*	Threatened	NE	NE	NE	NE
Canada lynx *(Lynx canadensis)*	Threatened	NE	NE	NE	NE
Oregon spotted frog *(Rana pretiosa)*	Candidate	NI	NI	MIIH	MIIH
Yellow-billed cuckoo *(Coccyzus americanus)*	Candidate	NI	NI	NI	NI

*Effects Determination Code for Threatened or Endangered Species
NE = No Effect from the project on the species or critical habitat.
LAA = The project may affect and is likely to adversely affect the species or critical habitat. Formal Consultation with U.S. Fish & Wildlife Service is required.
NLAA = The project may affect the species or critical habitat, but those effects are not likely to adversely affect the species or critical habitat. Informal Consultation is required with concurrence from the U.S. Fish & Wildlife Service.
BE = The project will benefit a species or its habitat. Written concurrence from the U.S. Fish & Wildlife Service requested.

*Effects Determination Code for Candidate Species
NI = No Impact
MIIH = May impact individuals or habitat, but will not likely contribute to a trend toward federal listing or loss of viability to the population or species.

Table 98: Region 6 sensitive species affected by this project

	Effects *			
	No Action		*Action Alts*	
Species Name	**Species**	**Habitat**	**Species**	**Habitat**
Horned grebe *(Podiceps auritus)*	NI	NI	NI	NI
Red-necked grebe *(Podiceps grisegena)*	NI	NI	NI	NI
Least bittern *(Ixobrychus exillis)*	NI	NI	NI	NI
Bufflehead *(Bucephala albeola)*	NI	NI	MIIH	MIIH
Peregrine falcon *(Falco peregrinus)*	NI	NI	NI	NI
Western sage grouse *(Centrocercus urophasianus)*	NI	NI	NI	NI
Yellow rail *(Coturnicops noveboracensis)*	NI	NI	NI	NI
Upland Sandpiper *(Bartramia longicauda)*	NI	NI	NI	NI
Gray flycatcher *(Empidonax wrightii)*	NI	NI	MIIH	NI
Tricolored blackbird *(Agelaius tricolor)*	NI	NI	NI	NI
California wolverine *(Gulo gulo)*	NI	NI	MIIH	MIIH
Pacific fisher *(Martes pennanti)*	NI	NI	MIIH	MIIH
Pygmy rabbit *(Brachylagus idahoensis)*	NI	NI	NI	NI
Northern Leopard Frog *(Rana boylii)*	NI	NI	MIIH	MIIH
Columbia Spotted Frog *(Rana luteiventris)*	NI	NI	MIIH	MIIH
Oregon spotted frog *(Rana pretiosa)*	NI	NI	MIIH	MIIH
Northwestern Pond Turtle *(Clemmys marmorata marmorata)*	NI	NI	MIIH	MIIH

*Effects Determination Code for R6 Sensitive Species
NI = No Impact
MIIH = May impact individuals or habitat, but will not likely contribute to a trend toward federal listing or loss of viability to the population or species

Table 99: Mitigation measure that applies to endangered, threatened, and sensitive species

Should any listed endangered, threatened, or sensitive species be found during project activities within, adjacent, or near enough to the project that activities could be a disturbance, activities will be halted until their effects can be determined and their significance assessed.	C,D,E

H. Bald Eagle

Bald Eagle - Existing condition

Ecology: Bald eagle populations have declined due to DDT-induced declines in natality rates, shooting, poisoning, habitat destruction, and disturbance (Fraser 1983). As a result, the bald eagle was placed on the federal list as a threatened species. Protective measures have been successful and eagle numbers have increased to a stable level and the species is currently being considered for de-listing by the USFWS. Active management and protection is still crucial to maintain population levels.

The primary diet of eagles is fish, waterfowl, and small mammals. Bald eagles are susceptible to disturbance from human activities, and require seclusive habitat for nesting, roosting, and foraging. Bald eagle nests are typically located in mature to overmature trees with large widely spaced limbs capable of supporting a heavy nest. Large snags, dead-topped trees, and live open-limbed trees within the nest stand is important for providing perch sites for the adults and landing sites for the fledglings. Nests are usually located near major bodies of water with abundant amounts of fish and/or waterfowl, or where there is an abundance of rodents or small mammals.

Issacs and Silovsky (1981) identified public knowledge of nest site locations, timing of human activities near nest sites, pesticide use, and permanent developments as concerns within BEMA's, in addition to habitat alteration and mortality factors. Other concerns that have surfaced are the increased amounts of fuels and the presence of dense understories that

can act as ladder fuels. Together these factors have increased the risk of crown fires that can destroy entire BEMA's. Secondly, trees that are currently used by bald eagles for nesting generally predate European settlement of the West. Stands that developed during this period were subject to different factors that determined stands structure and composition. Historically, frequent fires favored fire tolerant tree species, elevated the base of tree crowns, and resulted in wider tree spacing (Everett et al. 1993). Observations of the dense understories within BEMA's and elsewhere on the Fremont National Forest as a result of fire suppression suggest they may not be providing suitable replacement nest trees for bald eagle nesting.

Existing Condition: Three Bald Eagle Management Areas (BEMA's) were affected to some degree by the Toolbox and Silver Fires. The Silver Creek and the Thompson Reservoir eagle nests are located approximately 1.5 miles from the project area boundary, and the Dead Indian Rim eagle nest is located within the project area boundary. The Silver Creek and Thompson Reservoir BEMA's were only slightly affected and the nest stands did not burn. The majority of the Dead Indian Rim BEMA burned in a mosaic pattern and the historical and most recent nest tree was severely burned by the fire. All three nests have been monitored this year and all of the pairs have successfully returned to the BEMA and have been documented incubating.

Forest Service land within the Dead Indian BEMA and the Thompson Reservoir BEMA are Management Area 2. As stated in the LRMP for Management Area 2, "Timber harvest will be used as a management tool to enhance and perpetuate bald eagle habitat where necessary and appropriate" (1989). The management objectives for bald eagle areas are to provide: 1.) an abundance of mature/overmature trees for nesting/roosting platforms, 2.) a minimum of disturbance from people, and 3.) an abundance of food (LRMP 1989).

On April 10, a consultation meeting was held with the U.S. Fish and Wildlife Service. Those in attendance were Amy Markus, North Zone Wildlife Biologist for the Fremont-Winema National Forests, Brent Frazier, Forest Wildlife Biologist for the Fremont-Winema National Forests, Rick Hardy, U.S. Fish and Wildlife Service in Klamath Falls, and Leonard LeCaptain, U.S. Fish and Wildlife Service in Klamath Falls. The project was discussed including all potential alternatives, mitigation measures, and potential effects to bald eagles and their habitat.

Bald Eagle – Environmental Consequences

Direct and Indirect Effects

Alternative A (No Action)
The no action alternative would not remove, modify, or alter any bald eagle habitat. However, it would not contribute to reducing future fuel loadings, or providing future sustainable vegetation. This alternative has no proposed fuels treatment. Therefore areas that naturally regenerate and the remaining bald eagle habitat could have the potential to reburn in the future. No proposed planting will also result in a delayed advancement of future bald eagle nesting habitat.

Alternative C, D, E, G
These alternatives propose to harvest approximately 415 acres within the Dead Indian Rim Bald Eagle Management Area. However, no bald eagle nesting habitat would be removed, and snag retention standards as described in Section F of this report would provide for adequate snags for perching and/or pilot trees if a new nest were created in the project area. No harvest would occur within the Thompson Reservoir and the Silver Creek Bald Eagle Management Area.

Fuels treatment is proposed for approximately 400 acres within the Dead Indian Rim Bald Eagle Management Area for Alternatives C, D, E, and G, and in addition the ¼ mile buffer adjacent to private land will be treated in Alternative G. This will reduce fuel loadings and decrease the potential for a reburn within this BEMA in the future. Planting will expedite the recovery of bald eagle habitat and planting at lower densities of 130-250 trees per acres would increase the potential for producing suitable bald eagle trees in the long-term.

No visually disturbing activities (e.g. parking vehicles, tree marking, planning, etc.) and noise disturbing activities (e.g. falling, hauling, chainsaws, heavy equipment use, etc.) would occur within ¼ mile of the active nest site, no visually disturbing activities (e.g. parking vehicles, tree marking, planning, etc.) and noise disturbing activities (e.g. falling, hauling, chainsaws, heavy equipment use, etc.) that are in line of site of the nest would occur within ½ mile of the active nest site, and no helicopter use (e.g. flight paths, landings, etc.) would occur within ½ mile of the active nest site. In addition, these mitigations would be monitored to assure they are effective in avoiding disturbance.

The management objectives for bald eagle areas are to provide: 1.) an abundance of mature/overmature trees for nesting/roosting platforms, 2.) a minimum of disturbance from people, and 3.) an abundance of food (LRMP 1989). All of these objectives will be met through snag retention guidelines that are adequate for providing nesting/roosting platforms, mitigation measures to avoid disturbance, and there will be no effect on foraging habitat. It is also expected that bald eagle habitat will be enhanced and perpetuated through fuels reduction that will reduce the possibility of fuels conditions that would contribute to future high intensity fires, and planting of trees to expedite future bald eagle habitat.

Based on no removal of bald eagle nesting habitat and mitigations in place to avoid disturbance, it is expected that Alternatives C, D, E, and G would have no effect on bald eagles or their habitat.

Alternative H

This alternative proposes no harvest within the Dead Indian Rim Bald Eagle Management Area, and therefore no bald eagle nesting habitat would be removed. No harvest would occur within the Thompson Reservoir Bald Eagle Management Area or the Silver Creek Bald Eagle Management Area. In addition, no fuels treatments are proposed within any of the BEMA's which may increase the potential for a reburn in the future. Planting will expedite the recovery of bald eagle habitat and planting at lower densities of 130-250 trees per acres would increase the potential for producing suitable bald eagle trees in the long-term.

No visually disturbing activities (e.g. parking vehicles, tree marking, planning, etc.) and noise disturbing activities (e.g. falling, hauling, chainsaws, heavy equipment use, etc.) would occur within ¼ mile of the active nest site, no visually disturbing activities (e.g. parking vehicles, tree marking, planning, etc.) and noise disturbing activities (e.g. falling, hauling, chainsaws, heavy equipment use, etc.) that are in line of site of the nest would occur within ½ mile of the active nest site, and no helicopter use (e.g. flight paths, landings, etc.) would occur within ½ mile of the active nest site. In addition, these mitigations would be monitored to assure they are effective in avoiding disturbance.

The management objectives for bald eagle areas are to provide: 1.) an abundance of mature/overmature trees for nesting/roosting platforms, 2.) a minimum of disturbance from people, and 3.) an abundance of food (LRMP 1989). All of these objectives will be met through snag retention guidelines that are adequate for providing nesting/roosting platforms, mitigation measures to avoid disturbance, and there will be no effect on foraging habitat. It is also expected that bald eagle habitat will be enhanced and perpetuated through fuels reduction that will reduce the possibility of fuels conditions that would contribute to future high intensity fires, and planting of trees to expedite future bald eagle habitat.

Based on no removal of bald eagle nesting habitat and mitigations in place to avoid disturbance, it is expected that Alternatives H would have no effect on bald eagles or their habitat.

Table 100: Mitigation measures that apply to bald eagles

Mitigation Measure	Alternative(s)
Restrict all activities during the bald eagle breeding season as follows (January 15-August 31):	
1. 0.25 mile buffer around nest for visually disturbing activities (e.g. parking vehicles, tree marking, planning, etc.) and noise disturbing activities (e.g. falling, hauling, chainsaws, heavy equipment use, etc.). Maps on file at the Silver Lake Ranger District.	
Harvest units 19 and 21	C,D,E,G
All activities taking place within 0.25 mile buffer	C,D,E,G,H
2. 0.5 mile buffer around nest for visually disturbing activities (e.g. parking vehicles, tree marking, planning, etc.) and noise disturbing activities (e.g. falling, hauling, chainsaws, heavy equipment use, etc.) that is in line of site of the nest. Maps on file at the Silver Lake Ranger District.	
Harvest Unit 21	C,D,E,G
3. 0.5 mile buffer around three known nests for helicopter use (e.g. flight paths, landings, etc.) Maps on file at the Silver Lake Ranger District.	C,D,E,G,H
The first three days of implementation of a buffer to minimize disturbance would be monitored if activities occur during the breeding season, specifically to determine if the buffer if effective at preventing disturbance. If a buffer is found to not be effective, a larger buffer would be implemented	

based on recommendations from the monitoring regarding site-specific observations. If a Forest Wildlife Biologist determines that an activity will not result in reproductive failure or cause adverse effects to nesting eagles for that year, it may be allowed on a case-by-case basis. Any activities allowed should occur as late in the breeding season as possible and after the eggs have hatched. Monitoring of the nest site must take place if an activity is allowed to determine if adverse effects to nesting eagles are occurring. If monitoring determines there are unacceptable effects to nesting eagles, the activity must be terminated immediately. At the discretion of a wildlife biologist, if it is determined the eagles have not successfully nested by May15 the restrictions may be lifted around the nest site for that year.	

Cumulative Effects Common to All Alternatives

All of the activities in Appendix A have been considered for their cumulative effects on bald eagles, and the following activities have the potential to produce a cumulative effect. Past timber management activities on Federal and private land, as displayed in Table-2 and Table A-13 of Appendix A, and fire suppression activities, as displayed in Table A-3 of Appendix A, have likely reduced the abundance, distribution, and quality of potential bald eagle nesting and roosting habitat on the landscape. Green overstory removal and snag harvest has removed preferred nesting and roosting trees, and fire suppression has resulted in an increase in stand densities resulting in mortality of select overstory trees, loss of tree structure that provide large heavy open limbs, and reduced flight access. Some recreational activities, as displayed in Table A-5 of Appendix A, have had a negative impact on nesting success and productivity where recreational sites are located near nest sites. Diversion, dams, and reservoirs, as displayed in Table A-10 of Appendix A, have increased bald eagle habitat by creating large water bodies of water adjacent to forested stands that provide for the nesting and foraging habitat required by eagles. Examples of this are Thompson Reservoir and the Diversion Dam, both of which have active bald eagle nests.

Reasonably foreseeable future activities include treatments within the Bridge Creek Subshed and treatments displayed in Table A-16 of Appendix A within the project area subsheds. Silvicultural activities include restoration thinning and harvest that will promote will promote large open limbed growth of ponderosa pine, open the understory for flight access, increase replacement snag levels, and reduce the likelihood of habitat loss through catastrophic fire. Salvage on BLM, as displayed in Table A-15 of Appendix A, is minimal enough that it will likely have no effects on eagle habitat. Cumulatively, it is anticipated that bald eagle populations and their habitat will continue increase over time and with all cumulative effects considered, including the activities associated with this project, it is likely that the effects 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.

I. Canada Lynx

Canada Lynx - Existing condition

Ecology: Habitat for Canadian lynx occurs in the boreal, sub-boreal, and western montane forests of North America. Engelmann spruce, subalpine fir, and lodgepole pine, is the primary habitat in Washington and Oregon. Secondary habitats contain western larch, Douglas fir, Pacific silver fir, western red cedar/mountain hemlock, and the upper elevations of ponderosa pine forests. Deep winter snow packs often occur in lynx habitat. Fire and other landscape-disturbance processes are typically associated with lynx habitat and that of their main prey - the snowshoe hare. Denning habitat consists of late successional forest stands where downed logs, root wads, and other structural elements are available.

Existing Condition: Surveys designed specifically to detect the presence/absence of lynx occurred in the Yamsey Mountain Semi-Primitive Non-Motorized Wilderness Area in 1997 located approximately 3-4 miles west of the project area. Lynx were not detected with these surveys. Based on historical trapping records and incidental sightings, individuals of this species have ranged this far south; however, habitat would be considered atypical and preferred prey species is not abundant. It is suspected that these lynx are dispersing or transient and that habitat quantity and quality are lacking for the establishment of a self-sustaining population.

No potential habitat for this species would be modified, altered, or removed by implementing any alternative proposed. Based on the above information, this species will not be further addressed in this document.

J. Oregon Spotted Frog

Oregon Spotted Frog - Existing condition

Ecology: Primary habitat for spotted frogs is mainly tied to marsh habitat that offers a perennial water source, floating and submergent vegetation, and deeper water for refuge. Water temperatures exceeding 20 degrees C. (68 deg. F.) are required during the active season. Oregon spotted frogs have not been found above 5000 feet in elevation, which probably relates to these specific temperature requirements. Over-wintering areas, however, may occur in nearby spring/seep areas where colder water is present (Hayes 1997).

Existing Condition: There are no documented sightings of Oregon spotted frog within the project area. No specific Oregon spotted frog surveys were conducted for this project. Habitat may exist along perennial streams or water sources such as Silver Creek, West Fork Silver Creek, North Fork Silver Creek, or Guyer Creek generally below 5000 feet in elevation. There are no other permanent water sources that may provide habitat within the project area.

Oregon Spotted Frog – Environmental Consequences

Direct and Indirect Effects

Alternative A (No Action)
This alternative would have no direct or indirect impact on Oregon spotted frogs or their habitats. This alternative would not remove, modify, or alter any Oregon spotted frog habitat and there would be no projects that would have the potential to cause disturbance.

Alternative C, D, E, G, H
In all action alternatives, no harvest will occur immediately adjacent to any perennial water sources except when the perennial stream is within road buffer identified for harvest. In all action alternatives, road buffer harvest includes only 201 acres of salvage harvest immediately adjacent to perennial water sources. Within these acres and in the areas proposed for instream down wood placement in all action alternatives, direct effects may occur to Oregon spotted frog and their habitat. Outside of roadside buffer harvest, Class 1 RHCA's would be buffered by 300 feet in Alternatives D, G, and H and by 200 feet in Alternatives C and E. Class 3 RHCA's would be buffered by 75 feet in Alternatives C, E, and G and by 150 feet in Alternatives D and H. It is expected that with the small area of habitat affected, that the action alternatives may have impacts on Oregon spotted frogs or their habitat, but it is not likely to result in a trend toward Federal listing or loss of viability for Oregon spotted frog.

Cumulative Effects Common to All Alternatives

All of the activities in Appendix A have been considered for their cumulative effects on Oregon spotted frogs, and the following activities have the potential to produce a cumulative effect. Any activities associated with dozer line construction from the 2002 fire suppression activities, as displayed in Table A-1 of Appendix A, may have had a localized negative effect on Oregon spotted frog habitat. Past harvest, as displayed in Table A-2 of Appendix A, and fire suppression activities, as displayed in Table A-3 of Appendix A, have led to dense overstocked stands along riparian corridors that has led to a decrease in riparian vegetation and has increased the potential for stand replacement fire. Minimal effects may occur as a result of ongoing recreational activities adjacent to perennial water sources, as displayed in Table A-5 of Appendix A, from trails and human disturbance. Road developments, as displayed in Table A-6 of Appendix A, that cross perennial water sources have had an effect on Oregon spotted frog habitat directly related to the road developments and also to increased sedimentation associated with roads. Allotments that receive late season grazing likely experience a higher degree of disturbance. Culvert replacements, as displayed in Table A-9 of Appendix A, may have had a marginal localized effect on Oregon spotted frog. Any diversions or reservoirs, as displayed in Table A-10 of Appendix A, have likely had a negative influence on Oregon spotted frog by diverting water to larger waterbodies that become too warm for Oregon spotted frog habitat. With all cumulative effects considered, including the activities associated with this project, it is likely

that the effects 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.

K. Yellow-billed Cuckoo

Yellow-billed Cuckoo - Existing condition

Ecology: Grinnell and Miller (1944) identify habitat in California as "river bottomlands, where tracts of cottonwood, willow and mesquite adjoin weedy open ground; near vicinity of water a necessity." Willow-cottonwood >10 ha, wider than 100 m, at <1300 m elevation (Laymon and Halterman 1987 cited in Littlefield 1988).

Hughes (1999) cites Laymon and Halterman (1987) as saying that western populations suffered catastrophic range reductions in twentieth century due to loss of riparian habitat through clearing for agriculture, flood control, and urbanization. Riparian streamside habitat in the west has been degraded by or removed by logging, cattle grazing, dams, water diversions, and water pumping.

The yellow-billed cuckoo is listed by the US Fish and Wildlife Service as a bird of conservation concern, meaning that without additional conservation actions, it is likely to become a candidate for listing under the Endangered Species Act of 1973 (2002).

Existing Condition: This species is not known to occur within or adjacent to the proposed project area and habitat for this species is not present within the proposed project area. Based on the above information, this species will not be further addressed in this document.

L. Horned Grebe

Horned Grebe - Existing condition

Ecology: Horned Grebes normally breed on large marshes and small lakes where permanent open water has a substantial border of emergent vegetation. Most winter on salt water and a few winter inland. Nests are made of underwater plants, rotting vegetation, rubbish, and mud and consist of floating platforms in shallow water that are often anchored in emergent vegetation (Ehrlich et al. 1988). Diet includes aquatic insects, crustaceans, and mollusks.

Existing Condition: This species is not known to occur within the proposed project area nor is there any documented sightings on the Silver Lake Ranger District. The nearest potential habitat would be located at Thomson Reservoir that is located 1/2 mile of project area or Sycan Marsh located approximately 2 miles southeast of the project area.

No potential habitat for this species would be modified, altered, or removed by implementing any alternative proposed. Based on the above information, this species will not be further addressed in this document.

M. Red-necked Grebe

Red-necked Grebe - Existing condition

Ecology: The red-necked grebe is a rare to uncommon winter resident, found primarily in central and northern California. Red-necked grebes are rare or very uncommon in central and northern California from October to April. This species is more closely associated with estuarine, and marine subtidal waters, while occasionally in lacustrine habitats. Nesting typically occurs in the northernmost contiguous U.S., Canada, and Alaska. Usually nests within, or on the edge of, emergent vegetation bordering shallow inland lakes, which usually are larger than 4 ha (10 ac). Lakes with nests are found in forested or unforested habitats. Nests have been found as far south as Upper Klamath Lake, Oregon, however (Cogswell

1977, McCaskie et al. 1979, Garrett and Dunn 1981) many die when forced to alight on land when exhausted, or when blown off course by storms because they cannot take flight from land.

Existing Condition: This species is not known to occur within the proposed project area nor is there any documented sightings on the Silver Lake Ranger District. The nearest potential habitat would be located at Thomson Reservoir that is located 1/2 mile of the project area or Sycan Marsh located approximately 2 miles south of the project area.

No habitat for this species would be modified, altered, or removed by implementing any alternative proposed. Based on the above information, this species will not be further addressed in this document.

N. Least Bittern

Least Bittern - Existing condition

Ecology: Least Bitterns live in emergent vegetation in freshwater and are occasionally found in brackish marshes (Ehrlich 1988). They nest near or over water, on the ground in emergent vegetation, or in low shrubs (Ehrlich 1988). They forage on insects, amphibians, and small mammals. Least bitterns are solitary to loosely colonial birds (Ehrlich 1988).

Existing Condition: This species is not known to occur within the proposed project area nor is there any documented sightings on the Silver Lake Ranger District. The nearest potential habitat would be located at Thomson Reservoir that is located 1/2 mile of the project area or Sycan Marsh located approximately 2 miles south of the project area.

No habitat for this species would be modified, altered, or removed by implementing any alternative proposed. Based on the above information, this species will not be further addressed in this document.

O. Bufflehead

Bufflehead - Existing condition

Ecology: Buffleheads live by lakes, rivers, and bays, breeding in the northwestern part of North America, and migrating to coastal water on the Atlantic, Gulf, and Pacific coasts as far south as Mazatlan. They seek out either small lakes or permanent freshwater ponds with no outlet that are adjacent to aspen or coniferous forests. This small diving duck nests in tree cavities, primarily those excavated by Northern Flickers or in nest boxes. They dive for their food, which includes freshwater and saltwater aquatic invertebrates such as insects, crustaceans, and mollusks, and also feed on seeds of bulrushes and pond seeds.

Existing Condition: This species is known to occur within and adjacent to the proposed project area. The Toolbox and Silver have increased potential nesting habitat by creating numerous snags adjacent to riparian areas. There are several small to moderate size ponds within the project area that could provide foraging and nesting habitat for bufflehead. Ponds include Foster Flat, Buckaroo Lake, and Grassy Lake. Some of these potential water sources are only available during high water years. In addition, potential habitat is available at Thompson Reservoir located approximately ½ from the project area, and Sycan Marsh located approximately 2 miles south east of the project area. Based on the habitat definition, there is foraging and nesting habitat present within the proposed project area. No specific bufflehead surveys were conducted for this project.

Bufflehead – Environmental Consequences

Direct and Indirect Effects

Alternative A (No Action)
The no action alternative would not remove, modify, or alter any bufflehead habitat. There would be no projects that would have the potential to cause disturbance. Stands adjacent to ponds that burned would regenerate naturally and would likely

provide nesting habitat.

Alternative C, D, G, E, H
Salvage harvest would reduce potential future nesting habitat by reducing snags that could be used for nest trees. The effects would be the greatest with Alternative C that proposes the greatest amount of salvage and the least with Alternative D that proposes the least amount of salvage. Alternative C proposes 14,441 acres of salvage, Alternative G proposes 14,419 acres of salvage, Alternative H proposes 13,031 acres of salvage, Alternative E proposes 11,490 acres of salvage, and Alternative D proposes 6,367 acres of salvage. However in all action alternatives, snags would be maintained within riparian areas and across the landscape as described in Section F of this report. In all action alternatives, road buffer harvest includes only 201 acres of salvage harvest immediately adjacent to Class 1 or 3 RHCA water sources. Within these acres and in the areas proposed for instream down wood placement in all action alternatives, direct effects may occur to bufflehead and their habitat. Outside of roadside buffer harvest, Class 1 RHCA's would be buffered by 300 feet in Alternatives D, G, and H and by 200 feet in Alternatives C and E. Class 3 RHCA's would be buffered by 75 feet in Alternatives C, E, and G and by 150 feet in Alternatives D and H. Any harvest or activity during the breeding season may have a direct affect on nesting.

Implementation of any of the action alternatives may impact individuals or habitat, but will not likely contribute to a trend toward federal listing or loss of viability to the population or species.

Cumulative Effects Common to All Alternatives
All of the activities in Appendix A have been considered for their cumulative effects on bufflehead, and the following activities have the potential to produce a cumulative effect. The reduction of snag habitat on federal and private lands through harvest, as displayed in Table A-2 and A-13 of Appendix 2, or personal use firewood cutting, as displayed in Table A-12 of Appendix A, adjacent to water sources has likely decreased nesting habitat. Minimal effects may occur as a result of ongoing recreational activities adjacent to water sources, as displayed in Table A-5 of Appendix A, from trails and human disturbance. Grazing activities, as displayed in Table A-8 of Appendix A, likely has increased bufflehead habitat by creating more livestock ponds that provide foraging habitat for bufflehead. Any diversions or reservoirs, as displayed in Table A-10 of Appendix A, have likely had a positive effect on bufflehead by diverting water to larger waterbodies that become bufflehead habitat. With all cumulative effects considered, including the activities associated with this project, it is likely that the effects 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.

P. Peregrine Falcon

Peregrine Falcon - Existing condition

Ecology: History and Ecology: Peregrine falcon populations have mainly declined due to DDT-induced declines in natality rates. As a result, the peregrine falcon was placed on the federal list as a threatened species. Protective measures have been successful and falcon numbers have increased to a stable level and the species has been de-listing by the USFWS. Active management and protection is still crucial to maintain population levels. Eggshell thinning problems from contaminated prey (primarily DDT) still remains a serious problem in the Pacific Northwest, including the local nesting population (Pagel, pers. comm. 1996).

Peregrine falcon nesting habitat consists of tall cliffs (at least 75 feet tall) near surface water (streams, marshes, rivers, reservoirs, or lakes). Mean heights of cliffs with nests found by Pagel have been 125-160 feet. All nest sites found by Pagel have been within 1/4 to 1/2 mile of some source of water from a Class 4 intermittent stream to riparian to lacustrine or marine systems (pers. comm.). Foraging occurs in wooded areas, marshes, open grasslands, and shorelines. Prey species consists almost entirely of birds with waterfowl, shorebirds, passerines, and galliformes being a main part of the diet.

The peregrine falcon is listed by the US Fish and Wildlife Service as a bird of conservation concern, meaning that without additional conservation actions, it is likely to become a candidate for listing under the Endangered Species Act of 1973 (2002).

Existing Condition: An active peregrine falcon nest site is located approximately 0.2 miles from the project area boundary. The entire Peregrine Falcon Management Area (PFMA) and the Peregrine Falcon Consideration Area (PFCA) burned high intensity during the Toolbox and Winter Fires. Thirty-six percent of the PFCA is located within the project area and 10% of the PFMA is located within the project area. The PFMA is Management Area 2 in which the direction is to "manage and retain their natural character and a high degree of solitude and to provide an adequate food base" (1989). Timber management activities near an active nest will be managed to provide for a variety of habitats to support an adequate food base (LRMP 1989). Although the primary foraging base for this nest is waterfowl from Summer Lake, the fire likely improved habitat for falcons by creating more openings and providing foraging habitat in the uplands within the fire.

Monitoring of this nest is conducted annually on the district. Falcon habitat surveys on the Fremont National Forest were conducted using helicopter flights, aerial surveys, and ground surveys were used to rate priority cliff habitat areas for peregrine nesting potential. The pre-field review of the project area found potential cliff sites with varying levels of qualities within and adjacent to the project area. No falcons were sited during field review for this project. No specific falcon surveys were conducted for this project.

Peregrine Falcon – Environmental Consequences

Direct and Indirect Effects

Alternative A (No Action)
The no action alternative would not remove, modify, or alter any peregrine falcon habitat. There would be no projects that would have the potential to cause disturbance.

Alternative C, D, E, G, H
These alternatives propose to harvest approximately 25 acres in Alternatives C, G, and H, 15 acres in Alternative E, and 5 acres in Alternative D within the PFMA. However, no peregrine falcon nesting habitat would be altered, and snag retention standards as described in Section F of this Wildlife section would provide for adequate snags for perching and down wood for small mammal habitat. Therefore, the timber management activities will be managed to provide for an adequate food base as directed in the LRMP (1989).

Fuels treatment is proposed for the ¼ mile buffer adjacent to private land in Alternative G only. This will reduce fuel loadings and decrease the potential for a reburn within this PFMA in the future.

No visually disturbing activities (e.g. parking vehicles, tree marking, planning, etc.) and noise disturbing activities (e.g. falling, hauling, chainsaws, heavy equipment use, etc.) would occur within ¼ mile of the active nest site, and no helicopter use (e.g. flight paths, landings, etc.) would occur within ½ mile of the active nest site. No activities are within view of the nest site. In addition, these mitigations would be monitored to assure they are effective in avoiding disturbance.

Based on no removal of peregrine falcon nesting habitat and mitigations in place to avoid disturbance, it is expected that Alternatives C, D, E, G, and H will have no impact on peregrine falcons or their habitat and will not likely contribute to a trend toward federal listing or loss of viability to the population or species.

Table 101: Mitigation measures that apply to peregrine falcons

Mitigation Measure	Alternatives
Restrict all activities during the peregrine breeding season as follows (February 1-August 15):	
1. 0.25 mile buffer around nest for visually disturbing activities (e.g. parking vehicles, tree marking, planning, etc.) and noise disturbing activities (e.g. falling, hauling, chainsaws, heavy equipment use, etc.). Maps on file at the Silver Lake Ranger District.	
All activities taking place within 0.25 mile buffer	C,D,E,G,H
2. 0.5 mile buffer around the nest for helicopter use (e.g. flight paths, landings, etc.). Maps on file at the Silver Lake Ranger District.	C,D,E,G,H

The first three days of implementation of a buffer to minimize disturbance would be monitored if activities occur during the breeding season, specifically to determine if the buffer if effective at preventing disturbance. If the buffer is found not be effective, a larger buffer would be implemented based on recommendations from the monitoring regarding site-specific observations. If a Forest Wildlife Biologist determines that an activity will not result in reproductive failure or cause adverse effects to nesting falcons for that year, it may be allowed on a case-by-case basis. Any activities allowed should occur as late in the breeding season as possible and after the eggs have hatched. Monitoring of the nest site must take place if an activity is allowed to determine if adverse effects to nesting falcons are occurring. If monitoring determines there are unacceptable effects to nesting falcons, the activity must be terminated immediately. At the discretion of a wildlife biologist, if it is determined the falcons have not successfully nested by May15 the restrictions may be lifted around the nest site for that year.	

Cumulative Effects Common to All Alternatives

All of the activities in Appendix A have been considered for their cumulative effects on peregrine falcons, and the following activities have the potential to produce a cumulative effect. Past management activities, as displayed in Table A-2 of Appendix A, and fire suppression activities, as displayed in Table A-3 of Appendix 2, have converted open ponderosa pine stands to overstocked stands with dense understories. This has likely decreased peregrine falcon foraging habitat by reducing flight access. Prescribed burning and understory thinning, as displayed in Table A-3 of Appendix A, have improved foraging habitat by creating more open understory conditions. Recreational activities have had little effect on peregrine falcons as they nest in large cliffs that are generally not near any recreational facilities. The nest was not active last year, so the 2002 fire suppression activities had no effect on the active peregrine falcon nest. Peregrine falcons populations have declined from pre-fire historical levels, but this is due largely to the historical use of the chemical DDT and is not directly related to the cumulative activities that have taken place within the project area. Therefore, is expected that the cumulative activities mentioned will not likely contribute to a trend toward federal listing or loss of viability to the population or species.

Q. Western Sage Grouse

Western Sage Grouse - Existing condition

Ecology: Primary habitat for western sage grouse varies by season and includes dense stands of big sagebrush for nesting and wintering sites, open areas for breeding displays (leks) and semi-open wet grassy areas for rearing and/or foraging habitat for young chicks. Primary habitat usually involves large open sagebrush areas with few if any trees. Upland spring areas are also important since they are directly related to insect abundance, upon which the chicks depend during the first 2-3 weeks of life. Low sagebrush and or interspersed grasslands may also occur near lek areas. Nesting occurs at the base of dense sagebrush patches where cover and adjacency to food supplies are present.

Existing Condition: Marginal habitat may exist within the project area. On the northern portion of the project area, there are inclusions of low sagebrush and big sagebrush flats intermixed with ponderosa pine stands and stringers. The majority of these areas experienced moderate to high burn severities thereby reducing habitat qualities for sage grouse. There have been no documented sightings of sage grouse within the project area and sage grouse were not sited during field review for this project. No specific sage grouse surveys were conducted for this project.

Western Sage Grouse – Environmental Consequences

Direct and Indirect Effects

Alternative A (No Action), C, D, E, G, H

There will be no effects to sage grouse populations or habitat under any of these alternatives. The prescribed burning proposed in Alternatives C, D, G, and H would not affect potential sage grouse habitat. Therefore, it is expected that these

alternatives will have no impact on sage grouse or their habitat and will not likely contribute to a trend toward federal listing or loss of viability to the population or species.

Cumulative Effects Common to All Alternatives
All of the activities in Appendix A have been considered for their cumulative effects on sage grouse, and the following activities have the potential to produce a cumulative effect. Prescribed fire treatments, as displayed in Table A-3 of Appendix A, may have affected sage grouse habitat depending upon the nature of the burning. It the burning was a mosaic, it likely improved habitat for sage grouse by creating a mix of shrub and grass/forbs communities. Noxious weed treatments, as displayed in Table A-4 of Appendix A, has likely reduced the likelihood of native grass loss. Juniper thinning, as displayed in Table A-9 of Appendix A, may improve sage grouse habitat by reducing the loss of sagebrush and grass to juniper competition. Livestock grazing, as displayed in Table A-8 and Table A-17 of Appendix A, may have impacted sage grouse habitat by reducing the shrub and grass cover available for nesting. Overall, sage grouse habitat is extremely marginal within the project area. With all cumulative effects considered, including the activities associated with this project, it is likely that the effects 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.

R. Yellow Rail

Yellow Rail - Existing condition

Ecology: Yellow rails are very secretive birds that reside in wet sedge meadows. The two important habitat characteristics for yellow rail are water levels and cover of vegetation (Popper and Stern 1999). Over the fours years of the Popper and Stern study, the average water depth at yellow rail locations was 7.0 cm (1999). Vegetative levels should allow sufficient senescent and live vegetative cover that averaged almost 100% at known yellow rail sites and height to be available for next year (Popper and Stern 1999). Summer food diets for yellow rail indicate a wide variety of resources including both animal and vegetal matter, which reflects an opportunistic foraging strategy (Michel et al. 1997). During the summer, they predominately feed on arthropods and secondarily on seeds (Michel et al. 1997).

A study in Texas revealed that yellow rails would not use recently burned wetlands due to the lack of vegetative cover, and additionally would not use burned areas a year after burning because the plant community was too tall and dense (Mizell 1998). Burning and grazing together, or burning in a mosaic of burned/unburned patched appeared to increase potential yellow rail habitat (Mizell 1998). Prescribed fire is also found to be a method of managing for yellow rail habitat because wet sedge meadows are a pioneer community subject to succession, and left unmanaged, this type of habitat can become occupied by dense stands of leatherleaf, bog birch, or willows (Burkman 1993). Prescribed fire effectively reduces the percentage and height of shrubs present, acidic pH found on burned sites discourage shrub species, and the swift reestablishment of the herbaceous layer results in the rapid formation of a new senescent layer utilized by yellow rails for cover (Burkman 1993).

The yellow rail is listed by the US Fish and Wildlife Service as a bird of conservation concern, meaning that without additional conservation actions, it is likely to become a candidate for listing under the Endangered Species Act of 1973 (2002).

Existing Condition: This species is not known to occur within the proposed project area nor is there any documented sightings on the Silver Lake Ranger District. The nearest potential habitat would be located at Sycan Marsh located approximately 2 miles south of the project area. No habitat for this species would be modified, altered, or removed by implementing any alternative proposed. Based on the above information, this species will not be further addressed in this document.

S. Upland Sandpiper

Upland Sandpiper - Existing condition

Ecology: Upland sandpipers are restricted primarily to extensive, open tracts of short grassland habitat. They nest in native prairie dry meadows, pastures, domestic hayfields, short-grass savanna, and plowed fields. Nesting is also known to occur in dry patches of wet meadows. Preferred habitat includes large areas of short grass for feeding and courtship with interspersed or adjacent taller grasses for nesting and brood cover (Carter 1992). Vegetation height is an important factor in the selection of nesting sites with 54% of nests in cover between 25-40 cm in height, not exceeding 70 cm at the time of egg hatching. Upland sandpipers accept a variety of native and introduced grasses including timothy, bluegrass, quackgrass, Junegrass, needlegrass, bluestem, and bromegrass.

Prescribed burning, grazing, or mowing can be used to provide essential nesting conditions, but these activities can be detrimental if conducted inappropriately (Carter 1992). It is recommended that burning take place every 5 - 10 years after September 1 or before May 1, and only part of large units should be burned in any year (Jones and Vickery 1997).

Existing Condition: This species is not known to occur within the proposed project area nor is there any documented sightings on the Silver Lake Ranger District. The nearest potential habitat would be located at Sycan Marsh located approximately 2 miles south of the project area. No habitat for this species would be modified, altered, or removed by implementing any alternative proposed. Based on the above information, this species will not be further addressed in this document.

T. Gray Flycatcher

Gray Flycatcher - Existing condition

Ecology: Gray flycatchers breed in semi-arid woodlands and brushy areas that include pinyon pine and/or juniper woodlands, open woodlands of juniper and mountain mahogany, tall sagebrush/greasewood plains, open ponderosa pine forests, and open ponderosa pine forests with pinyon and/juniper understory. They winter in arid, edge or open riparian woodlands. The primary food for gray flycatchers is insects including butterflies, moths, bees, grasshoppers, and beetles. From Late May through July, nests are placed primarily 2-11 feet high in a shrub or crotch of a juniper or pinyon pine. When nesting in juniper woodlands, the nest is largely made of strips of juniper bark and therefore is well camouflaged. Conservation issues that are affecting gray flycatchers are the decline of mature and old growth juniper and brood parasitism by brown-headed cowbirds. Conservation strategies recommended in the Conservation Strategy for landbirds in the Columbia Plateau of Eastern Oregon and Washington document suggest to retain and protect mature and old-growth juniper trees where population of gray flycatchers occur within the historical range of this habitat type (Altman and Holmes 2000). There is a highly significant short term (1980-1998) increasing trend on 15.4%/year of gray flycatchers (Altman and Holmes 2000), likely do to the expansion of juniper.

Existing Condition: Gray flycatcher habitat does exist within the project area in ponderosa pine stands that burned light to moderate, and in the northern portion of the project area where there are inclusions of juniper/sagebrush flats intermixed with ponderosa pine stands and stringers. Gray flycatchers were not sited during field review for this project and no specific gray flycatcher surveys were conducted for this project. The fire increased grass and forbs, which is likely to increase the abundance of insects for foraging. Light to moderate burning in the lower elevation ponderosa pine stands resulted in thinned understories, which reduced the risk of catastrophic fire and produced the open pine character preferred by gray flycatchers.

There are several documented sightings of gray flycatchers within the project area. In addition, Neotropical point count surveys were conducted on the Silver Lake Ranger District at designated locations from 1994-2001. Four of the locations are within the project area located at Bottle Springs, Graham Creek, Guyer Creek, and West Fork Silver Creek. Graham Creek is the only site that is adjacent to ponderosa pine/juniper communities and where gray flycatchers were detected. Below is the total number of detections of gray flycatchers at Graham Creek from 1994-2001:

Table 102: Gray flycatcher sightings at Graham Creek

	1994	1995	1996	1997	1998	1999	2000	2001
Graham Creek	1	2	0	1	0	0	0	0

Gray Flycatcher – Environmental Consequences

Direct and Indirect Effects

Alternative A (No Action)
There will be no effects to gray flycatcher populations or habitat under this alternative. Therefore, it is expected that this alternative will have no impact on gray flycatchers or their habitat and will not likely contribute to a trend toward federal listing or loss of viability to the population or species.

Alternatives C, D, E, G, and H
No green ponderosa pine trees will be affected with any of the alternatives and so gray flycatcher habitat will not be affected. Reforestation and precommercial thinning in these alternatives will produce mature ponderosa pine stands more rapidly than with no treatments as proposed in Alternative A. Reducing fuel loadings should sustain the existing habitat that remains within the fire and protect future habitat from experiencing a large stand replacement fire, and planting will produce gray flycatcher habitat much quicker into the future than natural regeneration under alternative A. The advantages of fuels reduction treatment will be the greatest with Alternative G that proposes the greatest amount of these treatments, and the least with Alternative D that proposes the least amount of these treatments. Alternative G proposes 16,950 acres of fuels treatment, Alternative C proposes 10,244 acres of fuels treatment, Alternative H proposes 9,070 acres of fuels treatment, Alternative E proposes 6,723 acres of fuels treatment, and Alternative D proposes 5,680 acres of fuels treatment. The advantages of planting will be the greatest with Alternative C that proposes the greatest amount of planting, and the least with Alternative H that proposes the least amount. Alternative C proposes 20,906 acres of planting, Alternative E proposes 20,753 acres of planting, Alternative D proposes 20,743 acres of planting, Alternative G proposes 20,728 acres of planting, and Alternative H proposes 20,721 acres of planting. Any harvest or activity during the breeding season may have a direct effect on nesting.

There will be no effects to gray flycatcher habitat under any of these alternatives. Although there may be direct effects associated with harvest and other activities and individual may be impacted, it is not likely to contribute to a trend toward federal listing or loss of viability to the population or species

Cumulative Common to All Alternatives
All of the activities in Appendix A have been considered for their cumulative effects on gray flycatchers, and the following activities have the potential to produce a cumulative effect. Past management activities, as displayed in Table A-2 of Appendix A, and fire suppression activities, as displayed in Table A-3 of Appendix 2, have converted open ponderosa pine stands to overstocked stands with dense understories and reduced overall large ponderosa pine trees. This has likely decreased gray flycatcher habitat. Prescribed burning and understory thinning, as displayed in Table A-3 of Appendix A, have improved conditions by creating more open understory conditions. Recreation activities, as displayed in Table A-5 of Appendix A, may cause a disturbance if recreational facilities are located near nest sites. Grazing activities, as displayed in Table A-8 and Table A-17 of Appendix A, may have a slight impact on gray flycatcher habitat by reducing grass and forb abundance that provide for insect populations. Juniper thinning projects on federal and BLM land, displayed in Table A-9 and A-15 of Appendix A, has likely reduced gray flycatcher habitat, however the large old growth juniper was retained. Although open ponderosa pine habitat has diminished due to increased understory densities, juniper has expanded beyond its range within ponderosa pine stands and shrub-steppe communities, thereby increasing primary habitat. With all cumulative effects considered, including the activities associated with this project, it is likely that the effects 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.

U. Tricolored Blackbird

Tricolored Blackbird - Existing condition

Ecology: Nesting usually occurs in dense stands of cattails and tules, with nests located a few feet above water. Nesting colonies are sometimes transient, frequenting emergent marsh, blackberry thickets, or fallow agricultural fields overgrown with mustards. The nests are built out of mud and plant materials, and may be located as far as 4 miles from foraging areas.

Tricolored blackbirds are highly colonial nesters, requiring nesting areas large enough to support as least 50 pairs. Colonies may breed in different locations from year to year. Roosting areas for large winter flocks usually are in extensive stands of marsh vegetation (Elrich 1988).

Tricolored blackbirds feed on both plant and animal matter, depending mostly on season. In spring and summer the majority of their diet is composed of insects, grasshoppers, and spiders, and in the fall and winter, seeds and grain crops such as oats and rice constitute the dominant food source. An abundant, concentrated supply of insects is important to the success of tricolor breeding colonies. Foraging occurs on the ground in croplands, grassy fields, flooded land, and along the edges of ponds (Elrich 1988).

The tri-colored blackbird is listed by the US Fish and Wildlife Service as a bird of conservation concern, meaning that without additional conservation actions, it is likely to become a candidate for listing under the Endangered Species Act of 1973 (2002).

Existing Condition: This species is not known to occur within the proposed project area nor is there any documented sightings on the Silver Lake Ranger District. The nearest potential habitat would be located at Sycan Marsh located approximately 2 miles south of the project area. No habitat for this species would be modified, altered, or removed by implementing any alternative proposed. Based on the above information, this species will not be further addressed in this document.

V. California Wolverine

California Wolverine - Existing condition

Ecology: Wolverines are solitary animals that range widely over wide variety of habitats. Isolation from human impacts and a diverse prey base seem to be the most important habitat components. Within large roadless areas, wolverine use appears to be concentrated in medium to scattered mature timber and in ecotonal areas around natural openings such as cliffs, slides, basins, and meadows. There seems to be little use in stands of dense young timber or in openings such as clear-cuts or wet meadows (Reel et al., 1989, Butts, 1992).

The wolverine is non-migrating, non-hibernating and has a large home range. Home ranges for males in Alaska have been estimated at 257 square miles; 36 square miles for females. In Montana, home ranges for males and females were calculated at 163 and 150 square miles, respectively. There is little information about wolverines in Oregon, but because this is the southern end of their range, it might be safe to assume that average home ranges are larger than those in Alaska or Montana. Wolverines are territorial. Males will challenge other males within their home range, but will accept females. However, wolverine home ranges are too large to be aggressively defended so they might overlap on the edges (CWHR Internet 2002).

Existing Condition: Wolverine habitat may occur within the project area and surveys designed specifically to detect the presence/absence of wolverine have not been conducted within the project area. The Oregon Natural Heritage Database shows three documented sightings of wolverines or tracks on the Fremont National Forest: 1.) 1962 - a wolverine was sighted on the edge of a meadow by Ingram guard station near Elder Creek on the Paisley district; 2.) 1975 - a fairly reliable observer reported a wolverine at Camas Creek on the Lakeview district, and 3.) 1978 - a fairly reliable observer reported wolverine tracks near Fremont Point on the Silver Lake district. Track surveys have been conducted on the Silver Lake Ranger District in the areas of Fremont Point and Yamsey Mountain. No wolverine tracks were located, however, this is inconclusive as to whether wolverines were present or using the area.

Wolverines generally prefer remote or wilderness areas. Assuming that the proposed project area is within a wolverine home range, it would likely be the most eastern edge or the most western edge of a home range. The only areas that could remotely provide the home range size required for wolverine would be in the Yamsey Mountain Semi-primitive Non-motorized Recreation Areas, located approximately 3 miles west of the project area, or the top and face of Winter Rim immediately east of the project area. The Winter Fire heavily impacted Winter Rim and almost the entire area located adjacent to the project area to the east experienced very high vegetation mortality and likely no longer provides habitat for wolverine due to the loss of canopy closure and structure. However, because of the wolverine's nature, it would most likely

travel outside of these areas if they are currently being occupied by wolverines. While being analyzed here, it is unlikely that the proposed project area is being utilized by wolverines, or truly provides them with functional habitat.

Direct and Indirect Effects

Alternative A (No Action)

Alternative A (No Action)
Assuming wolverine occupy the area, use may continue on the eastern and western edge of the project area in areas of low to moderate vegetation mortality. There would be no increase in human disturbance. No proposed planting will result in a delayed advancement of future wolverine habitat. Wolverine use is expected to continue at current levels.

Alternative C, D, E, G, and H
These alternatives could cause short-term negative effects on wolverines by causing them to adjust use or movement patterns due to disturbance caused by the increase in human activity that would be part of these alternatives. This increase in human activity could affect wolverines if they are present by altering its suitability during the time of increased human activity. Based on the size of the project area and the fact that the project would only potentially effect the very edge of their potential home range, and the large home ranges that wolverines utilize, it is estimated that the disturbance and treatments would only affect a very small amount of habitat with these alternatives. None of the treatment areas include denning habitat and with no increase in roads and motorized travel, the risk of disturbance to wolverines is considered low, and none of the alternatives will affect wolverine habitat or species viability because the principal big game prey base in expected to remain stable. The action alternatives may have impacts on wolverines or their habitat, but it is not likely to result in a trend toward Federal listing or loss of viability for wolverines.

Cumulative Effects of Common to All Alternatives
All of the activities in Appendix A have been considered for their cumulative effects on wolverines and the following activities have the potential to produce a cumulative effect. Past management activities have likely decreased the potential habitat available for fisher within the project area. Past timber harvest activities, as described in Table A-2 and A-13 of Appendix A, have changed overall stand conditions on federal and private lands. These activities have removed large diameter trees, snags and down wood, reduced patch sizes and connectivity, and diminished the amount of high quality LOS interior habitat and overstory canopy cover all required for wolverine habitat. Recreation activities, as described in Table A-5 of Appendix 2, have likely increased the potential for human disturbance to wolverines. Snag and down wood loss through personal use firewood cutting, as described in Table A-12 of Appendix A, and through past timber management activities including salvage and hazard removal, as described in Table A-2 of Appendix A, and through salvage harvest on several acres of private land as described in Table A-13 of Appendix A have decreased snag and down wood levels. Road developments, as displayed in Table A-6 of Appendix A, has created a very fragmented roaded landbase, thereby decreasing habitat potential for wolverines.

Reasonably foreseeable future activities include treatments within the Bridge Creek Subshed and treatments displayed in Table A-16 of Appendix A within the project area subsheds. Silvicultural activities include restoration thinning and harvest that will promote open understory sustainable ponderosa pine stands. These activities in conjunction with prescribed fire and road closures are expected to increase habitat for wolverines by creating more contiguous unfragmented future LOS. With all cumulative effects considered, including the activities associated with this project, it is likely that the effects 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.

W. Pacific Fisher

Pacific Fisher - Existing condition

Ecology: Multi-storied Douglas fir, conifer-hardwood, and mixed conifer vegetation types with a minimum tree size of 24 inches DBH and a canopy closure of at least 40% characterize suitable fisher habitat. Fishers require snags and downed logs for protection, movement, and prey species habitat. Fishers require a minimum of 9800 acres of moderate quality

habitat for a home range, which accommodates one adult male and two adult females. Moderate quality home range habitat requires a minimum stand size of 80-120 acres of adjacent mature timber stands.

Existing Condition: There are no known documented fisher sightings on the Silver Lake Ranger District. The nearest potential habitat is located approximately 3 miles west of the project area within the Yamsey Semi-primitive Non-motorized Recreation Area. General reconnaissance following the Toolbox and Silver Fires resulted in no fisher sightings. No formal surveys were conducted for this project.

Alternative A (No Action)
It is anticipated that within the interior of the fire in large patches of high vegetation mortality, fisher use is not expected due to the entire loss of LOS character and because fisher tend to avoid very large openings. Fisher use may continue on the edges between areas of high vegetation mortality and low to moderate vegetation mortality, and foraging opportunities may become optimal on these edges when down wood becomes abundant in 20-30 years. Large numbers of jackstraw down wood will provide for the complex physical structure near the ground needed for nesting sites and access to subnivian prey. Although habitat quality may increase, other factors may preclude the future use of this habitat by fisher including the lack of connectivity for travel corridors most notably within the area of the fire. No proposed planting will result in a delayed advancement of future fisher habitat. Fisher use is expected to continue at current levels.

Alternative C, D, E, G, and H
In the long-term, salvage activities proposed under these alternatives may reduce the likelihood of fisher use within the planning area due to decreased future down wood levels. The effects would be the greatest with Alternative C that proposes the greatest amount of salvage and the least with Alternative D that proposes the least amount of salvage. Alternative C proposes 14,441 acres of salvage, Alternative G proposes 14,419 acres of salvage, Alternative H proposes 13,031 acres of salvage, Alternative E proposes 11,490 acres of salvage, and Alternative D proposes 6,367 acres of salvage. Units proposed for fuels treatment will likely diminish fisher habitat due to the loss of all non-commercial down wood that would provide the complex structure needed for nesting sites and access to subnivian prey. This would have the greatest effect where fuels treatment is proposed along the edges of high vegetation mortality areas and low to moderate vegetation mortality areas. However, reducing fuel loadings should sustain the existing habitat that remains within the fire and protect future habitat from experiencing a large stand replacement fire. The effects of fuels treatment would be the greatest with Alternative G that proposes the greatest amount of fuels treatment and the least with Alternative D that proposes the least amount of fuels treatment. Alternative G proposes 16,950 acres of fuels treatment, Alternative C proposes 10,244 acres of fuels treatment, Alternative H proposes 9,070 acres of fuels treatment, Alternative E proposes 6,723 acres of fuels treatment, and Alternative D proposes 5,680 acres of fuels treatment.

It is anticipated that within the interior of large patches where the vegetation mortality was very high, fisher use is not expected due to the entire loss of LOS character and because fisher tend to avoid very large openings. Fisher use may continue along the edges of lightly burned and severely burned stands. Foraging opportunities may increase within riparian corridors where salvage is not proposed. Although foraging quality may slightly increase within the riparian corridors, other factors may preclude the future use of this habitat by fishers including the lack of connectivity for travel corridors most notably within the area of the fire.

Planting is expected to accelerate development of future fisher at a much quicker rate than natural regeneration under alternative A. The advantages of planting will be the greatest with alternative C that proposes the greatest amount of planting, and the least with alternative H that proposes the least amount. Alternative C proposes 20,906 acres of planting, Alternative E proposes 20,753 acres of planting, Alternative D proposes 20,743 acres of planting, Alternative G proposes 20,728 acres of planting, and Alternative H proposes 20,721 acres of planting.

Although fisher habitat will remain stable under all alternatives, populations have the greatest potential to increase with the alternatives that provide for the greatest amount of down wood habitat for denning and nesting. This is directly related to salvage and therefore, Alternative D has the greatest potential for fisher populations to increase followed by Alternative E, H, C, and G respectively. It is expected that all action alternatives may have an effect on fishers and their population, but it is not likely to result in a trend toward Federal listing or loss of viability for fisher populations.

<u>Cumulative Effects of Common to All Alternatives</u>

All of the activities in Appendix A have been considered for their cumulative effects on fisher and the following activities have the potential to produce a cumulative effect. Past management activities have likely decreased the potential habitat available for fisher within the project area. Past timber harvest activities, as described in Table A-2 and A-13 of Appendix A, have changed overall stand conditions on federal and private lands. These activities have removed large diameter trees, snags and down wood, reduced patch sizes and connectivity, and diminished the amount of high quality LOS interior habitat and overstory canopy cover all required for fisher habitat. Fire suppression, as described in Table A-1 of Appendix A, have changed stand conditions providing more dense understories and have converted many stands previously dominated by open large diameter pine, to stands now characterized as multi-storied stands with white fire and pine in the understory. Recreation activities, as described in Table A-5 of Appendix 2, and grazing, as described in Table A-8 of Appendix A, likely have had little affect on fisher. Snag and down wood loss through personal use firewood cutting, as described in Table A-12 of Appendix A, and through past timber management activities including salvage and hazard removal, as described in Table A-2 of Appendix A, and through salvage harvest on several acres of private land as described in Table A-13 of Appendix A have decreased snag and down wood levels. This has likely decreased overall denning and foraging habitat for fisher.

Reasonably foreseeable future activities include treatments within the Bridge Creek Subshed and treatments displayed in Table A-16 of Appendix A within the project area subsheds. Silvicultural activities include restoration thinning and harvest that will promote open understory sustainable ponderosa pine stands. These activities in conjunction with prescribed fire are expected to increase habitat for fisher by creating more contiguous future LOS. With all cumulative effects considered, including the activities associated with this project, it is likely that the effects 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.

X. Pygmy Rabbit

Pygmy Rabbit - Existing condition

Ecology: Pygmy rabbits are found primarily in big sagebrush (*Artemisia tridentata*) and rabbitbrush (*Chrysothamnus spp*.) dominated communities. Pygmy rabbits are also found in areas where greasewood (*Sarcobatus spp*.) is abundant. Generally limited to areas on deep soils with tall, dense sagebrush that is used for cover and food. Individual sagebrush plants in areas inhabited by pygmy rabbits are often 6 feet or greater in height. Dense stands of big sagebrush along streams, roads, and fencerows provide dispersal corridors. Big sagebrush may be 99% of a pygmy rabbit's forage in winter (Green and Flinders 1980). In summer big sagebrush is used less (51% of diet). Grasses and forbs and other shrubs comprise the remainder of the summer diet. Some pygmy rabbits never range more than 60 feet from their burrows, however others have been observed to range up to 328 feet from their burrows. Most activity is within 100 ft radius of burrow. Pygmy rabbits are seldom found in areas of sparse cover and seem to be reluctant to cross open space.

Existing Condition: This species is not known to occur within or adjacent to the proposed project area. Habitat for this species is not present within the proposed project area because the existing big sagebrush areas are lot large and contiguous enough to provide for pygmy rabbit habitat. Furthermore, the majority of the big sagebrush openings within the project area experienced moderate to high vegetation mortality. Based on the above information, this species will not be further addressed in this document.

Y. Northern Leopard Frog

Northern Leopard Frog - Existing condition

Ecology: Northern leopard frogs are a highly aquatic species. However, adults may be found up to a mile from the nearest water (Slevin 1928), but only during or following rains. Water at breeding sites must persist long enough to permit the completion of larval development. Shoreline cover, submerged and emergent aquatic vegetation, appears to be an important habitat characteristic. For reproduction leopard frogs prefer cattail and sedge marshes, weedy ponds, or other water with aquatic vegetation (Nussbaum et al. 1983). Eggs are attached to emergent vegetation. Tadpoles use shallow water near shores. At colder localities, adults hibernate on the bottoms of unfrozen bodies of water. Submerged vegetation

is apparently unnecessary for hibernation cover. Individuals do not hibernate in southern California, but may become inactive during the coldest periods.

Adults are opportunistic feeders, taking a variety of aquatic and terrestrial prey. They primarily eat small adult insects, but sowbugs, spiders, leeches, snails, small fishes, amphibians (cannibalism has been reported), small snakes, and birds are also taken (Stebbins 1972, Nussbaum et al. 1983). Tadpoles probably feed primarily by filtering algae and diatoms, but may also consume some plant material and animal food incidentally encountered.

Existing Condition: Small natural ponds and perennial streams in the proposed project area would provide habitat for this species. No surveys have been conducted within the proposed project area, and there are no documented sightings of northern leopard frog on the Silver Lake Ranger District.

Northern Leopard Frog – Environmental Consequences

Direct and Indirect Effects

Alternative A (No Action)
The no action alternative would not remove, modify, or alter any northern leopard frog habitat.

Alternative C, D, E, G, and H
In all action alternatives, no harvest will occur immediately adjacent to any Riparian Habitat Conservation Area which should include all natural ponds and perennial water sources, except when the perennial stream is within road buffer identified for harvest. In all action alternatives, this includes only 201 acres of salvage harvest immediately adjacent to perennial water sources. Within these acres and in the areas proposed for instream down wood placement, direct effects may occur to Northern leopard frogs and their habitat. Outside of roadside buffer harvest, Class 1 RHCA's would be buffered by 300 feet in Alternatives D, G, and H and by 200 feet in Alternatives C and E. Class 3 RHCA's would be buffered by 75 feet in Alternatives C, E, and G and by 150 feet in Alternatives D and H. Direct effects associated with logging may occur in the uplands as Northern leopard frogs may move up to a mile from their water source. It is expected that with the small area of habitat affected, that the action alternatives may have impacts on Northern leopard frogs or their habitat, but it is not likely to result in a trend toward Federal listing or loss of viability for Northern leopard frogs.

Cumulative Effects Common to All Alternatives
All of the activities in Appendix A have been considered for their cumulative effects on Northern leopard frogs, and the following activities have the potential to produce a cumulative effect. Any activities associated with dozer line construction from the 2002 fire suppression activities, as displayed in Table A-1 of Appendix A, may have had a localized negative effect on Northern leopard frog habitat. Past harvest, as displayed in Table A-2 of Appendix A, and fire suppression activities, as displayed in Table A-3 of Appendix A, have led to dense overstocked stands along riparian corridors that has led to a decrease in riparian vegetation and has increased the potential for stand replacement fire. Minimal effects may occur as a result of ongoing recreational activities adjacent to perennial water sources, as displayed in Table A-5 of Appendix A, from trails and human disturbance. Road developments, as displayed in Table A-6 of Appendix A, that cross perennial water sources have had an effect on Northern leopard frog habitat directly related to the road developments and also to increased sedimentation associated with roads. Grazing, as displayed in Table A-8 of Appendix A, likely has had the largest influence on Northern leopard frog habitat. Cattle use and disturbance adjacent to perennial water sources has decreased habitat for Northern Leopard frogs. Allotments that receive late season grazing likely experience a higher degree of disturbance. Culvert replacements, as displayed in Table A-9 of Appendix A, may have had a marginal localized effect on Northern leopard frogs. Any diversions or reservoirs, as displayed in Table A-10 of Appendix A, have likely had positive influence on Northern leopard frogs by diverting water to larger waterbodies that may create marshy habitat. Future grazing, as displayed in Table A-17 of Appendix A, had the greatest likelihood of negatively effecting Northern leopard frog habitat in the future. With all cumulative effects considered, including the activities associated with this project, it is likely that the effects 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.

Z. Columbia Spotted Frog

Columbia Spotted Frog - Existing condition

Ecology: The Columbia spotted frog is a recent split from the Oregon Spotted Frog, and prior to splitting the species, their habitat was considered the same. Therefore, for the purposes of this document, their habitat and effects analysis would be identical to that of the Oregon spotted frog. Refer to Section J of this report.

AA. Western Pond Turtle

Western Pond Turtle - Existing condition

Ecology: Western pond turtles historically occurred in a wide variety of permanent and intermittent aquatic habitats, but generally slow moving water below 6000 feet elevation. Populations have been found in rivers, streams, lakes, ponds and other seasonal or permanent wetlands. In intermittent streams western pond turtles are able to use permanent pools present after the stream has dried. The presence of suitable refugia (spaces under rocks, downed logs, holes in banks and most importantly undercut banks) may be critical to allow populations to maintain themselves in small streams. Western pond turtles require basking sites such as partially submerged logs, rocks, mud banks or emergent vegetation (Zeiner 1988).

Females excavate nest depressions in May, June, or July that are generally located in open areas upslope from riparian areas and dominated by grasses or herbaceous annuals and are primarily on south or southwest facing slopes. Females leave the watercourse in the late afternoon or early evening and move overland to excavate one or more nests. Nests are known to range from 17-20 meters (56-66 feet) from water, although some have been documented as far as 500 meters (1640 feet). Hatchlings emerge and move to the watercourse in early spring, which is usually March or April. Survivorship among hatchlings and first year animals is low, averaging 8-12%.

The Northwestern pond turtle is known as a dietary generalist with small aquatic invertebrates making up a large portion of its diet. The diet does also include fish and frog larvae, carrion and some plant material. Western pond turtles forage throughout the water column and use both sight and smell to detect prey. Foraging throughout the year takes place during daylight, however, nighttime foraging has been documented in the summer months when water temperature is higher. Western pond turtles usually leave watercourses by October or November to over winter in upland habitats.

Existing Condition: Small ponds and perennial streams in the proposed project area would provide habitat for this species. No surveys have been conducted within the proposed project area, and there are no documented sightings of Northwestern pond turtles on the Silver Lake Ranger District.

Northwestern Pond Turtle – Environmental Consequences

Direct and Indirect Effects

Alternative A (No Action)
The no action alternative would not remove, modify, or alter any northwestern pond turtle habitat.

Alternative C, D, E, G, and H
In all action alternatives, no harvest will occur immediately adjacent to any Riparian Habitat Conservation Areas which should include all natural ponds and perennial water sources, except when the perennial stream is within road buffer identified for harvest. In all action alternatives, this includes only 201 acres of salvage harvest immediately adjacent to perennial water sources. Within these acres and in the areas proposed for instream down wood placement, direct effects may occur to Northwestern pond turtles and their habitat. Outside of roadside buffer harvest, Class 1 RHCA's would be buffered by 300 feet in Alternatives D, G, and H and by 200 feet in Alternatives C and E. Class 3 RHCA's would be buffered by 75 feet in Alternatives C, E, and G and by 150 feet in Alternatives D and H. It is expected that with the small area of habitat affected, that the action alternatives may have impacts on Northwestern pond turtles or their habitat, but it is not likely to result in a trend toward Federal listing or loss of viability for Northwestern pond turtles.

Cumulative Effects Common to All Alternatives
All of the activities in Appendix A have been considered for their cumulative effects on Northwestern pond turtles, and the following activities have the potential to produce a cumulative effect. Any activities associated with dozer line construction from the 2002 fire suppression activities, as displayed in Table A-1 of Appendix A, may have had a localized negative effect on Northwestern pond turtle habitat. Past harvest, as displayed in Table A-2 of Appendix A, and fire suppression activities, as displayed in Table A-3 of Appendix A, have led to dense overstocked stands along riparian corridors that has led to a decrease in riparian vegetation and has increased the potential for stand replacement fire. Minimal effects may occur as a result of ongoing recreational activities adjacent to perennial water sources, as displayed in Table A-5 of Appendix A, from trails and human disturbance. Road developments, as displayed in Table A-6 of Appendix A, that cross perennial water sources have had an effect on Northwestern pond turtle habitat directly related to the road developments and also to increased sedimentation associated with roads. Grazing, as displayed in Table A-8 of Appendix A, likely has had the largest influence on Northwestern pond turtle habitat. Cattle use and disturbance adjacent to perennial water sources has decreased habitat for Northwestern pond turtles. Allotments that receive late season grazing likely experience a higher degree of disturbance. Culvert replacements, as displayed in Table A-9 of Appendix A, may have had a marginal localized effect on Northwestern pond turtles. Any diversions or reservoirs, as displayed in Table A-10 of Appendix A, have likely had positive influence on Northwestern pond turtles by diverting water to larger waterbodies that may create habitat. Future grazing, as displayed in Table A-17 of Appendix A, had the greatest likelihood of negatively effecting Northwestern pond turtle habitat in the future. With all cumulative effects considered, including the activities associated with this project, it is likely that the effects 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.

III. Focal Species Identified for the Subprovince Central Oregon/Klamath Basin in the "*Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington*" (species addressed for only those habitats found within the project area)

BB. White-headed Woodpecker (specific to Ponderosa Pine – large patches of old forest with large snags)

White-headed Woodpecker - Existing condition (specific to Ponderosa Pine – large patches of old forest with large snags)

White-headed woodpeckers prefer old-growth ponderosa pine with large diameter trees (Garrett et al. 1996). A study in Central Oregon on the Winema and Decshutes National Forests discovered that the mean dbh of nest trees is 27.6 inches, mean height of nest trees is 50 feet, 87% of the nests were found in ponderosa pine, and the mean canopy closure is 6.4% at nest sites (Frenzel 1998). Habitat is not suitable without relatively large snags for nest sites and large trees for foraging (Altman 2000). Ponderosa pine is the preferred seed cone for foraging, and large trees are necessary for insect foraging substrate, seed cone production, and recruitment snags (Altman 2000). Continuous tracts of late-successional forests provide higher quality habitat than fragmented areas, and there is little overlap in home range per pairs (Altman 2000). White-headed woodpecker populations are abundant in burned or cut forests where residual large-diameter live and dead trees are present (Raphael 1991, Raphael and White 1984, Raphael et al 1987).

The biological objectives for habitat recommended in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are where ecologically appropriate, initiate actions in ponderosa pine stands to provide for a mean of 10 trees/acre >21 inches dbh and at least 2 of the trees are >31 inches dbh, a mean of 1.4 snag/acre >8 inches dbh with 50% >25 inches dbh in a moderate to advanced state of decay, and a mean canopy closure of 10-40% (Altman 2000). Where ecologically appropriate, these conditions should be >350 acres in predominately old-growth areas or >700 acres when the area is 26-75% old growth (Altman 2000).

White-headed woodpecker populations are predicted to decline because adult mortality is higher that recruitment of young (Frenziel 2001). The conservation issues identified in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are (Altman 2000):
1. Extensive loss of large diameter ponderosa pine trees to timber harvest.

2. Lack of recruitment of young ponderosa pine due to factors such as fire suppression that has allowed understory encroachment of firs and exotics, and intensive grazing which can suppress development of young pines.
3. Dependent on large pine seeds as food during non-breeding season and almost all ponderosa pine seed production is by large, dominant trees in open situations (Oliver and Ryker 1990).
4. Fire suppression that has allowed understory encroachment and increased fuel loads that predispose these areas to stand-replacement fires.
5. Fragmented habitat increases energy expenditure and risk of predation to secure resources.
6. Loss of snags and down wood from timber harvest and fuelwood cutting.

Table 103: The wildlife data in DecAID demonstrates the following snags densities for white-headed woodpeckers at the 30%, 50%, and 80% tolerance level (Mellen et al. 2003):

	30% Tolerance Level # snags/acre	50% Tolerance Level # snags/acre	80% Tolerance Level # snags/acre
Snags >10 inches dbh	0.3	1.7	3.7
Snags >20 inches dbh	0.5	1.8	3.8

The white-headed woodpecker is listed by the US Fish and Wildlife Service as a bird of conservation concern, meaning that without additional conservation actions, it is likely to become a candidate for listing under the Endangered Species Act of 1973 (2002).

Existing Condition: Habitat does exist and white-headed woodpeckers have been documented within the project area. Although past harvest and the Toolbox and Silver Fires created a more fragmented landscape within the ponderosa pine communities, snag levels have increased and large diameter ponderosa pine snags are more abundant on the landscape. Habitat for white-headed woodpeckers has decreased overall within the project area as a result of the fire, but the remnant ponderosa pine stands that burned light to moderate are likely in better condition due to the increase in large snags.

Although no specific white-headed woodpecker surveys were conducted for this project, they were sited on several occasions during field review for this project. In addition, Neotropical point count surveys were conducted on the Silver Lake Ranger District at designated locations from 1994-2001. Four of the locations are within the project area located at Bottle Springs, Graham Creek, Guyer Creek, and West Fork Silver Creek. Although all sites are located in close proximity to ponderosa pine communities, white-headed woodpeckers were not detected during these point count surveys.

White-headed Woodpecker – Environmental Consequences (specific to Ponderosa Pine – large patches of old forest with large snags)

Direct and Indirect Effects

Alternative A (No Action)
This alternative will provide for the greatest number of snags for white-headed woodpeckers. All existing snags would be available in several size classes with differing densities. The likelihood of meeting snag levels into the future with increased snag longevity and retention would be the greatest under this alternative, with large diameter snags expected to last 20-30 years. In the stands that experienced low to moderate vegetation mortality, it is expected that snags will continue to increase, even post salvage, as the beetles move into these areas. This alternative provides the greatest opportunity to provide snag numbers required by white-headed woodpeckers in the short term and long-term (15+ years).

This alternative has no proposed fuels treatment so the likelihood of naturally regenerated stands and the remaining habitat that burned light to moderate, have the potential to severely burn in the future more so than if the fuels were managed. No proposed planting will also result in a delayed advancement of future white-headed woodpecker nesting and foraging habitat.

Alternative C, D, E, G, H
Ponderosa pine habitat with large patches of old forest with large snags would be found in the <50% mortality areas only. Within these areas, snag retention in harvest units was based on the snag levels needed for cavity nesting species in: 1.)green stand conditions (<50% mortality) based on historical or "natural conditions" developed with the data available in DecAID. Clumps will range from 2-20 snags per clump throughout the harvest units. Based on the snag retention

guidelines for harvest units that are <50% mortality described above in Section F, combined with the areas that are <50% mortality where no harvest is being proposed and where snags levels are likely above historical range (approximately 4381 acres in Alternative C, 8164 acres in Alternative D, 6169 acres in Alternative E, 4387 acres in Alternative G, and 4949 acres in Alternative H), we are likely managing at 80+% tolerance level or assurance for white-headed woodpeckers across the landscape. In addition, in the stands that experienced low to moderate vegetation mortality, it is expected that snags will continue to increase post salvage, as the beetles move into these areas. Therefore, we are retaining ample amounts of habitat for white-headed woodpeckers in all action alternatives. Salvage logging may have a direct effect on white-headed woodpecker nesting.

In the long-term, planting and fuels reduction may improve white-headed woodpecker habitat. This is expected to reduce the likelihood of a reburn and accelerate development of future foraging and nesting habitat. Reducing fuel loadings should sustain the existing habitat that remains within the fire and protect future habitat from experiencing a large stand replacement fire, and planting will produce white-headed woodpecker habitat much quicker into the future than natural regeneration under alternative A. The advantages of fuels reduction treatment will be the greatest with Alternative G that proposes the greatest amount of these treatments, and the least with Alternative D that proposes the least amount of these treatments. Alternative G proposes 16,950 acres of fuels treatment, Alternative C proposes 10,244 acres of fuels treatment, Alternative H proposes 9,070 acres of fuels treatment, Alternative E proposes 6,723 acres of fuels treatment, and Alternative D proposes 5,680 acres of fuels treatment. The advantages of planting will be the greatest with Alternative C that proposes the greatest amount of planting, and the least with Alternative H that proposes the least amount. Alternative C proposes 20,906 acres of planting, Alternative E proposes 20,753 acres of planting, Alternative D proposes 20,743 acres of planting, Alternative G proposes 20,728 acres of planting, and Alternative H proposes 20,721 acres of planting.

Cumulative Effects Common to All Alternatives

All of the activities in Appendix A have been considered for their cumulative effects on white-headed woodpeckers while considering the conservation issues identified in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are (Altman 2000), and the following activities have the potential to produce a cumulative effect. Due to past harvest management including roadside hazard, fire suppression, snag removal, and overstory removal, snag numbers have declined from pre-fire historical levels. Excavators associated with open late/old ponderosa pine like the white-headed woodpecker, have likely experienced a decline in habitat suitability, bird distribution, and populations. Past timber harvest activities, as described in Table A-2 and A-13 of Appendix A, and fire suppression, as described in Table A-1 of Appendix A, have changed overall stand conditions on federal and private lands resulting in the forest succession from an open pine forest to a dense mixed conifer dominated forest, and from the direct removal of snag habitat. Although higher stocking levels may be creating more snags through competition and insects, the overall loss of snags through harvest has resulted in lower than historical levels. Prescribed fire has also likely increased snag levels locally with individual snag creation and small 1-10 acre blowouts. Wildfires, as displayed in Table A-1 of Appendix 2, have increased snag numbers in the short-term, but for the most part past wildfires have experienced some level of salvage. The snag felling involved in the 2002 suppression activities, as displayed in Table A-1 of Appendix A, involved the felling of approximately 300-400 trees which reduced snag levels, but increased down wood levels. Road developments, as displayed in Table A-6 of Appendix A, have had an influence in snag levels by increasing the amount of area considered to be a hazard resulting in the felling and harvest of road-side hazard snags. Personal use firewood cutting, as displayed in Table A-12 of Appendix 2, have decreased snag levels across the District. The salvage on BLM land, as displayed in Table A-15 of Appendix A, is so small in comparison to the fire that there is likely no cumulative impact.

Current trends indicate that snag numbers are increasing due to reduced harvest of snags and increased required levels according to the Regional Foresters Amendment #2 standard and guidelines. Activities that are expected to be implemented in the Bridge Creek Subshed, including prescribed fire and silvicultural treatments designed to promote the development of LOS habitat with a snag and down wood component and those activities displayed in Table A-16 of Appendix A including prescribed fire and thinning, are expected to improve habitat for white-headed woodpeckers. Prescribed fire is expected to increase replacement snag and down wood numbers and reduce the fuel loading thereby protecting stands from wildfire.

CC. Pygmy Nuthatch (specific to Ponderosa Pine – large trees)

Pygmy Nuthatch - Existing condition (specific to Ponderosa Pine – large trees)

Ecology: Pygmy nuthatches are found in open ponderosa pine forests or mixed conifer forests with a significant component of ponderosa pine (Altman 2000). The biological objectives for habitat recommended in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are where ecologically appropriate, initiate actions in ponderosa pine forests to maintain or provide a mean of 10 trees/acre >21 inches dbh and at least 2 of the trees are >31 inches dbh and a mean of 1.4 snags/acre >8 inches dbh with 50% >25 inches dbh in a moderate to advanced state of decay (Altman 2000).

The conservation issues identified in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are (Altman 2000):
1. Extensive loss of large diameter ponderosa pine trees to timber harvesting.
2. Lack of recruitment of young ponderosa pine due to factors such as fire suppression that has allowed understory encroachment of firs and exotics, and intensive grazing which can suppress development of young pines.
3. Fire suppression that has allowed understory encroachment and increased fuel loads that predispose these areas to stand-replacement fires.
4. Fragmented habitat increases energy expenditure and risk of predation to secure resources.

Existing Condition: Habitat does exist and pygmy nuthatches have been documented within the project area. Although past harvest and the Toolbox and Silver Fires have created a more fragmented landscape within the ponderosa pine communities, snag levels have increased and large diameter ponderosa pine snags are more abundant on the landscape. Habitat for pygmy nuthatches has decreased overall within the project area as a result of the fire, but the remnant ponderosa pine stands that burned light to moderate are likely in better condition due to the increase in large snags.

Although no specific pygmy nuthatch surveys were conducted for this project, they were sited on several occasions during field review for this project. In addition, Neotropical point count surveys were conducted on the Silver Lake Ranger District at designated locations from 1994-2001. Four of the locations are within the project area located at Bottle Springs, Graham Creek, Guyer Creek, and West Fork Silver Creek. Although all sites are located in close proximity to ponderosa pine communities, pygmy nuthatches were only detected at Graham Creek and West Fork Silver Creek. Below is the total number of detections of pygmy nuthatches at Graham Creek and West Fork Silver Creek from 1994-2001:

Table 104: Pygmy nuthatch sightings at Graham Creek and West Fork Silver Creek

	1994	1995	1996	1997	1998	1999	2000	2001
Graham Creek	3	0	3	0	1	3	4	2
West Fork Silver Creek	0	0	1	0	0	0	0	0

Pygmy Nuthatch – Environmental Consequences (specific to Ponderosa Pine – large trees)

Direct and Indirect Effects

Alternative A (No Action)
This alternative will provide for the greatest number of snags for pygmy nuthatches. All existing snags would be available in several size classes with differing densities. The likelihood of meeting snag levels into the future with increased snag longevity and retention would be the greatest under this alternative, with large diameter snags expected to last 20-30 years. In the stands that experienced low to moderate vegetation mortality, it is expected that snags will continue to increase post salvage, as the beetles move into these areas. This alternative provides the greatest opportunity to provide the appropriate mix of live large ponderosa pine and the snag numbers required by pygmy nuthatches in the short term and long-term (15+ years).

This alternative has no proposed fuels treatment so the likelihood of naturally regenerated stands and the remaining habitat the burned light to moderate, have the potential to severely burn in the future more so than if the fuels were managed. No proposed planting will also result in a delayed advancement of future pygmy nuthatch nesting and foraging habitat.

Alternative C, D, E, G, and H

Ponderosa pine habitat with large trees would be found in the <50% mortality areas only. Within these areas, snag retention in harvest units was based on the snag levels needed for cavity nesting species in: 1.)green stand conditions (<50% mortality) based on historical or "natural conditions" developed with the data available in DecAID. Clumps will range from 2-20 snags per clump throughout the harvest units. Based on the snag retention guidelines for harvest units that are <50% mortality described above in Section F, combined with the areas that are <50% mortality where no harvest is being proposed and where snags levels are likely above historical range (approximately 4381 acres in Alternative C, 8164 acres in Alternative D, 6169 acres in Alternative E, 4387 acres in Alternative G, and 4949 acres in Alternative H), we are likely managing for sufficient habitat for pygmy nuthatches across the landscape. In addition, in the stands that experienced low to moderate vegetation mortality, it is expected that snags will continue to increase post salvage, as the beetles move into these areas. With ample amounts of snags retained and with no removal of green ponderosa pine trees, we are retaining ample amounts of habitat for pygmy nuthatches in all action alternatives. Salvage logging may have a direct effect on pygmy nuthatch nesting.

In the long-term, planting and fuels reduction may improve pygmy nuthatch habitat. This is expected to reduce the likelihood of a reburn and accelerate development of future foraging and nesting habitat. Reducing fuel loadings should sustain the existing habitat that remains within the fire and protect future habitat from experiencing a large stand replacement fire, and planting will produce pygmy nuthatch habitat much quicker into the future than natural regeneration under alternative A. The advantages of fuels reduction treatment will be the greatest with Alternative G that proposes the greatest amount of these treatments, and the least with Alternative D that proposes the least amount of these treatments. Alternative G proposes 16,950 acres of fuels treatment, Alternative C proposes 10,244 acres of fuels treatment, Alternative H proposes 9,070 acres of fuels treatment, Alternative E proposes 6,723 acres of fuels treatment, and Alternative D proposes 5,680 acres of fuels treatment. The advantages of planting will be the greatest with Alternative C that proposes the greatest amount of planting, and the least with Alternative H that proposes the least amount. Alternative C proposes 20,906 acres of planting, Alternative E proposes 20,753 acres of planting, Alternative D proposes 20,743 acres of planting, Alternative G proposes 20,728 acres of planting, and Alternative H proposes 20,721 acres of planting.

Cumulative Effects Common to All Alternatives

All of the activities in Appendix A have been considered for their cumulative effects on pygmy nuthatches while considering the conservation issues identified in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are (Altman 2000), and the following activities have the potential to produce a cumulative effect. Due to past harvest management including roadside hazard, fire suppression, snag removal, and overstory removal, large ponderosa pine trees and snag numbers have declined from pre-fire historical levels. Excavators associated with open late/old ponderosa pine like the pygmy nuthatch, have likely experienced a decline in habitat suitability, bird distribution, and populations. Past timber harvest activities, as described in Table A-2 and A-13 of Appendix A, and fire suppression, as described in Table A-1 of Appendix A, have changed overall stand conditions on federal and private lands resulting in the forest succession from an open pine forest to a dense mixed conifer dominated forest, and from the direct removal of snag habitat. Although higher stocking levels may be creating more snags through competition and insects, the overall loss of snags through harvest has resulted in lower than historical levels. Prescribed fire has also likely increased snag levels locally with individual snag creation and small 1-10 acre blowouts. Wildfires, as displayed in Table A-1 of Appendix 2, have increased snag number in the short-term, but for the most part past wildfires have experienced some level of salvage. The snag felling involved in the 2002 suppression activities, as displayed in Table A-1 of Appendix A, involved the felling of approximately 300-400 trees which reduced snag levels, but increased down wood levels. Road developments, as displayed in Table A-6 of Appendix A, have had an influence in snag levels by increasing the amount of area considered to be a hazard resulting in the felling and harvest of road-side hazard snags. Personal use firewood cutting, as displayed in Table A-12 of Appendix 2, have decreased snag levels across the District. The salvage on BLM land, as displayed in Table A-15 of Appendix A, is so small in comparison to the fire that there is likely no cumulative impact.

Current trends indicate that snag numbers are increasing due to reduced harvest of snags and increased required levels according to the Regional Foresters Amendment #2 standard and guidelines. Activities that are expected to be implemented in the Bridge Creek Subshed, including prescribed fire and silvicultural treatments designed to promote the development of LOS habitat with a snag and down wood component and those activities displayed in Table A-16 of Appendix A including prescribed fire and thinning, are expected to improve habitat for white-headed woodpeckers. Prescribed fire is expected to increase replacement snag and down wood numbers and reduce the fuel loading thereby protecting stands from wildfire.

DD. Chipping Sparrow (specific to Ponderosa Pine – open understory with regenerating pines)

Chipping Sparrow - Existing condition (specific to Ponderosa Pine – open understory with regenerating pines)

Ecology: Chipping sparrows are found in areas with a relatively open understory with a heterogenous understory of herbaceous openings and patches of shrubs and/or seedling trees, especially pines (Altman 2000). The biological objectives for habitat recommended in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are where ecologically appropriate, initiate actions in ponderosa pine forests to maintain or provide an interspersion of herbaceous ground cover with shrub and regenerating pine patches, 20-60% cover in the shrub layer (includes shrubs and small trees) with >20% of the shrub layer in regenerating sapling conifers, especially pines, and a mean canopy cover of 10-30%.

The conservation issues identified in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are (Altman 2000):
1. Understory removal because of fire hazard or as part of restoration activities – timing, extent, and location of removal.
2. Intensive grazing may reduce adequate herbaceous cover for foraging and inhibit development of regenerating seedlings of pine for recruitment trees and nesting habitat.
3. Vulnerable to cowbird parasitism where matrix land-use provides for cowbirds.

Existing Condition: Habitat does exist and chipping sparrows have been documented within the project area. The Toolbox and Silver Fires have likely decreased habitat for chipping sparrows due to the large-scale loss of shrubs and regenerating pines.

No specific chipping sparrow surveys were conducted for this project. Neotropical point count surveys were conducted on the Silver Lake Ranger District at designated locations from 1994-2001. Four of the locations are within the project area located at Bottle Springs, Graham Creek, Guyer Creek, and West Fork Silver Creek. Chipping Sparrows were only detected at Graham Creek, Bottle Springs, and West Fork Silver Creek. Below is the total number of detections of chipping sparrows at Graham Creek, Bottle Springs, and West Fork Silver Creek from 1994-2001:

Table 105: Chipping sparrow sightings at Graham Creek, Bottle Springs, and West Fork Silver Creek

	1994	1995	1996	1997	1998	1999	2000	2001
Graham Creek	6	2	0	2	2	2	3	2
Bottle Springs	0	1	2	3	2	3	2	2
West Fork Silver Creek	0	0	0	0	0	0	0	1

Chipping Sparrow – Environmental Consequences (specific to Ponderosa Pine – open understory with regenerating pines)

Direct and Indirect Effects

Alternative A (No Action)
The no action alternative would not remove, modify, or alter any chipping sparrow habitat. This alternative has no proposed fuels treatment so the likelihood of naturally regenerated stands and the remaining habitat the burned light to moderate, have the potential to severely burn in the future more so than if the fuels were managed. No proposed planting will also result in a delayed advancement of future chipping sparrow nesting and foraging habitat.

Alternative C, D, E, G, and H
In the action alternatives, prescribed fire is the only activity that has the potential to affect chipping sparrow habitat. Burning may further reduce the understory regeneration and shrub component that chipping sparrows select for. Alternatives C and G propose 3572 acres of prescribed fire, Alternatives D and H propose 2450 acres of prescribed fire, and Alternative E proposes 0 acres of prescribed fire. It is expected that the proposed prescribed fire is not large enough in

scale to affect chipping sparrow populations under any of the action alternatives. Salvage activities may have a direct effect on chipping sparrow nesting.

In the long-term, planting and fuels reduction may improve chipping sparrow habitat. This is expected to reduce the likelihood of a reburn and accelerate development of future foraging and nesting habitat. Reducing fuel loadings should sustain the existing habitat that remains within the fire and protect future habitat from experiencing a large stand replacement fire, and planting will produce brown creeper habitat much quicker into the future than natural regeneration under alternative A. The advantages of fuels reduction treatment will be the greatest with Alternative G that proposes the greatest amount of these treatments, and the least with Alternative D that proposes the least amount of these treatments. Alternative G proposes 16,950 acres of fuels treatment, Alternative C proposes 10,244 acres of fuels treatment, Alternative H proposes 9,070 acres of fuels treatment, Alternative E proposes 6,723 acres of fuels treatment, and Alternative D proposes 5,680 acres of fuels treatment. The advantages of planting will be the greatest with Alternative C that proposes the greatest amount of planting, and the least with Alternative H that proposes the least amount. Alternative C proposes 20,906 acres of planting, Alternative E proposes 20,753 acres of planting, Alternative D proposes 20,743 acres of planting, Alternative G proposes 20,728 acres of planting, and Alternative H proposes 20,721 acres of planting.

Cumulative Effects Common to All Alternatives

All of the activities in Appendix A have been considered for their cumulative effects on chipping sparrows while considering the conservation issues identified in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are (Altman 2000), and the following activities have the potential to produce a cumulative effect. Past timber harvest activities, as displayed in Table A-2 of Appendix A, and fire suppression activities, as displayed in Table A-1 of Appendix 2, have likely improved chipping sparrow habitat by increasing understory regeneration and shrubs. However, the loss of overstory large ponderosa pine has likely had a negative impact on chipping sparrows. Fuels reduction projects that have occurred within the project area, as displayed in Table A-3 of Appendix A, include prescribed fire and understory thinning in a mosaic thereby creating a mix of understory conditions. This has likely improved habitat for chipping sparrows. Grazing, as displayed in Table A-8 and A-17 of Appendix A, has likely reduced understory forage, but has not been intensive enough to inhibit seedling regeneration. Grazing has also increased the cowbird population that has led brood parasitism and the eventual decline of chipping sparrow populations. Noxious weed treatments, as displayed in Table A-4 of Appendix A, has decreased the likelihood of noxious weeds outcompeting native grasses.

EE. Lewis' Woodpecker (specific to ponderosa pine – patches of burned old forest)

Lewis' Woodpecker - Existing condition

Refer to the Section F of this report.

FF. Brown Creeper (Specific to late successional mixed conifer –large trees)

Brown Creeper - Existing condition (Specific to late successional mixed conifer –large trees)

Ecology: Brown creepers are a bark-gleaning insectivore associated with late-successional forests and mature trees (Altman 2000). The biological objectives for habitat recommended in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are where ecologically appropriate, initiate actions in mixed conifer forests to maintain or provide for blocks of late-successional habitat >75 acres with 4 trees/acre >18 inches with at least 2 trees >24 inches dbh (Altman 2002).

Some of the conservation issues identified in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are (Altman 2000):
1. Reduction in the presence of large trees across the landscape due to timber harvests, high-grading, and shorter rotations.
2. Indicators that it may be a forest interior species that is area sensitive (Rosenberg and Raphael 1986, Nelson 1989, McGarigal and McComb 1995)

Existing Condition: Habitat does exist within the project area. However, the majority of the mixed conifer habitat within the project area is within the riparian zones that generally experienced moderate to high vegetation mortality.

There are many documented brown creeper sightings within the project area. No specific brown creeper surveys were conducted for this project. Neotropical point count surveys were conducted on the Silver Lake Ranger District at designated locations from 1994-2001. Four of the locations are within the project area located at Bottle Springs, Graham Creek, Guyer Creek, and West Fork Silver Creek. Brown Creepers were detected at all locations. Below is the total number of detections of brown creepers from 1994-2001:

Table 106: Brown creeper sightings at Bottle Springs, Graham Creek, Guyer Creek, and West Fork Silver Creek

	1994	1995	1996	1997	1998	1999	2000	2001
Bottle Springs	1	0	0	4	2	2	3	1
Graham Creek	0	1	0	1	3	2	4	6
Guyer Creek	2	1.3	1	2	3	3	1	2
West Fork Silver Creek	0	2	1	3	5	2	3	2

Brown Creeper – Environmental Consequences **(Specific to late successional mixed conifer –large trees)**

Direct and Indirect Effects

Alternative A (No Action)
This no action alternative would not remove, modify, or alter any brown creeper habitat. This alternative has no proposed fuels treatment so the likelihood of naturally regenerated stands and the remaining habitat the burned light to moderate, have the potential to severely burn in the future more so than if the fuels were managed. No proposed planting will also result in a delayed advancement of future brown creeper nesting and foraging habitat.

Alternative C, D, E, G, and H
These alternatives would not affect brown creeper habitat because no green trees will be harvested under any of the action alternatives. Salvage activities may have a direct effect on brown creeper nesting. Overall, these alternatives are expected to have little effect on brown creeper populations or habitat.

In the long-term, planting and fuels reduction may improve brown creeper habitat. This is expected to reduce the likelihood of a reburn and accelerate development of future foraging and nesting habitat. Reducing fuel loadings should sustain the existing habitat that remains within the fire and protect future habitat from experiencing a large stand replacement fire, and planting will produce brown creeper habitat much quicker into the future than natural regeneration under alternative A. The advantages of fuels reduction treatment will be the greatest with Alternative G that proposes the greatest amount of these treatments, and the least with Alternative D that proposes the least amount of these treatments. Alternative G proposes 16,950 acres of fuels treatment, Alternative C proposes 10,244 acres of fuels treatment, Alternative H proposes 9,070 acres of fuels treatment, Alternative E proposes 6,723 acres of fuels treatment, and Alternative D proposes 5,680 acres of fuels treatment. The advantages of planting will be the greatest with Alternative C that proposes the greatest amount of planting, and the least with Alternative H that proposes the least amount. Alternative C proposes 20,906 acres of planting, Alternative E proposes 20,753 acres of planting, Alternative D proposes 20,743 acres of planting, Alternative G proposes 20,728 acres of planting, and Alternative H proposes 20,721 acres of planting.

Cumulative Effects Common to All Alternatives
All of the activities in Appendix A have been considered for their cumulative effects on brown creepers while considering the conservation issues identified in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are (Altman 2000), and the following activities have the potential to produce a cumulative effect. Past timber harvest activities, as displayed in Table A-2 of Appendix A, has led to the loss of overstory large ponderosa pine and white fir that has likely had a negative impact on brown creepers. Grazing, as displayed in Table A-8 and A-17 of Appendix A, has increased the cowbird population that has led brood parasitism and the possible reduction in brown creeper populations. No other cumulative activities are expected to have an affect on brown creepers.

GG. Williamson's Sapsucker (Specific to late successional mixed conifer –large snags)

Williamson's Sapsucker - Existing condition (Specific to late successional mixed conifer –large snags)

Ecology: Williamson's sapsuckers inhabit mature and old growth mixed conifer forests (Thomas et al. 1979). The biological objectives for habitat recommended in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are where ecologically appropriate, initiate actions in mixed conifer forests to maintain or provide 1 snag/acre >12 inches dbh except ponderosa pine should be >18 inches dbh and a mean canopy cover 25-70% (Altman 2002).

Some of the conservation issues identified in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are (Altman 2000):
1. Williamson's sapsuckers are dependent on relatively large snags or dying trees for nesting and foraging.
2. The loss of large snags under intensive forest management practices.
3. Fire suppression has resulted in closed understories that inhibit growth of large trees.

The Williamson's sapsucker is listed by the US Fish and Wildlife Service as a bird of conservation concern, meaning that without additional conservation actions, it is likely to become a candidate for listing under the Endangered Species Act of 1973 (2002).

Existing Condition: Habitat does exist within the project area. The majority of the mixed conifer habitat within the project area is within the riparian zones that generally experienced moderate to high vegetation mortality thereby increasing snags levels. However, in the mixed conifer stands that burned light to moderate, Williamson's habitat has likely improved due to an increase in snags.

There are many documented Williamson's sapsucker sightings within the project area. No specific Williamson's sapsucker surveys were conducted for this project. Neotropical point count surveys were conducted on the Silver Lake Ranger District at designated locations from 1994-2001. Four of the locations are within the project area located at Bottle Springs, Graham Creek, Guyer Creek, and West Fork Silver Creek. Williamson's sapsuckers were detected at Bottle Springs, Graham Creek, and West Fork Silver Creek locations. Below is the total number of detections of Williamson's sapsuckers from 1994-2001:

Table 107: Williamson's sapsucker sightings at Bottle Springs, Graham Creek, and West Fork Silver Creek

	1994	1995	1996	1997	1998	1999	2000	2001
Bottle Springs	1.3	0	0	0	0	0	1	0
Graham Creek	0	0	0	1	0	2	0	0
West Fork Silver Creek	0	0	0	0	0	0	1	0

Williamson's Sapsucker – Environmental Consequences (Specific to late successional mixed conifer – large snags)

Direct and Indirect Effects

Alternative A (No Action)
This alternative will provide for the greatest number of snags for Williamson's sapsucker. All existing snags would be available in several size classes with differing densities. The likelihood of meeting snag levels into the future with increased snag longevity and retention would be the greatest under this alternative, with large diameter snags expected to last 20-30 years. In the stands that experienced low to moderate vegetation mortality, it is expected that snags will continue to increase, even post salvage, as the beetles move into these areas. This alternative provides the greatest opportunity to provide snag numbers required by Williamson's sapsucker in the short term and long-term (15+ years).

Alternative C, D, E, G, H
Mixed conifer habitat with large patches of old forest with large snags would be found in the <50% mortality areas only. Within these areas, snag retention in harvest units was based on the snag levels needed for cavity nesting species in:

1.)green stand conditions (<50% mortality) based on historical or "natural conditions" developed with the data available in DecAID. Clumps will range from 2-20 snags per clump throughout the harvest units. Based on the snag retention guidelines for harvest units that are <50% mortality described above in Section F, combined with the areas that are <50% mortality where no harvest is being proposed and where snags levels are likely above historical range (approximately 4381 acres in Alternative C, 8164 acres in Alternative D, 6169 acres in Alternative E, 4387 acres in Alternative G, and 4949 acres in Alternative H), we are likely providing sufficient habitat for Williamson's sapsucker across the landscape. In addition, in the stands that experienced low to moderate vegetation mortality, it is expected that snags will continue to increase post salvage, as the beetles move into these areas. Therefore, we are retaining ample amounts of habitat for Williamson's sapsucker in all action alternatives. Salvage logging may have a direct effect on Williamson's sapsucker nesting.

In the long-term, planting and fuels reduction may improve Williamson's sapsucker habitat. This is expected to reduce the likelihood of a reburn and accelerate development of future foraging and nesting habitat. Reducing fuel loadings should sustain the existing habitat that remains within the fire and protect future habitat from experiencing a large stand replacement fire, and planting will produce Williamson's sapsucker habitat much quicker into the future than natural regeneration under alternative A. The advantages of fuels reduction treatment will be the greatest with Alternative G that proposes the greatest amount of these treatments, and the least with Alternative D that proposes the least amount of these treatments. Alternative G proposes 16,950 acres of fuels treatment, Alternative C proposes 10,244 acres of fuels treatment, Alternative H proposes 9,070 acres of fuels treatment, Alternative E proposes 6,723 acres of fuels treatment, and Alternative D proposes 5,680 acres of fuels treatment. The advantages of planting will be the greatest with Alternative C that proposes the greatest amount of planting, and the least with Alternative H that proposes the least amount. Alternative C proposes 20,906 acres of planting, Alternative E proposes 20,753 acres of planting, Alternative D proposes 20,743 acres of planting, Alternative G proposes 20,728 acres of planting, and Alternative H proposes 20,721 acres of planting.

Cumulative Effects Common to All Alternatives

All of the activities in Appendix A have been considered for their cumulative effects on Williamson's sapsuckers while considering the conservation issues identified in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are (Altman 2000), and the following activities have the potential to produce a cumulative effect. Due to past harvest management including roadside hazard, fire suppression, snag removal, and overstory removal, snag numbers have declined from pre-fire historical levels. Excavators associated with mixed conifer communities like the Williamson's sapsucker, have likely experienced a decline in habitat suitability, bird distribution, and populations. Past timber harvest activities, as described in Table A-2 and A-13 of Appendix A, and fire suppression, as described in Table A-1 of Appendix A, have changed overall stand conditions on federal and private lands resulting in the forest succession from an open pine forest to a dense mixed conifer dominated forest, and from the direct removal of snag habitat. Although higher stocking levels may be creating more snags through competition and insects, the overall loss of snags through harvest has resulted in lower than historical levels. Prescribed fire has also likely increased snag levels locally with individual snag creation and small 1-10 acre blowouts. Wildfires, as displayed in Table A-1 of Appendix 2, have increased snag number in the short-term, but for the most part past wildfires have experienced some level of salvage. The snag felling involved in the 2002 suppression activities, as displayed in Table A-1 of Appendix A, involved the felling of approximately 300-400 trees which reduced snag levels, but increased down wood levels. Road developments, as displayed in Table A-6 of Appendix A, have had an influence in snag levels by increasing the amount of area considered to be a hazard resulting in the felling and harvest of road-side hazard snags. Personal use firewood cutting, as displayed in Table A-12 of Appendix 2, have decreased snag levels across the District. The salvage on BLM land, as displayed in Table A-15 of Appendix A, is so small in comparison to the fire that there is likely no cumulative impact.

Current trends indicate that snag numbers are increasing due to reduced harvest of snags and increased required levels according to the Regional Foresters Amendment #2 standard and guidelines. Activities that are expected to be implemented in the Bridge Creek Subshed, including prescribed fire and silvicultural treatments designed to promote the development of LOS habitat with a snag and down wood component and those activities displayed in Table A-16 of Appendix A, including prescribed fire and thinning, are expected to improve habitat for Williamson's sapsuckers. Prescribed fire is expected to increase replacement snag and down wood numbers and reduce the fuel loading thereby protecting stands from wildfire.

HH. Flammulated Owl (Specific to late successional mixed conifer – interspersion grassy opening and dense thickets)

Flammulated Owl - Existing condition (Specific to late successional mixed conifer – interspersion grassy opening

Ecology: Flammulated owls inhabit habitat with a mosaic of old dry forest with large trees and snags, low canopy closure, openings of grasslands or dry meadows, and with a primarily herbaceous understory with a few scattered small patches of young sapling thickets (Atman 2000). The biological objectives for habitat recommended in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are where ecologically appropriate, initiate actions in mixed conifer forests to maintain or provide >10 snags/100 acres >12 inches dbh and 6 feet tall, >8 trees/acre >21 inches dbh to function as recruitment snags, at least one large or two smaller dense brushy thickets of saplings/pole trees for roosting habitat, and at least one large or two smaller grassy openings within the territory (Altman 2002).

Some of the conservation issues identified in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are (Altman 2000):
1. Loss of mature and old growth trees and snags for nest and roost trees.
2. Loss of open understory because of invasion of exotics and fire tolerant species due to fire suppression.

The flammulated owl is listed by the US Fish and Wildlife Service as a bird of conservation concern, meaning that without additional conservation actions, it is likely to become a candidate for listing under the Endangered Species Act of 1973 (2002).

Flammulated Owl – Environmental Consequences (Specific to late successional mixed conifer – interspersion grassy opening

Existing Condition: Habitat does exist within the project area. One historical nest site is located within the project area. The majority of the mixed conifer habitat within the project area is within the riparian zones that generally experienced moderate to high vegetation mortality. In the areas that burned light to moderate, habitat for flammulated owls is probably improved due to the increase in snags and creation of small openings. There are only a few flammulated owl sightings within the project area. No specific flammulated owl surveys were conducted for this project.

Direct and Indirect Effects

Alternative A (No Action)
The no action alternative would not remove, modify, or alter any flammulated owl habitat. However, increased fuel loading does present a risk of future stand replacement fires in existing habitat.

Alternative C, D, E, G, and H
These alternatives would not affect flammulated owl habitat because no green trees will be harvested under any of the action alternatives. In addition, based on the snag retention guidelines for harvest units that are <50% mortality described above in Section F, combined with the areas that are <50% mortality where no harvest is being proposed and where snags levels are likely above historical range (approximately 4381 acres in Alternative C, 8164 acres in Alternative D, 6169 acres in Alternative E, 4387 acres in Alternative G, and 4949 acres in Alternative H), we are likely providing sufficient habitat for flammulated owls across the landscape. In addition, in the stands that experienced low to moderate vegetation mortality, it is expected that snags will continue to increase post salvage, as the beetles move into these areas. Salvage activities may have a direct affect on flammulated owl nesting. It is expected that these alternatives will have little effect on flammulated owl populations or habitat.

In the long-term, planting and fuels reduction may improve flammulated owl habitat. This is expected to reduce the likelihood of a reburn and accelerate development of future foraging and nesting habitat. Reducing fuel loadings should sustain the existing habitat that remains within the fire and protect future habitat from experiencing a large stand replacement fire, and planting will produce flammulated owl habitat much quicker into the future than natural regeneration under alternative A. The advantages of fuels reduction treatment will be the greatest with Alternative G that proposes the

greatest amount of these treatments, and the least with Alternative D that proposes the least amount of these treatments. Alternative G proposes 16,950 acres of fuels treatment, Alternative C proposes 10,244 acres of fuels treatment, Alternative H proposes 9,070 acres of fuels treatment, Alternative E proposes 6,723 acres of fuels treatment, and Alternative D proposes 5,680 acres of fuels treatment. The advantages of planting will be the greatest with Alternative C that proposes the greatest amount of planting, and the least with Alternative H that proposes the least amount. Alternative C proposes 20,906 acres of planting, Alternative E proposes 20,753 acres of planting, Alternative D proposes 20,743 acres of planting, Alternative G proposes 20,728 acres of planting, and Alternative H proposes 20,721 acres of planting.

Cumulative Effects Common to All Alternatives

All of the activities in Appendix A have been considered for their cumulative effects on flammulated owls while considering the conservation issues identified in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are (Altman 2000), and the following activities have the potential to produce a cumulative effect. Due to past harvest management including roadside hazard, fire suppression, snag removal, and overstory removal, large ponderosa pine trees and snag numbers have declined from pre-fire historical levels. Past timber harvest activities, as described in Table A-2 and A-13 of Appendix A, and fire suppression, as described in Table A-1 of Appendix A, have changed overall stand conditions on federal and private lands resulting in the forest succession from an open pine forest to a dense mixed conifer dominated forest, and from the direct removal of snag habitat. Although higher stocking levels may be creating more snags through competition and insects, the overall loss of snags through harvest has resulted in lower than historical levels. Prescribed fire has also likely increased snag levels and small openings locally with individual snag creation and small 1-10 acre blowouts. Wildfires, as displayed in Table A-1 of Appendix 2, have increased snag number in the short-term, but for the most part past wildfires have experienced some level of salvage. The snag felling involved in the 2002 suppression activities, as displayed in Table A-1 of Appendix A, involved the felling of approximately 300-400 trees which reduced snag levels, but increased down wood levels. Road developments, as displayed in Table A-6 of Appendix A, have had an influence in snag levels by increasing the amount of area considered to be a hazard resulting in the felling and harvest of road-side hazard snags. Personal use firewood cutting, as displayed in Table A-12 of Appendix 2, have decreased snag levels across the District. The salvage on BLM land, as displayed in Table A-15 of Appendix A, is so small in comparison to the fire that there is likely no cumulative impact.

II. Hermit Thrush (Specific to late successional mixed conifer– multi-layered/dense canopy)

Hermit Thrush - Existing condition (Specific to late successional mixed conifer– multi-layered/dense canopy)

Ecology: Hermit thrush abundance is significantly less in precommercial thinned versus unthinned stands, and is positively correlated with foliage volume of shrubs and small trees indicating a preference for areas having a dense understory (Altman 2000). The biological objectives for habitat recommended in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are where ecologically appropriate, initiate actions in mixed conifer forests to maintain or provide for patches of forest with multi-layered structure and a dense understory shrub layer (Altman 2002).

The conservation issue identified in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* is (Altman 2000):

1. Alteration of habitats (loss of understory and structural complexity) from fire, grazing, and winter recreational activities.

Existing Condition: Habitat does exist within the project area. However, the majority of the mixed conifer habitat within the project area is within the riparian zones that generally experienced moderate to high vegetation mortality and therefore generally do not provide for dense conditions. In the areas that burned light to moderate, habitat has likely decreased due to the loss of understory regeneration, structure, and shrubs.

There are many documented sightings of hermit thrush within the project area. No specific hermit thrush surveys were conducted for this project. Neotropical point count surveys were conducted on the Silver Lake Ranger District at designated locations from 1994-2001. Four of the locations are within the project area located at Bottle Springs, Graham Creek, Guyer Creek, and West Fork Silver Creek. Hermit thrush were detected at all locations. Below is the total number of detections of hermit thrush from 1994-2001:

Table 108: Hermit thrush sightings at Bottle Springs, Graham Creek, Guyer Creek, and West Fork Silver Creek

	1994	1995	1996	1997	1998	1999	2000	2001
Bottle Springs	2.5	1	2	3	3	2	0	0
Graham Creek	0	1	0	0	0	0	0	0
Guyer Creek	1	2	2	0	2	3	0	2
West Fork Silver Creek	1	1	0	2	2	2	0	1

Hermit Thrush – Environmental Consequences **(Specific to late successional mixed conifer– multi-layered/dense canopy)**

Direct and Indirect Effects

Alternative A (No Action)
The no action alternative would not remove, modify, or alter any hermit thrush habitat. This alternative has no proposed fuels treatment so the likelihood of naturally regenerated stands and the remaining habitat the burned light to moderate, have the potential to severely burn in the future more so than if the fuels were managed. No proposed planting will also result in a delayed advancement of future hermit thrush nesting and foraging habitat.

Alternative C, D, E, G, and H
In the action alternatives, prescribed fire is the only activity that has the potential to effect hermit thrush habitat. Burning may further reduce the understory regeneration and complexity, and shrub component that hermit thrush select for. Alternatives C and G propose 3572 acres of prescribed fire, Alternatives D and H propose 2450 acres of prescribed fire, and Alternative E proposes 0 acres of prescribed fire. It is expected that the proposed prescribed fire is not large enough in scale to affect hermit thrush populations under any of the action alternatives. Salvage activities may have a direct effect on hermit thrush nesting.

In the long-term, planting and fuels reduction may improve hermit thrush habitat. This is expected to reduce the likelihood of a reburn and accelerate development of future foraging and nesting habitat. Reducing fuel loadings should sustain the existing habitat that remains within the fire and protect future habitat from experiencing a large stand replacement fire, and planting will produce hermit thrush habitat much quicker into the future than natural regeneration under alternative A. The advantages of fuels reduction treatment will be the greatest with Alternative G that proposes the greatest amount of these treatments, and the least with Alternative D that proposes the least amount of these treatments. Alternative G proposes 16,950 acres of fuels treatment, Alternative C proposes 10,244 acres of fuels treatment, Alternative H proposes 9,070 acres of fuels treatment, Alternative E proposes 6,723 acres of fuels treatment, and Alternative D proposes 5,680 acres of fuels treatment. The advantages of planting will be the greatest with Alternative C that proposes the greatest amount of planting, and the least with Alternative H that proposes the least amount. Alternative C proposes 20,906 acres of planting, Alternative E proposes 20,753 acres of planting, Alternative D proposes 20,743 acres of planting, Alternative G proposes 20,728 acres of planting, and Alternative H proposes 20,721 acres of planting.

Cumulative Effects Common to All Alternatives
All of the activities in Appendix A have been considered for their cumulative effects on hermit thrush while considering the conservation issues identified in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are (Altman 2000), and the following activities have the potential to produce a cumulative effect. Past timber harvest activities, as displayed in Table A-2 of Appendix A, and fire suppression activities, as displayed in Table A-1 of Appendix 2, have likely increased hermit thrush habitat by increasing understory regeneration and complexity, and shrubs. However, the loss of overstory large ponderosa pine and white fir has likely had a negative impact on hermit thrush. Fuels reduction projects that have occurred within the project area, as displayed in Table A-3 of Appendix A, include prescribed fire and understory thinning. These activities are generally designed to create a mosaic thereby creating a mix of understory conditions. This has likely improved habitat for hermit thrush. Grazing, as displayed in Table A-8 and A-17 of Appendix A, has likely reduced understory forage, but has not been intensive enough to inhibit seedling regeneration. Grazing has also increased the cowbird population that has led brood parasitism and the possible reduction in hermit thrush populations. Noxious weed treatments, as displayed in Table A-4 of Appendix A, has decreased the likelihood of noxious weeds outcompeting native grasses.

JJ. Olive-sided Flycatcher (Specific to late successional mixed conifer– edges and openings created by wildfire)

Olive-sided Flycatcher - Existing condition (Specific to late successional mixed conifer– edges and openings created by wildfire)

Ecology: Olive-sided flycatchers are aerial insectivores that breed in natural or man-made openings and edges of coniferous forests where tall trees and snags are present for singing and foraging perches (Altman 2000). The biological objectives for habitat recommended in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are where ecologically and socially appropriate, through natural events or management, maintain >2% of the landscape as post-fire habitat and >40% of the landscape as unsalvaged (Altman 2002). Where salvage logging is occurring on post-fire old ponderosa pine forest, maintain or provide in burns >100 acres, >50% of the standing and down wood remains unsalvaged, in all burns retain all trees/snags >20 inches dbh and >50% of those 12-20 inches dbh, and retain patches with a mix of live and dead trees/snags to provide for potential nest trees (live) within the context of potential foraging and singing perches (dead) (Altman 2000).

The conservation issues identified in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* is (Altman 2000):
1. Changes in fire regimes that has resulted in fewer fires, but larger more destructive fires that has reduced the amount of edge of early and late seral forest (Wisdom et al in press).
2. Brush control and grazing limit understory growth that provides insect productivity.
3. Insect control during the breeding season could limit prey availability and reduce olive-sided flycatcher productivity.

Existing Condition: Habitat does exist within the project area. The variety of burn severities within the fire has created a mosaic of burned and unburned areas thereby creating an increase in edge habitat preferred by olive-sided flycatchers.

There are many documented sightings of olive-sided flycatchers within the project area. No specific olive-sided flycatcher surveys were conducted for this project. Neotropical point count surveys were conducted on the Silver Lake Ranger District at designated locations from 1994-2001. Four of the locations are within the project area located at Bottle Springs, Graham Creek, Guyer Creek, and West Fork Silver Creek. Olive-sided flycatchers were detected at Bottle Springs and Graham Creek. Below is the total number of detections of olive-sided flycatchers from 1994-2001:

Table 109: Olive-sided flycatcher sightings at Bottle Springs and Graham Creek

	1994	1995	1996	1997	1998	1999	2000	2001
Bottle Springs	0	0	0	0	0	0	0	1
Graham Creek	0	0	0	0	1	2	1	1

Olive-sided Flycatcher – Environmental Consequences (Specific to late successional mixed conifer– edges and openings created by wildfire)

Direct and Indirect Effects

Alternative A (No Action)
This alternative provides optimal conditions for olive-sided flycatchers. With increased nesting opportunities as snags begin to soften and foraging opportunities as the aerial insect population increase, an increase in olive-sided flycatchers populations within the burned area is expected until the large trees begin to fall (20-30 years).

Alternative C, D, E, G, and H
The biological objectives for habitat recommended in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are where ecologically and socially appropriate, through natural events or management, maintain >40% of a post-fire landscape unsalvaged (Altman 2000). Including all acres in all mortality classes, 42% of the areas proposed for salvage will remain unlogged in Alternative C, 75% of the areas proposed for salvage will remain unlogged in Alternative D, 54 % of the areas proposed for salvage in Alternative E, 43% of the areas

proposed for salvage in Alternative G, and 48% of the areas proposed for salvage in Alternative H. Any harvest or activity during the breeding season may have a direct effect on nesting. It is expected that all alternative will provide sufficient habitat for olive-sided woodpeckers.

Cumulative Effects Common to all Alternatives

All of the activities in Appendix A have been considered for their cumulative effects on olive-sided flycatchers while considering the conservation issues identified in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are (Altman 2000), and the following activities have the potential to produce a cumulative effect. Due to past harvest management including roadside hazard, fire suppression, snag removal, and overstory removal, snag numbers have declined from pre-fire historical levels. Past timber harvest activities, as described in Table A-2 and A-13 of Appendix A, and fire suppression, as described in Table A-1 of Appendix A, have changed overall stand conditions on federal and private lands resulting in the forest succession from an open pine forest to a dense mixed conifer dominated forest, and from the direct removal of snag habitat. Prescribed fire has also likely increased snag levels locally with individual snag creation and small 1-10 acre blowouts. Wildfires, as displayed in Table A-1 of Appendix 2, have increased snag number in the short-term, but for the most part past wildfires have experienced some level of salvage. The snag felling involved in the 2002 suppression activities, as displayed in Table A-1 of Appendix A, involved the felling of approximately 300-400 trees which reduced snag levels, but increased down wood levels. Road developments, as displayed in Table A-6 of Appendix A, have had an influence in snag levels by increasing the amount of area considered to be a hazard resulting in the felling and harvest of road-side hazard snags. Personal use firewood cutting, as displayed in Table A-12 of Appendix 2, have decreased snag levels across the District. The salvage on BLM land, as displayed in Table A-15 of Appendix A, is so small in comparison to the fire that there is likely no cumulative impact.

The Winter Fire is directly adjacent to the Toolbox and Silver Fires to the east. This fire was approximately 34,000 acres and currently only approximately 3000 acres is proposed for salvage harvest. This fire is a mix of conditions including forested, unforested, and plantations. Within the 3000 acres proposed for salvage, snags retention guidelines will assure the retention of snags to meet cavity dependent species habitat. Also, approximately 1500 acres of the Toolbox and Silver Fires located in the Bridge Creek and Anna Reservoir Subshed will not be proposed for salvage and will provide additional habitat for olive-sided flycatchers.

KK. Black-backed Woodpecker (Specific to lodgepole pine – old growth)

Refer to the Section F of this report.

LL. Sandhill Crane (Specific to meadows)

Sandhill Crane - Existing condition (Specific to meadows)

Ecology: Sandhill cranes nest, roost, and rear young in wet meadows and forage in dry and wet meadows (Altman 2000). The biological objectives for habitat recommended in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are where ecologically appropriate, initiate actions in wet/dry meadows to maintain or provide tracts of suitable habitat >300 acres where both wet and dry meadows are part of the meadow complex, where only wet meadow habitat is present tracts can be smaller (<20 acres) if dry meadow habitat is present within 0.3 miles, and manage hydrology where appropriate to include both wet and dry meadow habitat throughout the nesting season (Altman 2000).

Some of the conservation issues identified in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are (Altman 2000):

1. Livestock grazing may reduce habitat suitability of not managed properly and interfere with reproductive success.
2. Conifer invasion at edge of meadows.
3. Susceptible to human disturbance.

Existing Condition: Habitat does exist within the project area. Historical nest sites are located at Buckaroo Lake, Grassy Lake, Labrie Lake, and Thompson Reservoir. No specific sandhill crane surveys were conducted for this project.

Sandhill Crane – Environmental Consequences (Specific to meadows)

Direct and Indirect Effects

Alternative A (No Action)
The no action alternative would not remove, modify, or alter any sandhill crane habitat.

Alternative C, D, E, G, and H
In all action alternatives, no harvest will occur immediately adjacent to any open meadows. The areas mentioned above are considered to be Class 3 Riparian Habitat Conservation Areas, all of which will be buffered under all alternatives. These areas will be buffered by 75 feet in Alternatives C, E, and G, and by 150 feet in Alternatives D and H, both of which would be sufficient for sandhill crane habitat. In addition, these meadows will not receive planting within 200 feet of the meadow to prevent encroachment into these meadow systems. The disturbance involved with salvage activities may have a direct effect on sandhill crane nesting.

Cumulative Effects Common to All Alternatives
All of the activities in Appendix A have been considered for their cumulative effects on sandhill cranes while considering the conservation issues identified in the *Conservation Strategy for Landbirds of the East-slope of the Cascade Mountains in Oregon and Washington* are (Altman 2000), and the following activities have the potential to produce a cumulative effect. Any activities associated with dozer line construction from the 2002 fire suppression activities, as displayed in Table A-1 of Appendix A, may have had a localized negative effect on sandhill crane habitat habitat. Fire suppression has led to the expansion of conifers into meadow systems thereby reducing habitat for sandhill cranes. Minimal effects may occur as a result of ongoing recreational activities adjacent to meadows, as displayed in Table A-5 of Appendix A, from trails and human disturbance. Grazing, as displayed in Table A-8 of Appendix A, likely has had the largest influence on sandhill crane habitat. Cattle use and disturbance adjacent to meadows has decreased habitat for sandhill cranes. Allotments that receive late season grazing likely experience a higher degree of disturbance. Any diversions or reservoirs, as displayed in Table A-10 of Appendix A, have likely had both a negative influence on sandhill cranes by diverting water to larger waterbodies rather than shallow meadow complexes. Future grazing, as displayed in Table A-17 of Appendix A, had the greatest likelihood of negatively effecting sandhill crane habitat in the future, however the current grazing strategies and annual operating plans appear to retain suitable habitat. With all cumulative effects considered, including the activities associated with this project, it is likely there is little effect on sandhill cranes or their habitat.

MM. Red-naped Sapsuckers (Specific to Aspen)

Refer to Section E of this report.

IV. Other Species, Habitats, and Wildlife Issues of Concern

NN. Noetropical Migratory Birds and Songbirds

Neotropical Migratory Birds and Songbirds - Existing condition

Ecology: Neotropical migratory birds are those that breed in the United States and winter south of the border in Central and South America. They include a large group of species, including many hawks, shorebirds, warblers, and other song birds, with diverse habitat needs spanning nearly all successional stages of most plant community types (Niles 1992). Nationwide declines in population trends for Neotropical migrants have developed into an international concern.

Some Neotropical migratory birds have a positive effect from fires, while others have a negative effect. It is possible that the decline of some Neotropical migratory bird species, such as the olive-sided flycatcher, is linked to a century of fire suppression in western forests (Sallabanks and Mclver 1998). Overall, wildfire was found to have a somewhat negative

effect, reducing bird species richness wherever burn intensity was the highest (Sallabanks and Mclver 1998).

Existing Condition: Within the project area, it is expected that species richness and overall species abundance has decreased as a result of the fire, with these measures decreasing as burn intensities increase. Species that are foliage or crown feeders and overstory nesting species, may disappear within the high intensity burn areas. Some of these local species may include the golden-crowned kinglets, mountain chickadees, hermit thrush, ruby-crowned kinglet, yellow-rumped warbler, and western tanager. An increase in flycatchers, seedeaters, and cavity nesters is expected. Local species that may benefit from the fire include the olive-sided flycatcher, western-wood peewee, Hammond's flycatcher, dusky flycatcher, cordilleran flycatcher, dark-eyed junco, Cassin's finch, evening grosbeak, American robin, and several primary and secondary cavity nesters. Species that require more open ponderosa pine habitats such as the white-headed woodpecker, flammulated owl, chipping sparrow, townsend's solitaire, and pygmy nuthatch likely will increase in the stands that experienced low to moderate vegetation mortality as understory densities decreases as a result of the fire, while the species which prefer more dense understories like the Townsend's warbler, red-breasted nuthatch, warbling vireo, American robin, spotted towhee, and Nashville warbler may decrease as a result of the fire (OR/WA partners in Flight 2001).

Neotropical point count surveys were conducted on the Silver Lake Ranger District at designated locations from 1994-2001. Four of the locations are within the project area located at Bottle Springs, Graham Creek, Guyer Creek, and West Fork Silver Creek. Monitoring will continue at the West Fork Silver Creek location to compare pre- and post-fire bird responses.

Neotropical Migratory Birds and Songbirds – Environmental Consequences

Direct and Indirect Effects

Alternative A (No Action)
This alternative provides the greatest opportunity for maintaining nesting and foraging habitat for those species that respond well to fire. Most notably, habitat will be maintained for the olive-sided flycatcher that is a rapidly declining species. Local populations of Neotropical migratory bird species that utilize burned areas may increase.

Alternative C, D, E, G, H
Bird species richness has already decreased due to the high intensity of the burn. Due to the differing responses of individual species to tree size class and density, leaving variable clump sizes, variable diameter sizes, and unsalvaged areas in these alternatives will help assure we are providing habitat for a variety of species. Habitat maintenance for species that utilize burned areas is greatest with Alternative D that proposes the least amount of harvest. Alternative C proposes 14,441 acres of salvage, Alternative G proposes 14,419 acres of salvage, Alternative H proposes 13,031 acres of salvage, Alternative E proposes 11,490 acres of salvage, and Alternative D proposes 6,367 acres of salvage.

Salvage logging between May and August may have direct effects on Neotropical migratory bird nesting. However, logging is only expected to take place for one year and therefore the effects would be short-term. Although little is known about the effects of salvage logging in stand replacement fires on Neotropical migratory birds, it is expected that salvage of snags within harvest units under these alternatives could have a negative effect on potential population numbers of cavity nesting birds. Within areas designated for no harvest, there is expected to be little effect on Neotropical birds. Potential population numbers for grass and shrub nesting birds is expected to increase in the all areas in the long-term. Overall, some species will be negatively affected in some areas due to salvage harvest in the short-term, while other species will be positively affected in the short-term within the areas of no-harvest. In the long-term, sufficient habitat within harvest and no-harvest areas should be retained to provide for viable populations of all Neotropical migratory birds.

Cumulative Effects Common to All Alternatives
All of the activities in Appendix A have been considered for their cumulative effects on Neotropical migratory birds, and the following activities have the potential to produce a cumulative effect. Because Neotropical birds include such a wide range of species, all activities benefit some species while negatively impacting others. Past timber management activities, as displayed in Table A-2 of Appendix A, and fire suppression activities, as displayed in Table A-1 of Appendix A, have converted open ponderosa pine stands to those with dense understories favoring those species that prefer dense understories. Current silvicultural activities and prescribed fire, are converting these dense stands to more open ponderosa pine stands favoring those that prefer open stand conditions. Noxious weed treatments, as displayed in Table A-4 of

Appendix A, has decreased the likelihood of noxious weeds outcompeting native grasses. Livestock grazing, as displayed in Table A-8 and A-17 of Appendix A, has likely decreased the grass/forbs and shrub communities that may have a negative effect on ground-nesters. However, the current management plans and operating plans currently in place appear to be adequate to maintain shrubs and grass/forbs in the project area. Grazing has also increased the cowbird population that has led brood parasitism and the possible reduction in some populations of Neotropical migratory bird species. The aspen treatments identified in Table A-9 of appendix A has likely improved habitat for species that nest in aspen, while the juniper thinning identified in this Table A-9 has likely decrease habitat for species that nest in juniper. Although cumulative activities have caused alterations in habitat that favored some species over others, monitoring indicates that Neotropical migratory bird viability has not been affected for most species.

OO. Designated Old Growth

Designated Old Growth - Existing condition

Existing Condition: The Fremont LRMP includes Management Areas 3 and 14. Management Area 3 is old growth habitat for dependent species above the management requirement level and Management Area 14 is old growth to provide management requirements for dependent species (1989). These management areas are to help maintain viable populations of dependent native vertebrate species including goshawks, black-backed woodpeckers, pine marten, and pileated woodpeckers (1989). As stated in the LRMP, "salvage activities will take place only when catastrophic events occur (such as wildfire, insect infestations, windthrow, etc.) and the affected old growth stand is no longer considered suitable old growth habitat. A new old growth stand should be delineated to replace the original habitat" (1989).

Within the Toolbox and Silver Fires sixteen Management Area 3 and 14 old growth stands were affected to some degree by the fire totaling 1191 acres. Each individual old growth stand was assessed on the ground to determine if the stand remains functional habitat for the species it is designated for. Each old growth area was mapped individually into four vegetation mortality categories (0-25%, 25-50%, 50-85%, >85%) to assist in determining if the area is still functional. For old growth areas that are managed for species whose habitat requirements include green stands with large trees and high canopy closure such as the goshawk, pileated woodpecker, and pine marten, the majority of the old growth area needed to be <50% mortality, preferably <25% mortality. If it was determined that the stand remains functional, no harvest will occur within the old growth area. If is was determined that the stand is non-functional, harvest will occur within the existing old growth area and a new old growth stand was mapped. Replacement old growth areas were identified using the Region 6 Interim Old Growth Definitions (Hopkins et al. 1992) as a guide and the fieldwork included the following procedures:

> Random plots were placed on aerial photos 200-300 feet apart in areas that appeared to have potential. At each plot, a basal area factor of 10 was used to gather the data. The trees in each plot were counted and recorded. The results revealed the approximate number of trees per acre 16+ inches dbh. Notes were also taken on the abundance of snags and down wood in the stand.

For old growth areas that are managed for species whose habitat is improved with post fire conditions such as the black-backed woodpecker, the old growth areas may include high vegetation mortality, or >50% mortality. These areas will remain as designated old growth areas (MA 3 or 14) for approximately 10 years when it is expected the trees will have fallen and the stand will no longer provide the habitat required for black-backed woodpeckers. Potential replacement areas have been identified and will be reevaluated in 10 years to determine if they meet the criteria for old growth. At this time, these potential replacement areas will experience no harvest and the land management allocation will not change for approximately 10 years and would occur under another NEPA document. Total acres of old growth affected under this NEPA decision will increase from 1191 to 1267 acres.

Table 110: Management Area 3 and 14 allocated old growth within the project area

Old Growth Area	Management Area	Fire	Species	Functionality Determination	Acres of Original Old Growth Area	Acres of Replacement Old Growth Area`
PPGOGO414015	14	Silver	Goshawk	Functional	60	

PPGOGO414109	14	Silver	Goshawk	Functional	61	
PPGOGO414112	14	Silver	Goshawk	Functional	61	
LPTTTT403049	3	Silver	Black-backed Woodpecker	Functional	72	
LPTTTT414050	14	Silver	Black-backed Woodpecker	Non-functional Replace in 10 years	56	
LPTTTT414041	14	Silver	Black-backed Woodpecker	Functional	80	
LPTTTT414040	14	Silver	Black-backed Woodpecker	Non-functional Replace in 10 years	116	
LPTTTT414038	14	Silver	Black-backed Woodpecker	Functional	66	
PPGOGO414002	14	Toolbox	Goshawk	Non-functional Replace immediately	71	71
PAGOGO414136	14	Toolbox	Goshawk	Non-functional Replace immediately	97	128
LPTTTT403107	3	Toolbox	Black-backed Woodpecker	Non-functional Replace in 10 years	76	
PPGOGO414105	14	Toolbox	Goshawk	Functional	115	
PPGOGO414109	14	Toolbox	Goshawk	Non-functional Replace immediately	68	68
PAGOGO414108	14	Toolbox	Goshawk	Non-functional Replace immediately	80	121
PPGOGO414122	14	Toolbox	Goshawk	Functional	52	
PPGOGO414106	14	Toolbox	Goshawk	Non-functional Replace immediately	60	64

Designated Old Growth – Environmental Consequences

Direct and Indirect Effects

Alternative A (No Action)
This alternative does not offer the opportunity to reallocate non-functional old-growth areas within the project area.

Alternative C, D, E, G, H
Salvage is proposed in the designated old growth stands that are no longer functional. No harvest or other activities will occur within the existing old growth stands that are functional, or the stands designated to replace the non-functional old growth stands. Old growth areas identified for replacement immediately will be reallocated from Management Area 5 to Management Area 3 or 14 under the Forest Plan. Replacement areas identified for replacement in 10 years will be analyzed under a separate NEPA decision. Total acres of old growth affected under this NEPA decision will increase from 1191 to 1267 acres.

Increased snags and future down wood has likely improved habitat for old growth dependent species. Reducing fuel loadings adjacent to old growth areas should prevent the functional and replacement old growth areas from experiencing a large stand replacement fire. The advantages of fuels reduction treatment will be the greatest with Alternative G that proposes the greatest amount of these treatments, and the least with Alternative D that proposes the least amount of these treatments. Alternative G proposes 16,950 acres of fuels treatment, Alternative C proposes 10,244 acres of fuels treatment, Alternative H proposes 9,070 acres of fuels treatment, Alternative E proposes 6,723 acres of fuels treatment, and Alternative D proposes 5,680 acres of fuels treatment.

Cumulative Effects Common to All Alternatives
All of the activities in Appendix A have been considered for their cumulative effects on old growth, and the following activities have the potential to produce a cumulative effect. Designated old growth areas were identified on the District after the most recent LRMP decision in 1989. As recommended in the LRMP these areas have only received treatments that are designed to protect and enhance the area as old growth. Prescribed fire, as displayed Table A-3 of Appendix A, and understory thinning, as displayed in Table A-2 of Appendix A, 3 are some examples of treatments designed to enhance and protect old growth. Overall, there has been very little cumulative effect on designated old growth.

PP. Connectivity Corridors

Connectivity Corridors - Existing condition

The Regional Forester's Amendment #2 requires the identification of connectivity corridors designed to connect designated old growth areas and LOS habitat types across the landscape. These corridors are to allow movement and interaction of adults and dispersal of young. Corridors do not necessarily meet the same description of "suitable" habitat for breeding, but allow free movement between suitable breeding habitats. Connectivity corridors are considered stands in which medium to larger trees are common, and canopy closure are within the top-third of site potential. Stand widths should be at least 400 feet wide at their narrowest point, unless it is impossible to meet the 400 foot with current vegetative conditions. If these stands meeting these descriptions are not available, the next best available habitat will be identified. Harvesting within connectivity corridors is permitted if all the criteria in the above can be met, and if the amount of understory is left in patches or scattered to assist in supporting stand density and cover.

Connectivity corridors were identified and mapped prior to the fire. Due to the fire and change in old growth locations, these areas were reevaluated to determine if they still function as connectivity corridors. Using vegetation mortality mapping and post fire aerial photos, each connectivity corridor was evaluated to determine if it appeared to be functional. If it appeared to be non-functional due to the degree of vegetation mortality or a change in old growth location, a new connectivity corridor was identified in the best available habitat, preferably in the <50% vegetation mortality category. In most cases, the newly identified connectivity corridors are marginal due to the fragmentation resulting from the fire.

Connectivity Corridors – Environmental Consequences

Direct and Indirect Effects

Alternative A (No Action)
This alternative would have no effect on connectivity corridors.

Alternative C, D, E, G, H
Limited salvage is proposed in the functional and replacement connectivity corridors. Of the approximately 4000 acres of connectivity corridors identified for this project only 307 acres is proposed for harvest in Alternatives C and G, 305 in Alternative H, 268 in Alternative E, and 251 acres in Alternative D. Within these areas it is expected that the snag retention guidelines as described in Section F of this report will be sufficient for the purposes of functional connectivity corridors. Within the connectivity corridors that are not proposed for salvage, high snag levels will provide for the unique habitat required by many species. The connectivity corridors will provide continuity for woodpeckers and other snag and down wood dependent species across the project area, and aid in reducing large-scale fragmentation.

Reducing fuel loadings adjacent to the corridors should prevent the functional and replacement connectivity corridors from experiencing a large stand replacement fire. The advantages of fuels reduction treatment will be the greatest with Alternative G that proposes the greatest amount of these treatments, and the least with Alternative D that proposes the least amount of these treatments. Alternative G proposes 16,950 acres of fuels treatment, Alternative C proposes 10,244 acres of fuels treatment, Alternative H proposes 9,070 acres of fuels treatment, Alternative E proposes 6,723 acres of fuels treatment, and Alternative D proposes 5,680 acres of fuels treatment. The identified connectivity corridors that experienced moderate to high vegetation mortality will receive planting, but no site-pre or fuels treatment will occur to maintain the snag habitat.

Cumulative Effects Common to All Alternatives
All of the activities in Appendix A have been considered for their cumulative effects on connectivity corridors, and the following activities have the potential to produce a cumulative effect. Connectivity corridors were identified on the District after the direction from the Regional Forester's Amendment #2 became effective in 1994. As recommended, only treatments that could would maintain the site potential as described above and further enhance the area as a connectivity corridor have been applied. Prescribed fire, as displayed Table A-3 of Appendix A, and understory thinning, as displayed in Table A-2 of Appendix A, 3 are some examples of treatments designed to enhance and protect identified connectivity corridors. Overall, there has been very little cumulative effect on connectivity corridors on the District.

QQ. Fragmentation

Fragmentation - Existing condition

Ecology: Fragmentation occurs when an expanse of habitat is broken into two or more patches separated by different types of habitat. Fragmentation can lead to habitat loss, edge effects, and patch size effects. "Patches" refer to contiguous areas of fairly homogeneous vegetation conditions. "Edge" refers to the margins of patches. There are inter-relationships between patch sizes, the amount of edge, and the area in the interior of patches.

There is also a level of "natural" fragmentation related to landscape physiography. For example, contrasting vegetation edges occur where there are changes in aspect as well as changes in soil types or geology. Native wildlife species have evolved in a landscape with a high degree of fragmentation, abundant edge, and relatively small patch sizes as a result of natural processes and topography.

Existing Condition: Silvicultural practices on the Silver Lake Ranger District created openings that in general are probably larger then those created through historic fire events in the ponderosa pine communities. Had fire played a more natural role on the landscape it is expected that the land would be continuous and that openings in general would be less than 5 acres in size. Roads also play a role in fragmentation of habitat. Disturbance, whether it is achieved through fire or other silvicultural practices, is needed to maintain some level of fragmentation, edges, and patches to provide for the diversity of habitats consistent with the natural range of conditions.

The Toolbox and Silver Fires created a wide variety of patch sizes. The fire overall created a mosaic of different burn severities that range in size from 1 acre to 790 acres in size. The vegetation mortality mapping can be used as a tool to determine the patch type and size created by the fire, although recognizing the patches could be reduced even further using other factors including vegetation, slope, and past silvicultural practices. Patches of 0-25% vegetation mortality range from 1 to 790 acres in size, patches of 25-50% vegetation mortality mapping range from 1 to 450 acres in size, patches of 50-85% vegetation mortality range from 1 to 295 acres in size, and patches of >85% vegetation mortality range from 1 to 650 acres in size.

Fragmentation – Environmental Consequences

Direct and Indirect Effects

Alternative A (No Action), C, D, E, G, and H
Current vegetation patterns are a product of topography, historical fire regimes, fire suppression, management activities and other natural factors that combine to produce a diverse landscape including vegetation ranging from grasslands to old growth forests. The landscape has always been naturally fragmented to some degree by natural factors, especially topography. Patch sizes have been highly variable over time, primarily due to fire, the single greatest force in shaping the vegetation patterns of the District. None of the alternatives will have an effect on patch sizes or fragmentation of habitats, because none of the proposed actions will alter substantially the juxtaposition of post fire vegetation. However, the proposed road closures or decommissioning will have a positive effect on fragmentation. Alternative D proposes to close 147.1 miles, Alternative H 144.5 miles, Alternative C 141.9 miles, and Alternative E and G 82 miles.

Cumulative Effects Common to All Alternatives

All of the activities in Appendix A have been considered for their cumulative effects on fragmentation, and the following activities have the potential to produce a cumulative effect. Past harvest including clearcutting, as displayed in Table A-2 of Appendix A, has increased fragmentation by creating openings. However, these opening are small and tend to be less than 40 acres. Timber harvest on private land, as described in Table A-13 of Appendix A, has a larger affect by creating very large scale openings and plantations. Wildfires, as displayed in Table A-1 of Appendix A, has also contributed to creating larger openings than fire likely created historically. Road developments, as displayed in Table A-6 of Appendix A, has also divided the landscape

RR. Rocky Mountain Elk

Rocky Mountain Elk - Existing condition

Ecology: Elk forage in a variety of habitats that vary with the season and location. Generally, elk eat grasses and parts of woody plants in winter; grass in spring and fall; grass and forbs (low-growing, soft-stemmed plants) in summer. Meadows and forest opening typically provide foraging habitat for elk. Elk also need cover to hide from predators, and to moderate weather conditions, although hiding covers seems the more important of the two. LRMP standard and guidelines address habitat for this species only pertaining to special habitats such as licks, calving areas, and wallows.

Existing Condition: This area is within the South Central Elk Management Zone and the management objective is 3000 elk. The population is thought to be stable to slightly increasing (Hedrick, pers. comm.). The area of the propose project is within the Interstate Herd summer range. The fire improved foraging habitat for elk, but cover habitat was reduced.

Rocky Mountain Elk – Environmental Consequences

Direct and Indirect Effects

Overall, down wood percent cover is extremely low in all alternatives. Cover for elk will be minimal for many years until conifers are re-established through natural regeneration or planting. The few small patches of cover that remain in the fire are likely to get heavy use from elk. Forage production in the form of grasses and forbs is expected to increase. Although forage may improve, cover may be limited to the point of ineffectiveness in much of the interior of the burn. Increased down wood levels in the future is expected to improve calving habitat by increasing calving protection.

Mountain mahogany stands that burned severely will be monitored for natural regeneration. If it appears that natural regeneration is not occurring within the next 5-10 years, mountain mahogany planting or seeding may be considered under another NEPA decision.

Alternative A (No Action)
No harvest will allow the burned area to recover at a natural rate. This will result in a delayed return of cover than with Alternatives C, D, E, G, and H. This alternative does not offer the opportunity to close or decommission any existing roads that would increase elk security. Although elk population numbers are expected to increase with this alternative, distribution and use as a result of the project activities may change.

Alternatives C and G
Although cover will remain limited for many years, planting under these alternatives is expected to provide cover at a much quicker rate (approximately 10-15 years) than Alternative A. With a diversity in planting with variable spacing and trees per acre, some areas will recover as hiding cover quicker while some areas will remain open for forage longer. This treatment is expected to provide a distribution of cover to forage in the long-term that is favorable to elk. The few small patches of cover that remain in the fire are likely to get heavy use from elk. Forage should remain plentiful within the plantations until the stands begin to close in in 30-40 years. Planting at lower densities of 130-250 trees per acres will provide foraging habitat longer into the future. The silvicultural prescription for the plantation thinning will all be designed

to maintain cover. This should open up plantations and improve forage production, thereby producing a mix of cover and forage that is optimal for elk.

These alternatives will have a slight effect on cover. It is estimated that the proposed prescribed burning may reduce cover within exiting cover stands by 35%. Although the loss of cover is marginal, overall cover loss due to the fire was significant and further loss may have a negative effect on elk habitat.

Table 111: Effects of Cover Loss in Alternatives C and G

	Lower Duncan Creek Subshed Summer Range	Upper Duncan Creek Subshed Summer Range	East Duncan Creek Subshed Summer Range	East Duncan Creek Subshed Transition Range
Acres of existing cover stands proposed for prescribed fire	96 acres	100 acres	231 acres	33 acres

Alternative C has a greater impact on elk security than Alternative G by closing 141.9 miles of road versus 82 miles of road in alternative G. Salvage alternatives may result in a delayed or slower rate of response for some forage species. Elk populations are expected to increase with these alternatives and distribution and use as a result of the fire in the local area may change.

Alternatives D, E, and H

Although cover will remain limited for many years, planting under these alternatives is expected to provide cover at a much quicker rate (approximately 10-15 years) than Alternative A. With a diversity in planting with variable spacing and trees per acre, some areas will recover as hiding cover quicker while some areas will remain open for forage longer. This treatment is expected to provide a distribution of cover to forage in the long-term that is favorable to elk. The few small patches of cover that remain in the fire are likely to get heavy use from elk. Forage should remain plentiful within the plantations until the stands begin to close in in 30-40 years. Planting at lower densities of 130-250 trees per acres will provide foraging habitat longer into the future. The silvicultural prescription for the plantation thinning will all be designed to maintain cover. This should open up plantations and improve forage production, thereby producing a mix of cover and forage that is optimal for elk.

Alternative D and H have a greater impact on elk security than alternative E by closing 147.1 and 144.5 miles of road respectively, versus 82 miles of road in alternative E. Salvage alternatives may result in a delayed or slower rate of response for some forage species. Elk populations are expected to increase with these alternatives and distribution and use as a result of the fire in the local area may change.

Cumulative Effects Common to All Alternatives

All of the activities in Appendix A have been considered for their cumulative effects on elk and the following activities have the potential to produce a cumulative effect. Past management activities have likely increased the potential habitat for elk within the project area. Timber harvest, as displayed in Table A-2 of Appendix A, in conjunction with fuels reduction projects, as described in Table A-3 of Appendix A, have likely improved elk habitat by burning shrubs and increasing grass and forbs. Recreation activities, as described in Table A-5 of Appendix 2, may have some effect on elk security near campgrounds or other recreational sites. Grazing, as described in Table A-8 of Appendix A, has created competition with elk for early green-ups, forbs, and winter browse. However, the current management plans and operating plans currently in place appear to be adequate to maintain grass/forbs in the project area. Noxious weed treatments, as described in Table A-4 of Appendix A, has reduced the spread of noxious weed which maintains native vegetation for elk forage. Wildlife and watershed improvement projects, as described in Table A-9 of Appendix 2, include aspen enhance and juniper thinning projects. Aspen enhancement increases regeneration, a valuable forage for elk, and juniper thinning increases forage and production in areas where the juniper is out-competing the native vegetation. Down wood loss through personal use firewood cutting, as described in Table A-12 of Appendix A, and through past timber management activities, as described in Table A-2 of Appendix A, have decreased fawning habitat and protection. Road construction, as displayed in Table A-6 of Appendix A, has reduced elk security, although efforts to close and decommission roads (approximately 60 miles in the West Fork Silver Creek, Upper Silver Creek, Thompson Reservoir, and Benny Creek Subsheds), as displayed in Table A-9 of Appendix A, is reducing this effect.

Reasonably foreseeable future activities include treatments within the Bridge Creek Subshed and treatments displayed in Table A-16 of Appendix A within the project area subsheds. It is anticipated that prescribed fire and silvicultural treatments that move dense stands to a more open condition will increase forage. Riparian improvements including the large woody debris placement projects in the West Fork Silver Creek (Table A-16 of Appendix A) and in the Bridge Creek Subshed will likely increase riparian vegetation and likely improve elk habitat and success. Grazing, as displayed in Table A-17 of Appendix A, will continue to occur, and would continue to allow competition with elk for forage resources habitat. Dispersed recreation and hunting will continue to occur, and would directly affect elk. Also increases during hunting season contribute to altering movement patterns and habitat use. Cumulatively, all present and future cumulative activities including the activities proposed with this project, will likely increase local elk populations because overall.

SS. Wild Turkey

Wild Turkey - Existing condition

Ecology: Wild turkeys need mature, open forests for traveling and seeing predators interspersed with grassy openings (FEIS). The amount of openings required ranges from 10-25% of the total range (FEIS). In Oregon, wild turkeys prefer to roost in large ponderosa pines on easterly slopes (FEIS). Turkeys eat fruits, seeds, tubers, bulbs, and greens of locally common plants, as well as snails, spiders, grasshoppers, millipedes, and salamanders (FEIS, Schroeder 1985). Grasses are usually important spring foods and poults rely on insects for protein.

Prescribed burning can be used to stimulate growth of food plants and promote early spring green up of grasses (FEIS, Schroeder 1985). Fire can also reduce litter, exposing seeds and insects, and create edges to increase nesting habitat (FEIS, Stoddard 1961).

Existing Condition: Wild turkeys have only been documented on the North and West side of Hager Mountain, approximately 2-3 miles from the project area. No turkeys have been documented on the Silver Lake Ranger District since 1996, and it is thought that the local population may be exterminated due to drought for predation. Habitat does exist within the fire in areas of large open spaced ponderosa pine that burned light to moderate.

Wild Turkey – Environmental Consequences

Direct and Indirect Effects

Alternative A (No Action)
The no action alternative would not remove, modify, or alter any wild turkey habitat.

Alternatives C, D, E, G, and H
No green ponderosa pine trees will be affected with any of the alternatives and so wild turkey habitat will not be affected. Reforestation and precommercial thinning in the action alternatives will produce mature ponderosa pine stands more rapidly than with no treatments as proposed in Alternative A. Reducing fuel loadings should sustain the existing habitat that remains within the fire and protect future habitat from experiencing a large stand replacement fire, and planting will produce wild turkey habitat much quicker into the future than natural regeneration under alternative A. The advantages of fuels reduction treatment will be the greatest with Alternative G that proposes the greatest amount of these treatments, and the least with Alternative D that proposes the least amount of these treatments. Alternative G proposes 16,950 acres of fuels treatment, Alternative C proposes 10,244 acres of fuels treatment, Alternative H proposes 9,070 acres of fuels treatment, Alternative E proposes 6,723 acres of fuels treatment, and Alternative D proposes 5,680 acres of fuels treatment. The advantages of planting will be the greatest with Alternative C that proposes the greatest amount of planting, and the least with Alternative H that proposes the least amount. Alternative C proposes 20,906 acres of planting, Alternative E proposes 20,753 acres of planting, Alternative D proposes 20,743 acres of planting, Alternative G proposes 20,728 acres of planting, and Alternative H proposes 20,721 acres of planting. Logging during the breeding season may cause a disturbance to nesting wild turkeys in Alternatives C, D, E, G, and H.

There will be no effects to wild turkeys habitat under any of these alternatives. Although there may be direct effects associated with logging activities and individuals may be impacted in Alternatives C, D, E, G, and H, it is not expected to

have an impact on local populations or habitat.

Cumulative Effects Common to All Alternatives

All of the activities in Appendix A have been considered for their cumulative effects on wild turkeys, and the following activities have the potential to produce a cumulative effect. Past management activities, as displayed in Table A-2 of Appendix A, and fire suppression activities, as displayed in Table A-3 of Appendix 2, have converted open ponderosa pine stands to overstocked stands with dense understories and reduced overall large ponderosa pine trees. This has likely decreased wild turkey habitat. Prescribed burning and understory thinning, as displayed in Table A-3 of Appendix A, have improved conditions by creating more open understory conditions and increasing deciduous vegetation. Grazing activities, as displayed in Table A-8 and Table A-17 of Appendix A, may have a slight impact on wild turkey habitat by reducing grass and forb abundance that provides for insect populations. Locally, wild turkey populations have been largely affected by weather, rather than by the cumulative activities discussed.

V. Consistency with the Forest Plan

Goshawks: Fremont National Forest LRMP standards and guidelines for goshawks, as amended by the Regional Forester's Amendment #2, are to protect a 30-acre nest core, to delineate a 400-acre post fledging area with an emphasis of maintaining existing LOS stands and enhancing younger stands towards LOS condition, and to protect every known active and historical nest site from disturbance. A 30-acre nest stand and a 400-acre post family fledging area has been delineated for every known historical and active goshawk nest, and this will be done for every new nest discovered through surveys conducted during the summer of 2003. No disturbance is expected because there are no proposed harvest units within ½ mile of a known nest.

Mule Deer and MA 1: LRMP Standards and Guidelines that apply to this project are:

1.) Retain a minimum of 30 percent cover on summer range, 30 percent cover on transition range, and 50 percent cover on winter range. Alternatives C, D, G and H each include the use of prescribed fire outside of harvest areas. The amount and location of the additional prescribed fire in Alternatives C and G is expected to result in a minor decrease in cover in mule deer summer range (Lower Duncan Creek, Upper Duncan Creek and East Duncan Creek subwatersheds) and transition range (East Duncan Creek subwatershed). This would require a site-specific Forest Plan Amendment in relation to mule deer cover for the summer range in Lower Duncan Creek, Upper Duncan Creek and East Duncan Creek subwatersheds and transition range in East Duncan Creek subwatershed, and in relation to Habitat Effectiveness for the summer range in the Lower Duncan subwatershed. Prescribed fire would be applied to the ground with the intention of creating a mosaic of burned and unburned area and breaking up the continuity of the fuels. Prescribed fire would not occur in existing areas mapped as cover in Alternatives D and H and therefore would not reduce percent cover and would not require a site specific Forest Plan Amendment.

2.) Retain 50 percent HE on summer range, 60 percent HE on transition range, and 80 percent HE on winter range. Habitat effectiveness would not be reduced in any alternative.

3.) Where shrubs are part of the plant community, retain 10 - 20 percent of the project unit in shrubs on summer range and 30-40 percent of the project unit in shrubs on transition range. Where bitterbrush is a component on winter range, retain at least 40 percent of the area in bitterbrush distributed throughout the area. Within the areas proposed for prescribed fire in Alternatives C, D, G, and H, the desired condition is to produce a mosaic of shrub habitat and cover while increasing forest sustainability. The objective would be to achieve a 40 - 60 percent ***burned*** / 60 - 40 percent ***unburned*** mosaic, which will likely maintain shrubs on 60 percent of the area proposed for prescribed fire.

4.) Fawning cover should be emphasized in riparian areas where a high density of shrubs, lush forage, and running water are available during the fawning season. In all action alternatives, no harvest would occur immediately adjacent to any Riparian Habitat Conservation Areas which include perennial water sources, except when the perennial stream is within a road buffer identified for harvest. In all action alternatives, this includes only 201 acres of salvage harvest immediately adjacent to perennial water sources. Outside of roadside buffer harvest, Class 1 RHCAs would be buffered by 300 feet in Alternatives D, G, and H and by 200 feet in Alternatives C and E. Class 3 RHCAs would be buffered by 75 feet in Alternatives C, E, and G and by 150 feet in Alternatives D and H. Snag retention guidelines will provide for sufficient amounts of down wood for fawning protection. In all alternatives, fawning habitat quality will be maintained.

5.) Roads open to motorized vehicle traffic would be managed at a level of 2.5 miles or less per square mile on summer range and 1.0 miles or less per square mile on winter range. Where possible, road densities will be dropped to 1.0 mile or less of open road density per square mile on summer/transition range. Road management objectives will move substantially toward Forest Plan direction on summer/transition range by reducing road densities to from 3.68 miles per square mile to 2.57 miles per square mile in Alternatives E and G, to 1.76 miles per square mile in Alternative C, to 1.72 miles per square mile in Alternative H, and to 1.68 miles per square mile in Alternative D. Road management objectives will move substantially toward Forest Plan direction on winter range by reducing road densities from 2.4 miles per square mile to 1.87 miles per square mile in Alternatives E and G, and to 1.28 miles per square mile in Alternative C, D, and H.

Snags and Down Wood: LRMP Standards and Guidelines, as amended by the Regional Forester's Amendment #2, require that, "All sale activities (including regeneration, select cutting, thinning, or salvage) will maintain snag and green tree replacement/roost trees greater than 15 inches dbh at 100 percent population potential levels of primary cavity excavators, and this should be determined using the best available data on species requirements as applied through current snag models or other documented procedures." The best available science at the time determined this to be 4 snags per acre, 3 snags greater than 15 inches dbh (greater than 20 inches dbh preferred), and 1 snag greater than 10 inches dbh (12 inches dbh preferred). Down wood requirements are to manage for 80 lineal feet of down wood in ponderosa pine communities, and 120 lineal feet of down wood in mixed conifer communities. In all alternatives, snag levels will exceed LRMP Standard and Guidelines, as amended by the Regional Forester's Amendment #2, and down wood levels will exceed LRMP Standard and Guidelines, as amended by the Regional Forester's Amendment #2, in the long term.

Connectivity Corridors: The Regional Forester's Amendment #2 requires the identification of connectivity corridors designed to connect designated old growth areas and LOS habitat types across the landscape. Connectivity corridors are considered stands in which medium to larger trees are common and canopy closure are within the top-third of site potential. Stand widths should be at least 400 feet wide at their narrowest point, unless it is impossible to meet the 400 foot width with current vegetative conditions. If stands meeting these descriptions are not available, the next best available habitat would be identified. Harvesting within connectivity corridors is permitted if all the criteria in the above can be met and if the amount of understory is left in patches or scattered to assist in supporting stand density and cover. All the criteria for connectivity corridors will be met under all alternatives.

Old Growth: The Fremont LRMP includes Management Areas 3 and 14. Management Area 3 is old growth habitat for dependent species above the management requirement level and Management Area 14 is old growth to provide management requirements for dependent species (1989). As stated in the LRMP, "Salvage activities would take place only when catastrophic events occur (such as wildfire, insect infestations, windthrow, etc.) and the affected old growth stand is no longer considered suitable old growth habitat. A new old growth stand should be delineated to replace the original habitat" (1989). This direction has been followed under all alternatives.

Threatened and Endangered Species Habitat – MA 2: In Bald Eagle Management Areas designated as MA 2, "Timber harvest will be used as a management tool to enhance and perpetuate bald eagle habitat where necessary and appropriate" (1989). The management objectives for bald eagle areas are to provide: 1.) an abundance of mature/overmature trees for nesting/roosting platforms, 2.) a minimum of disturbance from people, and 3.) an abundance of food (LRMP 1989). All of these objectives will be met in all alternatives through snag retention guidelines that are adequate for providing nesting/roosting platforms and mitigation measures to avoid disturbance. There will be no effect on foraging habitat. It is also expected that bald eagle habitat will be enhanced and perpetuated through fuels reduction that will reduce the possibility of fuels conditions that would contribute to future high intensity fires and through planting of trees to expedite future bald eagle habitat.

In Peregrine Falcon Management Areas designated as MA 2, the direction is to, "Manage and retain their natural character and a high degree of solitude and to provide an adequate food base" (1989). Timber management activities near an active nest will be managed to provide for a variety of habitats to support an adequate food base (LRMP 1989). In all alternatives, the fire and consequent salvage will likely improve habitat for falcons by creating more openings and providing foraging habitat in the uplands within the fire.

Rocky Mountain Elk: LRMP direction is, where possible, road densities should be reduced to one mile of open road per square mile of summer range. Road management objectives will move substantially toward Forest Plan direction on summer range by reducing road densities to from 3.68 miles per square mile to 2.57 miles per square mile in Alternatives E and G, to 1.76 miles per square mile in Alternative C, to 1.72 miles per square mile in Alternative H, and to 1.68 miles per square mile in Alternative D.

Other Raptors: LRMP direction states that when an active raptor nest is discovered, the nest tree and four adjacent large trees will be left standing. The nest and perch trees may be harvested after the young have left the area. This direction will be met with the following mitigation measure: If an active raptor nest is found during operation, LRMP Standards and Guidelines would be followed at a minimum. The LRMP states that "major activities such as logging and road construction adjacent (300 yards) to active raptor nests, should be postponed until young have fledged (usually around July 30)" (LRMP, 180). The Wildlife Biologist would be contacted.

Threatened, Endangered, and Sensitive Species: All alternatives, would meet all regulatory laws and regulations required for these species.

VI. Monitoring

Monitoring began in 2003 to monitor the effectiveness of salvage logging prescriptions designed to maintain habitat for sensitive woodpeckers including black-backed woodpeckers, Lewis' woodpeckers, and white-headed woodpeckers. Surveys will include nest searching and monitoring within some of the areas identified as suitable habitat for black-backed woodpeckers and Lewis' woodpeckers as described in the Existing Condition Section of this report, and vegetation sampling. See Appendix D for more information on this study. The objectives of the study are:

1. To determine the nest occurrences and reproductive success of black-backed, white-headed, and Lewis' woodpecker within predicted "suitable" and random sites within the Toolbox and Silver Fires.
2. To determine the effectiveness of the salvage logging prescriptions designed to provide habitat for sensitive woodpecker species in the Toolbox and Silver Fires compared to traditional methods of snag retention in post fire conditions on the Fremont National Forest.
3. To determine habitat characteristics at multiple spatial scales associated with nest sites of sensitive woodpecker species and to compare those habitat characteristics with random sites to determine habitat preferences.
4. To conduct an accuracy assessment of the vegetation mortality mapped by aerial photos with that recorded at ground locations by cover type and crown closure.
5. Determine if vegetation mortality are important for nest site selection by woodpeckers.

Results from this study will help managers evaluate the effectiveness of varying salvage logging prescriptions for maintaining habitat for sensitive woodpecker species. Results will also help in assessing the ecological trade-offs associated with salvage logging, such as potential conflicts among sensitive species of woodpeckers and the removal of commercial material. Information from existing studies and from this proposed work will be used for evaluating salvage logging projects through National Environmental Policy Act (NEPA) analyses, appeals and litigation, sub-basin reviews, watershed analyses, forest plan revisions, long-term monitoring strategies, and consultations, including recovery plans, and biological assessments, evaluations, and opinions. Thus, by addressing the ecological consequences of various levels of salvage logging, this study will provide crucial information for planning and implementing salvage logging projects in ponderosa pine forests of the Interior West.

VI. References

Agee, James K. 2002. Fire as a coarse filter for snags and logs. In: Laudenslayer, William F., Jr.; Valentine, Brad; Weatherspoon, C. Philip; Lisle, Thomas E., technical coordinators. Proceedings of the symposium on the ecology and management of dead wood in western forests. 1999 November 2-4; Reno, NV. Gen. Tech. Rep. PSW-GTR-181. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture. http://www.psw.fs.fed.us/Tech_Pub/Documents/gtr-181/029_Agee.pdf

Altman, B. 2000. Conservation Strategy for Landbirds of the east-slope of the Cascade Mountains in Oregon and Washington. Version 1. Oregon-Washington Partners in Flight.

Amman, G.D., and K.D. Ryan. 1991. Insect infestation of fire-injured trees in the greater Yellowstone area. Research note In T-398, U.S. Forest Service, Ogden, Utah. In: Bates, L. 2001. Effects of fire on cavity-nesting birds. Unpubl.

Aney, W.C. and B.R. McClelland. 1985. Habitat suitability index model for northern Rocky Mountain pileated woodpeckers. Unpublished Report. Univ. of Montana. 31pp.

Anthony, Robert G. et. al. 1982. Habitat use by nesting and roosting bald eagles in the Pacific Northwest. Publ. by the Wildlife Management Institute, Washington D.C.

Bienz, C.S., R.Opp, G. Silovsky, and J. Toman. 1985. Mule deer habitat effectiveness: The criteria for habitat management. Unpublished model user manual.

Black, H., R. Scherzinger, and J.W. Thomas. 1976. Relationships of Rocky mountain elk and rocky mountain mule deer habitat to timber management in the Blue Mountains of Oregon and Washington. In proceedings of the elk-Logging-Roads Symposium, 16-17 Dec. 1975, Moscow, Idaho. Edited by S.R. Heib Forest Wildlife and Range Experiment Station, University of Idaho, Moscow, ID. Pp. 11-31.

Blackford, John L. 1955. Woodpecker concentration in burned forest. Condor 57: 28-30. In: Bates, L. 2001. Effects of fire on cavity-nesting birds. Unpubl.

Bock, C.E. and J.H. Bock. 1974. On the geographical ecology and evolution of the three-toed woodpeckers. American Midland Naturalist 92:397-405.

Buehler, D.A., T.J. Mersmann, J. D. Fraser and J. K. D. Seegar. 1991. Nonbreeding bald eagle communal and solitary roosting behavior and roost habitat on the Northern Chesapeake Bay. Journal of Wildlife Management. 55(2):273-281.

Bull, E.L. et al. 1980. Perpetuation of snags on managed mixed conifer forests of the Blue Mountains. In: Management of Western Forests and Grasslands for Nongame Birds Workshop Proceedings, USDA Forest Service. Gen. Tech. Rep. INT-86. 325-336.

Bull, E and R.S. Holthausen. 1993. Habitat use and management of pileated woodpeckers in northeastern Oregon. J. Wildl. Manage. 57:335-345.

Bull, Evelyn L., Catherine G. Parks, and Torolf R. Torgersen. 1997. Trees and Logs Important to Wildlife in the Interior Columbia River Basin. Gen. Tech. Rep. PNW-GTR-390. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 55p.

Bull, E., S.R. Peterson and J.W. Thomas. 1986. Resource partitioning among woodpeckers in northeastern Oregon. Res. Note. PNW-444. Portland, OR: U.S. Dept. of Agriculture, Forest Service, Pacific Northwest Research Station. 19pp.

Bunting, S.C. 1998. Use of prescribed fire for habitat enhancement in woodlands and shrub-steppe ecosystems. Fire and wildlife in the Pacific Northwest research, policy, and management symposium. Spokane, WA

Burkman, M.A. 1993. The use of fire to manage breeding habitat for yellow rails. School of Graduate Studies, Northern Michigan University.

Butts, T.W. 1992. Wolverine (Gulo gulo) Biology and management: a literature review and annotated bibliography. USDA, Forest Service, Northern Region, Missoula, MT. Pg 105. In: Burned Area Recovery FEIS, USDA Forest Service, Bitteroot National Forest, Sept. 2001.

Carey, A.J. 1995. Sciurids in Pacific Northwest managed and old-growth forests. Ecol. Appl. 5:648-661. In: Mellen, Kim, Marcot. B, Janet L. Ohmann, Karen L. Waddell, Elizabeth A. Willhite, Bruce B. Hostetler, Susan A. Livingston, Catherine Ogden, and Tina Dreisbach. 2002. The DecAID repository: background information for DecAID, the decayed wood advisor for managing snags, partially dead trees, and down wood for biodiversity in forests of Washington and Oregon. USDA Forest Service, Pacific Northwest Research Station and Pacific Northwest Region, Portland, Oregon. Available on-line at: http://wwwnotes.fs.fed.us:81/pnw/DecAID/DecAID.nsf.

Carter, J.W. 1992. Upland sandpiper, *Bartramia longicauda*. Pp 235-252 in K.J. Schneider and D.M. Pence, editors. Migratory nongame birds of management concern in the Northeast U.S. Fish and Wildlife Service, Newton

Corner, Massachusetts. 400 pp. Located on website: http://www.tnc.org/wings/wingresource/upsa.htm or on file at the Silver Lake Ranger District.

Caton, Elaine L. 1996. Effects of fire and salvage logging on the cavity nesting bird community in northwestern Montana. Missoula: University of Montana; ph D. dissertation. In: Saab, Victoria, R. Brannon, J. Dudley, L. Donohoo, D. Vanderzanden, V. Johnson, and H. Lachowski. 2002. Selection of fire-created snags at two spatial scales by cavity-nesting birds. Gen. Tech. Rep. PSW-GTR-181. Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture.

Caton, E. 1996 Effects of fire and salvage-logging on a cavity-nesting bird community in northwestern Montana. Ph.D. Dissertation. Univ. of Montana. Missoula. 115 pp. In: Bates, L. 2001. Effects of fire on cavity-nesting birds. Unpubl.

Chapin, Theodore G.; Harrison, Daniel J.; Phillips, David M. 1997. Seasonal habitat selection by marten in untrapped forest preserve. J. Wildl Manag. 61(3):707-717.

Chester, D.N., D.F. Stauffer, T.J. Smith, D.R. Luukkonen and J.D. Fraser. 1990. Habitat use by nonbreeding bald eagles in North Carolina. Journal of Wildlife Management. 45(2):223-234.

Collins, Thomas C. 1980. A report on the Moose Creek Fire of August, 1979. Unpublished report on file with: U.S. Department of Agriculture, Forest Service, Salmon National Forest, North Fork Ranger District, North Fork, ID. 27+ p. [666]. In: http://www.fs.fed.us/database/feis/

Cook, J.G, T.J. Hershey, L.L. Irwin. 1994. Vegetative response to burning on Wyoming mountain-shrub big game ranges. Journal of Range Management. 47:296-301.

Dealy, J.E. 1971. Habitat characteristics for the Silver Lake mule deer range. Pacific Northwest Forest and Range Experiment Station. Forest Service, US Department of Agriculture, Portland, OR.

Demarchi, M.W. and Bunnell F.L. 1993. Estimating canopy effects on summer thermal cover for *Cervidae* (deer family). Can. J. For. Res. Vol. 23.

Dixon, Rita D.; Saab, Victoria A. 2000. Black-backed Woodpecker (*Picoides arcticus*). In: Poole, A.; Gill, F., eds. The birds of North America, No. 509. Philadelphia, PA: The Academy of Natural Sciences; and Washington DC: The American Ornithologists' Union. In: Saab, Victoria, R. Brannon, J. Dudley, L. Donohoo, D. Vanderzanden, V. Johnson, and H. Lachowski. 2002. Selection of fire-created snags at two spatial scales by cavity-nesting birds. Gen. Tech. Rep. PSW-GTR-181. Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture.

Dudley, Jonathan; Saab, Victoria. 2003. A field protocol for monitoring cavity-nesting birds. USDA Forest Service, Rocky Mountain Research Station, Research Paper.

Everett, R. and P. Hessburg, M. Jensen, and B. Bormann. 1993. Eastside Forest Ecosystem Health Assessment. Vol. 1, Executive Summary. USDA Forest Service.

Fraser, J.D. 1983. The impact of human activities on bald eagle populations - a review. Unpubl. Inst. 14pp.

Frenzel, Richard W. 1998. Nest sites and nesting success of white-headed woodpeckers on the Winema and Deschutes National Forests, Oregon in 1997. Unpublished Report. Submitted to Oregon Natural Heritage Program, The Nature Conservancy of Oregon, Portland. 25pp. In. Altman, B. 2000. Conservation Strategy for Landbirds of the east-slope of the Cascade Mountains in Oregon and Washington. Version 1. Oregon-Washington Partners in Flight.

Frenzel, Richard W. 2001. Nest-sites, nesting success, and turnover-rates of white-headed woodpeckers on the Deschutes and Winema National Forests, Oregon in 1999. Oreg. Nat. Heritage Prgm., Portland, OR. Unpubl. Rpt. 33 pp. plus tables and figures. In: Mellen, Kim, Marcot. B, Janet L. Ohmann, Karen L. Waddell, Elizabeth A. Willhite, Bruce

B. Hostetler, Susan A. Livingston, Catherine Ogden, and Tina Dreisbach. 2002. The DecAID repository: background information for DecAID, the decayed wood advisor for managing snags, partially dead trees, and down wood for biodiversity in forests of Washington and Oregon. USDA Forest Service, Pacific Northwest Research Station and Pacific Northwest Region, Portland, Oregon. Available on-line at: http://wwwnotes.fs.fed.us:81/pnw/DecAID/DecAID.nsf.

Garrett, K., J. Dunn. 1981. Birds of Southern California, status and distribution. Los Angeles Audobon Society, Los Angeles, CA.

Garrett, K. L., Raphael M.G., Dixon, R. D. 1981. Birds of Southern California, status and distribution. Los Angeles Audobon Society, Los Angeles, CA.

Gay, D. 1998. A test of the southcentral Oregon mule deer habitat suitability index. M.S. thesis, Univ. of Idaho, Moscow, Idaho.

Gobar, Charles F. 1996. Dead standing tree (snag) standards and guidelines for fire recovery areas. Pendleton, OR: USDA, Forest Service, Pacific Northwest Region, Umatilla National Forest. 7 p.

Goggans, R., R.D. Dixon, C. Seminara. 1988. Habitat use by Three-toed and Black-backed Woodpeckers, Deschutes National Forest, Oregon. Nongame Rep. 87-3-02. Oregon Dept. of Fish and Wildlife; Deschutes National Forest. 49p.

Greull, G, S. Bunting, and L Neuenschwander. 1984. Influence of fire on curlleaf mountain mahogany in the intermountain west. Pages 58072 in Fire Effect on Wildlife Symposium Proceedings. US Forest Service, Intermountain Research Station, Gen. Tech. Rep, INT-381.

Harris, Mary A. 1982. Habitat use among woodpeckers in forest burns. Missoula, MT: University of Montana. 63p. M.S. Thesis. In: Bates, L. 2001. Effects of fire on cavity-nesting birds. Unpubl.

Harrod, Richy J., William L. Gaines, William E. Hartl, and Ann Camp. 1998. Estimating historical snag densities in dry forests east of the Cascade Range. USDA Forest Service, Pacific Northwest Research Station, Gen. Tech. Rept. PNW-GTR-428, Portland, OR. 16 p. http://www.fs.fed.us/pnw/pubs/gtr_428.pdf

Hart, S. 1998. Beetle mania: an attraction to fire. BioScience 48(1):3-5.

Hayes, M.P. 1997. Final Report: Status of the Oregon spotted frog (Rana pretiosa sensu stricto) in the Deschutes Basin and selected other systems in Oregon and northeastern California with a rangewide synopsis of the species' status. Final Rep. for The Nature Conserv. under contract to the US Fish and Wildl. Serv., 26000 SE 98th Ave., Suite 100. Portland, OR. 57 pp. + append.

Hedrick, Mary Jo. ODF&W Wildlife Biologist. Personal communication. 2001.

Hitchcox, Susan M. 1998. A comparison of abundance, nesting success, and nest-site characteristics of cavity-nesting birds in salvage-logged and un-cut patches with a burned forest in northwestern Montana. In: Pruden, T.L.; Brennan, L. A., eds. Fire in ecosystem management: shifting the paradigm from suppression to prescription. Tall timbers fire ecology conference proceedings No. 20. Tallahassee, FL: Tall Timbers Research Station; 365 In: Saab, Victoria, R. Brannon, J. Dudley, L. Donohoo, D. Vanderzanden, V. Johnson, and H. Lachowski. 2002. Selection of fire-created snags at two spatial scales by cavity-nesting birds. Gen. Tech. Rep. PSW-GTR-181. Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture.

Hitchcox, Susan, M. 1996. Abundance and nesting success of cavity-nesting birds in unlogged and salvaged-logged burned forest in northwestern Montana. M.S. Thesis. Univ. of Montana. Missoula, MT. 89 pp.

Hoffman, Nancy. 1997. Distribution of Picoides woodpeckers in relation to habitat disturbance in Yellowstone area. Bozeman: Montana State University; Master's thesis. In: Saab, Victoria, R. Brannon, J. Dudley, L. Donohoo, D. Vanderzanden, V. Johnson, and H. Lachowski. 2002. Selection of fire-created snags at two spatial scales by

cavity-nesting birds. Gen. Tech. Rep. PSW-GTR-181. Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture.

Hoffman, N.J. 1997. Distribution of *Picoides* woodpeckers in relation to habitat disturbance within the Yellowstone area. M.S. Thesis. Montana State Univ. Bozeman, Mt. 74 pp.

Hopkins, William E. 1979. Plant associations of the Fremont National Forest. R6-ECOL-79-004. USDA Forest Service, Pacific Northwest Region.

Hopkins, William E., S. Simon, M. Schafer, and T. Lillybridge. 1992. Region 6 Old Growth Definitions. U.S.D.A. Forest Service.

Hughes, Kerry L. 2000. The foraging ecology of *picoides* woodpeckers in relation to ponderosa pine decay dynamics. Moscow, ID: University of Idaho. 55 p. M.S. Thesis. In: Bates, L. 2001. Effects of fire on cavity-nesting birds. Unpubl.

Hutto, Richard L. 1995. Composition of bird communities following stand-replacement fire in northern Rocky Mountain conifer forests. Conservation Biology 9:1041-1058. In: Saab, Victoria, R. Brannon, J. Dudley, L. Donohoo, D. Vanderzanden, V. Johnson, and H. Lachowski. 2002. Selection of fire-created snags at two spatial scales by cavity-nesting birds. Gen. Tech. Rep. PSW-GTR-181. Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture.

Hutto, Richard L. 1995. Composition of bird communities following stand-replacement fires in Northen Rocky Mountain (U.S.A.) conifer forests. Conservation Biology. 9(5): 1041-1058. In: Bates, L. 2001. Effects of fire on cavity-nesting birds. Unpubl.

Isaacs, Frank. ODF&W Wildlife Biologist. Personal communication. 2001.

Issacs F.B. and G. Silovsky. 1981. Bald Eagle Management Plan Fremont National Forest. On File, Silver Lake Ranger District, Fremont National Forest.

Jackman, Siri M. 1974. Woodpeckers of the Pacific Northwest: their characteristics and their role in the Forests. Masters thesis.

Johnson, D. H. and T. A. O'Neil. 2001. Wildlife-Habitat Relationships in Oregon and Washington. Oregon State University Press, Oregon, 736 p.

Johnson, T.H. and R.H. Wauer. 1996. Avifaunal response to the 1977 La Mesa fire. PP. 70-94 In: Fire effects in southwestern forests. Proceedings of the second La Mesa Fire Symposium (C.D. Allen, ed.). U.S. Dept. of Agric., For Serv. Gen. Tech. Rep. RM-GTR-286, Los Alamos Johnson, T.H. and R.H. Wauer. 1996. Avifaunal response to the 1977 La Mesa fire. PP. 70-94 In: Fire effects in southwestern forests. Proceedings of the second La Mesa Fire Symposium (C.D. Allen, ed.). U.S. Dept. of Agric., For Serv. Gen. Tech. Rep. RM-GTR-286, Los Alamos. In: Bates, L. 2001. Effects of fire on cavity-nesting birds. Unpubl.

Johnson, V., Saab, V., Vanderzanden, D., Brannon, R., Crist, C., and Lachowski, H. 2000. Using landsat satellite imagery to assess fire-created habitat for cavity-nesting birds. In: Remote sensing and geospatial technologies for the new millennium; Proceedings of the eighth Forest Service Remote Sensing Applications Conference, 10-14 April 2000, Alburquerque, New Mexico, editor Greer, J.D. American Society for Photogrammetry and Remote Sensing. Published on CD-ROM.

Jones, A.L., and P.D. Vickery. 1997. Conserving grassland birds: managing agricultural lands including hayfields, crop fields, pastures for grassland birds. Massachusetts Audobon Society, Lincoln, MA. Located on website: http://www.tnc.org/wings/wingresource/upsa.htm or on file at the Silver Lake Ranger District.

Keiser, G.P. and R.G. Anthony. 1983. Characteristics of bald eagle communal roosts in the Klamath Basin. Journal of Wildlife Management. 51(2):415-420.

Koplin, James R. 1969. The numerical response of woodpeckers to insect prey in a subalpine forest in Colorado. Condor 71 (4): 436-438. In: Bates, L. 2001. Effects of fire on cavity-nesting birds. Unpubl.

Kreisel I. J., Stein, S. J. 1999. Bird use of burned and unburned coniferous forests during winter. Wilson Bulletin 111: 243-250. In: Saab, Victoria, R. Brannon, J. Dudley, L. Donohoo, D. Vanderzanden, V. Johnson, and H. Lachowski. 2002. Selection of fire-created snags at two spatial scales by cavity-nesting birds. Gen. Tech. Rep. PSW-GTR-181. Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture.

Machmer, Marlene. 2000. Ecological role of fire for cavity nesting birds. Final Technical Report. Science Council of British Columbia, FRBC Program, Burnaby, B.C. In: Bates, L. 2001. Effects of fire on cavity-nesting birds. Unpubl.

Marshall, D.B. 1992. Black-backed woodpecker (*Picoides arcticus*). In: Sensitive vertebrates of Oregon. First ed. Portland, OR: Oregon Dept. of Fish and Wildlife.

Mellen, Kim, Bruce G Marcot, Janet L. Ohmann, Karen L. Waddell, Elizabeth A. Willhite, Bruce B. Hostetler, Susan A. Livingston, Catherine Ogden, and Tina Dreisbach. 2002. The DecAID repository: background information for DecAID, the decayed wood advisor for managing snags, partially dead trees, and down wood for biodiversity in forests of Washington and Oregon. USDA Forest Service, Pacific Northwest Research Station and Pacific Northwest Region, Portland, Oregon. Available on-line at: http://wwwnotes.fs.fed.us:81/pnw/DecAID/DecAID.nsf.

McGarigal, K. and W.C. McComb. 1995. Relationships between landscape structure and breeding birdsin the Oregon coast range. Ecol. Monogr. 65 (3):235-260. In: Altman, B. 2000. Conservation Strategy for Landbirds of the east-slope of the Cascade Mountains in Oregon and Washington. Version 1. Oregon-Washington Partners in Flight.

Mclver, J.D. 2000. Environmental effects of post-fire logging: literature review and annotated bibliography. Gen. Tech. Rep. PNW-GTR-486. USDA Forest Service.

Michel, R., L. Cloutier, and P. Laporte. 1997. The summer diet of the yellow rail in southern Quebec. Wilson Bull., 109(4). Pp. 702-710.

Mizell, K.L. 1998. Effects of fire and grazing on yellow rail habitat in a Texas coastal marsh. Texas A&M University.

Morrison, M. L. and M. G. Raphael. 1993. Modeling the dynamics of snags. Ecological Applications. 3(2). 322-330.

Murphy, E.C., and W. A. Lenhausen. 1998. Density and foraging ecology of woodpeckers following a stand-replacement fire. Journal of Wildlife Management 62:1359-1372. In: Bates, L. 2001. Effects of fire on cavity-nesting birds. Unpubl.

Murphy, E.C. and W.A. Lehnhausen. 1998. Density and foraging ecology of woodpeckers following a stand-replacement fire. J. of Wildl. Management. 62(4):1359-1372.

Neel, Larry A. 1999. Nevada Partners in Flight bird conservation plan. On file at the Silver Lake Ranger District.

Nelson, S.K. 1989. Habitat use of densities of cavity-nesting birds in the Oregon coast ranges. M.S. Thesis, Oregon State University, Corvallis. 157 pp. In: Altman, B. 2000. Conservation Strategy for Landbirds of the east-slope of the Cascade Mountains in Oregon and Washington. Version 1. Oregon-Washington Partners in Flight.

Niles, Lawrence J. 1992. Protection of neotropical migrants as a major focus of wildlife management. Status and management of neotropical migratory birds. U.S.D.A. Forest Service. Rocky Mountain Forest and Range Experiment Station.

Nussbaum, R. A., E. D. Brodie, Jr., and R. M. Storm. 1983. Amphibians and reptiles of the Pacific Northwest. Univ. Press of Idaho. 332pp.

Oliver, W.W. and R.A. Ryker. 1990. Ponderosa pine. Pp. 413-424 in R.M. Burns and B.H. Honkala (tech. Cords.) Silvics of North America: Vol. 1, Conifers. USDA For. Ser. Handb. 654. In: Altman, B. 2000. Conservation Strategy for Landbirds of the east-slope of the Cascade Mountains in Oregon and Washington. Version 1. Oregon-Washington Partners in Flight.

Pagel, Joel. Personal communication. 1996

Peek, J.M., J.A. Korol, and B.C. Dennis. 1999. A review and analysis of habitat relationships and mule deer populations in south-central Oregon. Univ. of Idaho. Moscow, ID. On file at the Silver Lake Ranger District.

Peek, J.M, M.D. Scott, L.J. Nelson, and D.J. Pierce. 1982. Role of cover in habitat management for big game in northeastern United States. Contribution No. 230, Forest, Wildlife, and Range Experiment Station, University of Idaho, Moscow, ID. Presented at the 47th North America and Natural Resources Conference, Portland, Oregon.

Popper, K.J. and M. A. Stern. 1999. Breeding Ecology of Yellow Rails at Fourteenmile Creek, Mares Egg Spring, and additional areas in the Klamath Basin, Klamath Co., Oregon, 1998. Oregon Natural Heritage Program.

Ralph, C.J., G.R. Geupel, P. Pyle, T.E. Martin, and D.F. DeSante. 1993. Field methods for monitoring landbirds. U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station, General Technical Report, PSW-GTR-144.

Raphael, M. G. 1981. Interspecific differences in nesting habitat of symparic woodpeckers and nuthatches. Pp. 142-151 in The use of multivariate statistics in studies of wildlife habitat (D. E. Capen, ed.). USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Gen. Tech. Rep. RM-87. In: Garrett, K. L., Raphael M.G., Dixon, R. D. The birds of North America, No. 509. Philadelphia, PA: The Academy of Natural Sciences; and Washington DC: The American Ornithologists' Union.

Raphael, M. G., and M. White. 1984. Use of snags by cavity nesting birds of the Seirra Nevada. Wildl. Monogr. 86:1-66. In: Garrett, K. L., Raphael M.G., Dixon, R. D. The birds of North America, No. 509. Philadelphia, PA: The Acadamy of Natural Sciences; and Washington DC: The American Ornithologists' Union. In: Altman, B. 2000. Conservation Strategy for Landbirds of the east-slope of the Cascade Mountains in Oregon and Washington. Version 1. Oregon-Washington Partners in Flight.

Raphael, Martin G.; White, Marshall. 1984. Use of snags by cavity-nesting birds in the Sierra Nevada. Wildlife Monographs 86:1-66. In: Bates, L. 2001. Effects of fire on cavity-nesting birds. Unpubl.

Raphael, M. G., M. L. Morison, and M. P. Yoder-Williams. 1987. Breeding bird populations during twenty-five years of postfire succession in the Sierra Nevada. Condor 89: 614-626. In: Garrett, K. L., Raphael M.G., Dixon, R. D. The birds of North America, No. 509. Philadelphia, PA: The Acadamy of Natural Sciences; and Washington DC: The American Ornithologists' Union.

Reel, S.A., ed. 1989. Caring for our Natural Community. USDA, Forest Service, Northern Region, Missoula, MT. Pg 309. In: Burned Area Recovery FEIS, USDA Forest Service, Bitteroot National Forest, Sept. 2001.

Reynolds, Richard T.; Graham, Russell T.; Reiser, M. Hildegard; [and others]. 1992. Management recommendations for the northern goshawk in the southwestern United States. In: Proceedings, 10th Intermountain Region silvicultural workshop; 1991 December 3-5; Ogden, UT. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Region: 54-59. [21324]. In: http://www.fs.fed.us/database/feis/

Reynolds, R.T., et. al. 1991. Management recommendations for the northern goshawk in the southwestern United States. USDA For. Serv. Northern Goshawk Scientific Committee Report; USDA For. Serv. SW Region, 184 pp.

Rose, C.L., B.G. Marcot, T.K. Mellen, J.L. Ohmann, K.L. Waddell, D.L. Lindley and B. Schreiber. 2001. Decaying wood in Pacific Northwest forests: Concepts and tools for habitat management. In: Wildlife habitat relationships in Oregon and Washington. D.H. Johnson and T.A. O'Neil, managing directors. Oregon State University Press. Pp. 580-623.

Rosember, K.V. and M.G. Raphael. 1986. Effects of forest fragmentation on vertebrates in Douglas-fir forests. Pp. 263-272 In: Verner, M.L. Morrison, and C.J. Ralph (eds.) Wildlife 2000: modeling habitat relationships of terrectrial vertebrates. Univ. Wisconsin Press, Madison. In: Altman, B. 2000. Conservation Strategy for Landbirds of the east-slope of the Cascade Mountains in Oregon and Washington. Version 1. Oregon-Washington Partners in Flight.

Ruggiero, L.F., K.B. Aubry, S.W. Buskirk, J.L. Lyon, W.J. Zielinski. 1994. The scientific basis for conserving forest carnivores: American marten, fisher, lynx and wolverine in the western United States. USDA For. Serv. Gen. Tech. Rep. RM-254. Ft. Collins, CO. 7 pp.

Saab, V. A. 1997. Cavity-nesting birds responses to stand-replacement fire and post-salvage logging. Blue Mountain Natural Resource Institute Natural Resources News. Summer Edition. Pages 8-9.

Saab, Victoria, R. Brannon, J. Dudley, L. Donohoo, D. Vanderzanden, V. Johnson, and H. Lachowski. 2002. Selection of fire-created snags at two spatial scales by cavity-nesting birds. Gen. Tech. Rep. PSW-GTR-181. Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture.

Saab, Victoria, Dudley, J. 1995. Nest Usurpation and cavity use by Lewis' woodpeckers. Unpublished report, USDA , Forest Service, Intermountain Research Station, Boise, Idaho. 13p.

Saab, V.A. and J. Dudley. 1997. Responses by cavity-nesting birds to high intensity wildfire and post-fire salvage logging in ponderosa pine/Douglas fir forests of southwestern Idaho. Boise, ID: U.S. Department of Agriculture, Forest Service, Intermountain Research Station; progress report. 34pp.

Saab, Victoria, and J. Dudley. 1998. Responses of cavity-nesting birds in stand-replacement fire and salvage logging in ponderosa pine/Douglas-fir forests of Southwestern Idaho. Gen. Tech. Rep. RMRS-RP-11. Rocky Mountain Research Station, Forest Service, U.S. Department of Agriculture.

Saab, Victoria A.; Vierling, Kerri T. 2001. Reproductive success of Lewis' woodpecker in burned pine and cottonwood riparian forests. Condor 103:491-501. In: Saab, Victoria, R. Brannon, J. Dudley, L. Donohoo, D. Vanderzanden, V. Johnson, and H. Lachowski. 2002. Selection of fire-created snags at two spatial scales by cavity-nesting birds. Gen. Tech. Rep. PSW-GTR-181. Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture.

Sallabanks, R. and Mclver, James D. Response of breeding bird communities to wildfire in the Oregon Blue Mountains: the first three years following the Twin Lakes Fire, 1995-1997. Fire and Wildlife in the Pacific Northwest Symposium. 1998.

Sallabanks, Rex. 1995. Effects of wildfire on breeding bird communities in coniferous forests of Northeastern Oregon: Annual report to the Blue Mountains Natural Resources Institute. Unpublished report. Sustainable Ecosystems Institute. Meridian, Idaho. 44pp. In: Bates, L. 2001. Effects of fire on cavity-nesting birds. Unpubl.

Salwasser, H. 1979. The ecology and management of the Devil's Garden interstate deer herd and its range. Univ. California (Berkley) PhD dissertation. 377pp.

Scheldt, R. S.; Tisdale, E. W. 1970. Ecology and utilization of curl-leaf mountain mahogany in Idaho. Station Note No. 15. Moscow, ID: University of Idaho, College of Forestry, Wildlife, and Range Sciences. 2 p. [2074] In: http://www.fs.fed.us/database/feis/

Schroeder, R.L. 1985. Habitat suitability index models: eastern wild turkey. Biol. Rep. 82(10.106). Washington D.C.: US Department of Agriculture, Fish and Wildlife Service. 33p.

Sexton, Tim. 1998. In: Snag Habitat Management: Proceedings of the Symposium. Ecological Effects of Salvage Logging and Grass Seeding Following the Lone Pine Fire, Winema National Forest.

Slevin, J. R. 1928. The amphibians of western North America. Occas. Pap. Calif. Acad. Sci. 6:1-152.

Sousa, PlJ. 1983. Habitat suitability index models: Lewis' woodpecker. U.S. Fish Wildl. Serv. Biol. Serv. Program.

Stebbins, R. C. 1972. California amphibians and reptiles. Univ. California Press, Berkeley. 152 pp.

Strickland, Marjorie A., and Carmen W. Douglas. 1987. Marten. In: Novak, M., J.A. Baker, M.E. Obbard and B. Malloch, eds. Wild Furbearer Management and Conservation in North America. Pp. 530-547. In: Burned Area Recovery FEIS. Bitterroot National Forest. USDA Forest Service. Sept. 2001. Vol. 1. Pp. 3-498.

Taylor, D.L., and W.J. Barmore Jr. 1980. Post-fire succession of avifauna in coniferous forests of Yellowstone and Grand Teton National Parks, Wyoming. Pp 130-145 in Management of western forests and grasslands for nongame birds. USDA Forest Service General Technical Report INT-86. In: Bates, L. 2001. Effects of fire on cavity-nesting birds. Unpubl.

Thomas, Jack Ward. September, 1979. Wildlife Habitats in Managed Forests, the Blue Mountains of Oregon and Washington. U.S.D.A. Agriculture Handbook No. 553. 512 pp.

Tobalske, Bret W. 1997. Lewis' woodpecker (*Melanerpes lewis*). In: Poole, A.; Gill, F., editors. The Birds of North America. No. 284. Philadelphia, PA: The Academy of Natural Sciences; and Washington DC: The American Ornithologist' Union. In: Saab, Victoria, R. Brannon, J. Dudley, L. Donohoo, D. Vanderzanden, V. Johnson, and H. Lachowski. 2002. Selection of fire-created snags at two spatial scales by cavity-nesting birds. Gen. Tech. Rep. PSW-GTR-181. Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture. In: Altman, B. 2000. Conservation Strategy for Landbirds of the east-slope of the Cascade Mountains in Oregon and Washington. Version 1. Oregon-Washington Partners in Flight.

Torgersen, Torolf R. Log resources and wildlife relationships. Unpub. Pacific Northwest Research Station. LaGrande, Or.

Urness, P.J. 1990. Livestock as manipulators of mule deer winter habitats in northern Utah. Pp. 25-40 in USDA Forest Service Gen. Tech. Rep. RM-194.

U.S.D.A. Forest Service Region 6 Land and Resource Management Plan - Fremont National Forest, 1989.

U. S. Fish and Wildlife Service. 2002. Birds of conservation concern 2002. Division of Migratory Bird Management, Arlington, Virginia. 99pp. [Online version available at http://migratorybirds.fwa.gov/reports/bcc2002.pdf]

U. S. Forest Service. 2003. Birds and Burns Network, Progress Reports. Rocky Mountain Research Station, Boise, Idaho Lab. [Online available at http://www.fs.fed.us/rm/boise/teams/terrestrial/Joint%20Fire%20Sciences%20Project.htm

Wall, T., M. Vavra, R. Miller. 1999. Aspen Ecology and Rehabilitation in Eastern Oregon. Annual Report, Eastern Oregon Agricultural Research Center.

Walstad, J., et al. 1990. Natural prescribed fire in Pacific Northwest forests. Literature on file at the Silver Lake Ranger District.

Wisdom, M.J., R.S. Hothausen, D.C. Lee, B.C. Wales, W.J. Murphy, M.R. Earnes, C.D. Hargis, V.A. Saab, T.D. Rich, F.B. Samson, D.A. Newhouse and N. Warren. 2000. Source habitats for terrestrial vertebrates of focus in the Interior Columbia Basin: Broad-scale trends and management implications. U.S. Dept. Agric., For. Serv., Pacific Northwest Res. Stat. Gen. Tech. Rep. PNW-GTR-485, Portland, OR. In: Altman, B. 2000. Conservation Strategy for Landbirds of the east-slope of the Cascade Mountains in Oregon and Washington. Version 1. Oregon-Washington Partners in Flight.

Witmer, Gary W.; Martin, Sandra K.; Sayler, Rodney D. 1998. Forest carnivore conservation and management in the interior Columbia basin; issues and environmental correlates. Gen.Tech. Rep. PNW-GTR-420. Portland, OR; U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 51p.

Zhang, Q.H., J.A. Byers, and X.D. Zhang. 1993. Influence of bark thickness, trunk diameter and height on reproduction of the longhorned beetle, *Monochamus sutor* (Col., Cerambycidae) in burned larch and pine. Journal of Applied Entomology 115: 145-154. In: Bates, L. 2001. Effects of fire on cavity-nesting birds. Unpubl.

Zyznar, E. and P.J. Urness. 1969. Qualitative identification of forage remnants in deer feces. Journal of Wildlife Management 33:506-510.