CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 INTRODUCTION

This section summarizes the existing environmental conditions of the affected project area and the potential changes to those conditions due to implementation of the alternatives presented in Chapter 2. It also presents the scientific and analytical basis for comparison of alternatives. The individual discussions are organized by resource.

3.2 FOREST VEGETATION

This section of the document describes the characteristics and patterns of the vegetation as well as the effects of the alternatives on the different components of the vegetation resource. Unless specifically stated otherwise, the analysis area used in the assessment of the vegetation resources consists of the combined area within the perimeters of the Lucky (1,582 acres) and Lightning fires (6,994 acres), for a combined total of 8,576 acres (Figure 3.1 and Figure 3.2).

To provide context, the individual components are discussed in terms of the pre-fire and post-fire (i.e., existing) conditions where the wildfire altered that particular component. Stand data, collected from 1994 through 1998, for pre-fire conditions exists for approximately 4,173 acres (slightly less than half of the vegetation analysis area). For those components of the vegetation that were not altered by the 2007 wildfire, only a discussion of the post-fire (i.e., existing) condition is provided. Post-fire conditions described in this section are based on two information sources. Post-fire tree mortality maps derived from satellite images (remote assessment of vegetation, i.e., RAVG) within the boundaries of the wildfires were developed in the fall of 2007 (Figure 3.1 and Figure 3.2). These maps were used to assess the extent of tree mortality and aid in field reconnaissance. Table 3.1 contains acreage estimates from the RAVG modeling.

Individual components discussed in the following pages include fire-killed trees, forest insects, potential vegetation groups, tree size class, canopy closure, species composition, snags, reforestation, created openings, and vegetation effects of gopher control with strychnine bait.

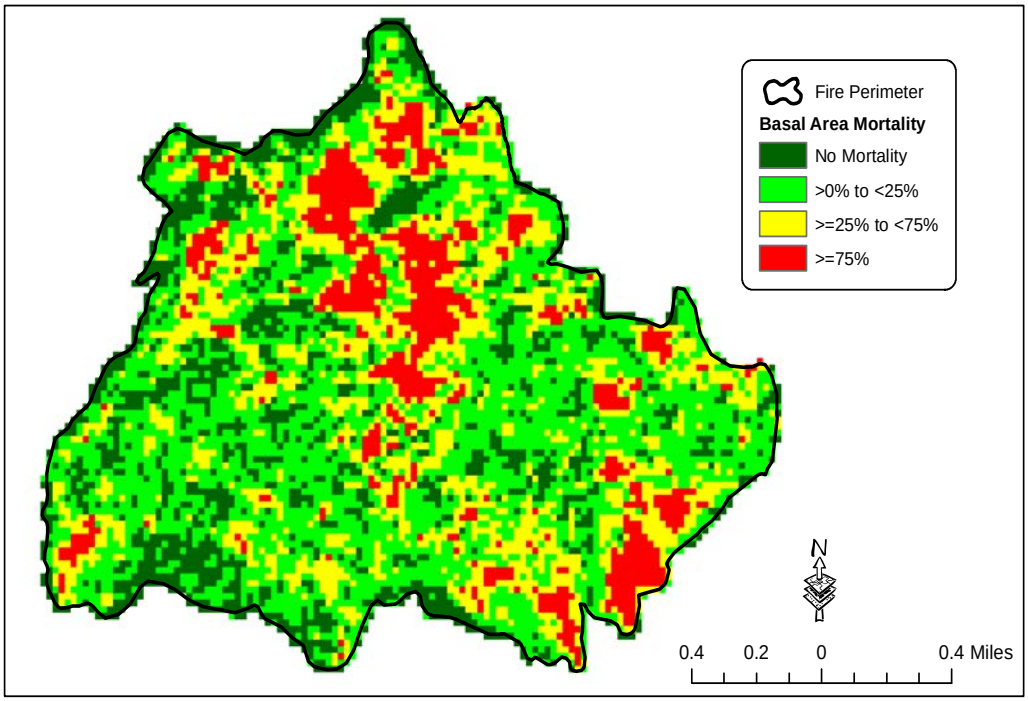


Figure 3.1 – RAVG Modeled Basal Area Mortality in the Lucky Fire Area

Post-fire aerial photography, in conjunction with the RAVG maps, was used to stratify the fire areas into two levels of tree mortality, moderate and high. These polygons were digitized and overlaid with Management Prescription Categories (MPC) and stream buffers. The exclusion of stream buffers and all MPCs except MPC 5.2 resulted in the identification of potential salvage harvest units for the Proposed Action (Alternative B) (Figure 3.3). Stand data was collected in the fall of 2007 within these proposed units to assess live and dead trees, snags, and coarse woody debris.

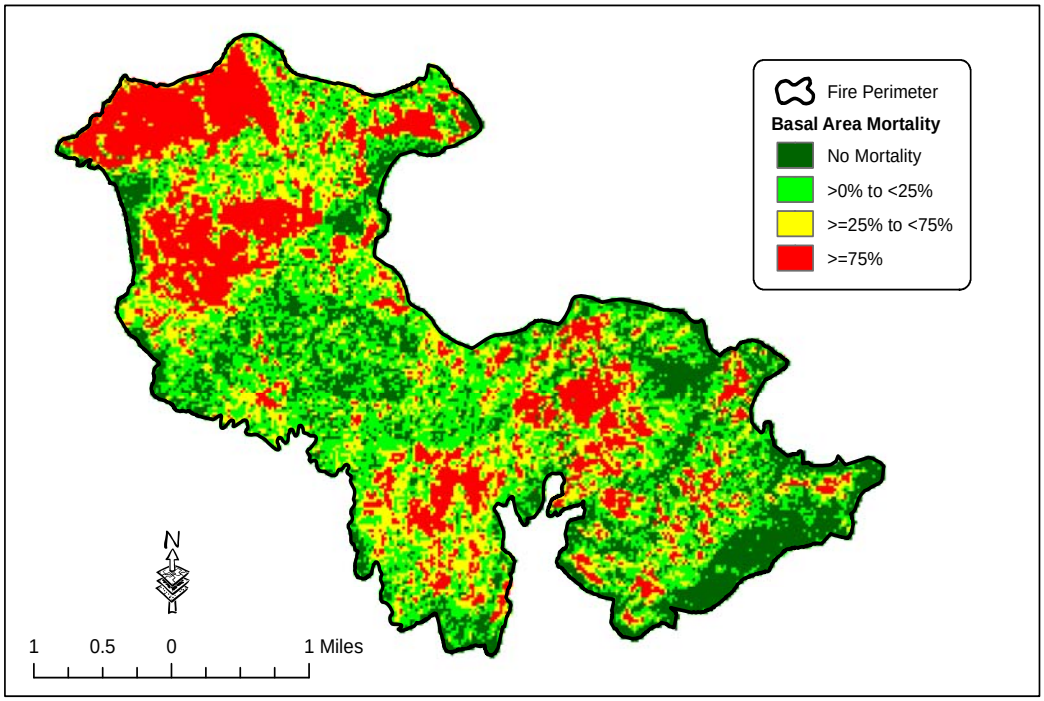


Figure 3.2 – RAVG Modeled Basal Area Mortality in the Lightning Fire Area

3.2.1 Fire-killed Trees

The 2007 wildfires were a major disturbance event that directly altered the composition, structure, and function of the vegetation within the analysis area. The amount of tree mortality associated with any given burn intensity[1] varied depending upon the predominant tree species present. Thin-barked species such as lodgepole pine, subalpine fir, Engelmann spruce, and grand fir are generally intolerant of fire and easily succumb to low and/or moderate intensity burns. Although the fire may not have directly impacted the tree's limbs or foliage, the less obvious damage to the tree's root system and/or basal stem often results in death of the tree. In contrast, species such as Douglas-fir, ponderosa pine, and western larch with their thick bark are much less susceptible to the impacts of low and moderate intensity burns. The fire's effect on the live foliage of these species is generally a good indicator of whether or not these trees will survive the wildfire.

Table 3.1. RAVG Basal Area Mortality Acreage Estimates*

Basal Area Mortality	Lightning Fire		Lucky Fire		Total	
	Acres	Percent	Acres	Percent	Acres	Percent
0%	1,643	23%	333	20%	1,976	22%
>0% to < 25%	2,284	32%	695	43%	2,979	34%
>=25% to < 75%	1,635	23%	402	25%	2,037	23%
>= 75%	1,599	22%	203	12%	1,802	20%
Totals	7,161	100%	1,633	100%	8,794	100%

*RAVG acreage does not conform to fire perimeter polygon acreage because many of the satellite imagery pixels project outside of the fire perimeter.

[1] For the purposes of this analysis, the terms "severity" and "intensity" are used interchangeably.

In 1989, the Lowman fire burned 47,600 acres in the South Fork Payette River drainage roughly 40 air miles south of the project area. Impact plots consisting of over 400 trees, nearly all of which were ponderosa pine or Douglas-fir, were installed to monitor tree survivorship and causes of mortality. Impact plots were established immediately after the Lowman fire in 1989, monitored in 1990, and again in 1993. The results of that monitoring revealed that those trees that died as a result of the fire had a mean crown scorch of 74 percent (Weatherby et al., 1994).

A recent study, *Assessing Post-fire Douglas-fir Mortality and Douglas-fir Beetle Attacks in the Northern Rocky Mountains* (Hood et al., 2007) revealed similar results. That study found that Douglas-fir trees with a diameter at breast height (d.b.h.) of 10 inches and a cambium kill rating (CKR) of two or more had a probability of mortality exceeding 85 percent when 70 percent of the crown was scorched. A Douglas-fir tree with a 20 inch d.b.h. and a CKR of two or more had a probability of mortality exceeding 75 percent when 70 percent of the crown was scorched (Hood et al., 2007).

Perhaps the most dramatic difference in fire resistance between trees of different species is due to differences in bark thickness. Field and laboratory studies indicate that resistance to cambium damage varies with the bark thickness (Reinhardt and Ryan, 1989). Although most tree mortality studies have focused on the thick-barked species, Wagener (1961) suggests that cambium injury to more than one-quarter of the circumference above stump height seriously reduces the chances for tree survival. Forest Health Protection personnel from the Boise Field Office in 1995 suggested that thin-barked species with greater than 40 percent bole and root char would be expected to die, even those with minimal crown scorch (Weatherby IN: USDA, Forest Service, 1995).

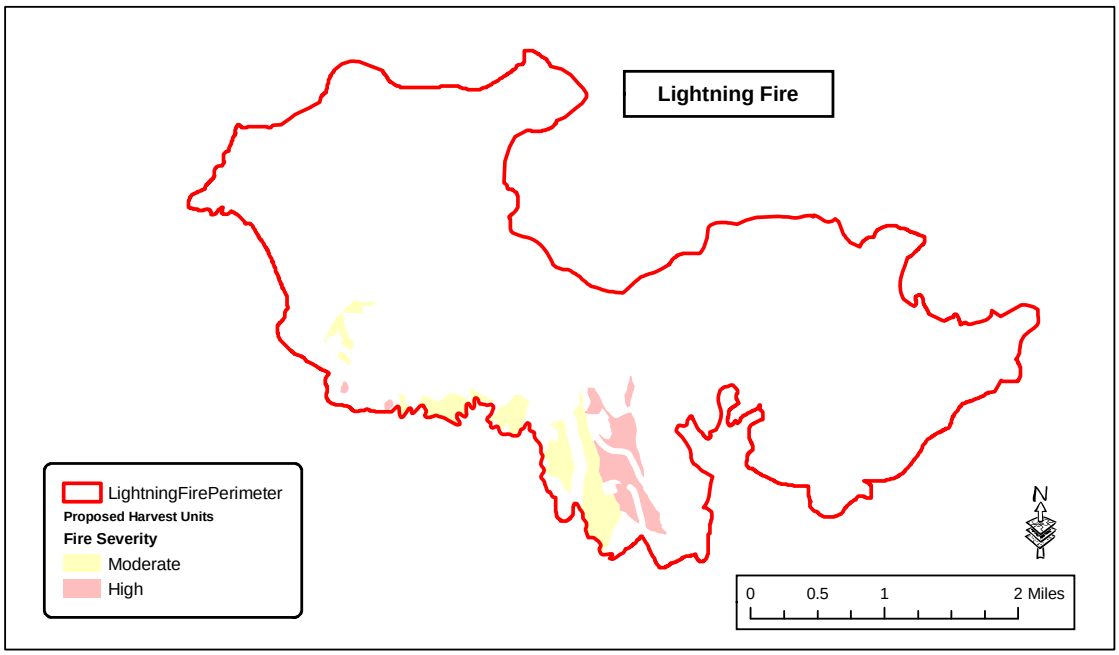
Therefore, based on the above research, for the purposes of this analysis, a fire-killed tree was defined as: (1) a tree of any species that has 70 percent or more of its crown scorched, or; (2) any Engelmann spruce, lodgepole pine, subalpine fir, or grand fir that has 50 percent or more of its basal circumference burned.

3.2.1.1 Environmental Consequences Specific to Alternative A

This alternative does not include harvest of any trees. All trees, regardless of the level of fire damage, would be retained onsite.

3.2.1.2 Environmental Consequences Common to All Action Alternatives

All fire-killed trees greater than 8 inches d.b.h. would be harvested within designated harvest units, with the exception of snags (trees that were dead prior to the fire), and fire-killed trees needed to meet the wildlife habitat snag requirements (Figure 3.3).



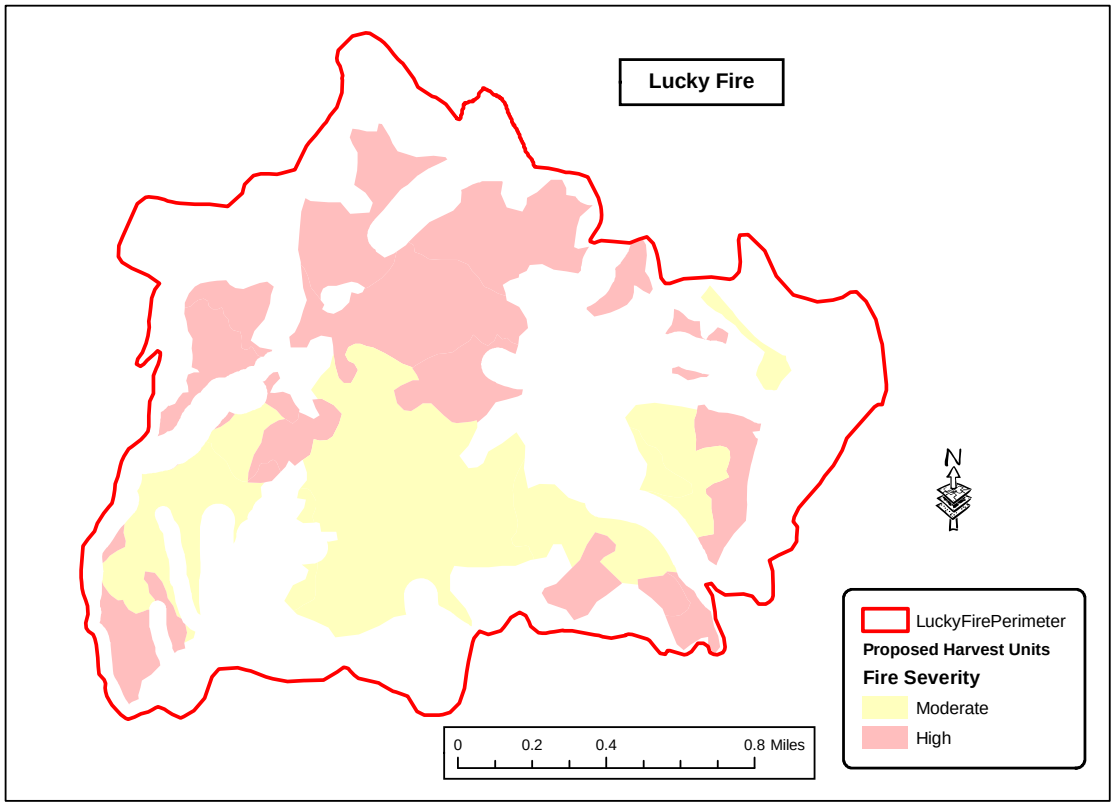


Figure 3.3 – Proposed Salvage Harvest Areas

3.2.1.3 Cumulative Effects

The effects of any alternative on the quantity of fire-damaged trees that could survive the 2007 wildfire would be limited to the Lucky and Lightning fire areas. Therefore, the area used to assess cumulative effects consists of the 8,576 acre analysis area (Figure 3.1 and Figure 3.2). Appendix B includes a list of past, ongoing, and reasonably foreseeable future activities considered for this analysis. The effects of all past activities were considered in disclosing the existing conditions and the direct and indirect effects presented above. Ongoing or foreseeable future activities that could potentially affect the quantity of fire-damaged trees within the cumulative effects area include:

Personal Use Firewood - Personal use firewood cutting is expected to continue into the foreseeable future and would likely reduce the quantity of fire-damaged trees within 100 to 200 feet of open roads.

Frontier Timber Sale - Portions of the planned Frontier Timber Sale (172 acres) occur within the Lucky Fire perimeter and overlap some of the proposed salvage units (108 acres). This is a “green” timber sale, scheduled for sale in 2009 that would include only live timber. However, some fire-damaged trees that survived the fire might be included in the Frontier timber sale.

Alternative A would have no direct effects on fire-damaged trees, therefore, no incremental or cumulative effects would occur.

The cumulative effects of Alternatives B and C would be an unquantifiable reduction of fire damaged trees within the cumulative effects analysis area.

Since none of the alternatives would have any measurable effect on the quantity of fire-killed trees that could survive within the analysis area, no incremental or cumulative effects would occur as a result of implementation of either alternative.

3.2.2 Forest Insects

Aerial detection surveys are conducted annually by the Boise Field Office of Forest Health Protection to monitor forested stands being impacted by insects on or adjacent to the Forest. A variety of forest insects exist within the analysis area. The majority of these insects were present in low levels prior to the 2007 wildfire and were not substantially affecting forest health or vigor at that time. Others, however, particularly bark beetles, constitute an existing or potential threat to forest health and are discussed in detail below.

Bark beetle outbreaks following wildfires are not unprecedented, but neither are they certain. Several conditions must exist for bark beetles to take advantage of fire-damaged hosts. First, there must be a sufficient supply of undamaged inner bark in fire-damaged trees. If the beetle’s food supply (the inner bark) becomes dry and darkened, which is often the case with high severity fires or in thin-barked species, beetles can neither feed nor deposit eggs in the tree (DeNitto et al., 2000). For this reason, trees often infested by bark beetles following a wildfire event are not the trees killed by the fire, but instead are those trees that survived the fire but are in a weakened condition.

Second, fires must occur at a time when beetles are in the adult stage and can quickly infest susceptible trees. Fires in late summer or early fall may occur after beetles have flown. A recently killed tree’s inner bark remains usable to beetles for a relatively short period of time. If not attacked while still “green,” the inner bark of fire-killed trees may become too dry before the beetle’s next flight season (DeNitto et al., 2000). Given that many bark beetles only have one flight each year, bark beetle activity is often not noticeable until 2 or 3 years after the wildfire has occurred.

And third, there must be a population of beetles within a reasonable distance to take advantage of weakened trees. Because all three conditions must be met for an outbreak to develop, beetle epidemics following wildfires are not a foregone conclusion. Still, a few such outbreaks are well documented in the literature (DeNitto et al, 2000).

3.2.2.1 Environmental Consequences Specific to Alternative A

This alternative would have no effect on tree mortality associated with insect infestations. A percentage of the preferred host species, damaged but not killed by the wildfire, would likely succumb to attacks by the Douglas-fir beetle or mountain pine beetle. Preferred host trees stressed by the 2007 wildfire would continue to be abundant across the analysis area, particularly where the fire burned in a mosaic pattern, and/or where the fire burned at a low intensity. It should be noted, however, that the level to which either insect population expands over the next few years and the extent of tree mortality associated with these insects is unpredictable.

3.2.2.2 Environmental Consequences Common to All Action Alternatives

Imminently dead trees, as used in this analysis, are defined as any tree not directly killed by the fire but subsequently considered dead or dying as a result of windthrow or successful bark beetle attack. The definition of a successful bark beetle attack (i.e., more than 50 percent of the tree's circumference has evidence of bark beetle boring dust) was derived from local research (Weatherby et al., 1994).

Preferred host species exhibiting signs of a successful bark beetle attack would be removed under this alternative from an estimated 1,077 acres. However, removal of these trees would have a negligible effect on the overall potential for additional tree mortality associated with insect infestations. Preferred host trees stressed by the 2007 wildfire would continue to be abundant across the analysis area, particularly where the fire burned in a mosaic pattern, and/or where the fire burned at a low intensity. It should be noted, however, that the level to which either insect population expands over the next few years and the extent of tree mortality associated with these insects is unpredictable.

Implementation of the reforestation activities in Alternatives B and C would not increase the potential for insect mortality of the green trees remaining in the project area.

3.2.2.3 Cumulative Effects

The effects of any alternative on insect-related tree mortality would be limited to the analysis area. Therefore, the area used to assess cumulative effects consists of the 8,576 acre analysis area (Figure 3.1 and Figure 3.2). Appendix B includes a list of past, ongoing, and reasonably foreseeable future activities considered for this analysis. The effects of all past activities were considered in disclosing the existing conditions and the direct and indirect effects presented above. Ongoing or foreseeable future activities that could potentially affect insect-related tree mortality within the cumulative effects area include:

Personal Use Firewood - Personal use firewood cutting is expected to continue into the foreseeable future and could slightly reduce the quantity of insect-infested trees within 100 to 200 feet of open roads.

Frontier Timber Sale - Portions of the planned Frontier Timber Sale (172 acres) occur within the Lucky Fire perimeter and overlap some of the proposed salvage units (108 acres). This is a "green" timber sale and would contain live timber. However, there is a chance that some insect-infested trees might be harvested during implementation of the Frontier timber sale.

Alternative A would have no direct effects on insect-related tree mortality, therefore, no incremental or cumulative effects would occur.

Although unquantifiable, the cumulative effects of Alternatives B and C, in combination with past, ongoing, and foreseeable future activities would be a slight reduction of the risk of insect-related tree mortality within the analysis area.

Since none of the alternatives would have any measurable effect on insect-related tree mortality within the analysis area, no incremental or cumulative effects would occur as a result of implementation of either alternative.

3.2.3 Potential Vegetation Groups

Forested habitat types are categorized into potential vegetation groups (PVGs) based on their similar environmental characteristics, site productivities, and disturbance regimes. There are seven PVGs in the analysis area, with PVGs 2, 4 and 10 comprising about 44 percent of the entire analysis area and 90 percent of the portion of the analysis area for which data exists. Table 3.2 displays the acres and percentages of the various PVGs found within the analysis area. Figure 3.4 displays the locations and juxtaposition of those PVGs.

Although the wildfire has impacted the structure and composition of the vegetation present within the analysis area, no PVG for any site has been altered. Therefore, the pre-fire and post-fire amounts and distribution of PVGs are identical.

Table 3.2. Area of Potential Vegetation Groups within the Analysis Area

PVG	Wildfire (acres)		Total Acreage	%
	Lightning	Lucky		
No Data	4,133	270	4,403	51%
2 - Warm, Dry DF / Moist PP	1,158	1,176	2,334	27%
3 - Cool, Moist DF	103	37	140	2%
4 - Dry, Moist DF	519	-	519	6%
6 - Cool, Moist GF	-	83	83	1%
7 - Warm, Dry SF	95	2	97	1%
8 - Warm, Moist SF	-	14	14	0%
10 - Persistent LP	986	-	986	11%
Total	6,994	1,582	8,576	100%

3.2.3.1 Environmental Consequences Common to All Alternatives

None of the alternatives considered in this analysis would have any effect on the existing quantities or distribution of forested habitat types or potential vegetation groups (PVGs) within the analysis area.

3.2.3.2 Cumulative Effects

The effects of any alternative on the quantities or distribution of PVGs would be limited to the analysis area. Therefore, the area used to assess cumulative effects consists of the 8,576 acre analysis area (Figure 3.1 and Figure 3.2). Appendix B includes a list of past, ongoing, and reasonably foreseeable future activities considered for this analysis. The effects of all past activities were considered in disclosing the existing conditions and the direct and indirect effects presented above. There are no ongoing or foreseeable future vegetative management activities within the cumulative effects analysis area that would impact the quantity or distribution of any PVG.

Since none of the alternatives would have any direct or indirect effects on the quantities or distribution of PVGs within the analysis area, no incremental or cumulative effects would occur.

3.2.4 Tree Size Class

Tree size class for a stand, as described in the Forest Plan, is determined by the size of the live overstory trees that have a non-overlapping canopy closure of at least 10 percent. The average diameter of the trees in the overstory or uppermost tree layer determines the stand's size class.

Pre-fire Condition - Stands within the analysis area were categorized into one of five size classes using stand exam data collected from 1994 through 1998. This data was projected to the year 2008 using the Forest Vegetation Simulator (FVS) (Wykoff, et. al., 1982) and used to calculate pre-fire tree size class, canopy closure and species composition.

Prior to the 2007 wildfires, the majority of the analysis area consisted of stands in the large tree size class. Table 3.4 displays the percentages of the pre-fire tree size classes within the analysis area by fire. Figure 3.5 displays the locations of the pre-fire tree size classes.

Post-fire Condition – Given the lack of extensive post-fire stand examinations, RAVG data (Figure 3.1 and Figure 3.2) was used to assess mortality levels, and the following assumptions (Table 3.5) were made to project fire-induced changes to tree size classes in order to estimate the post-fire conditions:

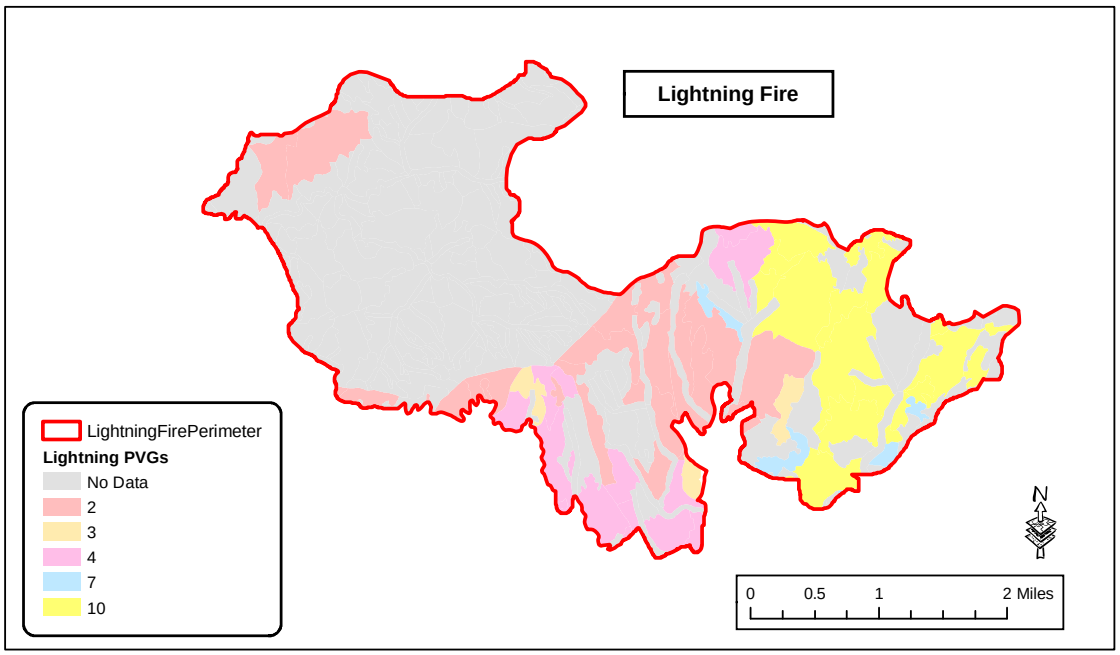
PVG 2, 3, 4 and 6 - Any site that experienced greater than 75 percent tree mortality was assumed to have been converted to a grass/forb/shrub/seedling size class. While a few of the trees in the small tree size class may survive, tree mortality in the 25 to 75 percent range was assumed to convert the grass/forb/shrub/seedling, sapling, and small tree size classes to the grass/forb/shrub/seedling size class. Tree mortality in the 25 to 75 percent range likely eliminated the smaller diameter trees in the medium and large tree size classes, presumed to be mostly thin-barked species, but the large diameter Douglas-fir, ponderosa pine, and western larch would have survived these fire intensities in sufficient numbers to convert the medium tree to a large tree size class and retain the large tree size class where previously existing. Tree mortality less than 25 percent was assumed to have had no effect on the size class of the affected stands.

PVG 7, 8 and 10 – Given that these PVGs are dominated by thin-barked species which are very intolerant of fire, any site that experienced 25 to 75 percent tree mortality was assumed to have been converted to a grass/forb/shrub/seedling size class. While a few of the trees in the small tree size class may survive, tree mortality in the 25 to 75 percent range was assumed to convert the grass/forb/shrub/seedling, sapling, and small tree size classes to the grass/forb/shrub/seedling size class.

Due to the impacts of the 2007 wildfires, the grass/forb/shrub/seedling size class now comprises 17 percent more of analysis area, coming at the expense of the large, medium, and small tree size classes. Table 3.4 displays the estimated post-fire percentages of the various tree size classes within the analysis area. Figure 3.6 displays the locations of the post-fire tree size classes.

Table 3.3. Pre-fire and Post-fire Tree Size Classes within the Analysis Area

	Percent of Analysis Area	
Tree Size Class	**Pre-fire**	**Post-fire**
Grass/Forb/Shrub/Seedling (<4.5’ tall)	3	20
Sapling (0.1-4.9” d.b.h.)	0	0
Small Tree (5.0-11.9” d.b.h.)	4	1
Medium Tree (12.0-19.9” d.b.h.)	12	6
Large Tree (≥20” d.b.h.)	81	73



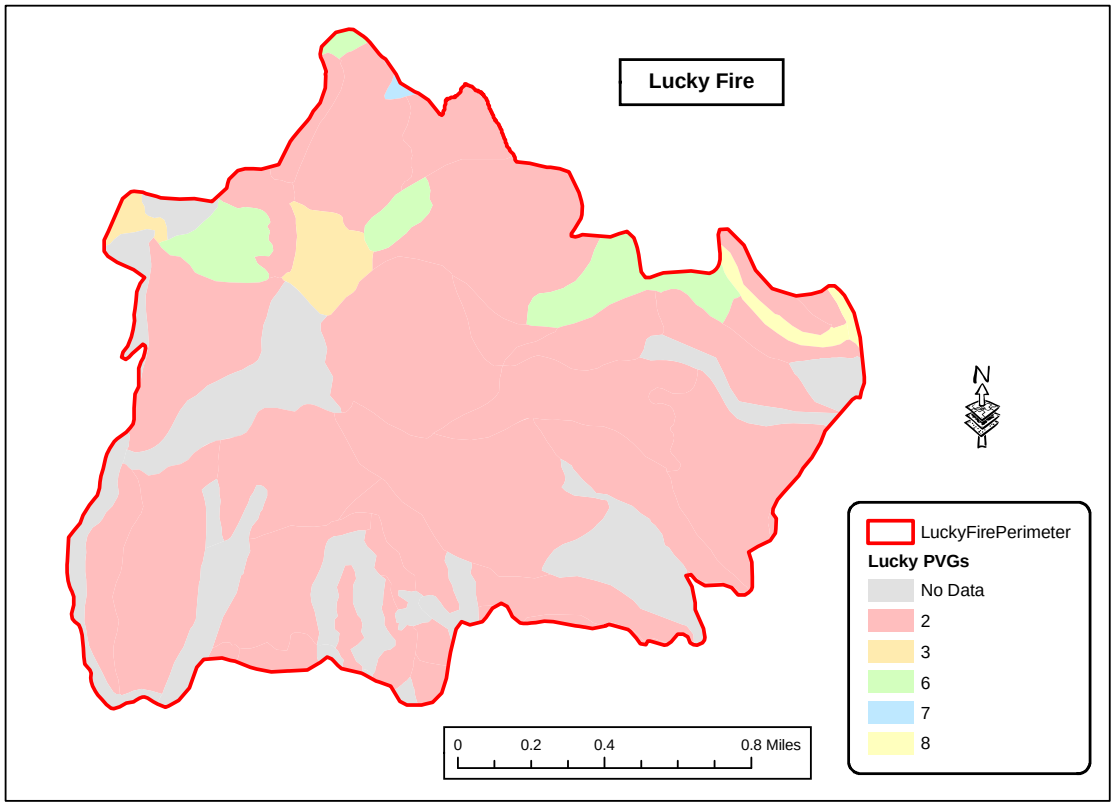
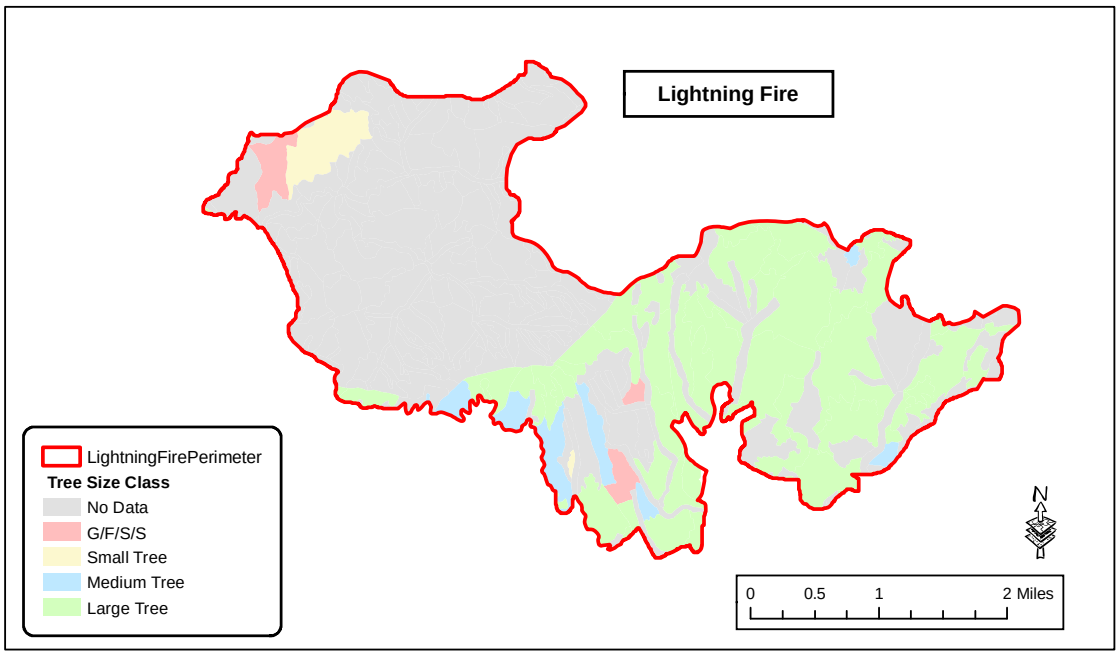


Figure 3.4 – Potential Vegetation Groups



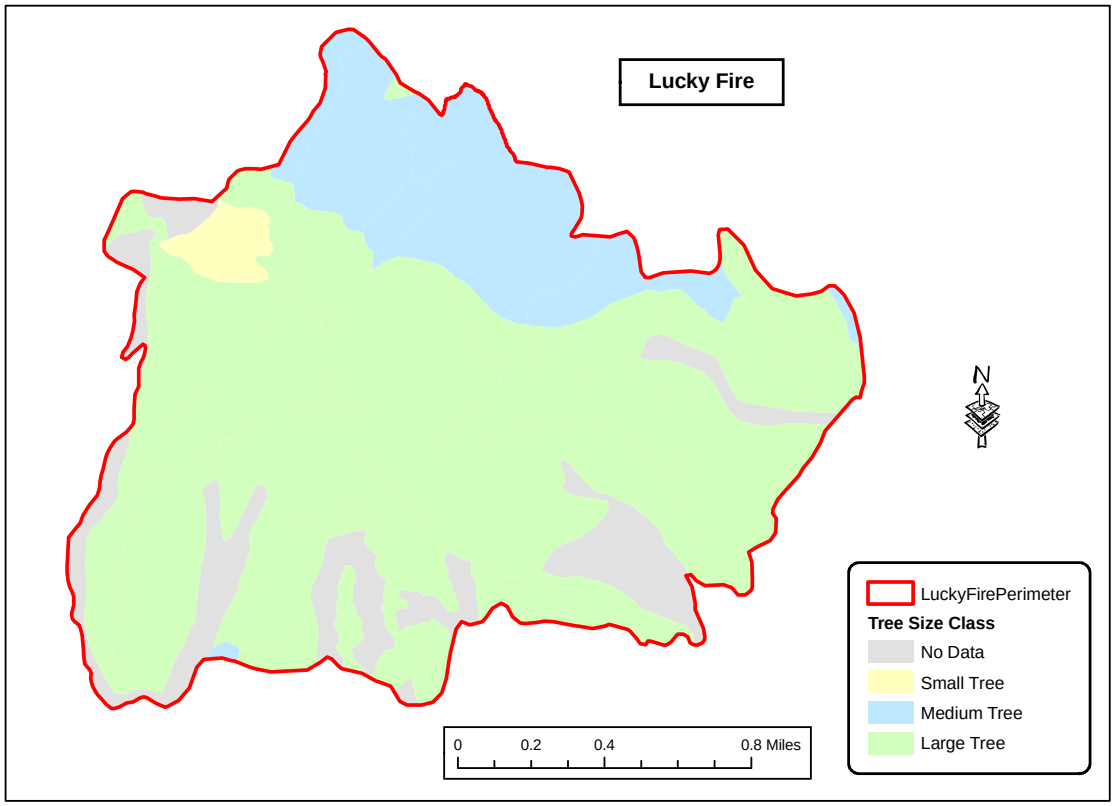


Figure 3.5 – Pre-Fire Tree Size Class

3.2.4.1 Environmental Consequences Specific to Alternative A

Implementation of this alternative would have no effect on the existing quantities or distribution of tree size classes within the analysis area, since no live trees would be treated. Following implementation the large tree size class would continue to dominate the analysis area.

Table 3.4. Tree Size Class Assumptions

PVG	Tree Mortality	Pre-fire	Post-fire
2,3,4,6	>75%	All size classes	GFSS
2,3,4,6	25% to 75%	GFSS, SAP, ST	GFSS
2,3,4,6	25% to 75%	MT, LT	LT
2,3,4,6	<25%	All size classes	No Change
7,8,10	>75%	All size classes	GFSS
7,8,10	25% to 75%	GFSS, SAP, ST	GFSS
7,8,10	25% to 75%	MT, LT	MT, LT
7,8,10	<25%	All size classes	No Change

3.2.4.2 Environmental Consequences Specific to Alternative B

Implementation of this alternative would have a negligible effect on the existing post-fire quantities or distribution of tree size classes within the analysis area. Although some fire-killed or imminently dead trees (as defined in this assessment) may be removed that could actually survive the wildfire, the number of trees likely to fall under this scenario would be minor and certainly not present in quantities sufficient to convert any particular stand from one size class to another (*see Section 3.2.1)*.

Reforestation (784 acres) would occur within areas currently classified as Grass/Forb/Seedling/Shrub, and would likely result in a class change to Sapling within 5-10 years from planting.

3.2.4.3 Environmental Consequences Specific to Alternative C

The effects of Alternative C are identical to Alternative B, except that Alternative C reforests 132 fewer acres. The change from Grass/Forb/Seedling/Shrub to Sapling on these acres would take much longer than with Alternative B.

3.2.4.4 Cumulative Effects

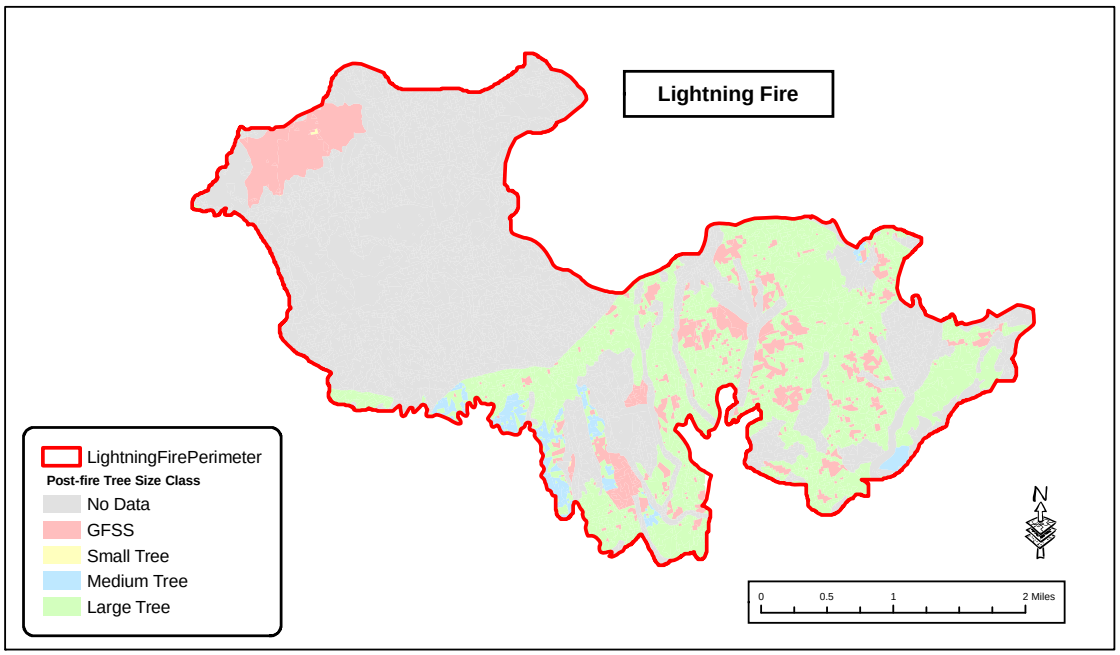
The effects of any alternative on the quantities or distribution of size classes would be limited to the analysis area. Therefore, the area used to assess cumulative effects consists of the 8,576-acre analysis area (Figure 3.1 and Figure 3.2). Appendix B includes a list of past, ongoing, and reasonably foreseeable future activities considered for this analysis. Ongoing or foreseeable future activities that could potentially affect tree size class within the cumulative effects area include:

Frontier Timber Sale - Portions of the planned Frontier Timber Sale (172 acres) occur within the Lucky Fire perimeter and overlap some of the proposed salvage units (108 acres). This is a “green” timber sale and would contain live timber. Therefore, this sale has the potential to change tree size class on 172 acres within the analysis area over a 5-year timeframe.

Given that most of this acreage was affected by the fire, it is unclear at this time what condition these stands are in. Therefore, it is not possible to know what treatment these stands may require to achieve their desired future condition (DFC), nor the precise effect of that treatment on tree size class. However, in no case would a stand classified as Large Tree be reduced to a smaller size class, as per Forest Plan Standard WIST01.

Lightning Creek Reforestation - An additional 745 acres of land within the Lightning Fire perimeter, currently classified as Grass/Forb/Seedling/Shrub, is proposed for planting in the spring of 2009 under a Categorical Exclusion (CE). As in Alternatives B and C, this would result in a change in classification from Grass/Forb/Seedling/Shrub to Sapling over a 5- to 10-year period.

Alternatives B and C would have slight measurable direct effects, related to reforestation, on the quantities and distribution of tree size classes within the analysis area over a 5-10 year horizon. Additionally, the proposed Frontier Timber Sale and the Lightning Creek Reforestation project produce a small cumulative effect. In the analysis area, implementation of Alternative B or C, along with the ongoing or foreseeable future activities, would result in a small cumulative effect in the tree size class by conversion of Grass/Forb/Seedling/Shrub to Sapling over a 5– to 10-year period.



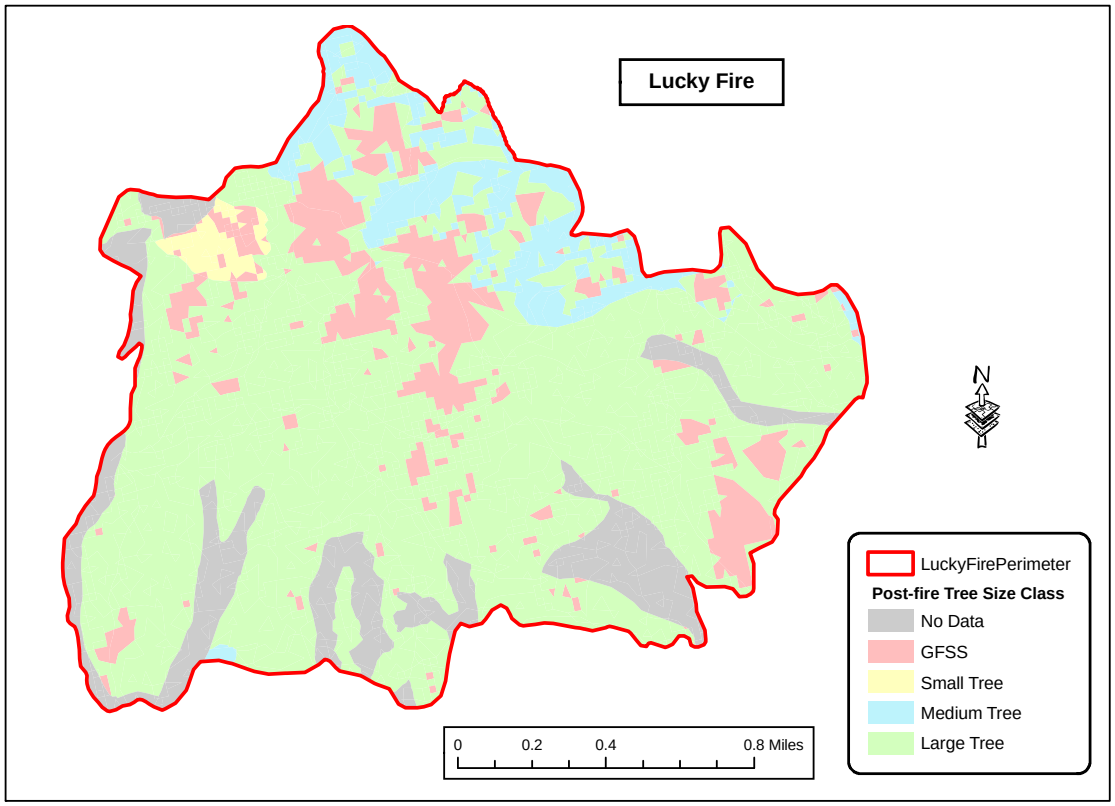


Figure 3.6 – Post-Fire Tree Size Class

3.2.5 Canopy Closure

Canopy closure represents the density of all live trees in individual stands. As used in this analysis, stands were categorized into one of three classifications: low (canopy closure 10 to 39 percent); moderate (canopy closure 40 to 69 percent); or high (canopy closure ≥70 percent).

Pre-fire Condition - Stands within the analysis area were categorized into the individual canopy closure groups using pre-fire stand exam data collected from 1994-1998, and projected to 2008 using the FVS. Prior to the wildfire, canopy closure within the analysis area was mostly a moderate classification (40 to 69 percent canopy closure) which constituted about 58 percent of the area. Table 3.6 displays the percentages of the analysis area in the individual canopy closure classifications prior to the 2007 wildfire. Figure 3.7 displays the pre-fire locations and distribution of the three canopy closure categories within the analysis area.

Table 3.5. Pre-fire and Post-fire Canopy Closures within the Analysis Area

	Percent of Analysis Area	
Canopy Closure	**Pre-fire**	**Post-fire**
Low (≤39%)	17	41
Moderate (40 to 69%)	58	41
High (≥70%)	25	18

Post-fire Condition - Given the lack of extensive post-fire stand examinations, the following assumptions were made to project fire-induced changes to canopy closure in order to estimate the post-fire conditions:

All PVGs - Any stand that experienced greater than 75 percent tree mortality has likely shifted to a low canopy closure. Stands with a high or moderate canopy closure prior to the fire that experienced 25 to 75 percent tree mortality were assumed to have been converted to the next lower classification (i.e., high down to moderate and moderate down to low). The pre-fire canopy closures of the remaining stands were assumed to be unchanged.

3.2.5.1 Environmental Consequences Specific to Alternative A

Implementation of this alternative would have no effect on the existing quantities or distribution of canopy closures within the analysis area. Following implementation, the moderate (40 to 69 percent) and low (≤39 percent) canopy closure classifications would continue to dominate the analysis area.

Table 3.6. Canopy Closure Assumptions

PVG	Tree Mortality	Pre-fire	Post-fire
All	>75%	All canopy closures	L
All	25% to 75%	H	M
All	25% to 75%	M	L
All	25% to 75%	L	unchanged
All	<25%	All canopy closures	unchanged

3.2.5.2 Environmental Consequences Specific to Alternative B

Implementation of this alternative would have little or no effect on the existing quantities or distribution of canopy closures within the analysis area. Following implementation, moderate and low canopy closures would continue to dominate the analysis area, since no activities are proposed that would alter canopy closure in the short-term (<15 years). Longer-term (>=15 years), reforestation activities would eventually result in 784 acres changing from low canopy closure to moderate canopy closure.

Although some fire-killed or imminently dead trees (as defined in this assessment) may be removed that could actually survive the wildfire, the number of trees likely to fall under this scenario would be negligible

and certainly not present in quantities sufficient to convert any particular stand from one canopy closure category to another (see Fire-killed Trees section).

3.2.5.3 Environmental Consequences Specific to Alternative C

Alternative C is identical to Alternative B except that 132 acres of reforestation would not occur in the Peace Rock Roadless Area (MPC 4.1c). Consequently, there is no difference in effects to canopy closure between Alternatives B and C in the short-term. However, in the long-term, reforestation activities would eventually result in 652 acres changing from low canopy closure to moderate canopy closure.

3.2.5.4 Cumulative Effects

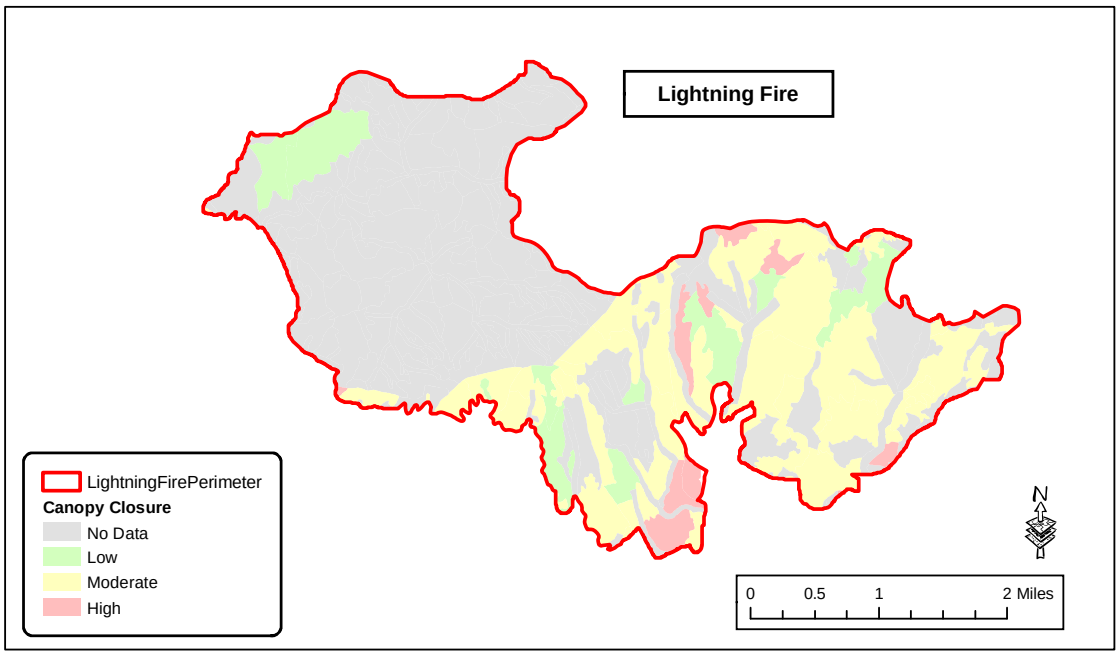
The effects of any alternative on the quantities or distribution of canopy closures would be limited to the analysis area. Therefore, the area used to assess cumulative effects consists of the 8,576-acre analysis area (Figure 3.1 and Figure 3.2). Appendix B includes a list of past, ongoing, and reasonably foreseeable future activities considered for this analysis. The effects of all past activities were considered in disclosing the existing conditions and the direct and indirect effects presented above. Ongoing or foreseeable future activities that could potentially affect canopy closure within the cumulative effects area include:

Frontier Timber Sale - Portions of the planned Frontier Timber Sale (172 acres) occur within the Lucky Fire perimeter and overlap some of the proposed salvage units (108 acres). This is a “green” timber sale and would contain live timber. Therefore, this sale has the potential to change canopy closure on 172 acres within the analysis area over a 5-year timeframe.

Given that most of this acreage was affected by the fire, it is unclear at this time what condition these stands are in. Therefore, it is not possible to know what treatment these stands may require to achieve their desired future condition (DFC), nor the precise effect of that treatment on canopy closure. However, it is probable that stands with high canopy closure would be treated to reduce canopy closure to low or moderate.

Lightning Creek Reforestation - An additional 745 acres of land within the Lightning Fire perimeter, currently classified as low canopy closure, is proposed for planting in the spring of 2009 under a Categorical Exclusion (CE). As in Alternatives B and C, this would result in a change from low canopy closure to moderate canopy closure on these acres in the long-term.

Alternatives B and C would have slight measurable direct effects, related to reforestation, on canopy closure within the analysis area over the long-term. Additionally, the proposed Frontier Timber Sale and the Lightning Creek Reforestation project produce small cumulative effects. In the Lucky fire area, implementation of Alternative B or C, along with ongoing and foreseeable activities there would be a cumulative reduction of canopy closure from the current level to low or moderate. In the Lightning fire area, implementation of either action alternative would result in a cumulative change in canopy closure from low to moderate in the long-term.



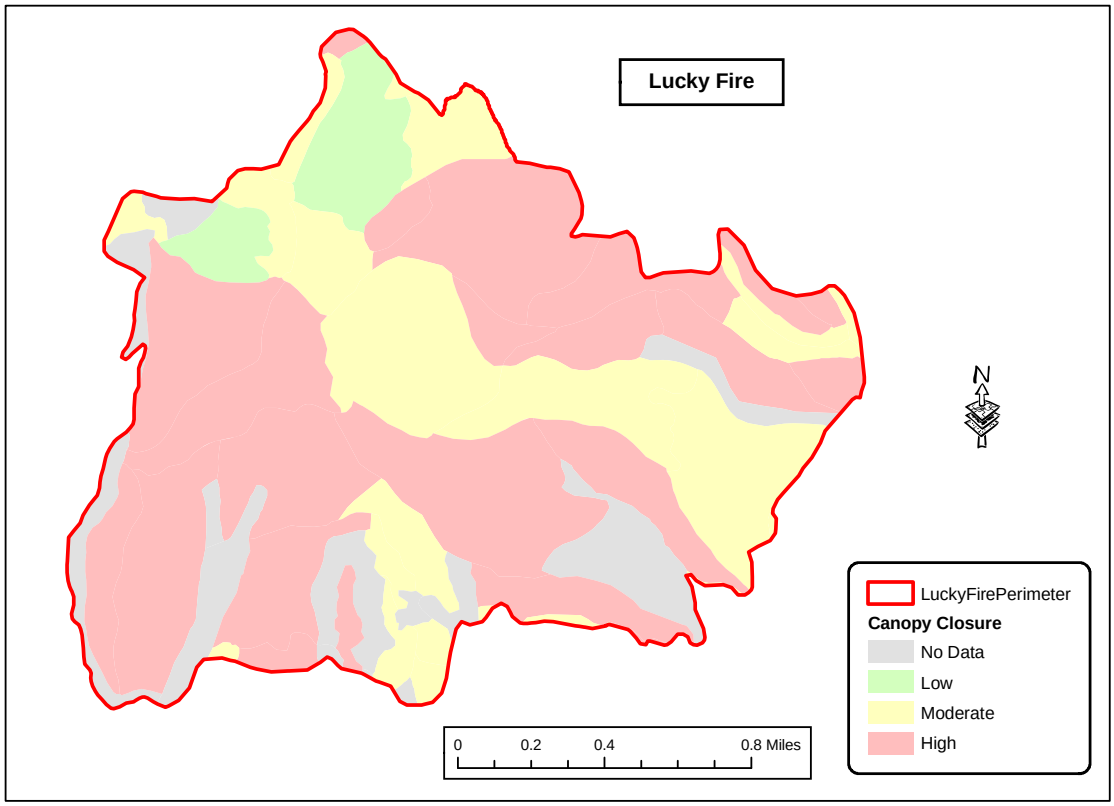
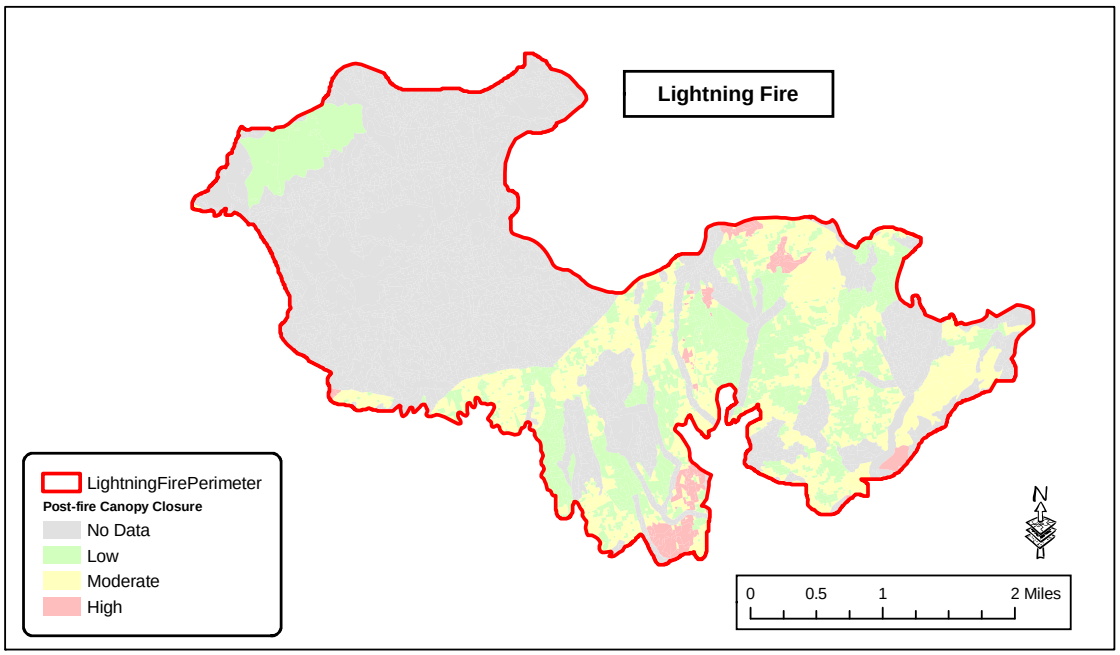


Figure 3.7 – Pre-fire Canopy Closure



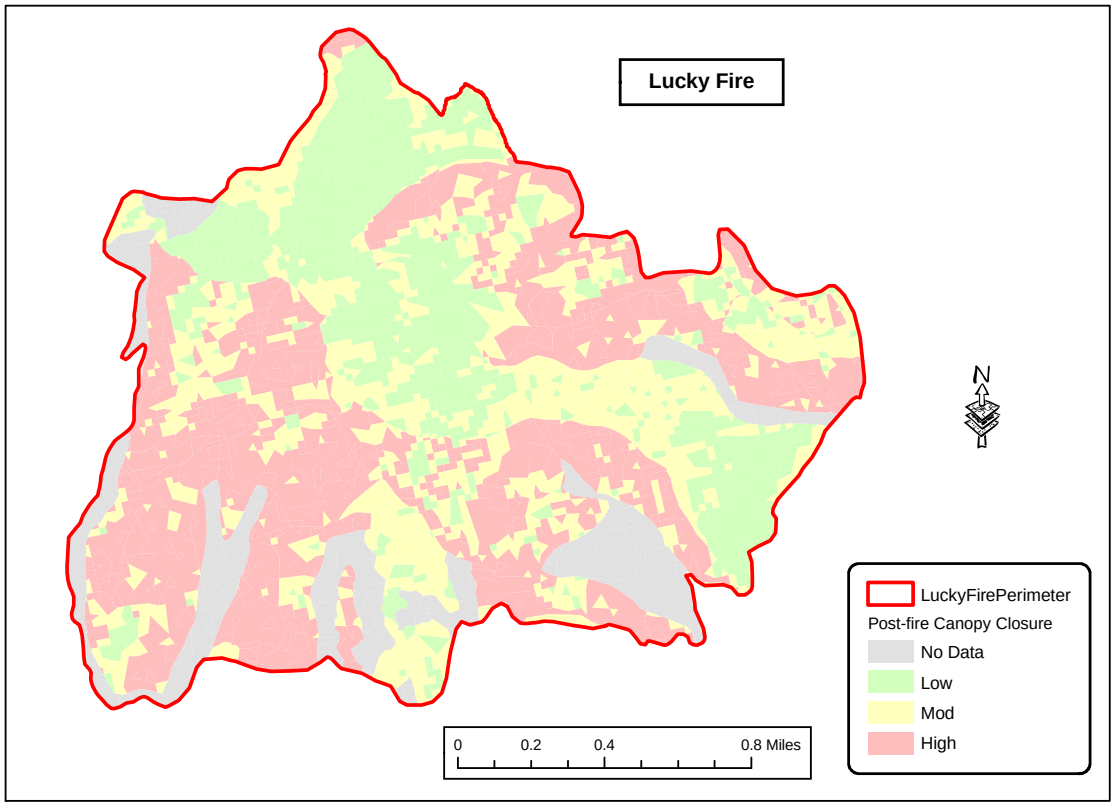


Figure 3.8 – Post-fire Canopy Closure

3.2.6 Species Composition

Appendix A of the Forest Plan refers to species composition to describe the desire conditions of forest vegetation. In the following discussion, "cover type" is used interchangeably with "species composition".

Pre-fire Condition - Stand data, collected from 1994 through 1998, and projected to 2008 classifies the analysis area into five different cover types, based upon the plurality of basal area (i.e., the species with the most basal area determines the cover type). Table 3.7 displays those pre-fire cover types. Figure 3.9 displays the locations of the various pre-fire cover types.

As displayed in Table 3.7, prior to the 2007 wildfire the Douglas-fir cover type (69 percent) comprised the majority of the analysis area for which data was collected. Ponderosa pine was the second most prevalent species (28 percent).

Table 3.7. Pre-fire Cover Types within the Analysis Area

Cover Type	Pre-fire Percent of Analysis Area
Douglas-fir	69
Ponderosa Pine	28
Grand Fir	1
Lodgepole Pine	1
Subalpine Fir	1

Post-fire Condition - Use of the RAVG data to predict tree mortality allows assumptions to be made as to likely post-fire tree size and canopy closure. However, it is difficult to predict fire effects on species composition. Consequently, such predictions are not presented here. In general, it is likely that the more fire tolerant ponderosa pine cover type would increase in acreage at the expense of the other cover types within the analysis area, but the magnitude of this change cannot be quantified.

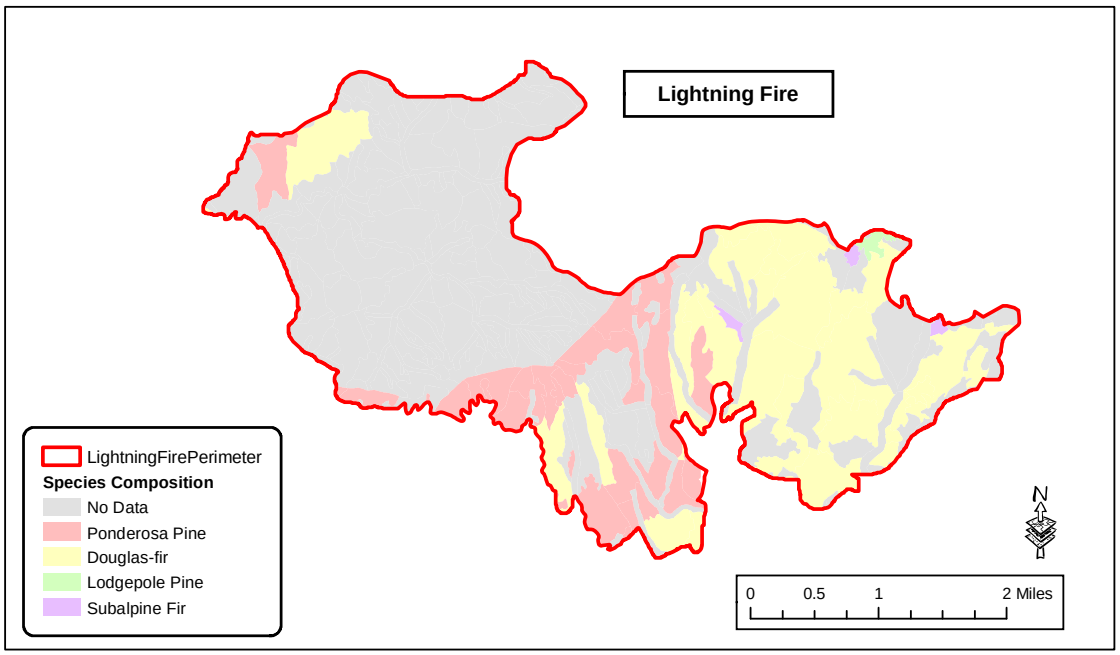
3.2.6.1 Environmental Consequences Specific to Alternative A

Implementation of any Alternative A would have no effect on the existing quantities or distribution of cover types within the analysis area. Following implementation, cover types would remain the same as currently exist.

3.2.6.2 Environmental Consequences Specific to Alternative B

Implementation of this alternative would have a slight effect on the existing quantities and distribution of cover types within the analysis area. Following implementation, Douglas-fir and ponderosa pine cover types would continue to dominate the analysis area. However, 784 acres of reforestation proposed with Alternative B would eventually result in 784 acres of ponderosa pine cover type. Since post-fire cover types are not known, it is impossible to quantify the magnitude of potential change. However, it is likely that some of the severely burned Douglas-fir types would become ponderosa pine cover types in the short-term (<15 years).

Although some fire-killed or imminently dead trees (as defined in this assessment) may be removed that could actually survive the wildfire, the number of trees likely to fall under this scenario would be slight and certainly not present in quantities sufficient to convert any particular stand from one cover type to another (see Fire-killed Trees section).



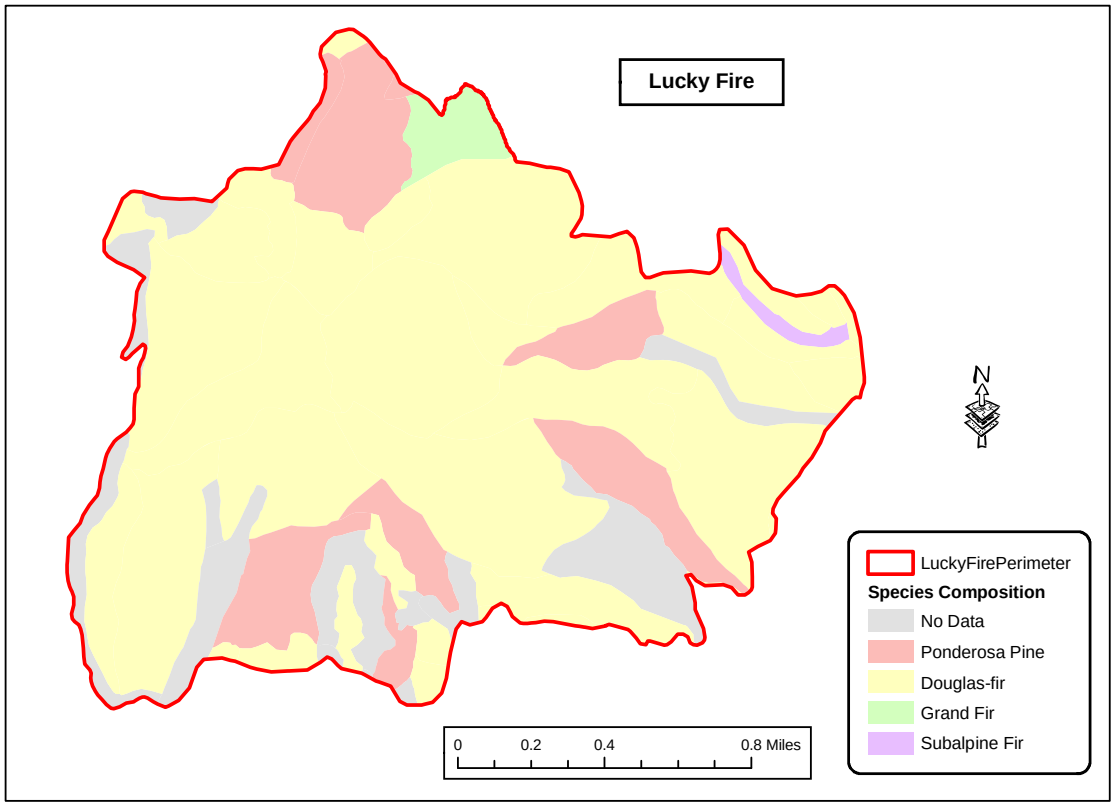


Figure 3.9 – Pre-fire Species Composition

3.2.6.3 Environmental Consequences Specific to Alternative C

Alternative C is identical to Alternative B except that 132 acres of reforestation would not occur in the Peace Rock Roadless Area (MPC 4.1c). Consequently, these acres would retain their current cover type.

3.2.6.4 Cumulative Effects

The effects of any alternative on the quantities or distribution of cover types would be limited to the analysis area. Therefore, the area used to assess cumulative effects consists of the 8,576 acre analysis area (Figure 3.1 and Figure 3.2). Appendix B includes a list of past, ongoing, and reasonably foreseeable future activities considered for this analysis. The effects of all past activities were considered in disclosing the existing conditions and the direct and indirect effects presented above. Ongoing or foreseeable future activities that could potentially affect canopy closure within the cumulative effects area include:

Frontier Timber Sale - Portions of the planned Frontier Timber Sale (172 acres) occur within the Lucky Fire perimeter and overlap some of the proposed salvage units (108 acres). This is a “green” timber sale and would contain live timber. Therefore, this sale has the potential to change cover type on some or all of 172 acres within the analysis area over a 5-year timeframe.

Given that most of this acreage was affected by the fire, it is unclear at this time what condition these stands are in. Therefore, it is not possible to know what treatment these stands may require to achieve their desired future condition (DFC), nor the precise effect of that treatment on cover type. However, it is possible that stands composed primarily of Douglas-fir and/or grand would be treated to favor ponderosa pine, thereby altering the species composition.

Lightning Creek Reforestation - An additional 745 acres of land within the Lightning Fire perimeter, of unknown species composition, is proposed for planting in the spring of 2009 under a Categorical Exclusion (CE). As in Alternatives B and C, this might result in a change of cover type in the short-term.

Alternatives B and C may produce slight direct effects, related to reforestation, on species composition within the analysis area over the short-term. Additionally, the proposed Frontier Timber Sale and the Lightning Creek Reforestation project may also produce small cumulative effects. Therefore, implementation of Alternatives B or C, along with ongoing or foreseeable future activities may result in a small cumulative effect on species composition within the analysis area.

3.2.7 Snags

For this discussion, a distinction will be made between a snag that was a dead tree that pre-existed the wildfires, and a snag that is a dead tree as the result of the fires. Snags are an important component of the environment, providing not only habitat for a variety of birds and terrestrial species, but also serving as a source of coarse woody debris which plays an important role in soil productivity.

Snags are known to fluctuate both spatially and temporally and are often found in clumps for a variety of reasons including insect infestations, root diseases, and/or wildfire. Appendix A of the Forest Plan discloses desired ranges of snags for individual potential vegetation groups (PVGs), and goes on to explain that those desired ranges are not meant to provide an even distribution of snags across every acre of the forested landscape, but to provide numbers that serve as a guide to approximate an average condition for an activity area (Forest Plan, Appendix A, pg. A-8). Appendix A also states that although snags are managed at the activity area, it is useful to have some knowledge of the larger landscape to assist in determining the appropriate number and amount that fall within the desired ranges in order to provide context (Forest Plan, Appendix A, pg. A-10).

Pre-fire Condition – Given the age of the available stand data (10-14 years old), an analysis of pre-fire snag levels using this data is not warranted. Many of the snags inventoried from 1994 through 1998 have likely fallen, and others were undoubtedly consumed during the wildfires. Within the MPC 4.1c portion of the analysis area, given the lack of road access, and therefore, of firewood cutting, and the level of Douglas-fir beetle, western pine beetle, and wildfire activity within the last decade, it is likely that snag

levels prior to the wildfire within this MPC were generally near levels indicative of unmanaged ecosystems, although this cannot be substantiated.

Within MPC 5.2, past commercial timber harvest, which reduced the number of trees available to become future snags, and firewood cutting adjacent to open roads, would likely have resulted in snag levels somewhat less than unmanaged stand conditions. However, the magnitude of this reduction is unknown.

Post-fire Condition – Post-fire snag data was collected during the fall of 2007 on 60, one-fifth acre fixed plots, randomly located within the proposed harvest units (Figure 3.3). For this dataset, a snag is defined as a dead tree that pre-existed the wildfires, not a fire-killed tree. However, data was also collected for fire-killed trees at the same time. Since this was such a small sample, no attempt was made to parse this data by PVG. Therefore, an estimate of snag density for each PVG represented within the harvest units is not available. Since PVGs 2 and 4 represent 95 percent of the proposed harvest units, Table 3.8 discloses the average post-fire snag density from the plot data compared to the desired conditions for PVGs 2 and 4, as portrayed in Appendix A (pg. A-9) of the Forest Plan.

As displayed in Table 3.8, the snag density (snags/acre) of pre-fire snags in the analysis area post-fire fall at the low end of the desired ranges in the 10- to 20-inch diameter group for both PVGs. Pre-fire snags/acres in the greater than 20-inch diameter group for PVG 4 is within the desired range, however at the low end of the range, and snags/acre in PVG 2 fall below the desired range for this diameter group.

Table 3.8. Pre-Fire Snag Densities in the Analysis Area Post-Fire

Diameter Group	PVG 2 DFC	PVG 4 DFC	Plot Data Average
10” – 20”	1.8-2.7	1.8-2.7	1.9
>20”	0.4-3.0	0.2-2.1	0.3
Total	2.2-5.7	2.0-4.8	2.2

3.2.7.1 Environmental Consequences Specific to Alternative A

Implementation of this alternative would have no effect on the existing quantities or distribution of snags within the 8,576 acre project area. As Table 3.8 demonstrates, post-fire snag levels are within or very near DFC, albeit at the low end. However, since no fire-killed trees would be harvested with Alternative A, these trees would become available habitat for snag-dependent species, and their numbers would far exceed the DFC.

3.2.7.2 Environmental Consequences Common to All Action Alternatives

The environmental consequences for Alternatives B and C are identical in terms of effects to snag levels. The discussion will differentiate between proposed harvest units that were severely burned (i.e., high basal area mortality), versus those that were moderately burned (i.e., low to moderate basal area mortality) (Figure 3.3).

Since existing pre-fire snag levels fall within the low end of the DFC range, all fire-killed ponderosa pine greater than 20 inches (>20”), d.b.h. and two 10- to 20-inch fire-killed trees per acre will be left onsite to enhance snag levels (Design Feature WL-1). Cruise data indicates this will result in an average of approximately 2.2 fire-killed snags greater than 20-inch fire-killed ponderosa pine per acre left onsite. The 99 percent confidence limits for this mean range from 0.88 to 3.45, which puts the true mean within the DFC range for PVGs 2 and 4 (Table 3.8).

Severely-burned proposed harvest units total about 489 acres within the two fire areas. Following salvage harvest, snag populations in these units will consist of all existing pre-fire snags and the fire-killed trees intentionally left to achieve the Appendix A DFC. Scattered live trees that survived the fires will also be present in places, and would be available for future snag recruitment, although their numbers would be low. These units will meet the Forest Plan DFC for snag levels post-harvest, however, over time (5-25

years), the majority of snags will have fallen to the ground and there would be few live trees within the desired size classes available for recruitment.

Proposed harvest units that were moderately burned total about 588 acres. These units generally have fewer fire-killed trees, more pre-fire snags, and numerous live trees, compared to the severely-burned units. Post-harvest, these units would be expected to meet the Forest Plan DFC for snag levels with a combination of pre-fire snags and retained fire-killed trees. Numerous live trees would be available for future snag recruitment.

Approximately 18 acres of hazard-tree removal would occur adjacent to 1.1 miles of NFS road 670 within the Middle Fork Payette River Wild and Scenic eligible corridor. Only trees that pose a public safety hazard, evaluated on a case by case basis, would be removed. Although it is not possible to evaluate the effect of this activity on snag levels, it is likely the post-harvest DFC would be met. In any case, there would be no harvest of fire-killed trees that do not pose a safety hazard within the Wild and Scenic eligible corridor.

Within the estimated 146 acres of severely-burned riparian conservation areas (RCAs) that are adjacent to some of the harvest units, no harvest would occur and the effects would be similar to Alternative A.

3.2.7.3 Cumulative Effects

The effects of any alternative on snag densities would be limited to the proposed harvest units. Therefore, the area used to assess cumulative effects consists of the 1,077 acres of cutting units (Figure 3.3), and the estimated 18-acre hazard tree buffer above Road 670. Appendix B includes a list of past, ongoing, and reasonably foreseeable future activities considered for this analysis. The effects of all past activities were considered in disclosing the existing conditions and the direct and indirect effects presented above. Ongoing or foreseeable future activities that could potentially affect snag densities within the cumulative effects area include:

Personal Use Firewood - Personal use firewood cutting is expected to continue into the foreseeable future and could slightly reduce the quantity snags within 100 to 200 feet of open roads.

Frontier Timber Sale - Portions of the planned Frontier Timber Sale (172 acres) occur within the Lucky Fire perimeter and overlap some of the proposed salvage units (108 acres). This is a “green” timber sale and would contain only live timber. Mitigation measures contained in the Sixshooter FEIS (USDA, Forest Service, 2006, A-6), the governing environmental document for the sale, directs that all snags meeting minimum size requirements as specified in Appendix A of the Forest Plan be retained on site, unless the tree presents a safety hazard to the logger or the public. Consequently, the Frontier Timber Sale could slightly reduce the quantity of snags within the 108 acres where cutting units overlay proposed salvage units.

Alternative A would have no direct or indirect effects on snag densities, therefore, no incremental or cumulative effects would occur as a result of this alternative.

The cumulative effect of Alternatives B and C, in combination with ongoing and/or foreseeable future activities would be a decrease in snag densities, but would not likely result in snag levels dropping below desired ranges post-harvest, except within 200 feet of open authorized roads as a result of personal-use firewood cutting.

3.2.8 Reforestation

Approximately 1,200 acres within the analysis area have been reforested, beginning in the 1960s. These efforts have largely been successful, as evidenced by the existence of the resulting plantations. Inventory data does not exist for most of these stands, however, it would appear from field reconnaissance and aerial photo interpretation that most of these plantations are adequately stocked and at least one has been thinned.

The most recent reforestation project within the analysis area took place in 2004 following a prescribed fire in the Granite Creek drainage that burned out of control. Portions of this fire (~300 acres) were planted with ponderosa pine. Survival following the third growing season was 88 percent. Unfortunately, most of these seedlings were killed during the 2007 wildfires.

In the areas proposed for reforestation with this project, the 2007 wildfires burned with such intensity, on roughly 784 acres, that a viable ponderosa pine or Douglas-fir seed source is not present in sufficient numbers to provide for natural regeneration. Past experiences on similar sites suggests that, in the absence of artificial regeneration, brush and grass species such as velvetleaf ceanothus, willow, ninebark, common snowberry, elk sedge, and pine grass would occupy these sites and inhibit the establishment and growth of natural conifer regeneration for decades.

Most of the riparian habitats in the analysis area consisted of mature conifer species prior to 2007. These conifer species, in combination with shrub and brush species provided valuable shade which assisted in regulating stream temperatures. The conifer species also served as potential sources of large woody debris recruitment to adjacent streams. In most locations, the predominant conifer species were ponderosa pine and Douglas-fir, with lesser amounts of Engelmann spruce, lodgepole pine, and subalpine fir. Within the RCAs planned for reforestation, the stream shading previously provided by these mature conifers is now absent.

3.2.8.1 Environmental Consequences Specific to Alternative A

Natural regeneration of conifers would eventually occur across the analysis area. However, the time needed for this regeneration to become established would vary depending upon site characteristics (elevation, aspect, soil type, etc.) and seed availability, and may take decades.

Brush and grass species would be expected to quickly become established in those portions of PVGs 2, 3, 4, 5, and 6 that burned at high or moderate intensities. The presence of these species would inhibit the establishment and growth of natural conifer regeneration. Given the lack of competition with conifers, regrowth of brush and shrub species should be immediate and abundant within the riparian habitats affected by the wildfire.

3.2.8.2 Environmental Consequences Specific to Alternative B

Conifers would be planted on 784 acres of severely-burned stands and RCAs to accelerate forest re-establishment within MPC 5.2, and in stands and RCAs where inadequate seed source exists to provide for natural regeneration within a portion of MPC 4.1c. Artificial regeneration on these sites prior to the establishment of competing brush and grass species would enhance survival of conifer trees and reduce the time necessary for the sites to return to a forested condition.

Within MPC 4.1c, trees would be planted at a low density (200 trees per acre) in a random pattern. This, combined with unplantable spots and normal mortality, will result in a natural forested appearance in much less time than if the stand(s) were naturally regenerated.

Natural regeneration of conifers on unplanted sites would eventually occur across the analysis area. However, the time needed for this regeneration to become established would vary depending upon site characteristics (elevation, aspect, soil type, etc.) and seed availability, and may take decades.

The removal of dead standing trees under this alternative is not expected to negatively influence the survival of regenerating trees. Sections 3.3.7 and 3.15.1 of this chapter disclose the effects of this alternative on snags and coarse woody debris, both of which influence shade and soil moisture, and therefore, influence regeneration. It should be noted, however, that snags, as defined in Section 3.3.7, are greater than or equal to 10 inches d.b.h., and coarse wood is defined as that material greater than or equal to 3 inches in diameter. Dead standing and down material less than these diameter limits, although by definition not considered snags or coarse wood, do nevertheless influence shade and soil moisture.

3.2.8.3 Environmental Consequences Specific to Alternative C

Conifers would be planted on 652 acres of severely-burned stands and RCAs to accelerate forest reestablishment within MPC 5.2. No reforestation would occur within stands or RCAs classified as MPC 4.1c. These stands will regenerate naturally over time, but it could take many decades, given the lack of a suitable seed source in many areas. Otherwise, the effects of Alternative C are identical to Alternative B.

3.2.8.4 Cumulative Effects

The effects of any alternative on regeneration would be limited to the 8,576 acre analysis area (Figure 3.1 and Figure 3.2). Appendix B includes a list of past, ongoing, and reasonably foreseeable future activities considered for this analysis. The effects of all past activities were considered in disclosing the existing conditions and the direct and indirect effects presented above. Ongoing or foreseeable future activities that could potentially affect canopy closure within the cumulative effects area include:

Lightning Creek Reforestation - An additional 745 acres of land within the west end of the Lightning Fire perimeter is proposed for planting in the spring of 2009 under a Categorical Exclusion (CE). This project would result in additional acreage of artificial regeneration within the analysis area.

Alternative A would have no direct or indirect effects on regeneration, and no incremental or cumulative effects would occur as a result of this alternative.

The cumulative effects of Alternatives B and C, in combination with foreseeable future activities would be an increase in the acres of planted conifers within the analysis area.

3.2.9 Created Openings

The Code of Federal Regulations (36 CFR 219.27) states that the maximum size limit for openings created in one harvest operation by even-aged management is 40 acres. Created openings that exceed 40 acres are subject to a 60-day public notice, and review and approval by the Regional Forester, except where catastrophe exists.

3.2.9.1 Environmental Consequences Specific to Alternative A

This alternative does not include any silvicultural prescriptions, and therefore, would not result in any management created openings.

3.2.9.2 Environmental Consequences Common to All Action Alternatives

Silvicultural prescriptions associated with this alternative would be limited to salvage of fire-killed and imminently dead trees and reforestation activities. This prescription would not result in management-created openings.

3.2.9.3 Cumulative Effects

The effects of any alternative on management-created openings would be limited to the analysis area. Therefore, the area used to assess cumulative effects consists of the 8,576-acre analysis area (Figure 3.1 and Figure 3.2). Appendix B includes a list of past, ongoing, and reasonably foreseeable future activities considered for this analysis. Ongoing or foreseeable future activities that could potentially create openings within the cumulative effects area include:

Frontier Timber Sale - Portions of the planned Frontier Timber Sale (172 acres) occur within the Lucky Fire perimeter and overlap some of the proposed salvage units (108 acres). The Sixshooter FEIS (USDA, Forest Service, 2006, B-3), the governing environmental document for the sale, states that: "*No cultural treatments that result in the creation of openings (USDA, Forest Service, 2003b, IV-43) are prescribed for the Sixshooter project." Consequently*, no opening creation is planned for the Frontier Timber Sale.

Since none of the alternatives considered in this analysis, nor any ongoing or foreseeable future activities result in management-created openings, none of the alternatives would have any incremental or cumulative effects on created openings.

3.2.10 Vegetation Effects of Gopher Control with Strychnine Bait

3.2.10.1 Trees

The application of up to three, yearly strychnine bait applications would quickly reduce localized gopher densities, thus reducing gopher depredation on planted seedlings. Individual-tree morality would decrease as young trees increase in diameter, develop more complex root systems, and become less vulnerable to stem girdling, clipping, and root pruning by gophers. As these young trees grow, a more closed overstory structure would develop that impedes growth of herbaceous vegetation cover preferred by gophers. The resulting changes in habitat would render these areas less suitable or unsuitable for high densities of pocket gophers (Engeman and Witmer, 2000). If enough trees survive to near complete canopy closure, pocket gopher would not be a serious threat to regenerating forest stands. Well-stocked forested areas appear to be less attractive to pocket gophers than open areas sparsely stocked with small trees.

3.2.10.2 Nontarget Species

There is limited information available on toxicity to plants. High concentrations (500 ppm) of soluble strychnine salts inhibit, and low concentrations (10 ppm) stimulate, germination and growth of cereal (*Triticum*). In one study, no measurable strychnine residues were found in crops such as alfalfa or apples after underground application of grain bait (USDA, Forest Service, 1995).

Failure to find dangerous residues in crops suggests that there is insufficient translocation of strychnine from underground-treated soil to plants to produce any toxicity under recommended conditions of use (USDA, Forest Service, 1995).

3.3 RANGE

3.3.1 Range Condition

The Lightning Fire project area occurs within a portion of the old Anderson Creek sheep grazing allotment. The grazing permit was waived back to the Government in the late 1980s and remained vacant and unused until 2001 when the allotment was closed.

The Lucky Fire project area includes a small portion of the 43,315-acre Middle Fork South allotment in the Scriver Creek drainage. Nine hundred and fifty ewes with lambs now graze from June 6 to mid-August after which the lambs are shipped. At that time, some ewes are culled, bucks are added, and the band is combined with the band from the Middle Fork North allotment. The dry band spends the remainder of the season until October 6 grazing from Bear Run to East Mountain lookout.

The Middle Fork South allotment grazing system is rotated from year to year. Under this strategy, grazing on some of the area is deferred, or delayed, for several months (i.e., until the plant growth/seed formation cycle is completed).

3.3.2 Rangeland Effects

The rangeland direct and indirect effects analysis area includes the 1,582-acre Lucky Fire project area and the 13,853-acre Lightning Fire project area. The analysis area is the two sheep allotments in the Middle Fork Payette drainage encompassing approximately 15,435 acres.

3.3.2.1 Environmental Consequences Specific to Alternative A

Alternative A has no effect upon the ongoing range program since there would be no change in management activities with implementation of this alternative.

3.3.2.2 Environmental Consequences Common to All Action Alternatives

Both action alternatives have no effect upon the grazing program in the Lightning Fire area because this allotment is closed to grazing. In the Lucky Fire area Alternative B and C could result in sheep displaced of sheep to other areas. This effect is difficult to estimate because it depends on weather, forage production, the effectiveness of herders, and recreational and predator disturbance. In the past, however, permittees and their herders successfully managed similar situations elsewhere on this allotment by using additional herding, and there were no effects to the range program. These experiences suggest neither Alternative B or C would affect the current grazing program.

3.3.2.3 Cumulative Effects

The cumulative effects area for the Range analysis is the 15,435-acre project area. Appendix B of this document outlines the past, ongoing, and foreseeable actions included in this analysis. Continually increasing human use and forest management activities make livestock management more difficult and complex. As recreational and managerial activities increase, livestock herding must be more careful and more continual to achieve grazing management standards. However, because none of the Middle Fork Payette Salvage alternatives would affect the range program, the project would not contribute to any cumulative effects to the livestock grazing program.

3.4 NOXIOUS WEEDS

3.4.1 Affected Environment

"Noxious weeds are plant species designated by law that can have detrimental effects on agriculture, commerce, or public health" (Forest Plan, p. II-18). Many nonnative species (originating in a different part of the world) and noxious weeds spread aggressively and are invasive to native plant communities. Noxious weeds and invasive non-native species pose a threat to native plants by out-competing them for nutrients, moisture, space or other necessary elements.

Noxious weeds and invasive, non-native species are most often found in areas of disturbed soil. Roads, powerline corridors, timber harvest units, trails, and other areas associated with human activity where soil disturbance occurs are likely locations for weed infestation. Infestations then may spread across the landscape, filling in between the roads and corridors as the weed community matures.

Noxious weeds have already altered the plant communities within both fire areas. The areas now have infestations of spotted knapweed and rush skeletonweed within or near the fire perimeters. There are large infestations of dalmatian toadflax and spotted knapweed upstream to the east near Lowman, Idaho. A growing population of leafy spurge exists to the south of the project area in Garden Valley, yellowstar thistle continues approaching from the north, and whitetop is spreading from the Treasure Valley. The most serious infestation to date within the Middle Fork Payette drainage is the widespread rush skeletonweed which is common within the project area. Rush skeletonweed has escaped control on the Emmett Ranger District and control efforts are now focused on restricting it to the Middle Fork Payette drainage in an attempt to halt its northerly spread. Because new invading noxious weeds are spread most frequently by the activities of people, other infestations may appear at any time.

It is assumed that prior to the late 1800s, there was relatively little land disturbance and no noxious weeds within the project area. When livestock were introduced to the area, plant communities were altered, and bare ground became available for weed establishment. However, no large infestations occurred since seed sources for noxious weeds were not present. Timber harvest activities produced additional surface disturbance but the seed source was still not present.

Grazing is now greatly reduced from historic levels and as currently practiced does not provide widespread opportunities for weed establishment. Cattle have not used the area for 30 years, sheep use in the Lightning Fire area no longer occurs, and sheep use on the Lucky Fire area is much reduced from historical levels. Noxious weeds are primarily dispersed as seeds are moved from place to place on off-road vehicles, cars and pickups, and logging equipment. The Forest Plan provides standards requiring

cleaning of commercial equipment to prevent the spread of noxious weeds; however, recreational and other private vehicles remain potential modes of travel for weed seeds.

Except for rush skeletonweed, there are no known noxious weed infestations within the Lucky and Lightning fire boundaries, although there are some nearby. Spotted knapweed has been found about 1 mile west of the Lucky Fire on Forest Road 670, and close to the west edge of the Lightning Fire. Dalmation toadflax occurs about 15 miles southeast, leafy spurge is established just to the south, and Scotch thistle is approaching from the west.

Recreational traffic in the project areas is currently high, and as the population of southwest Idaho continues to grow this traffic will increase. Given the increasing traffic, it is a reasonable assumption that more noxious weed species could be introduced to the project area within the next 5 years.

Weed control efforts have been effective and are increasing. The project area lies within the Upper Payette Cooperative Weed Management Area in which land owners and agencies unite and work together to improve weed control using Integrated Pest Management. Integrated Pest Management uses all available control techniques including mechanical, cultural, biological, and chemical, and applies the most appropriate, effective, and light-on-the-land techniques available. Early Detection Rapid Response methods have been employed to eradicate new outbreaks before they become established infestations across and around the project area.

The analysis area for direct and effects to noxious weeds is the 15,435-acre project area.

3.4.1.1 Environmental Consequences Specific to Alternative A

Alternative A would have no effect to the distribution and status of noxious weeds in the Middle Fork Payette River drainage given that no new ground disturbing management activities would occur. Since this alternative would not have direct or indirect effect, there would be no cumulative effects.

3.4.1.2 Environmental Consequences Common to All Action Alternatives

Alternative B and C result in the same amount of disturbance. Harvest activities associated with yarding trees to landing and log haul produce potential establishment sites for noxious weeds. The degree of this impact is difficult to estimate because it depends on factors including weather, proximity of existing weed sources, transportation of weed seeds, and unpredictable disturbances created either naturally or by man. However, Forest Plan standards, as well as design features NX-1 through NX-3 that ensure appropriate off-road equipment is cleaned, and that seed mixes and organic matter brought into the project area are weed-free, would minimize the potential for noxious weed introduction, dispersal or establishment. Reforestation is not anticipated to contribute enough disturbance to affect noxious weed distribution.

3.4.1.3 Cumulative Effects

The noxious weeds cumulative effects analysis area for this project is the 15,435-acre project area. Appendix B of this document outlines the past, ongoing, and foreseeable actions included in this analysis. Although noxious weed infestation could potentially increase with increased levels of recreation and other activities in the project area, either Alternative B or C would minimize the potential for noxious weed introduction, dispersal or establishment, due to implementation of the design features described above. Consequently, the Middle Fork Salvage project would not contribute to cumulative effects on noxious weeds within the project area.

3.5 RARE AND SENSITIVE PLANTS

3.5.1 Affected Environment

The analysis area for direct, indirect and cumulative effects to botanical resources is the fire areas plus a 5–mile buffer around each. This analysis area was selected to include those documented Threatened, Endangered, Sensitive, and Forest Watch (TES/W) plant locations that are within a reasonable distance of the project area.

3.5.1.1 Field Surveys

Field surveys were conducted for plant species having U.S. Fish and Wildlife Service (FWS) Listed, Proposed or Candidate status, Regional Forester Sensitive Species status, Boise National Forest Watch status, and for species proposed for the U.S. Forest Service Region 4 Sensitive Species List Update (USDA, Forest Service 2004a). Collectively, these species are referred to as "TES/W" species.

Field surveys for TES/W species in the Lucky portion of the project were previously conducted within the boundaries of the Sixshooter Project area during 1999, 2000, and 2001 (USDA, Forest Service 2004b). The Lucky Project area is completely within the prior Sixshooter Project area and no further surveys were conducted. During autumn of 2007, "intuitive controlled" surveys were conducted in the Lightning portion of the Middle Fork Salvage Project. An intuitive controlled survey is one in which the examiner selects specific limited areas for complete survey after walking or driving through and around the project area.

3.5.1.2 Site Description

Information plus prior experience and surveys near the project area were used to make the rare and sensitive plant analysis and resultant determinations. Stands in the project are typically mixtures of Douglas-fir and ponderosa pine. The most extensive Potential Vegetation Type (PVG) within the analysis area is Warm-Dry Douglas-fir /Moist Ponderosa Pine (PVG2). This PVG is most common on the lower and middle elevations of the analysis area, and on south or west aspects at the higher elevations. Engelmann spruce *(Picea engelmannii)* may occur at cool, moist extremes and some quaking aspen (*Populus tremuloides*) is also found. A variety of common shrubs, forbs and grasses typically occupy the under story within the project area. Shrubby under stories usually consist of low-growing huckleberries *(Vaccinium sp.)* including dwarf huckleberry and grouse whortleberry. Other shrubs found include mountain maple *(Acer glabrum)*, *Ceanothus velutinus, Symphoricarpos albus* and *Prunus virginiana*. Common forbs include *Achillea millefolium, Epilobium angustifolium, Potentilla glandulosa* and *Sedum stenopetalum.* Several graminoids including elk sedge (*Carex geyeri*), pinegrass (*Calamagrostis rubescens*) have been typically found in the area.

Mean annual precipitation is about 30-35 inches (mostly as snow). Slopes range from moderately steep to steep, and the surface erosion rate is considered moderate to high, depending upon the slope location.

3.5.1.3 Habitat Suitability within Project Area

There are no known populations of any Threatened, Endangered, Proposed, Candidate, Sensitive, Proposed Sensitive or Forest Watch species (TES/W) within the project area or the immediate surroundings. There is potential habitat for Ute ladies'-tresses orchid (*Spiranthes diluvialis*) (Threatened).

Rare plants, for which there are known populations or suitable habitat within the project area, or in the surrounding analysis area, will be discussed here. There will be no effects or impacts to any other TES/W plants that the Boise NF considers in NEPA analysis.

Table 3.9. Eleven Plant Species Included In Rare and Sensitive Plant Analysis

Species	*Species Status*
Allium validum – Tall swamp onion	Forest Watch List
Botrychium crenulatum– Scalloped moonwort	Priority Watch - proposed sensitive

Botrychium lineare – Slender moonwort	Sensitive
Botrychium multifidum – Leathery grapefern	Forest Watch
Botrychium simplex – Least moonwort	Forest Watch
Botrychium virginianum– Rattlesnake fern	Forest Watch
Douglasia idahoensis -- Idaho primrose	Sensitive
Epipactis gigantea – Giant helleborine orchid	Priority Watch - proposed sensitive
Lewisia sacajaweana (kelloggii) -- Sacajawea's bitterroot	Priority Watch – proposed sensitive
Phacelia minutissima– Least phacelia	Sensitive
Spiranthes diluvialis – Ute ladies' tresses	Threatened

3.5.1.4 Environmental Effects to Potential Habitat for TES/W Plant Species

There is potential habitat for several TES/W species in the Middle Fork Complex Salvage Project area. Impacts from project implementation are expected to be minimal to potential habitat for TES/W species (Botanical Specialist Report and Biological Evaluation in Project Record). There are known populations of *Douglasia idahoensis, Lewisia sacajaweana* and *Allium validum* directly to the north and east of the Lightning portion of the salvage project.

3.5.1.5 Environmental Consequences Specific to Alternative A

The no action alternative does not propose any new management activities and is not expected to have any effects on threatened, endangered, proposed, candidate, sensitive, or Forest watch plants.

3.5.1.6 Environmental Consequences Common to All Action Alternatives

The action alternatives would generate similar short-term and indirect effects. Alternatives B and C may temporarily reduce the number of individuals or habitat but is not likely to cause a trend to Federal listing or loss of viability of these species. Therefore, the determination for Botanical Resources for this project is: May Affect, but is Not Likely to Adversely Affect (NLAA) unknown individuals, populations or habitat for the listed species, *Spiranthes diluvialis*.

This project may impact individuals or habitat of the sensitive species *Botrychium lineare, Douglasia idahoensis,* and *Phacelia minutissima* but would not likely contribute to a trend toward Federal listing or cause a loss of viability to the population or species (MIIH). There would be no impacts to potential habitat for any other Candidate, Sensitive or Proposed Sensitive plant species.

This project May Impact Individuals but is Not Likely to Cause a Trend to Federal Listing or Loss of Population Viability (MIIH) to potential populations or individuals *of Botrychium simplex, Lewisia sacajaweana, Allium validum, Botrychium crenulatum, Botrychium multifidum, Botrychium virginianum* and *Epipactis gigantea.* There should be no loss of population viability or habitat for any other Forest Watch plant species.

3.5.1.7 Cumulative Effects Specific to Alternative A

Alternative A would have no direct or indirect effects, and therefore, no cumulative effects would occur to potential habitats or populations of rare plant species.

3.5.1.8 Cumulative Effects Common to All Action Alternatives

Appendix B includes a list of the past, ongoing and reasonably foreseeable future activities included in the cumulative effects analysis. For potential habitat and species of TES/W plants both action alternatives would generate similar long-term effects. Because no direct or indirect effects would occur to any populations or potential habitat for any TES/W species, there would be no cumulative effects to known populations of rare plants from management activities or other human activities.

3.6 TIMBER ECONOMIC EFFICIENCY ANALYSIS

3.6.1 Economic Environment

Non-commodity values are difficult to assess, especially on projects of this scope. The full range of non-timber costs and priced benefits (as used to determine management area allocation) is appropriate at the Forest Plan level, but is extremely difficult to identify at a project scale. There is inadequate information to perform an analysis of this type at the project level, and in addition, this analysis is not essential to the decision to be made.

Several environmental values and amenities occur within and adjacent to the project area, including recreational, visual, and wildlife resources. Although no attempt has been made to assign a monetary value to these amenities or to include them in this financial assessment, discussions relative to many of these aspects of the social environment are addressed elsewhere in this document. In addition, the Final EIS completed for the Forest Plan includes a comprehensive socioeconomic analysis of the effects of timber harvest on the communities in southwestern Idaho, including effects on non-commodity resources (USDA, Forest Service 2003b, pp. 2-113-131; pp. 3-998-970).

The project area is located within Boise and Valley County; however, timber harvested could be processed anywhere within the region. The closest primary processing facility is in Adams County, although there are also sawmills in eastern Oregon and central Idaho.

Timber sales and their associated activities have an effect on local communities through their impact on employment. Timber sales influence the wood products, government, construction, and recreation sectors. Indirect impacts occur as these sectors transact additional business with other sectors.

The analysis for this project used the Forest Service's Transaction Evidence Appraisal System (TEA Bulletin BU411207) and estimated net sale volumes, costs, and appraised values as indicators of the effects of the alternatives.

Logging systems, or the method by which logs are "yarded" to a landing, are a major determinant of the economic efficiency of timber sales. Conventional ground-based yarding methods, such as tractor or skyline, are substantially less expensive than helicopter yarding. Often, the cost associated with removing logs by helicopter exceeds the value of the material removed, thus affecting the profit margin of a sale. Even though conventional yarding may require construction of access roads, it is usually more efficient to maximize the amount of material removed by conventional yarding systems.

For the purposes of this project, costs associated with watershed restoration activities (e.g., decommissioning roads, conversion of road to non-motorized trail, and road closures) and reforestation activities were not reflected in the economic analysis. Funds for reforestation activities have been allocated from fire restoration funding ("In the Black"), and funding for the watershed restoration activities from the Forest Service Legacy Roads and Trails funds is anticipated in FY 2009. Therefore implementation of these activities is not dependent upon revenue generated by proposed salvage activities, nor would these activities influence the economic returns of either alternative. Costs associated with NEPA analysis, sale administration, and sale preparation were also not considered relevant to the decisions being made and were also not reflected in this economic analysis.

This economic analysis is based on static information in a dramatically fluctuating market and is provided to display the relative difference between alternatives. A variety of factors could change unexpectedly, increasing or decreasing the value of any alternative at any time.

3.6.2 Economic Consequences

3.6.2.1 Economic consequences Specific to Alternative A

Because no activities would be undertaken under this alternative, no activity-related expenses or revenues would result, and no jobs or individual income would be generated.

3.6.2.2 Economic Consequences Common to all Action Alternatives

Both Alternative B and C would remove 6,473 CCF of dead or imminently dead timber using identical yarding systems. More specifically, the Lucky Salvage would harvest about 4,867 CCF of dead or imminently dead timber and the Lightning Salvage would remove about 1,606 CCF of dead or imminently dead timber.

Under either action alternative, sawlogs and other wood products, as well as employment opportunities, would help sustain sawmills and economies in Boise County, Valley County, and/or adjacent counties. Jobs supported by these alternatives would also indirectly benefit local economies and the economies of adjacent counties.

Forest Service policy requires that timber be offered for no less than a minimum advertised value of $6.00/CCF. When the minimum advertised value for a sale exceeds the appraised value (i.e. value of the timber minus the costs to harvest), a sale is considered to be "deficit". As portrayed in Table 3.10, both Alternative B and C would be considered "deficit" by roughly $93,032. Methodologies for the timber economic efficiency analysis are located in the Project Record.

Relative to the individual sales, the appraised value of the Lucky Salvage Sale would be negative $25,838 and the minimum advertised value roughly $29,196. This sale would be deficit by an estimated $55,034, due in large part to the associated $33,436 road maintenance[2] cost and the relatively long helicopter yarding distances.

The appraised value of the Lightning Salvage Sale would be negative $28,362 and the minimum advertised value roughly $9,636. This sale would be deficit by an estimated $37,998 primarily due to the abundance of low-value species as well as a $31,078 road maintenance expense.

Table 3.10. Timber Sale-Related Economic Outputs by Alternative.

	Alternative A			Alternative B or C		
Revenues and Expenses[1]	**Lucky**	**Lightning**	**TOTAL**	**Lucky**	**Lightning**	**TOTAL**
Acres Salvaged	0	0	0	696	381	1,077
Net Sale Volume (CCF)[2]	0	0	0	4,867	1,606	6,473
Advertised Sale Value Using Min Rate[3]	0	0	0	$29,196	$9,636	$38,832
Appraised Sale Value (TEA)	0	0	0	$-25,838	$-28,362	$-54,200
Sale Deficit	0	0	0	$-55,034	$-37,998	$-93,032

[1] Table displays only costs associated with salvage harvest activities since reforestation and watershed restoration activities would be paid for with other allocated funding sources.
[2] One CCF (hundred cubic feet) equals approximately 0.56643 MBF (thousand board feet).
[3] Minimum rate is $6.00/cubic foot (CF).

[2] Road maintenance refers to all road work that would be required to facilitate salvage harvest operations.

3.6.2.3 Cumulative Effects

Appendix B includes a list of past, ongoing, and reasonably foreseeable future activities considered for this analysis. There are no other current or foreseeable future projects that would affect the economic viability of any of the proposed alternatives. The potential influence of other projects currently being analyzed on adjacent districts or forests are unpredictable at this time. Therefore no cumulative effects are anticipated on the financial aspects or net revenue/expenditures of this project.

3.7 RECREATION

Recreational uses within the project area include big game hunting, fishing, dispersed camping, fuelwood gathering, and motorized recreation. The discussion below is organized as follows: roads and trails, recreational uses, and Recreation Opportunity Spectrum (ROS) classifications. Additional details are found in the specialist report included in the project record.

3.7.1 Roads and Trails

3.7.1.1 Affected Environment

The analysis area used in this assessment for the purpose of evaluating direct, indirect, and cumulative effects related to proposed project activities consists of the 15,435 acre project area plus all NFS roads used to facilitate harvest activities. This area was selected because the expected and measureable social impacts are most likely to be localized and emphasized along access routes supporting project acitivities. This area includes about 36 miles of authorized NFS road and about 7 miles of unauthorized road.

The timeframes discussed throughout this report refer to a temporary timeframe of 0 to 3 years, a short-term timeframe of 3 to 15 years, and a long-term timeframe of greater than 15 years.

The most common recreational uses are associated with the existing roads and include hunting, sightseeing, and wood gathering, and fishing in project area streams. The number of roads in the project area provides an abundance of opportunities for off highway vehicle (OHV) riding. Use of the area begins as early as spring conditions permit and lasts throughout the snow-free season.

3.7.1.2 Environmental Consequences Specific to Alternative A

Because no new activities would be undertaken under Alternative A, there would be no effects to recreational opportunities within the project area.

3.7.1.3 Environmental Consequences Common to All Action Alternatives

In the temporary timeframe, the active harvest operations would disrupt visitors along haul routes and within harvest units and a moderate amount of spring summer and fall recreational use of the project area would be displaced by active harvest operations. Proposed closures would have a long-term reduction in motorized access. Users of the area would effectively be displaced to other road systems in the vicinity for sightseeing, wood gathering, and other activities.

Primary effects would occur in the fall, because the area is used extensively for big game hunting. There would also be about 7.2 miles of authorized road closed yearlong to motor vehicles and about 1.2 miles of authorized road converted to non-motorized trail that connects with the Lightning Ridge Tail. The conversion of one currently authorized road to a non-motorized trail reflects the results of both the roads analysis of the area but also an evaluation of dispersed recreation within Granite Basin. The area received infrequent dispersed camping except during the hunting season. However, one dispersed camp exists along NFS road 668B. This road has received little maintenance in the past and has experienced considerable erosion. A dispersed recreation site that has been utilized by campers with horses exists at the point where NFS 668B would be converted to a non-motorized trail. The conversion of a portion of NFS 668B to a non-motorized trail should provide foot and horse access to other to trails in the area.

Motorized trails adjacent to the project area can be accessed by existing motorized trails within the project area. However, no motorized trail opportunities exist within the project area currently.

During active harvest operations the amount of traffic on project area roads would increase by an estimated 10 to 15 vehicles per day, roughly half of which would be logging trucks. This increased level of traffic is expected to be sustained for a six to seven month period. Design features common to the two action alternatives would reduce, but would not completely mitigate, the potential for conflicts between recreationists, residents, and logging traffic. Residents, businesses, and schools adjacent to the haul routes would experience higher levels of dust and noise associated with logging operations. Users of project area roads and haul routes would also experience higher levels of traffic than currently exist. These effects would diminish after project activities are completed.

Both Alternatives B and C would remove trees that are a hazard to travelers on Forest Road 670 in the Lucky Fire Area. This activity might create a temporary interruption in recreational activity and a temporary displacement of visitors, but the reduction of roadside hazards will ultimately benefit visitors by increasing safety along routes within the burned area.

No effects are anticipated associated with reforestation activities.

3.7.1.4 Cumulative Effects

Appendix B includes a list of the past, ongoing and reasonably foreseeable future activities included in the cumulative effects analysis. Other projects in the Middle Fork Payette river drainage that have the potential to displace recreational use on NFS Road 698 (Middle Fork Payette River Road) include timber sales planned through Sixshooter decision (Present Action), the Silver Bullet timber sale (Present Action) and Scriver Creek Integrated Resource Project (Foreseeable Action). This salvage project also has the potential to displace recreational use on the NFS Road 668 (Anderson Creek Road). These same projects also result in a reduction in road densities within the Middle Fork Payette river drainage. The E Area Analysis (Travel Management) Project, planned for 2009 overlaps spatially with this project and has the potential to reduce motorized access in the area long-term; however, no environmental analysis, public involvement, or decision on this project has yet been made. The cumulative effects associated with these actions may reduce motorized recreational opportunities in the analysis area in the long-term. Motorized recreational opportunities are anticipated to remain available at some level in areas adjacent to and/or within the analysis area.

3.7.2 Recreational Uses

3.7.2.1 Affected Environment

The analysis area for direct and indirect effects to recreational uses is the 15,435-acre project area. Big game hunting (elk, deer, and bear) is an important recreational activity throughout the project area in the fall months. Hunters use project area roads extensively for road hunting. Some of the hunters use dispersed campsites adjacent to existing roads. In the Lightning Fire area, many hunters access the area on horses and ATVs are used for hunting in both fire areas. Fishing use is estimated to be low in the project area since the only fish streams occur at or beyond the project boundaries.

Outside of the hunting season, very little camping is or has been observed in the area. There are no developed campsites and few dispersed sites in or near the project area. The highest dispersed camping use occurs along the Middle Fork Payette River and the Sixmile Project Camp in the Lucky Fire area and along the lower portion of Anderson Creek in the Lightning Fire area.

Moderate amounts of firewood are available within the project area. The steep terrain limits offroad travel so most of the wood gathering occurs adjacent to open roads. An exception is within the southern portion of the Lightning Fire area near Granite Basin, where the terrain allows limited off-road travel, although rough, native surface roads make fuelwood gathering difficult.

Snowmobiling is a popular activity along existing travel routes. (Because of steep slopes, there is little offtrail snowmachine use within the project area.) Typically, snow depths accommodate snowmobiling between December and April. NFS roads 670, 662, 600, and 698 are also segments of designated, groomed snowmobile routes. These trails are important to snowmobilers using the Middle Fork Payette River drainage and provide a popular link between Packer John Mountain, Middle Fork Payette River, Smith's Ferry, Warm Lake, and Silver Creek Plunge Resort. NFS road 600 is currently the preferred route from the north (Warm Lake area) to the Silver Creek Plunge, a popular destination for snowmobilers. From Smith's Ferry or Scriver Creek, snowmobile traffic generally follows NFS road 670 to the Silver Creek Plunge and the upper portion of the Middle Fork Payette River drainage. NFS road 662 offers spectacular panoramic views along the ridge between the North and Middle Forks of the Payette River.

3.7.2.2 Environmental Consequences Specific to Alternative A

Because no new activities would be undertaken under Alternative A, there would be no effects to recreational opportunities within the project area.

3.7.2.3 Environmental Consequences Common to All Action Alternatives

Timber harvest activities would temporarily displace hunters, fishermen, and dispersed campers as areas where helicopters, tractors, or offroad jammers are yarding logs would likely be temporarily closed to public. Since the major use of the area is big-game hunting and associated dispersed camping, the primary effect would be to these users during the relatively short period during which operations are underway, and use would likely resume following project activities. Although outfitted hunting is permitted within the area, use is minimal and would not likely be affected by the project.

Alternatives B and C would result in no reduction of recreational opportunities within the Lucky Fire area. However, within the Lightning Fire area road closures and decommissioning would reduce the opportunities for "end of the road" dispersed camping.

Fuelwood access is contingent upon the miles of road outside of riparian areas that are open during the fuelwood season. The reduction of roads through decommissioning, yearlong closure, or conversion to trail would limit access to the area for fuelwood gathering. During the timber sale contract period, fuelwood gathering would be prohibited within the timber sale boundary and along haul routes.

Because winter logging activities would be prohibited from December 1 to April 15 to provide for safe winter recreation (design feature TH-4), snowmobile use would not be affected by either implementation of either action alternative.

3.7.2.4 Cumulative Effects

Appendix B includes a list of the past, ongoing and reasonably foreseeable future activities included in the cumulative effects analysis. Other projects in the Middle Fork Payette river drainage that have the potential to displace recreational use include timber sales planned through Sixshooter decision and the Silver Bullet timber sale haul route on Forest Road 698. In addition, vegetation management activities are planned within the Scriver Creek drainage which could also temporarily displace recreational uses. This project also has the potential to displace recreational use on the NFS Road 668 (Anderson Creek Road). These same projects also result in a reduction in road densities within the Middle Fork Payette river drainage. The E Area Analysis (Travel Management) Project, planned for 2009 overlaps spatially with this project and has the potential to reduce motorized access in the area long-term; however, no environmental analysis, public involvement, or decision on this project has yet been made. The cumulative effects associated with these actions may reduce motorized recreational opportunities in the analysis area in the long-term. Motorized recreational opportunities are anticipated to remain available at some level in areas adjacent to and/or within the analysis area.

3.7.3 Recreation Opportunity Spectrum (ROS)

"Recreation Opportunity Spectrum" is a framework for stratifying and defining classes of outdoor recreation environments, activities and experience opportunities. The settings, activities, and opportunities for obtaining experiences are arranged along a continuum or spectrum divided into six classes ranging from "Primitive" to "Urban" (Forest Plan, p. GS-30). ROS provides the framework, which defines and characterizes types of outdoor activities and experiences the public may desire (USDA, Forest Service 1986). ROS also provides a tool for estimating and describing recreation resources as well as the effects of management strategies. ROS is a convenient way to inventory and display recreation settings, but it does not account for singular attractions that draw people to recreation settings such as water and wildlife. The presence of water is always an important feature for recreating visitors.

The analysis area chosen for ROS is defined by the entire Management Area 14 for direct, indirect, and cumulative effects. This area was chosen to provide a consistent and broad comparison to the classification provided in the Boise National Forest Land and Resource Management Plan (Forest Plan, Objective 1444, III-264). The Management Area contains four ROS classes that include Semi-Primitive Non-Motorized, Semi-primitive Motorized, Roaded Natural, and Roaded Modified. Table 3.11 summarizes the ROS classification in Management Area 14. As shown in the table, nearly all of the management area is classified as:

- Semi-Primitive Motorized: settings were human interaction is evident and the recreational use is low. Camping experiences are relatively primitive; there are no developed sites within the project area. Conventional motorized use is not permitted.

and

- Roaded Modified: settings were human interaction is readily evident and the recreational use ranges from low to high. Camping experiences are relatively primitive; there are no developed sites within the project area. Recreation opportunities depend on vehicular access off the primary roads to secondary roads.

Table 3.11. Management Area 14 ROS Classifications

ROS Class	Percent of Mgt. Area	
	Summer	**Winter**
Semi-Primitive Non-Motorized	**0%**	**Trace**
Semi-Primitive Motorized	**36%**	**99%**
Roaded Natural	**8%**	**1%**
Roaded Modified	**56%**	**Trace**

ROS provides the framework which defines and characterizes types of outdoor activities and experiences the public may desire (USDA Forest Service, 1986). ROS also provides a tool for estimating and describing recreation resources as well as the effects of management strategies. ROS is a convenient way to inventory and display recreation settings, but it does not account for singular attractions that draw people to recreation settings such as water and wildlife. The presence of water is always an important feature for recreating visitors.

Roaded Modified are settings were human interaction is readily evident and the recreational use ranges from low to high. Camping experiences are relatively primitive; there are no developed sites within the project area. Recreation opportunities depend on vehicular access off the primary roads to secondary roads.

Roaded Natural are settings were human interaction is evident and the recreational use ranges from low to moderate. Camping experiences are relatively primitive; there are no developed sites within the project area. Conventional motorized use is provided.

Semi-Primitive Motorized are settings were human interaction is evident and the recreational use is low. Camping experiences are relatively primitive; there are no developed sites within the project area. Conventional motorized use is permitted.

Semi-Primitive Non-Motorized are settings were human interaction is evident and the recreational use is low. Camping experiences are relatively primitive; there are no developed sites within the project area. Conventional motorized use is not permitted.

3.7.3.1 Environmental Consequences Specific to Alternative A

Alternative A would have no effect on the ROS. Alternative A would not restrict or affect any future Forest Plan direction to change the ROS.

3.7.3.2 Environmental Consequences Common to All Action Alternatives.

Although, there are roads in the Lightning fire area identified for decommissioning and closure, the management area considered for ROS is large enough to accommodate smaller, site-specific changes to recreation access without changing the overall character. To put this into perspective, this management area is 109,600 acres and contains a road density of 2.2 miles per square mile of classified roads. The Lightning fire area activities will remove access to about 16 miles of road (7 miles of the 11 miles are unclassified). The removal of these roads amounts to less than 4 percent of the total classified road miles and therefore would not change the ROS classification for the management area.

There would be vegetation treatment under each action alternative within the Roaded Modified area of the project boundaries. This is consistent with the Roaded Modified setting that exists within the project area in that highly roaded, substantially modified setting that characterizes this ROS classification.

Project activities are not expected to change the ROS classification of any area within the analysis area. There would be no direct or indirect effects to ROS classification and they would not compromise the achievement or maintenance of the Forest Plan ROS strategy (Forest Plan, Objective 1444, III-264).

The Roaded Natural portion of the Lucky project area is within a half mile of the Middle Fork Payette River road. Harvest within this corridor would be limited to hazard tree removal to protect persons using NFS road 670. Reforestation would also occur along NFS road 670, but only a small portion of that activity would be within the Roaded Natural corridor. There would be no visual changes as a result of the project; visual changes have already occurred as a result of the Lucky Fire. The corridor would retain its natural appearance from the Middle Fork road and would remain classified as Roaded Natural under both action alternatives.

3.7.3.3 Cumulative Effects

There would be no direct or indirect effects with implementation of either action alternative to the ROS classification and consequently there would be no cumulative effects.

3.8 WILD AND SCENIC RIVERS

3.8.1 Affected Environment

A segment of the Middle Fork Payette River from Boiling Springs to Bell Creek has been determined to be eligible for inclusion in the National Wild and Scenic Rivers System. This 12.2-mile segment, with a river corridor area of 3,900 acres, is the analysis area for direct, indirect and cumulative effects. The eastern boundary of the Lucky fire project lies along about 1 mile of this segment with about 74 acres of the

project area lying within this classified corridor. It has a Recreational classification and is considered eligible for Wild and Scenic River status because of its outstandingly remarkable scenic and heritage values (ORVs).

The Scenic ORV is characterized by a combination of aquatic and landform features. Strong water movement is evident throughout with diversity and variety of slow-moving water, pools, cascades, ripples, small falls, and rapids. A steep rocky gorge provides a narrow canyon enclosure in one location. Small falls flow from rocky canyon walls. Huge rock boulders in the river create diversity, and large ponderosa pine trees occur at various locations along the river. There is a natural appearing forested setting interspersed with natural openings. There is little evidence of human alteration other than the road corridor in some locations. Scattered hot springs occur along the river.

The Heritage ORV is associated with historic as well as archeological features. Historically, this river area was a popular transportation corridor linking the agricultural communities along the North and South Fork Payette Rivers. The Middle Fork was also a gateway to Deadwood Basin and Salmon River mining camps. Portions of Forest Road 698 are built on a wagon road constructed in 1902 by Placerville and Garden Valley residents as the “best route” to the Thunder Mountain gold rush. This road is not recorded as a site, but is considered eligible for the National Register of Historic Places. Boiling Springs Guard Station is a National Register eligible site built in the 1930s by Civilian Conservation Corps crews. CCC crews also built the campgrounds along the river. There are eight prehistoric sites that are eligible for listing on the National Register. At least one archeological site has contributed significant information about wildlife species no longer present in the drainage, and the possible co-existence of Columbia Plateau and Great Basin cultural groups.

Features such as roads, timber harvest units, and dispersed camping are consistent with the recreational classification. The shoreline can have substantial evidence of human activity. Lands may have been developed for the full range of agricultural and forestry uses. Harvesting hazard trees is also consistent with the recreational classification provided that Visual Quality Objectives (VQOs) are met (see Visual Resource section).

3.8.2 Environmental Consequences Specific to Alternative A

No new management actions are proposed with Alternative A and, therefore, this alternative would have no effect on the Wild and Scenic eligible segment of the Middle Fork Payette River.

3.8.3 Environmental Consequences Common to All Action Alternatives

Because the project activities under Alternatives B or C would be limited to hazard tree removal and reforestation, neither the free flowing character, ORVs, or Recreational classification of the eligible segment of the Middle Fork Payette River would be affected. Consequently, the eligibility of this segment of the Middle Fork Payette River under the Wild and Scenic Rivers Act would not be affected by implementation of either action alternatives.

3.8.4 Cumulative Effects

Because none of the project alternatives would affect the free flowing character, ORVs, Recreational classification, or eligibility of this segment of the Middle Fork Payette River for Wild and Scenic classification, no cumulative effects would result.

3.9 VISUAL RESOURCES

The analysis area for visual resources is the 15,435-acre project area. While most all National Forest lands can be viewed from high vista points or from aircraft, the esthetic concern varies with the types of viewers, number of viewers, and the view duration. During the Forest Planning effort various visual quality objectives (VQOs) were established for seen areas. These VQOs function as indicators of allowable levels of induced change on the landscape. VQOs defined in the Forest Plan include:

***Preservation* (P)** - This visual quality objective allows ecological changes only

Retention (R) - Provides for management activities that are not visually evident to the casual forest visitor.

Partial Retention (PR) - Management activities may be visible but remain subordinate to the characteristic landscape.

Modification (M) - Management activities may dominate the characteristic landscape, but must concurrently use natural, established form, line, color, and texture. Activities should appear as natural occurrences when viewed in foreground or middleground distances.

Maximum Modification **(MM)** - Management activities of vegetative and landform alternations may dominate the characteristic landscape.

The distance from which a landscape is viewed has an affect on how much detail, pattern, color, line, and texture a viewer sees. To capture this difference, various distance zones are established from the sensitive viewing areas:

Foreground (Fg) - That portion of a view from the observer to 0.25 to 0.50 mile from the observer. The limit of this zone is based upon distances at which textural details can be perceived.

Middleground (Mg) - That portion of a view from 0.25 or 0.50 mile up to 3 to 5 miles from the observer. Texture is characterized by the masses of trees in stands of uniform tree cover.

Background (Bg) - The visible terrain beyond the foreground and middleground where individual trees are not visible but are blended into the total fabric of the stand. Also, that portion of a view between 3 to 5 miles from the observer, and as far as can be seen.

A third component of the scenic environment relates to the degree of variety (variety class) within a visual landscape. The more distinctive the variety class, the more restrictive the visual quality objective. In contrast, those landscapes with minimal variety usually have a less restrictive VQO.

Table 3.12 discloses the visually sensitive use areas or travelways identified in the Forest Plan that provide views into the project area and identifies their sensitivity levels, variety classes, and VQOs. The remainder of this document will focus on these use areas or travelways and the potential effects on them. The analysis area used in this assessment consists of the project area as seen from these sensitive viewing locations.

Table 3.12. Visually Sensitive Travel Routes and Visual Quality Objectives

Sensitive Travel Route Or Use Area	Sensitivity Level	Visual Quality Objective								
		Fg			Mg			Bg		
		Variety Class			Variety Class			Variety Class		
		A	B	C	A	B	C	A	B	C
Middle Fork Payette River	1	R	R	PR	R	PR	PR	R	PR	M
Forest Road 698	2	PR	PR	M	PR	M	M	PR	M	MM
Forest Trail 038 (Airline)	2	PR	PR	M	PR	M	M	PR	M	MM

3.9.1 Affected Environment

3.9.1.1 Lightning Fire Area

Forest Trail 038

The trail in the project area location has a variety class of B-Common and has a resulting visual quality objective (VQO) of partial retention in the foreground and modification in the middleground. There is approximately 2.5 miles of this trail that winds through the Lightning project area. Most of the area adjacent the trail has either no fire mortality or low to moderate mortality (0-25 percent mortality) with small scattered pockets of higher mortality ranging from 25 percent to 100 percent (reference mortality maps). There is approximately 0.25 mile of trail that winds through one salvage unit (Unit 21) of 38 acres. Mortality in this unit consists of primarily low (0-25 percent mortality) with pockets of higher 25-100 percent mortality.

3.9.1.2 Lucky Fire Area

Forest Road 698

No salvage harvest would occur immediately adjacent to NFS 698. Hazard tree removal adjacent to NFS road 670 would occur within the foreground distance zone of NFS road 698. NFS road 698 has visual quality objectives of retention in the immediate foreground (variety class A) and partial retention beyond that zone within the foreground.

Middle Fork Payette River

The Middle Fork Payette River has a retention VQO in the foreground and in the 0.25-mile river corridor considered eligible for the Wild and Scenic River System. No salvage harvest would occur within this foreground retention area, but some hazard tree removal along NFS road 670 would occur within the foreground and 0.25-mile river corridor.

3.9.2 Environmental Consequences

The analysis area used in this assessment consists of the project area as seen from the identified visually sensitive routes. Specifically, the visual resources were assessed relative to the VQOs established in the Forest Plan.

3.9.2.1 Environmental Consequences Specific to Alternative A

Because no new activities would occur under Alternative A, no direct or indirect effects would result. There would be short- and long-term changes associated with the natural processes of vegetation growth and succession.

3.9.2.2 Environmental Consequences Common to All Action Alternatives

Most vegetative management activities can affect the visual resources to some degree. The greater the degree of visual contrast that is created, the greater the potential effect on the visual resources. The degree of disturbance or visual contrast on the landscape also depends upon the steepness of the terrain, screening effects of vegetation, and locations of these management activities in relation to the critical viewpoints or viewing areas.

3.9.2.3 Visual Effects Relative to Specific Visually Sensitive Travelways or Rivers

There would be no difference in visual effects between Alternatives B and C relative to seen areas from identified sensitive travelways.

3.9.2.4 Lightning Fire Area

Forest Trail 038

Due to the mosaic nature of the burn mortality, the predominantly low mortality adjacent to the trail, and the very short segment of salvage to adjacent to the trail (0.25 mile), changes from the salvage harvest

adjacent to the trail would not dominate the viewshed, and the visual quality objective of partial retention would be met.

3.9.2.5 Lucky Fire Area

Hazard tree removal would occur adjacent to NFS road 670, which in turn occurs within the foreground viewshed of NFS road 698. As described in Chapter 2, hazard trees would be identified only after assessing a tree's potential to fail, potential failure zones, the nature of nearby activity, and whether a hazard would exist if failure would occur. Although it is thus difficult to accurately predict the visual effect of the hazard tree removal (Toupin and Barger, 2005), some projections can be made from the degree of burn mortality along this segment of NFS 670. The burn mortality in the immediate foreground area seen from NFS 698 is predominantly low or no mortality (0-25 percent crown mortality). Portions of this foreground area within the Lucky fire consist of nonforest types. As a result relative little hazard tree removal would be anticipated and the remaining live green trees would minimize the visual effect of hazard tree removal. This immediate foreground zone has a retention visual quality objective, and it is anticipated that this visual quality objective would be met due to the very low amounts of mortality in this area and the screening from non burned areas immediately adjacent to NFS road 698. Further back from the 698 road (300 feet to 0.25 mile), the visual quality objective is partial retention. The burn mortality in this zone along FR 670 ranges from low (0-25 percent) to moderate and high (25-100 percent). Most of the hazard tree removal in this zone would be likely be screened by the unburned forest vegetation that lies in the foreground between NFS roads 670 and 698. The foreground visual quality objectives of retention and partial retention would likely be met and the hazard tree removal would likely be unnoticeable from NFS road 698. Some salvage units would be located in the middleground distance zone as seen from NFS road 698; the VQO in this zone is modification. The middleground salvage units would be screened by intervening vegetation, the visual change would not dominate the viewshed, and the middleground modification VQO would be met.

Middle Fork Payette River

Because NFS road 698 closely parallels the Middle Fork Payette River in this location, views from the riverbank and the river would be very similar as those seen from NFS 698, as described above. Some hazard trees would be removed along NFS 670 within the foreground viewshed seen from the riverway. This hazard tree removal would generally not be noticeable and would likely be screened by intervening forest vegetation that occurs between the river and hazard removal zone. Visual changes would be subtle and likely not noticeable, and it is anticipated that the retention visual quality objective would be met.

3.9.3 Cumulative Effects

Two cumulative effects analysis areas have been identified for visual resources: the Lightning Fire area, and the Lucky Fire area.

Lightning Fire Area: While past timber and salvage sales and prescribed fire projects described in Appendix B, including the 1986 Pyle-Lightning Creek and Anderson-Little Anderson Helicopter salvage, the 1970s Balloon and Hailey Creek sales, and the Danskin/Gallagher and Anderson/Pyle prescribed burns, have shaped the current landscape. However, the 2007 Lightning fire, and the 1986 Anderson Creek Complex wildfire have had the most influence in changing the visual conditions. There are no ongoing or current actions in the viewshed as seen from trail 038. The cumulative visual effects would be the same as that described under direct and indirect effects. The visual effects of the recent wildfire event would continue to characterize and dominate the visual condition depending upon fire severity. There would be noticeable visual evidence of salvage harvesting along a very short segment of the trail.

Lucky Fire Area: The 1979 West Fork helicopter timber sale of 1979 occurred in the general vicinity of the viewsheds as seen from NFS road 698 and the Middle Fork of the Payette River (Appendix B), but visual effects from this past action are not noticeable from these visually sensitive travelway. The recent Lucky Fire event dominates portions of the viewshed as seen from these travelways. There are no ongoing or current actions in the viewshed as seen from NFS road 698 or the Middle Fork Payette River

(Appendix B). The cumulative effect would be the same as that described under direct and indirect effects. No noticeable changes in the foreground seen area would be anticipated, and some portions of the middleground would continue to be dominated by the wildfire effects with subtle visual effects of the salvage harvesting.

3.10 ROADLESS RESOURCE

3.10.1 Roadless Area

The term "inventoried roadless area" (IRA) refers to an area at least 5,000 acres in size without developed and maintained roads and substantially natural. An inventoried roadless area is specifically defined as an area that meets the minimum criteria for wilderness as defined by the Wilderness Act of 1964 and Forest Service guidelines.

On the Boise NF, IRAs were initially identified during the Roadless Area Resource Evaluation of 1972 (also known as RARE I) and the RARE II of 1979. These inventories were updated and areas were reevaluated for wilderness suitability as part of the initial forest planning efforts completed on the Boise NF in 1990. As part of the recent Forest Plan revision process on these Forests, the inventories were further reviewed and updated. During the reinventory process, changes were made to the roadless area boundaries based on project-level development and by examining boundaries for areas that may have been missed or omitted. Roadless area boundaries were adjusted to reflect previous project developments such as timber harvest units, new road construction, and utility corridors; undeveloped areas missed in previous inventories; and areas that have changed, over time, affecting their eligibility for classification as roadless and undeveloped. Roadless acreages also changed due to the use of new technology (GIS) to determine acreages of defined areas.

The updated inventory was included in the Forest Service Roadless Area Conservation, FEIS, Volume 2 (USDA, Forest Service, 2000).

Portions of the Peace Rock IRA occur within the 15,435-acre Middle Fork Salvage project area. Appendix C of the Final EIS for the Southwest Idaho Ecogroup Land and Resource Management Plans (July 2003) provides an overview description of the roadless areas. Pages C-100 through C-103 of the Southwest Idaho Ecogroup Land and Resource Management Plans, FEIS, Appendix, Volume 3, C. Roadless Area Re-evaluation provides a brief description of the Peace Rock IRA, a discussion of the capability, availability and need relative to wilderness designation.

Effects were assessed by determining the area changed from an undeveloped to developed condition based on the criteria established in the Wilderness Act, section 2(C) and Forest Service Handbook 1909.12, Section 7. The criteria is used to evaluate if activities would effect an area to such a degree that a portion of, or the entire area, would no longer meet the roadless area definition and, therefore, be omitted from consideration as potential wilderness.

A key factor in analyzing the effects of management activities on roadless areas is disturbance. Disturbance is the alteration, through human interference, of the area's undeveloped character. The intensity, magnitude, and nature of the disturbance determine if the area would be considered developed.

3.10.2 Peace Rock IRA (0402026)

Peace Rock is the largest roadless area on the Boise NF. The IRA is on the Cascade, Emmett, and Lowman Ranger Districts, between the Middle Fork Payette River and the Deadwood River. Additional stringers of land extend into the headwaters of the South Fork Salmon River. The IRA is accessed off the Banks-Lowman Highway (Highway 17), the Scott Mountain Road (NFS road 555), and the Middle Fork Payette River Road (NFS road 698), via State Highways 55 or 21. The area is also accessed by several trails, including the Switchback, Middle Fork Payette, Rattlesnake, Lightning Ridge, Silver Creek Summit, Peace Creek, and Tranquil Basin Trails.

3.10.2.1 Natural Integrity and Appearance

The apparent naturalness and natural integrity of the area have generally been unaffected, with the imprint of man's work substantially unnoticeable. The area generally appears to have been affected primarily by the forces of nature. There are a number of short classified road segments that are just within the IRA boundaries. There are five such classified road segments totaling 2.28 miles, with most of this in the Silver Creek vicinity.

Within the part of the IRA inside the Middle Fork Salvage project area, however, there are approximately 217 acres that have been previously altered by ground based timber harvest and contain old skid trails and a constructed road that is no longer maintained. This harvest and road construction occurred when this area was under State management prior to a land exchange with the National Forest. This 217-acre area has been altered to a degree that it is considered developed and no longer retains wilderness attributes.

3.10.2.2 Opportunities for Solitude and Primitive Recreation

The area's rugged terrain provides outstanding opportunities for primitive and unconfined recreation. Extremely good opportunities for high-quality backpacking, remote hiking, and hunting are readily available. Opportunities for solitude are plentiful due to the large area, rugged and steep terrain, and numerous drainages.

3.10.2.3 Special Features

The jagged, rocky knobs of Peace Rock and Silver Creek Summit are notable distinct features. Scattered high-elevation glacial basins are special features that contrast with the dry steep terrain of most of the area. The Long Fork Silver Creek with its steep canyon walls is also a special feature of the area. Rice Peak fire lookout is managed for recreational rental use.

This IRA contains segments of three different rivers that have been identified as eligible Wild and Scenic Rivers: Middle Fork Payette River, South Fork Payette River, and Deadwood River. The segments total an estimated 4,330 acres and 16.2 river miles within the IRA. This IRA also contains a river segment determined suitable for designation to the Wild and Scenic River System, the South Fork Salmon River. There are an estimated 1,606 acres of this river corridor and 4.4 miles of the segment within the IRA.

3.10.2.4 Manageability and Boundaries

Peace Rock has some very complex and irregular boundaries in some locations due to cherry-stem boundaries caused by excluding roads and associated timber harvest. Some of the boundaries would be difficult to identify on the ground and to administer. Creating more manageable boundaries would result in a reduction of acreage.

3.10.2.5 Public Interest

There has been relatively high public interest in this area becoming wilderness. Numerous concerned individuals or organizations specifically suggested this IRA for wilderness recommendation in response to the DEIS. This IRA is recommended for wilderness designation in the most recent wilderness bill, HR 1105, the Northern Rockies Ecosystem Protection Act.

3.10.3 Environmental Consequences

3.10.3.1 Environmental Consequences Specific to Alternative A

Under Alternative A, no new activities would occur and no effects to the Peace Rock IRA would be anticipated.

3.10.3.2 Environmental Consequences Specific to Alternative B

Under Alternative B, about 132 acres within the Peace Rock IRA would be hand-planted with about 200 native conifer seedlings per acre. Of the 132 acres planted within the IRA, 90 acres occur within the 217 acre area considered previously developed. Of the unauthorized roads that would be decommissioned, about 3.2 miles lie within the Peace Rock IRA, including road segments X555BCX1, X668BX2, X668BX3, X668BX7, and X668BX5.

Because 90 of the 132 acres within the Peace Rock IRA to be reforested are already considered developed, effects on wilderness attributes (natural integrity and appearance, opportunities for solitude or primitive recreation, special features, and manageability and boundaries) will be assessed only on the undeveloped part of the IRA affected by this alternative (e.g., 42 acres).

Natural Integrity and Appearance - With the harsh planting site characteristics it is anticipated that survival of the planted stock might be as low as 75 trees per acre (25 percent survival). A very irregular pattern would be expected due to the rocky terrain and rock outcrops combined with the uneven nature of mortality/survival at this harsh site. In locations where suitable seed trees remain, natural regeneration would add to the future structural and spatial diversity.

There would be subtle temporary disturbances to the natural appearance during the first year of the planting operations. There would be short- and long-term impacts to the natural integrity from the hand planting of trees although the patterns would be expected to emulate the natural processes. These subtle changes would not be expected to result in development or loss of natural appearance to such a degree that the potential for wilderness designation would be affected. It is not anticipated that the planting would result in developing any portion of the Peace Rock IRA.

Opportunities for Solitude or Primitive Recreation - There would be noise generated by the planting operations. Planting activities would occur for approximately 2 weeks during mid to late spring. This could affect users in the immediate vicinity of these operations. Noise from these activities is expected to be confined to the immediate Granite Creek area which is a very small portion of the entire Peace Rock IRA. Noise from the proposed planting would be expected to impact solitude for a temporary period as a one time event.

In addition, there would be noise generated with decommissioning of unauthorized roads in the Peace Rock IRA. This would affect users in the immediate vicinity of these activities (Granite Basin area). The impact to solitude would be expected to be limited to the implementation period of the road decommissioning activities (about 1 to 2 weeks).

Special Features - The planting project would have no impact on the special features of the Peace Rock IRA**.**

Manageability and Boundaries - The project would not alter any boundaries of the Peace Rock IRA. The project would not result in the development of an area that would require a boundary adjustment.

3.10.3.3 Environmental Consequences Specific to Alternative C

Under Alternative C, no reforestation would occur in the Peace Rock IRA. Of the unauthorized roads that would be decommissioned, about 3.2 miles lie within the Peace Rock IRA, including road segments X555BCX1, X668BX2, X668BX3, X668BX7, and X668BX5.

Natural Integrity and Appearance – Because no reforestation would occur within the Peace Rock IRA, Alternative C would have no effect on the appearance and natural integrity of the Peace Rock IRA.

Opportunities for Solitude or Primitive Recreation - Noise would be generated by the harvest and planting operations on the adjacent MPC 5.2 area. Salvage harvest would require 2 to 3 weeks of logging during the summer. Planting activities would occur for approximately 2 weeks during mid to late spring. Although these operations would occur outside the IRA they could affect users in the immediate

vicinity. Noise from these activities is expected to be confined closely to the short IRA/MPC 5.2 border of the Lightning Salvage Sale. This border area is an extremely small portion of the entire Peace Rock IRA. Noise from the proposed salvage and planting would be expected to impact solitude for a temporary period as a one time-each event very close to the IRA boundary.

In addition, there would be noise generated with decommissioning of unauthorized roads within the Peace Rock IRA. This would affect users in the immediate vicinity of these activities (Granite Basin area). The impact to solitude would be expected to be limited to the implementation period of the road decommissioning activities (about 1 to 2 weeks).

Special Features – Alternative C activities would have no impact on the special features of the Peace Rock IRA**.**

Manageability and Boundaries – Alternative C activities would not alter any boundaries of the Peace Rock IRA. The project would not result in the development of an area that would require a boundary adjustment.

3.10.3.4 Cumulative Effects

While the project will result in subtle changes to the natural integrity, natural appearance, and solitude or primitive recreation opportunities, the intensity and magnitude of such impacts will not result in the development of any portion of the IRA. The Peace Rock IRA will retain its wilderness characteristics within the current undeveloped portion of the IRA. It is not anticipated that this activity would affect any future consideration for wilderness designation of any portion of the Peace Rock IRA.

3.11 CULTURAL RESOURCES

3.11.1 Affected Environment

Cultural resources are the material evidence of human occupations and activities. They can include but are not limited to objects (i.e., artifacts), buildings, features, places, and landscapes. They document the cultural legacy of human land use by diverse peoples, and as such are important to our understanding and appreciation of the past.

The National Historic Preservation Act (NHPA) is the principle guiding statute for the management of cultural resources. Section 106 of NHPA requires federal agencies to consider the effects of their activities and programs on historic properties, and provide the Advisory Council on Historic Preservation the opportunity to comment on Agency undertakings. At the state level, the State Historic Preservation Officer (SHPO) reviews federal undertakings on behalf of the Advisory Council. Historic properties are significant cultural resources that are included in or eligible for inclusion in the National Register of Historic Places. The criteria for National Register eligibility and procedures for implementing Section 106 of NHPA are outlined in the U.S. Code of Federal Regulations (36 CFR Parts 60 and 800, respectively).

NHPA, as amended in 1992, also requires federal agencies to consult with appropriate Indian tribes regarding the management of traditional religious and cultural properties eligible for the National Register of Historic Places.

Humans have occupied the Middle Fork Payette River drainage for thousands of years. Prior to Euro-American settlement, ancestors of the Shoshone and Paiute Indians camped along the Middle Fork during hunting, fishing, and plant-gathering excursions. Archeologists have recovered stone tools from the area dating to 5,000 years ago. Historic and ethnographic records indicate that native peoples pursued traditional life-ways in the area as late as the 1870s.

In the 1870s, settlers established farms in Garden Valley to supply nearby mining camps with fresh meat and produce. Ranchers, especially those who raised sheep, began using the Middle Fork country as rangeland. After President Theodore Roosevelt created the Sawtooth Reserve in 1905, grazing became the highest priority of Forest Service rangers stationed in the area. In 1908, Roosevelt partitioned the

reserve into smaller national forests. The Payette NF administered the Middle Fork lands until 1944, when they were transferred to the Boise National Forest.

The Civilian Conservation Corps (CCC) played an important role in developing the Middle Fork's recreational amenities during the 1930s. CCC crews stationed in camps located on Tie Creek and in Peace Valley reconstructed the Middle Fork road, originally built in 1902, and established all of the present-day campgrounds along the river. They built several Forest Service administrative sites in the area, including Scott Mountain Lookout.

3.11.2 Environmental Consequences

Previous cultural resources surveys and the historical record document the cultural sensitivity of the Middle Fork Payette River system. Four sites have been identified in the area of potential effect (APE) for the Middle Fork Fire Salvage Project. Two of these sites are historic properties eligible or potentially eligible for listing on the National Register of Historic Places. Both sites are located on or adjacent to the project boundaries.

3.11.2.1 Environmental Consequences Specific to Alternative A

Under the no action alternative there would be no effect to historic properties because the project would not occur.

3.11.2.2 Environmental Consequences Common to All Action Alternatives

Under both action alternatives, two historic properties would require avoidance and protection during project implementation (design feature CR-1). These properties are not located in timber salvage or reforestation units, or on roads proposed for closure or decommissioning. In addition, design feature CR-2 notes that contract provisions will be implemented to prevent adverse impacts to any unknown cultural sites discovered during project implementation. Consequently, no impacts to cultural resources would be anticipated under either action alternative.

3.11.2.3 Cumulative Effects

Under Alternatives B and C, historic properties in the APE will be protected during implementation of management activities associated with the Middle Fork Salvage. Therefore, no cumulative effects to historic properties are anticipated from this project.

The Forest has submitted to the Idaho SHPO a report that documents the potential for effects to historic properties from the proposed management activities, and received concurrence of the No Adverse Effect determination No Adverse Effect determination from the Idaho SHPO for the Middle Fork Salvage Project on May 21, 2008 (Project Record).

3.12 AIR QUALITY

3.12.1 Affected Environment

The affected environment for the air quality resource is discussed in terms of air quality regulatory framework; ambient air quality standards; state regulations; air quality management; and project ambient air quality.

3.12.1.1 Air Quality Regulatory Framework

The 1970 Clean Air Act (CAA), as amended in 1990 and 1999 (State of Idaho, 1998), provides the framework for controlling air pollutants in the United States. The CAA was designed to "protect and enhance" air quality. There are several parts of the CAA, as amended, that apply to prescribed (management-ignited) fire.

Primarily, projects should adhere to National Ambient Air Quality Standards (NAAQS). Other sections of the CAA including General Conformity, Prevention of Significant Deterioration, and visibility (regional haze) may also apply to project level analysis. Because there are no mandatory Class I airsheds or nonattainment areas within the Middle Fork Salvage Project area no General Conformity elements apply to the project.

The Environmental Protection Agency (EPA) regards prescribed fire as a temporary, short-lived area source (State of Idaho, 1998) that must meet federal and state air quality standards set forth in the Clean Air Act (section 160) and the NAAQS. Coordination and compliance with the Montana/Idaho Airshed Group is also required. The Airshed Group assigns numbers (STAG numbers) to each prescribed fire so smoke impacts and acres of burning accomplished can be tracked. Participation in the multi-agency smoke monitoring unit is the primary means by which potential affects from this project on air quality will be minimized.

3.12.1.2 Ambient Air Quality Standards

Temporary, indirect impacts to visibility and air quality often result from prescribed burning. There are NAAQS standards for the following six air pollutants: carbon monoxide, ozone, nitrogen dioxide, sulfur dioxide, lead, and particulate matter. Several pollutants listed in the standards can be identified in smoke from burning vegetation. Typically, particulate matter (PM) is the primary concern from a human health and visibility standpoint.

The symbol PM_{10} describes aerodynamic particulate matter less than 10 micrometers (equivalent to 1/25,000th of an inch) in diameter. In July 1997, the EPA added both daily and annual standards to the NAAQS particulate standards for the even smaller $PM_{2.5}$ (US EPA. 1997) because $PM_{2.5}$ can lodge deeply in the lungs and is more likely to adversely affect health effects than is $PM_{10.}$

Compliance with NAAQS standards is achieved if project activities do not generate more than, on average, of 150 micrograms/cubic meter (M^3) of PM_{10} and 35 micrograms/M^3 of $PM_{2.5}$ during a 24-hour period, either alone or in combinations with existing pollution sources. The Idaho Department of Environmental Quality (DEQ) declares “Emergency Conditions” if $PM_{2.5}$ is sustained at 80 micrograms/M^3 for an extended period of time. Under Emergency Conditions, burning within the airshed would cease.

3.12.1.3 State Regulations

Applicable state regulations are found in the Idaho Administrative Code, DEQ (IDAPA 58.01.01 – Rule for the Control of Air Pollution in Idaho), Section 614 (Prescribed Burning) and Section 550 (*Air Pollution Emergency Rule*); see section 1.11 Air Quality.

3.12.1.4 Air Quality Management

National, Idaho, and Montana/Idaho Airshed Group air quality designations of attainment, nonattainment, and unclassified indicate compliance and noncompliance with NAAQS criteria for air quality.

The Montana/Idaho Airshed Group has defined “airsheds” within the state of Idaho and Montana to track smoke inputs across these states from cooperators’ burning activities. At this time, 25 “airsheds” have been delineated within the state of Idaho. Airsheds are geographical areas classified by similar atmospheric characteristics (Montana/Idaho Operating Guide, August 2006). Several population centers are described as “special protection zones”, or impact zones, that the Airshed Group has found to be smoke sensitive areas.

Smoke sensitive areas, including non-attainment or maintenance areas, population centers or other sensitive areas, and mandatory Class I airsheds, within100 kilometers (approximately 62 miles) of the project areas are listed in Table 3.13.

Prevailing wind direction, topography, amount of particulates generated, duration of the burning, and proximity to the burning must be considered when predicting the effects to air quality..

Table 3.13. Identified Sensitive Air Quality Areas

Identified Sensitive Areas	Name	Approx. Distance from Project Area (Air miles)	Approx. Direction from Project Area (Air miles)	MT/ID Airshed No.
Former PM_{10} Non-attainment Area	North Ada County, ID	55	South	22
Population Center(s):	Boise "Impact Zone"	55	South	22
	Garden Valley	10	Southeast	21A
	Crouch	8	South	21A
Other Sensitive Area(s):	Silver Creek Plunge	15	East	21A
	Round Valley	5	Northwest	21A
	Smith Ferry	15	Northwest	21A
	Deadwood Reservoir	15	Northeast	21A
Mandatory Class I	Sawtooth Wilderness	35	Southeast	Portions of 21A, 17, 21
Class II	Frank Church RONR Wilderness	30	Northeast	16

3.12.1.5 Project Ambient Air Quality

The Middle Fork Salvage Project areas are located within Boise and Valley Counties. Ambient air quality for this area is likely to be good because there are no primary urban and industrial sources of man-made pollutants, and because there are few other activities that would generate pollutants. Relatively minor amounts of pollutants could come from road dust, motor vehicles, other prescribed fire, wildfire, or other rural or agricultural activities. At a larger scale, the project areas lay entirely within the lower southwest corner of Montana/Idaho (MT/ID) airshed 21A. Specific data for ambient particulate concentration of the MT/ID airshed 21A are unavailable, but current air quality and potential pollutants may be qualitatively estimated by comparison to surrounding airsheds.

Idaho started monitoring $PM_{2.5}$ in 1998 near urban and industrial sources of pollutants such as Boise, Caldwell, and Nampa. Three more monitors in MT/ID airshed 21A became operational in the spring of 2001. Two $PM_{2.5}$ monitors have been located near Idaho City and McCall, and the Forest Service and DEQ installed a PM_{10} monitor near Garden Valley.

3.12.2 Environmental Consequences

The analysis area used in this assessment consists of the MT/ID 21A airshed, (Montana/Idaho Operating Guide, August 2006).

3.12.2.1 Environmental Consequences Specific to Alternative A

This alternative would not result in any direct effects to air quality because it does not entail any prescribed burning. Impacts from dust, vehicle emissions, and other existing sources would not change from current conditions.

3.12.2.2 Environmental Consequences Common to All Action Alternatives

Smoke from prescribed burning activity fuels would temporally reduce air quality. Prescribed burning activities are the same for both alternatives. Burning landing piles would likely occur in the fall months

and would be scheduled to occur when fuel moistures and atmospheric conditions are conducive to meeting resource objectives.

The Middle Fork Salvage Project areas lay within MT/ID airshed 21A, which covers the east side of the Emmett Ranger District of the Boise National Forest. Both alternatives would have direct short-term impacts (1-3 days) on air quality, but airborne particulates would not exceed State and Federal air quality thresholds.

To estimate the effects of smoke from prescribed burning on air quality the Smoke Impact Spreadsheet (USDA, Forest Service, 2003e (spreadsheet available at SIS-http://www.airsci.com/SIS.html)) was used to estimate smoke production, dispersion, and potential impacts to receptors within 62 miles (100km) based on common weather and fuel moisture conditions used when burn activities would occur. The model can predict 1-hour average and 24-hour average $PM_{2.5}$ concentrations at increments of distance either straight down wind or at a user defined offset. Site specific wind direction, wind speed, mixing height, and ventilation index inputs for SIS were obtained from knowledge of the area, and historical RAWS data.

Using SIS both the Lucky and Lightning project areas were modeled for a day of landing slash pile burning without wind offset to estimate a worst case scenario. Because of the limited amount of prescribed burning that would occur the SIS model indicated that project generated particulates combined with average ambient pollutants would remain below regulatory thresholds in sensitive areas.

Figure 3.10 and Figure 3.11 illustrate the 1-hour and 24-hour average $PM_{2.5}$ smoke concentrations at distance intervals downwind.

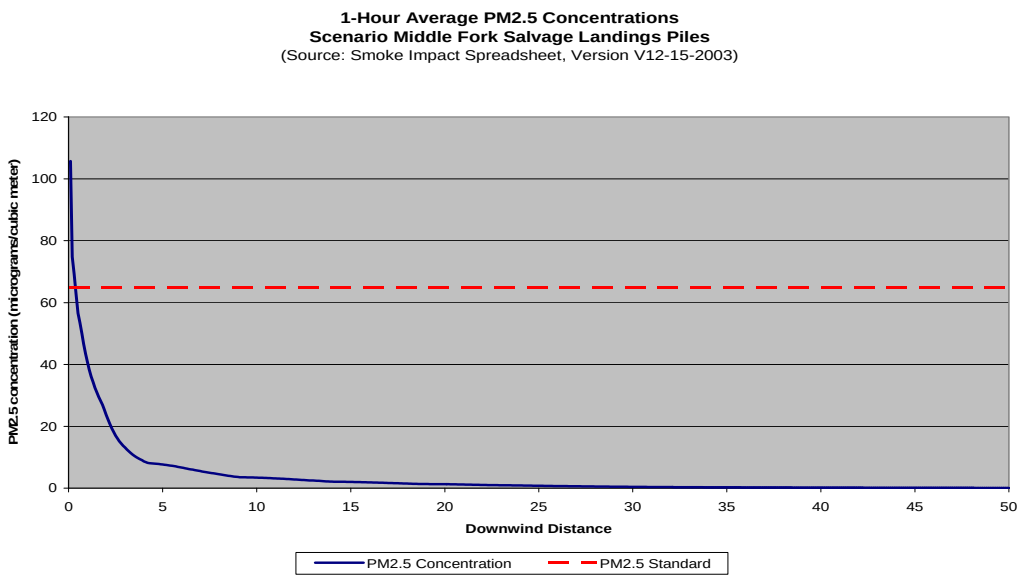


Figure 3.10 – Burn Pile 1-Hour Average PM2.5 Concentrations Downwind at Distance Intervals

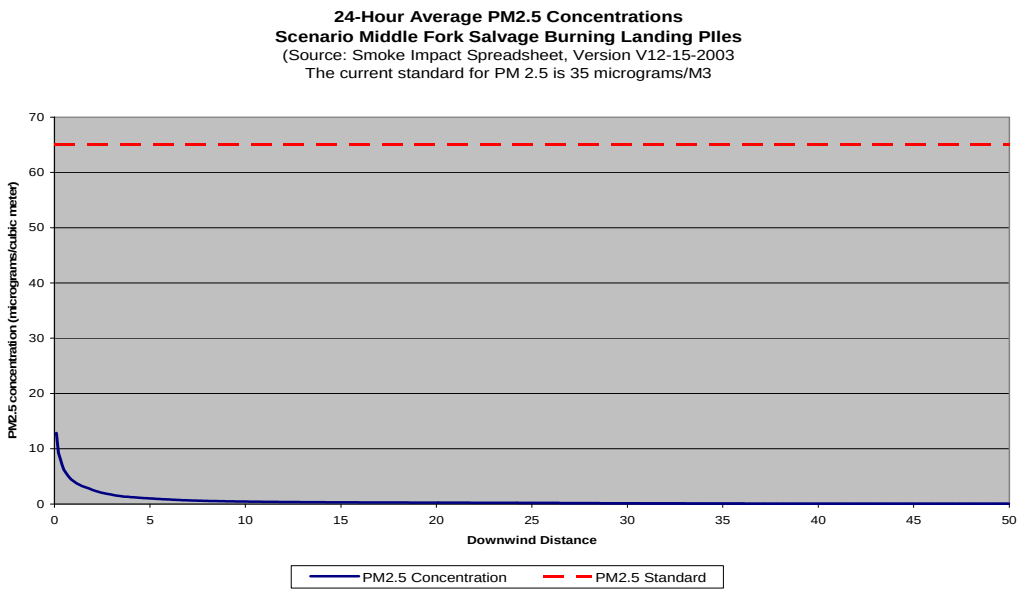


Figure 3.11 - Burn Pile 24-Hour Average PM2.5 Concentrations Downwind at Distance Intervals

Model outputs indicate that between 0 and 0.5 mile from the source $PM_{2.5}$ generated by burning landing piles, at a 24-hour average, would be below the National Ambient Air Quality Standards. Adjacent Montana/Idaho airsheds are not expected to be directly affected by emissions from this project due to long transport distances. Local residents adjacent to the project area and visitors may notice residual smoke while burning activities are conducted, but the activities will not exceed the NAAQS for $PM_{2.5}$ emissions.

3.12.3 Cumulative Effects

The analysis area used in this assessment consists of the Montana/Idaho airshed 21A, (Montana/Idaho Operating Guide, August 2006).

3.12.3.1 Cumulative Effects Specific to Alternative A

There would be no cumulative smoke effect from prescribed fire added to the airshed (21A), as no prescribed burning would occur.

3.12.3.2 Cumulative Effects Common to All Action Alternatives

Current, proposed, and reasonably foreseeable activities were considered to estimate cumulative effects to air quality. Because effects on air quality from forest management practices are short-lived, past activities do not contribute to cumulative effects. Currently, Idaho has a voluntary smoke management program for open burning. The Montana/Idaho Airshed Group is listed as part of the Idaho Smoke Implementation Plan and composed of members, including the US Forest Service, who do major amounts of prescribed burning to minimize wildfire fire impacts on forests and rangelands. The Boise National Forest, other state and Federal land management agencies, and the DEQ are members of the Montana/Idaho Airshed Group. The intent of the Airshed Group is to “minimize or prevent smoke impacts to communities while using fire to accomplish land management objectives or fuel hazard reduction” (Montana/Idaho Operating Guide, August 2006). Burning associated with other foreseeable actions by the district (Appendix B), adjacent districts, and all Airshed Group Members will be coordinated through the monitoring unit. Smoke from other prescribed fires could combine with the Middle Fork Salvage Project smoke and result in reduced visibility, but this visibility reduction would not be as noticeable as the smoke coming directly from the project burning. The Middle Fork Salvage Project is tentatively scheduled

to begin in the summer of 2008. Burning of landing piles would occur over the next 2-3 years once the salvage timber harvest was completed.

3.13 WILDLIFE

This section describes the potential effects of the Middle Fork Payette Salvage project on Federally listed (Canada lynx and northern Idaho ground squirrel) and candidate (southern Idaho ground squirrel and yellow-billed cuckoo) wildlife species as listed by the U.S. Fish and Wildlife Service in the Boise National Forest, 90-day Species List Update, Emmett Ranger District (2008-SL-0268). Additionally, the effects to 16 Region 4 (USDA, Forest Service, 2003f) sensitive wildlife species are described. The Regional Forester maintains a list of sensitive wildlife species that warrant concern for population viability. Also described are the effects of the project to management indicator species (MIS) and other wildlife species of concern. The following represents the most relevant data from the detailed analyses contained in the Biological Assessment (BA) and Wildlife Specialist Report/Biological Evaluation (WSR/BE) for this project.

The primary effects to wildlife species from this project would result from the modification to snag densities, road densities, and disturbance from implementation. No wildlife effects associated with proposed reforestation activities (including application of strychnine) were identified, although it is assumed that more rapid transition from grass/forb to seedling/sapling cover types (see forest vegetation discussion) would ultimately benefit some of the wildlife species tied to forested conditions. A full description of the proposed action is described in Chapter 2. An underlying assumption in this analysis is that if the direct and indirect effects of an action to specific individuals do not reduce their ability to survive and reproduce, then that action would not impact species viability at the Forest or Ecogroup scale.

3.13.1 Analysis Methods

Habitat for sensitive and MIS was modeled as needed based on habitat parameters identified in the Interim Direction for Habitat Modeling Parameters for District Biologist (Nutt 2006). Information pertaining to wildlife species includes data collected from visits to the project area and elemental occurrences in the Idaho Department of Fish and Game Conservation Data Center database (IDFG CDC). The project area was visited multiple times during the 2007 fire suppression efforts (Schoeberl functioned as Resource Advisor). Tree mortalities resulting from the 2007 fires were taken from Rapid Assessment of Vegetation Condition (RAVG) modeling (RSAC,\ 2007) using four basal area mortality categories. These mortalities were then used to identify activity units that exhibited moderate or high mortalities (see Forest Vegetation section). Snag conditions and PVGs in the project area were characterized via multiple methods:

Within Salvage Units (moderate and high mortality) - timber cruise surveys were conducted during fall 2007 at random locations throughout the units. The units were comprised of areas that experienced moderate and high tree mortalities and there was one set of estimates generated to characterize various parameters across all units.

Outside Salvage Units, Within Project Area (moderate and high mortality) – parameters calculated from the timber cruise surveys in the salvage units were assigned to these areas.

Outside Salvage Units, Within Project Area (no and low mortality) – parameters taken from prefire timber stand exam (TSE) data collected between 1994 and 1998.

Outside Project Area – parameters taken from pre-fire TSE data collected between 1994 and 1998.

Timber Stand Exam data was processed with the Forest Vegetation Simulator (FVS) stand growth model (USDA, Forest Management Service Center, Fort Collins, CO) in which snags per acre (SPA) in various size classes were modeled to 2009 for the Lucky Fire area and 2008 for the Lightning Fire area. Collection of dead tree presence during TSE surveys during the 1990s focused on recent dead (up to 5 years post-mortality) so snag densities with these surveys are likely underestimated. The forest vegetation section provides a description of the Potential Vegetation Groups (PVGs), cover classes, tree species composition and size, and canopy closure prior to and after the wildfire.

Actions associated with this project include harvest of fire-killed trees, reforestation, and modifications to roads so analyses focused on how these alterations will affect species and their source habitat (i.e., macrovegetation that contribute to stationary or positive population growth). Since the primary effects to source habitats will result from the modification of snags, effects to wildlife will focus on species most affected by changes in snag densities. Conversely, species whose source habitat is characterized primarily by canopy closure or other parameters of live trees, or is dependent on dense stands of live trees, will not be affected by the vegetation alterations associated with this project. Additionally, use of TSE and Geographic Information System data results in greater apparent accuracy than actual conditions in the field so acre descriptions should be considered approximate.

Analysis areas comprise the greatest extent over which the combined direction, indirect, and cumulative impacts are assessed for each species. Since life history characteristics differ by species, the analysis area also varies by species.

3.13.2 Overall Effects on the Environment

Most of the effects to wildlife species will occur from the modification to snags and roads. Figure 3.12 illustrates the projected difference between the three alternatives when only the fire-created Douglas-fir and ponderosa pine snags (87 percent of total) are considered for snag retention. The prescription portrayed for the action alternatives represents retention of an average of 4.1 fire-created snags/acre, which includes an average of two snags/acre in the 10 to 20-inch d.b.h. class and all of the ponderosa pine > 20 inches d.b.h. (density across all activity units = 2.1/acre). Table 3.14 displays the miles of roads by various parameters within the project area, both for the existing condition and for the post-implementation conditions. Although existing road parameters are described for both areas, only the Lightning Fire area would experience changes to roads (decommissioning, closure status, and conversion to trail) during implementation of either action alternative. The project area varies in elevation from 3,770 to 8,200 feet (Lucky 3,770-5,500; Lightning 3,640-8,200) and the activity units are comprised mostly of the warm Douglas fir/moist ponderosa pine vegetation group (PVG 2) in the Lucky Fire, while the Lightning Fire area comprises PVG 2 and the cool, dry Douglas fir vegetation group (PVG 4; Figure 3.13).

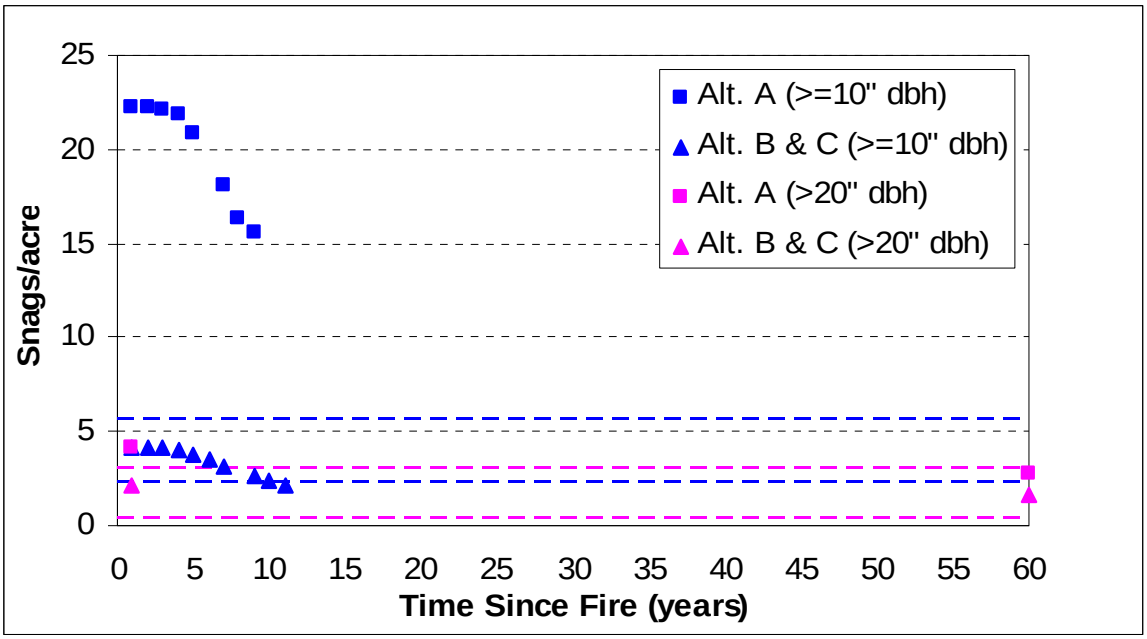


Figure 3.12 - Projected fire-created snag densities within salvage units (only Douglas-fir and ponderosa pine ≥ 10 inches d.b.h.) by alternative using values extrapolated from Russell et al. (2006; Figure 1) for snags ≥ 10"d.b.h. and Everett et al. (1999) for snags > 20 inches d.b.h. Dashed lines represent minimum and maximum desired conditions for PVG 2 (Forest Service 2003a, Appendix A) for snags ≥ 10 inches d.b.h. (blue) and > 20 inches d.b.h. (pink); Alt B and C Prescription = retention of two snags in the 10-20 to inch d.b.h. category and all ponderosa pine > 20 inches d.b.h. (data modeled by assuming retention of two Douglas-fir (10-20" d.b.h.) and 2.1 ponderosa pine (>20 inch d.b.h.)/acre).

Table 3.14. Comparison of Road Parameters by Alternative in the Two Fire Areas

Lightning Fire (13,853 acres / 21.6 mi^2)	Units	Alt A	Alt B & C
Roads (Authorized)	miles	23.0	12.4
Road (Unauthorized)	miles	7.2	0.0
Road Density	mi/mi^2	1.4	0.6
RCA Roads	miles	4.7	2.0
RCA Rd Density (3.7 mi^2)	mi/mi^2	1.3	0.5
Roads Decommissioned	miles	N/A	9.4
Roads with Yearlong Closure	miles	0	7.2
Roads Converted to Trail	miles	N/A	1.2
Wildlife Habitat Improved (elk security)*	acres	N/A	3,127
Wildlife Habitat Improved (snag-dependent species)*	acres	N/A	1,031
Lucky Fire (1,582 acres / 2.5 mi^2)			
Roads (Classified)	miles	8.1	N/A
Road Density	mi/mi^2	3.2	N/A
RCA Roads	miles	2.2	N/A
RCA Road Density (0.6 mi^2)	mi/mi^2	3.7	N/A

* see WSR/BE for derivation method.

3.13.3 Environmental Consequences

3.13.3.1 Environmental Consequences Specific to Alternative A – All Wildlife Species

The No Action alternative would maintain the current level of disturbance in the project area and facilitate the continued amount of access by motorized vehicles, and maintain the density of snags resulting from the 2007 fires. Although no additional disturbance would be introduced with this alternative (temporary and short-term), short- and long-term disturbance in the Lightning Fire area would also not decrease.

Snag densities would remain at the existing level with the No Action alternative. Since the activity units were located in areas experiencing moderate to high tree mortality, fire-created snags in these areas are abundant (10-20 inches d.b.h. = 21.1/ac.; >20 inches d.b.h. = 4.4/ac.). Some wildlife species are positively affected by a high density of snags (e.g., black-backed woodpecker), whereas some are found in higher densities in areas exhibiting snags in low or moderate densities (e.g., Lewis' woodpecker). Besides the effects to wildlife species from snag removal, the retention of the existing roads in the Lightning Fire area (only area where open road densities would decrease with the action alternatives) would allow woodcutters to continue to remove dead trees proximate to those roads that could provide shelter and foraging sites for snag-dependent wildlife species. These roads also provide access to areas for hunters to harvest big game species (e.g., deer and elk). Disturbance from the existing roads would also continue to affect wildlife species that are sensitive to human activities. Since no new activities would be implemented under Alternative A, no effects would be anticipated. Alternative A would be used as a reference condition in which to compare the action alternatives.

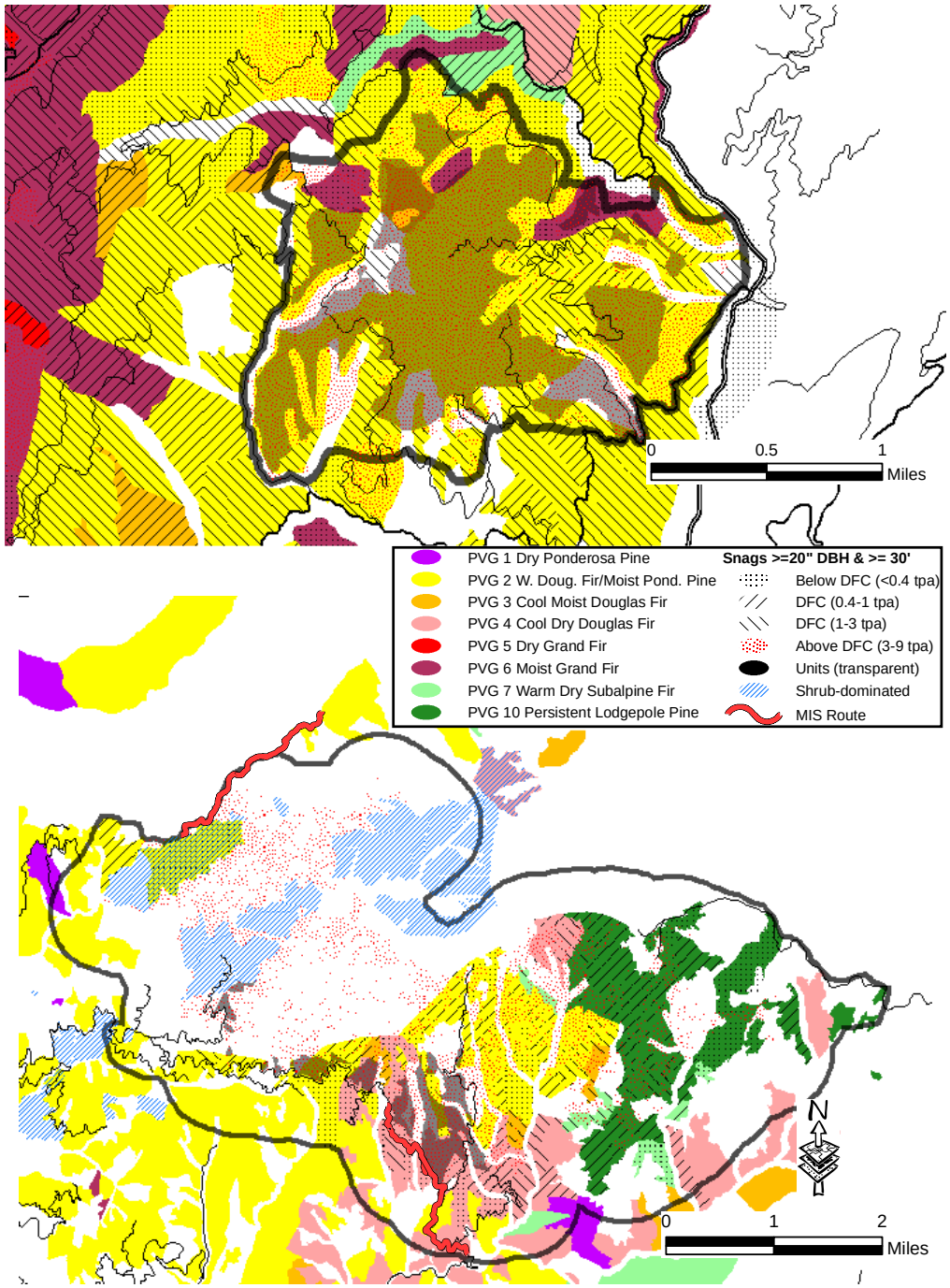


Figure 3.13 - Key Habitat Characteristics of the Project Area

3.13.3.2 Federally Listed Threatened, Endangered, and Candidate Species

There were two Federally Listed species and two Candidate species evaluated for effects from the MF Salvage Project (gray wolf removed from protection on March 28, 2008). Detailed analyses for each of these species were conducted according to ESA specifications and are described in the biological assessment (BA) for this project. As disclosed in the wildlife specialist report included in the project record, the project area does not provide (or have the potential to provide) source habitat for the northern Idaho ground squirrel, yellow-billed cuckoo, and southern Idaho ground squirrel. Because the Middle Fork Salvage project would, therefore, not have any direct, indirect or cumulative effects on these species

or their habitat, they will not be discussed further in the EA. Habitat for the Canada lynx does occur within the project area and a detailed discussion is provided below.

Table 3.15. Effects of the MF Salvage Project on T&E and Candidate Species

Species Category	Species	Effect's Conclusions [1]		Rationale for Determination
		Alt. A	Alt. B/C	
Threatened	Canada Lynx	NE	NE	The lack of direct and indirect effects to lynx in either fire area means that there will be no incremental effects to contribute to cumulative effects to this species.
Threatened	Northern Idaho Ground Squirrel	NE	NE	No habitat within or adjacent to project area.
Candidate	Yellow-Billed Cuckoo	NI	NI	No habitat within or adjacent to project area.
Candidate	Southern Idaho Ground Squirrel	NI	NI	No habitat within or adjacent to project area.
[1]NE = No Effect NI = No Impact				

Canada lynx *(Lynx Canadensis; Threatened)*

Life History
Lynx were listed as Threatened by the USDI FWS in 2000. Habitat requirements for lynx include both early successional forests for foraging as well as late successional forests for denning (Koehler and Brittell 1990, pp. 10-11). In the western US, primary habitat for lynx consists of lodgepole pine, subalpine fir, Engelmann spruce, and moist Douglas fir with most occurrences recorded between 4900 and 6600 feet (Ruediger et al. 2000, p. 6). Dry forest types (e.g., ponderosa pine) do not function as suitable habitat for lynx (Ruediger et al. 2000, p. 37). Timber management is listed as a factor that affects lynx productivity because forest structure and composition affects lynx, as well as their prey (e.g., snowshoe hares and red squirrels; Ruediger et al. 2000, pp. 5 and 18). Home range sizes for lynx are highly variable but are usually larger in the southern extent of its range (average of 16.1 and 47 mi^2 for females and males, respectively, in northern Montana; Johnson 1997, pp. 7-6 to 7-13). The major threat to lynx populations is degradation of habitat (composition and juxtaposition of mixed-aged stands), while incidental take may occur from trapping but is not yet considered a threat for concern (USDI FWS 2002b).

Affected Environment
The two fire areas reside within the East Mountain Lynx Analysis Unit (LAU) (Lucky Fire) and Deadscott LAU (Lightning Fire). Road densities and suitable habitat within these LAUs are within the standards and guidelines recommended for conservation of this species (Reudiger et al. 2000).

Foraging habitat for lynx (Forest Service 2003; modeled using TM Landsat imagery) in the East Mountain exists in the central and northern portion of this LAU, whereas the Lucky Fire area resides in the southern portion of the LAU. The Lucky Fire area is 2.5 miles from the nearest potential habitat and proximate to the edge of this LAU. Field visits to the Lucky Fire area confirmed that the habitat coincides with the dry habitat described by the stand exam data for this area. The highest elevation in the Lucky Fire area is 5,500 feet and the nearest documented evidence of lynx is from a hair sample collected in 1999 over 21 miles away (IDFG 2008). Walk-through and snowmachine surveys were conducted proximate to the Lucky Fire area during the winters of 1999-2000 (two surveys; Baldwin 2000) and 2000-2001 (one

survey; Johnson 2001), which revealed very little snowshoe hare sign and no lynx tracks or sign. Hare populations appeared to be low and have scattered and disjunct local populations.

Foraging habitat for lynx (modeled using TM Landsat imagery) in the Deadscott LAU overlaps with the eastern portion of the Lightning Fire area but is over 200 yards from the nearest salvage unit. Field visits to the Lightning Fire area confirmed that the habitat within the salvage units correlate with the dry habitat described by the stand exam data for this area. Modifications to roads within the Lightning Fire area will occur where unclassified roads overlap suitable lynx habitat along roughly 0.5 mile. These overlap areas occur along the edge of the lynx habitat within this LAU. The highest elevation in the Lucky Fire area is 8,200 feet and the nearest documented evidence of lynx was an observation of tracks in 1998 over 13 miles away (IDFG 2008)

The analysis area for lynx relative to the MF Salvage Project includes the two fire areas for direct and indirect effects, while the East Mountain and Deadscott LAUs comprise the possible extent for the cumulative effects analyses.

Environmental Consequences and Cumulative Effects Common to All Action Alternatives
There is an absence of potential lynx habitat in and around the Lucky Fire area so activities proposed in this area will not have any direct or indirect effects to lynx.

Salvage activities in the Lightning Fire area will occur in dry habitat types and not affect any potential lynx habitat. Possible use of strychnine for gopher control during reforestation could occur along the extreme edge of modeled lynx habitat in MPC 4.1. However, effects from gopher control can be disregarded because ingestion of a poisoned gopher (considering primary prey is snowshoe hare) is unlikely and the amount needed to inflict a lethal dose (LD_{50}) would mean a 19-pound lynx would have to eat 59 pounds of carcasses (see BA Addendum for Sixshooter Project; Schoeberl 2005). Consequently, the only activity that will occur in potential lynx habitat is the decommissioning of unclassified roads in roughly 0.5 mile of potential lynx habitat. Although this activity has the potential to incur beneficial effects to lynx, the amount of habitat affected is so small that current suitability and potential use of the area by lynx would not be altered. Furthermore, actual use on these unclassified roads is minimal and there are no documented sightings of lynx in this LAU. The absence of changes in the usability of the habitat for lynx and lack of evidence that this species inhabits the area means that there will be no direct or indirect effects to lynx from the proposed actions in the Lightning Fire area.

The lack of direct and indirect effects to lynx in either fire area means there will be no incremental effects to contribute to cumulative effects to this species.

Northern Idaho Ground Squirrel *(Spermophilus brunneus brunneus; Threatened)*

Northern Idaho ground squirrels occupy dry meadows surrounded by ponderosa pine and Douglas fir between 3,400 and 7,500 (Evans Mack 2007) feet and loss of this habitat and shooting is suspected for their decline (USDI FWS 2002, Evans Mack 2007). The suspected historic distribution of northern Idaho ground squirrels is confined to a small area of west-central Idaho (Yensen 2002), with documented individuals occurring only in Adams and Valley counties (Evans Mack 2007). The nearest edge of the suspected historic range for this ground squirrel is 3 miles from the MF Salvage Project area (Lucky Fire area) (Yensen 2002) and the nearest extant population is 5 miles away (IDFG 2008; Evans Mack 2007). There is no potential habitat (natural meadows adjacent to ponderosa pine/Douglas-fir stands) in or near the Lucky Fire area or in or near the salvage units in the Lightning Fire area. However, the area was surveyed for the Scott Mountain Whitebark Pine Restoration Project (Holbrook and Collette 2007) and no northern Idaho ground squirrels were detected. Based upon this analysis, it was determined that implementation of the proposed action will not affect northern Idaho ground squirrels because the project area is not proximate to the suspected historic distribution of this species or any known extant population. The lack of potential habitat in the project area means that there will be no direct, indirect, or cumulative effects incurred by northern Idaho ground squirrels through the implementation of either action alternative.

Yellow-billed Cuckoo *(Coccyzus americanus; Candidate)*

These birds are rare visitors and breeders in Idaho and are associated with large blocks of riparian habitat dominated by an overstory of tall deciduous trees like cottonwoods or within willows adjacent to tall deciduous trees (Montana Partners in Flight 2000). The nearest suspected nesting area for this species was observed in 1985 roughly 70 miles south of the project area (IDFG 2008) and the nearest recorded sighting of a likely migrant was over 5 miles south of the Lightning Fire area (1983; Reynolds and Hinckley 2005). Since the MF Salvage Project area does not contain any suitable habitat for cuckoos or the likelihood to develop suitable habitat, implementation of either action alternative will not directly or indirectly affect this species. Consequently, there will be no cumulative effects to yellow-billed cuckoos from these activities.

Southern Idaho Ground Squirrel *(Spermophilus brunneus endemicus; Candidate)*

The MF Salvage Project area is over 20 miles from the nearest recorded sighting of these squirrels (IDFG 2008). Southern Idaho ground squirrels are associated with areas dominated by sagebrush and bitterbrush which are not found within the project area. Since no habitat presently exists or has the potential to exist in the project area for this ground squirrel species, there will be no direct, indirect, or cumulative effects from the implementation of either action alternative.

3.13.3.3 Sensitive Species

Table 3.16 summarizes the effects and rationale for the determinations. As described in the wildlife specialist report included in the project record, seven species (bald eagle, peregrine falcon, boreal owl, great gray owl, greater sage-grouse, spotted bat and western big-eared bat) are not associated with habitat within or immediately adjacent to the project area. Because the Middle Fork Salvage project would, therefore, not affect any of these species or their habitat, they will not be discussed further in this EA.

Table 3.16. Effects of the MF Salvage Project on Region 4 Sensitive Species

Species	Determination [1]		Rationale for Alt B/C Determination
	Alt. A	Alt. B/C	
Gray Wolf	NI	MI	Minor displacement anticipated due to disturbance, reduction in roads results in benefits.
Bald Eagle	NI	NI	No habitat within or adjacent to project area.
Peregrine Falcon	NI	NI	No habitat within or adjacent to project area.
Northern Goshawk	NI	NI	Key nesting and post fledgling areas do not occur in areas where harvest of snags will occur.
Boreal Owl	NI	NI	Insufficient source habitat in project area.
Flammulated Owl	NI	MI	Live trees will not be harvested
Great gray Owl	NI	NI	No habitat within or adjacent to the project area.
Mountain Quail	NI	BE	Riparian protection and restoration of road beds benefit mountain quail.
Greater Sage-grouse	NI	NI	No habitat within or adjacent to the project area.
Three-toed Woodpecker	NI	NI	No suitable habitat in areas where salvage harvest will occur.
White-headed Woodpecker	NI	MI	Although sufficient snags are retained initially, loss of snags over time would result in snags densities dropping below desired levels sooner than Alt. A.
Spotted Bat	NI	NI	Key roosting habitat not present in project area.

Species	Determination [1]		Rationale for Alt B/C Determination
	Alt. A	Alt. B/C	
Western Big-eared Bat	NI	NI	Key roosting habitat not present in project area.
Wolverine	NI	MI	Disturbance during harvest displace individuals, reduced road densities result in beneficial effect
Fisher	NI	BE	Salvage harvest will occur in areas that experienced ≥ 50 percent mortality and will not affect fisher source habitat, live trees will not be harvested, absence of salvage harvest in RCAs will preclude removal of snags in riparian areas that could be used by fishers.
Columbia Spotted Frog	NI	NI	Protection of riparian areas (RCAs) eliminates direct and indirect effects.
[1]NE = No Effect			
NLAA = Not Likely to Adversely Affect			
NLJ = Not Likely to Jeopardize the Continued Existence			
NI = No Impact			
BE = Beneficial Effect			
MI = May Impact Individuals But is Not Likely to Cause a Trend to Federal Listing or Loss of Viability			
+ / - / 0= Positive, Negative, or Immeasurable Effect to Population (non-TECS species only)			
N/A = Not Applicable – effects determination not required but effects discussed			

Gray Wolves *(Canis lupus)*

Life History

Gray wolves were delisted as a Federally listed endangered species after meeting US Fish and Wildlife recovery goals. Management of this species is now the responsibility of the Idaho Department of Fish and Game (IDFG) and wolf population levels will be maintained at numbers coinciding with those obtained between 2005 and 2007 (Nadeau et al. 2008). Wolves will prey on elk, mule deer, white-tailed deer, moose, Columbia ground squirrel, snowshoe hare, and grouse but must rely on ungulates during the winter months (USDI FWS 2002). Territories usually range from 50 mi^2 to 200 mi^2. Denning and rendezvous sites reside within these territories and are characterized by an absence of substantial human disturbance and in the case of rendezvous sites, contain meadows adjacent to forest habitat (USDI FWS 2002). Habitat loss (i.e., loss of habitat containing abundant prey and little human disturbance) and human-induced mortality are primary contributors to gray wolf declines and recovery limitations (USDI FWS 2002).

Affected Environment

Both fire areas overlap with a wolf pack territory (IDFG 2006) and telemetry locations for wolves have been recorded within or very proximate to both fire areas (IDFG 2007). The most recent and nearest known denning or rendezvous site (2001) was less than 2 miles southeast of the Lightning Fire area (IDFG 2007). Road densities in the fire areas are 3.2 mi/mi^2 for the Lucky Fire area and 1.4 mi/mi^2 for the Lightning Fire area and lower than those for the subwatersheds in which they completely (Lucky) or partially (Lightning) reside. The closest elk winter range to either project area is over 2 miles from the Lighting Fire (RMEF 1999). Additional surveys were not conducted since there was sufficient information about the presence of wolves in the project area to assess the effects from project activities.

The analysis area for gray wolves relative to the Middle Fork Salvage Project includes the two fire areas for direct and indirect effects, while the two wolf pack territories overlapping the fire areas (Packer John and Scott Mountain) comprise the extent for the cumulative effects analyses.

Environmental Consequences and Cumulative Effects Common to All Action Alternatives
The proposed activities could impose impacts to wolves as the amount of disturbance in the project area would be increased for up to a mile from salvage units (3 years for all activities; up to 2 for salvage harvest alone). Since the nearest known rendezvous or denning site was over 1.5 miles away and was not recent, disturbance would not be expected to impact productivity and would be slight given the size of each wolf pack territory. Also, modifications to roads in the Lightning Fire area (decommissioning of 9.4 miles and year-round closing of 7.2 miles) would benefit wolves as access would be reduced and the accompanying human-induced mortality to wolves and their prey would be decreased (increase of 3,127 acres of elk security habitat). The reduction of snags in the activity units might slightly increase forage for elk and deer following implementation (via shrub release) but reforestation would reduce the time that shrubs will dominate those activity units as stand regeneration is expedited. Possible use of strychnine for gopher control would not affect wolves because ingestion of a poisoned gopher is unlikely (considering most carcasses will remain underground) and because a 33-pound juvenile wolf would need to eat 103 pounds of carcasses to reach LD_{50} (see BA Addendum for Sixshooter Project; Schoeberl 2005b). Overall, the effects from vegetation modifications would be immeasurable to wolves as only a small amount of either wolf pack territory would be affected. In summary, the following components of the proposed activities would be expected to incur direct or indirect effects to wolves:

- Disturbance – negative effects up to 2 years for up to a mile from activity units as wolves and/or their prey avoid those areas (only recognizing salvage harvest as a possible disturbance impact)
- Road Modifications – positive effects following implementation
- Vegetation Modifications – immeasurable effect

With the omission of reforestation on 132 acres in the roadless area, the effects from Alternative C would be the same as with Alternative B. There would be less area comprising potential treatment for gopher control with Alternative C (vs. Alternative B) but any possible effects from this activity are so negligible that the effects between the two action alternatives would be the same.

Disturbance from implementation of this project is the primary vector for negative effects to wolves. Appendix B includes a list of the past, ongoing and reasonably foreseeable future activities considered for this cumulative effects analysis. Since the ongoing activities (e.g., grazing, dispersed recreation) have been occurring since the gray wolf was reintroduced into the area and have had little impact on the species, the only projects that will be considered for cumulative effects relative to disturbance include:

- Lucky Fire area (Packer John Wolf Pack)
  - Three Sixshooter Project sales (1640 acres of harvest beginning in 2010)
  - Sixwest Thinning (2010)

- Lightning Fire area (Scott Mountain Wolf Pack)
  - Scott Mountain Whitebark Pine Restoration (2008-2014)
  - Potlatch Timber Harvest (2013)

The disturbance associated with the salvage harvest portion of the Middle Fork Salvage Project would likely occur during 2008 only but could extend into 2009. Since the actual harvest (excluding road building) of the projects in and proximate to the Lucky Fire area would occur during 2010 and later, disturbance effects to wolves from any combination of the Middle Fork Salvage Project and the aforementioned future timber harvests and pre-commercial thinning, could easily be avoided by resident wolf packs and their prey. Likewise, disturbance from salvage harvest in the Lightning Fire area would not coincide temporally with the disturbance created from the Potlatch Timber Harvest so there would be no effects from this interaction. The Scott Mountain Whitebark Pine Restoration Project would overlap in time with the Middle Fork Salvage Project but would only include roughly 370 acres of whitebark pine release during 2008 and 150 acres during 2009 (Wier, 2008). Pesticide application, planting, and burning would occur across additional acres but these activities were not considered measurably disturbing to wolves. Since only a small amount of area would be harvested or manipulated at the same time (up to 760 acres) during the implementation of the Middle Fork Salvage (Lightning Fire area) and Scott Mountain Projects, wolves would easily be able to avoid those areas and productivity will not be affected.

Beneficial effects would result in the Lightning Fire area from the road decommissioning and closures and they will partially mitigate any negative effects occurring from other projects within the Scott Mountain territory. Overall, the combination of the effects from this project (negative and positive), when combined with other projects in the cumulative effects area (two overlapping wolf pack territories), would not measurably affect the maintenance of either wolf pack overlapping the project area.

Bald Eagle (*Haliaeetus leucocephalus)*
Field observations and GIS data were used to determine that the Middle Fork Project area does not contain or reside adjacent to large water bodies that could provide nesting, foraging, or wintering habitat for bald eagles. The nearest known bald eagle nest is roughly 8 miles away (IDFG 2008). Also, the nearest wintering habitat is 5 miles away along the South Fork Payette River east of Garden Valley (Forest Service 1998). Since the project area does not contain any suitable habitat and is not routinely flown over by bald eagles, activities associated with these action alternatives will not cause direct or indirect effects to bald eagles. Because neither action alternative will have direct or indirect effects to this species or its habitat, there will be no cumulative effects to the species from implementation of these activities.

Peregrine Falcon *(Falco peregrinus anatum)*

Life History
Field visits for this project and others within and proximate to the fire areas have not resulted in identification of any cliffs that are suitable for peregrine falcon eyries. Although modeling showed potential eyrie cliffs (low quality; 45-60 degrees and 200-400 feet; Davis 2006) in some areas within the western portion of the Lightning Fire area and adjacent to both fire areas, familiarity with the area facilitated excluding them as likely nesting habitat. The nearest higher quality cliffs (>60 degrees and 200-400 feet high) are located 6 miles south of the Lightning Fire area. The nearest known historic peregrine falcon nest was 13 miles from the Lucky Fire area where it was last occupied during the 1950s (IDFG 2008). Implementation of either action alternative would not affect peregrine falcons because activities would not affect foraging suitability and there is no suitable nesting habitat. Consequently, there will be no direct, indirect, or cumulative effects from either action alternative.

Northern Goshawk *(Accipiter gentilis)*

Life History
Although northern goshawks utilize a variety of prey species (mainly forest birds and mammals), they seem to prefer closed canopy forests to more open habitat and they are associated with mature forests during the breeding season (Patla et al. 1995). Most of the observed nest locations in the Upper Columbia River Basin (UCRB) are between 4,000 and 8,000 feet in mature stands on moderate slopes near water. Furthermore, conifer species are generally chosen for nest trees in the northern portion of the UCRB area, whereas quaking aspen (*Populus tremuloides*) are used more commonly in the forest shrubsteppe ecotone found in the southern parts of the UCRB. Additionally, foraging areas are much larger than nesting areas for northern goshawks and are less specific relative to stand conditions and will include a wide diversity of forest cover types and vegetation structural stages (Reynolds et al., 1992, p. 16). Conversely, nesting areas are a key component for goshawks and are generally comprised of older-aged stands characterized by a high density of large trees, high tree canopy closure, high basal areas, and found on low, gentle slopes (Reynolds et al., 1992, p. 15). The primary threat to northern goshawks in Idaho is the loss of nesting (dense, large trees) and post-fledging (variable, but generally large trees) habitat (USDA, Forest Service, 2003g, p. 12).

Affected Environment
Past timber sales and incidental detections have resulted in the identification of goshawk activities near both fire areas. Although no goshawks were detected during surveys for the Sixshooter Project (USDA, Forest Service 2006a), nesting birds were found 1.5 miles from the Lucky Fire area and 3.5 miles from the Lightning Fire area during 2007 (Schoeberl, 2007). Either fire area could be used for a portion of a goshawk territory. However, there were no surveys conducted for goshawks since the activities

associated with the action alternatives would not alter potential nesting habitat associated with goshawks (i.e., large trees with dense canopy closure) or render forage habitat unsuitable.

Environmental Consequences and Cumulative Effects Common to All Action Alternatives
Although goshawks might use both fire areas for foraging or nesting, both action alternatives would include activities that would not affect goshawk productivity or foraging. Salvage harvest would occur in areas where trees experienced ≥ 50 percent mortality during the 2007 fires. These areas would not function as nesting or post-fledging habitat for goshawks and the partial harvest of dead trees would not make any areas unsuitable for foraging. Also, road decommissioning and closures would not result in effects to habitat associated with goshawks. Reforestation could involve gopher control via strychnine on up to 638 acres for Alternative B (fewer acres for Alternative C, as 132 acres within the Peace Rock IRA would not be reforested). However, effects to goshawks would be unlikely since most carcasses remain underground and because hawks generally do not eat the gut, where the strychnine concentrates (see WSR/BE for Sixshooter Project; Schoeberl 2006). Because neither action alternative would have direct or indirect effects to this species or its habitat, there would be no cumulative effects to goshawks from implementation of these activities.

Boreal Owl *(Aegolius funereus)*
The project area does not provide sufficient source habitat for boreal owls. The nearest suspected boreal owl nesting territory was identified during 1985 roughly 30 miles to the northeast of the Lightning Fire area (IDFG 2008). Implementation of the action alternatives will not affect boreal owls because there is insufficient source or potential for source habitat to develop for this species in the MF Salvage Project area. Consequently, there will be no direct, indirect, or cumulative effects from the activities associated with either action alternative.

Flammulated Owl *(Otus flammeolus)*

Life History
The flammulated owl is a neotropical migrant that migrates due to its insectivorous diet (McCallum 1994a, pp. 18 and 23-27). Because of their diet, these owls also are often associated with ponderosa pine and Douglas-fir because these forest types have high densities of nocturnal invertebrates. Habitat requirements vary between roosting and foraging activities with an overall association with an open stand structure containing some denser foliage for roosting. As with boreal owls, flammulated owls are dependent on pileated woodpeckers and northern flickers for nest cavities. Home ranges of these owls average about 40 acres (Colorado and Oregon, McCallum 1994b) and will decrease during the breeding season (20 acres in Oregon during nestling period), with most of the foraging occurring near the nest. Habitat destruction is likely the primary threat to flammulated owls (McCallum 1994b).

Affected Environment
Large amounts of the project area are characterized with the PVGs associated with this species (PVGs 2, 3, 5, and 6; Nutt et al. 2006b). Consequently, flammulated owls likely inhabit and nest in the project area. The analysis area for flammulated owls relative to the Middle Fork Salvage Project includes the two fire areas for direct, indirect, and cumulative effects. Home ranges were not delineated and used for assessing cumulative effects for this project because existing source habitat for this species would not be affected.

Environmental Consequences and Cumulative Effects Common to All Action Alternatives
Salvage harvest would not affect source habitat for flammulated owls because of the following:

- Salvage harvest would occur in areas that experienced ≥ 50 percent mortality and will not reduce source habitat (40-70 percent canopy closure; Nutt et al. 2006b).
- Live trees would not be harvested.

Harvest prescriptions and Design Feature WL-1 would result in the retention of snags within the desired condition in the salvage units immediately following implementation (Figure 3.12). However, these owls might occupy habitat adjacent to the harvest units and could inhabit snags along the periphery of the

salvage units. Compared to Alternative A, snag conditions (within units) with the action alternatives would:

- Decline to lower levels immediately after implementation (Figure 3.12).
- Fall below desired conditions sooner (Figure 3.12; see white-headed woodpecker analysis).
- Comprise a longer period of deficiencies before natural recruitment will occur (see white-headed woodpecker analysis).

Although slight, the possibility that flammulated owls could nest within snags adjacent to source habitat but within salvage units means that the removal of snags could reduce productivity during implementation (active nest snags). An even less likely effect, would an extended period when suitable nest snags are absent from the activity units because these owls will probably not gravitate toward salvage units whether salvage occurs or not.

Road modifications in the Lightning Fire area would indirectly benefit these owls as areas would be closed to access by woodcutters. As 17.8 miles of road would be removed from motorized access (9.4 miles decommissioned, 7.2 miles closed year-round, and 1.2 miles converted to non-motorized trail), 1,031 acres that are within 300 feet of roads would be enhanced for snag retention and recruitment (Table 3.14). The enhancement of roughly 1,000 acres for snag maintenance and recruitment would benefit snag-dependent species, like flammulated owls, in the short (after estimated 5 years of implementation) and long (>15 years) term.

Removal of snags adjacent to flammulated owl source habitat might have slight negative effects to these owls. Conversely, road modifications would indirectly benefit flammulated owls following implementation of either action alternative. Since the potential for negative effects are immeasurable and because beneficial effects would also occur, any effects to this species from this project, when combined with others in any reasonable cumulative effects area (project area plus any home range extending up to 40 acres outside the project area; McCallum 1994b), would not contribute toward a measurable increase of negative impacts to this species and would partially mitigate any reduction of source habitat resulting from nearby projects.

Great Gray Owl *(Strix nebulosa)*

Life History
Great gray owls are large birds that inhabit northern and central Idaho where they remain year-round (Duncan and Hayward 1994, p. 160). The Lightning Fire area contains non-forested, south-facing slopes adjacent to some potential habitat (PVGs 2 and 5 outside historic range of variability {HRV} but normally PVGs 3 and 7-11; Nutt et al. 2006c) but they do not exhibit the gentle slopes and meadow vegetation associated with this species. Because there is no source habitat for great gray owls in the project area, no surveys were conducted for this species. The nearest recorded great gray owl nest was 11 miles northwest of the Lucky Fire area during the 1980s (IDFG 2008). Implementation of the action alternatives will not affect great gray owls because there is no source habitat in the project area. Consequently, there will be no direct, indirect, or cumulative effects from the activities associated with these alternatives.

Mountain Quail (*Oreortyx pictus*)

Life History
Mountain quail are secretive birds that inhabit steep, riparian shrub habitats (forested and non-forested), primarily within a few hundred meters of water (Vogel and Reese 1995). They may travel 16-50 miles between lower elevation winter habitat to higher elevation breeding areas. Their breeding season is between March and July and both females and males care for the young. They primarily eat plant matter (e.g., ceanothus, manzanita, clover, locoweed) and are associated with slopes 20 percent or steeper. Habitat alteration that destroys riparian habitat and disrupts dispersal and migration is the primary threat to this species.

Affected Environment
More commonly found in southwest Idaho within the Boise, Snake, and lower Salmon River drainages (Vogel and Reese 1995), this species is found along ecotones of grasslands and timberlands. Habitat in the project area does contain the edge habitats and appropriate slopes that might function as mountain quail source habitat as well as perennial streams. The nearest potential or known population of mountain quail from the project area is adjacent to the Lightning Fire area (see Figure 7 in Wildlife Specialist Report and Biological Evaluation in Project Record), which is along the edge of the suspected historical distribution (Moser 2004). Surveys were conducted along the South Fork Payette River during 2003 and 2004 (roughly 5 miles south of the Lightning Fire area) but no mountain quail were detected (Moser 2004). The nearest sighting of a mountain quail to the project area was over 2.5 miles east of the Lightning Fire area (during 2004; IDFG 2008). Since activities associated with this project would not remove any source habitat that might exist in the project area, no surveys were conducted.

The analysis area for mountain quail relative to the Middle Fork Salvage Project includes the project area for direct, indirect, and cumulative effects. Home ranges would be delineated and used as the parameter for assessing cumulative effects for projects consisting of modifications to source habitat for this species. However, given that road modifications would be the only effect to mountain quail, home ranges were not delineated for this species.

Environmental Consequences and Cummulative Effects Common to All Action Alternatives
Although unlikely, there is potential that mountain quail could reside in the Lightning Fire area. Salvage harvest would only result in removal of dead or imminently dead trees and riparian vegetation will be unaltered as most activities will be excluded within RCAs (240 feet buffer of perennial streams). Reforestation and road decommissioning would occur in RCAs but would not result in the loss of any source habitat. Reforestation in the Lightning Fire area would occur only in areas that experienced high tree mortality (≥ 50 percent mortality) so road decommissioning is the only activity that could minimally affect source habitat for this species. About 2.7 miles of road would be decommissioned within RCAs (0.7 of authorized and 2.0 of unauthorized) under both action alternatives. Consequently, if this riparian-associated species is present in the project area, it would benefit via the eventual creation of source habitat (e.g., road bed conversion to vegetation) and reduced potential for being shot if misidentified as a California quail. Although source habitat would not be created immediately following implementation of either action alternative, decommissioning roads would result in a slight amount of short (after estimated 5 years of implementation) and long (>15 years) term increase in source habitat.

Although the probability that mountain quail reside in the project area is low, their presence would mean that road modification would incur direct (lowered likelihood of being shot) and indirect (eventual creation of source habitat) benefits following implementation of either action alternative. Consequently, any effects to this species from this project, when combined with others in any reasonable cumulative effects area (Appendix B), would not contribute toward a net increase of negative impacts to this species and would partially mitigate any reduction of source habitat or creation of roads in RCAs.

Greater Sage-Grouse *(Centrocercus urophasianus)*

Life History
Greater sage-grouse are large gallinaceous birds that are associated with sagebrush habitat. Large, continuous areas of sagebrush that greater sage-grouse require are absent from the MF Salvage Project area. Since the project area is not characterized by habitat that is suitable or has the potential to function as source habitat for this species, implementation of either action alternative will not affect sage-grouse. Consequently, there will be no direct, indirect, or cumulative effects from the activities associated with the action alternatives.

Northern Three-toed Woodpecker *(Picoides tridactylus)*

Life History
Considered one of the least known woodpeckers in North America, the northern three-toed woodpecker has been described as highly dependent on areas that experience insect epidemics (Montana Partners in

Flight 2000). These woodpeckers are associated with tree species that have thin flaky bark, like spruce or lodgepole pine, and are specialized at scaling bark to acquire bark beetles (Montana Partners in Flight 2000, Goggans et al. 1989). They exhibit a preference for mature or overmature timber containing a single canopy layer (Goggans et al. 1989), likely because primary bark beetles can invade and kill older, live trees providing gaps within stands do not prohibit beetle dispersal (Imbeau and Desrochers 2002). However, disturbances such as fire and wind will facilitate an invasion by secondary bark beetles that will attack weak, dying, or recently dead trees (Imbeau and Desrochers 2002). After a few years, these trees become unsuitable for the secondary bark beetles and northern three-toed woodpeckers must search for prey elsewhere. Although suitable nest sites are critical to woodpeckers, foraging habitat is suspected to be most important to the abundance of northern three-toed woodpeckers (Montana Partners in Flight 2000).

Affected Environment

Only portions of the Lightning Fire area contain habitat that could potentially function as source habitat for this woodpecker species (PVGs 8-11 and 5 when outside HRV; Nutt et al. 2006d). These area are located in the eastern part of the fire area and do not coincide with any of the harvest units (Figure 3.13). Since the project activities do not have the potential to detrimentally affect source habitat for this species, there were no surveys conducted specifically for three-toed woodpeckers. MIS surveys, which targeted white-headed and pileated woodpeckers but resulted in identification of all species, were conducted along the southeastern and northwestern boundaries of the fire area during 2004 - 2007 (Figure 3.13). There were no three-toed woodpeckers detected on either of these routes. The nearest sighting of a three-toed woodpecker was 12 miles southeast of the Lightning Fire area (IDFG 2008).

Environmental Consequences and Cumulative Effects Common to All Action Alternatives

Harvest activities would not occur in existing source habitat for this species or areas that could potentially function as source habitat. As a result, the action alternatives would not have direct, indirect, or cumulative effects to this woodpecker species.

White-headed Woodpecker *(Picoides albolarvatus)*

Life History

White-headed woodpeckers are associated with abundant, mature pine stands (possessing large cones producing abundant seeds) exhibiting low canopy closure that also have snags and stumps available for nest cavities (Garrett et al. 1996). These woodpeckers generally feed on insects and conifer seeds, with seasonal variation of use (generally feed on pine seeds from late summer through winter). Average nest sites for these woodpeckers are dead trees or stumps 25–31 inches d.b.h. and home range sizes for white-headed woodpeckers ranges from about 165 acres in contiguous suitable habitat to roughly 800 acres in fragmented habitat (Garret et al. 1996, p. 12). Habitat loss is a primary threat to white-headed woodpeckers, with losses of large, live ponderosa pine (seeds for over-winter survival) and large diameter snags (for nesting) being the primary consideration (Servheen et al. 1996). White-headed woodpeckers are also classified as an MIS because they are associated with large trees (especially ponderosa pine) and snags characterized by low canopy closures. When Wisdom et al. (2000) assessed the source habitat for the white-headed woodpecker within the Columbia Basin and for the Central Idaho Mountains (ERU 13), they detected a decline by more than 60 percent from the historical source habitat in both. Most projected declines in source habitat were due to losses of late-seral forests that today are in early and mid-seral stages (Wisdom et al. 2000, Vol. 2-27).

Affected Environment

Most of the salvage activities associated with the action alternatives would occur in or adjacent to existing or potential source habitat for white-headed woodpeckers (PVGs 1, 2, 3, 5, and 6; Nutt et al. 2006e). A white-headed woodpecker was even detected in one of the salvage units categorized as PVG 4 in the Lightning Fire area (Schoeberl 2007; Figure 3.14). Although home ranges for white-headed woodpeckers are variable (Garret et al. 1996), effects to woodpeckers from this project (including white-headed woodpeckers) were assessed using 0.6-mile radii circles. This distance represents the common distance traversed from a nest for foraging by cavity-nesters (Russell et al. 2007) and comprises 776 acres. To measure the effects of snag removal on woodpeckers using the project area, three circles were

positioned over the Lucky Fire area with minimal overlap and one was positioned over the largest contiguous compilation of units in the Lightning Fire area (Figure 3.14). The remaining units in the western portion of the Lightning Fire area were not examined because they are fragmented and will reside in a mosaic of non-harvested burned areas that will provide an abundance of snags for woodpecker forage. Snag data existed for 66-96 percent of the four circles (see Analysis Methods for data sources). Surveys were not conducted for white-headed woodpeckers because 1) some of the areas had been surveyed previously (e.g., annual MIS surveys; Figure 3.13), 2) the assumption was made that all harvest units could function as a portion of a home range for this species, and because 3) snag retention recommendations for white-headed woodpeckers will be met.

The National Breeding Bird Survey (BBS; Sauer et al. 2007) shows a very broad description of population trends of birds across the United States. The white-headed woodpecker shows a slightly increasing trend within its range (1966-2006: +2.2 percent/year, P = 0.00, 95 percent confidence interval = 0.8-3.5). Initial forest-wide surveys for white-headed and pileated woodpeckers occurred during 2004 across the Boise National Forest (500 stations surveyed) with detections of six white-headed woodpeckers (five from survey stations) during 2004 and four during 2005. Summaries for data from 2006 and 2007 are pending. The route nearest to both fire areas where a white-headed woodpecker was detected between 2004 and 2007 borders the northwest boundary of the Lightning Fire area (2004, 2006, 2007; Figure 3.14). Subsequent, annual surveys will facilitate the calculation of trends for these species on the forest.

Existing snag densities in the four theoretical home ranges are much higher than the desired conditions identified in the Forest Plan (2003a). Although snag densities prior to the fire were variable (area outside harvest units and <50 percent mortality from the fire in Figure 3.13), the 2007 fires greatly increased the number of snags across the project area. Current road densities are 3.2 miles/mi^2 in the Lucky Fire area and 1.4 miles/mi^2 in the Lightning Fire area (Table 3.14). There have been multiple detections of white-headed woodpeckers in and near the fire areas during pre-fire MIS surveys and post-fire field visits (Schoeberl 2004, 2006, 2007; Figure 3.14).

Table 3.17. Pre- and Post-implementation Snag Densities Within Four Theoretical Home Ranges in the MF Salvage Project Area

Home Range	10-20 Inches		>20 Inches		All ≥10 Inches	
	Existing	Post-imp	Existing	Post-imp	Existing	Post-imp
1	15.4	6.5	3	2.0	18.4	8.5
2	18.2	6.9	4.1	2.7	22.3	9.6
3	17.1	11.7	2.9	2.2	20.0	13.9
4	14.4	6.3	2.8	1.9	17.2	8.2

Note: Desired conditions for snags in PVG 2: **10-20"**1.8-2.7, **>20"** 0.4-3.0, **Total** 2.2-5.7
Desired conditions for snags in PVG 4: **10-20"**1.8-2.7, **>20"** 0.2-2.1, **Total** 2.0-4.8
Forest Service (2003a)

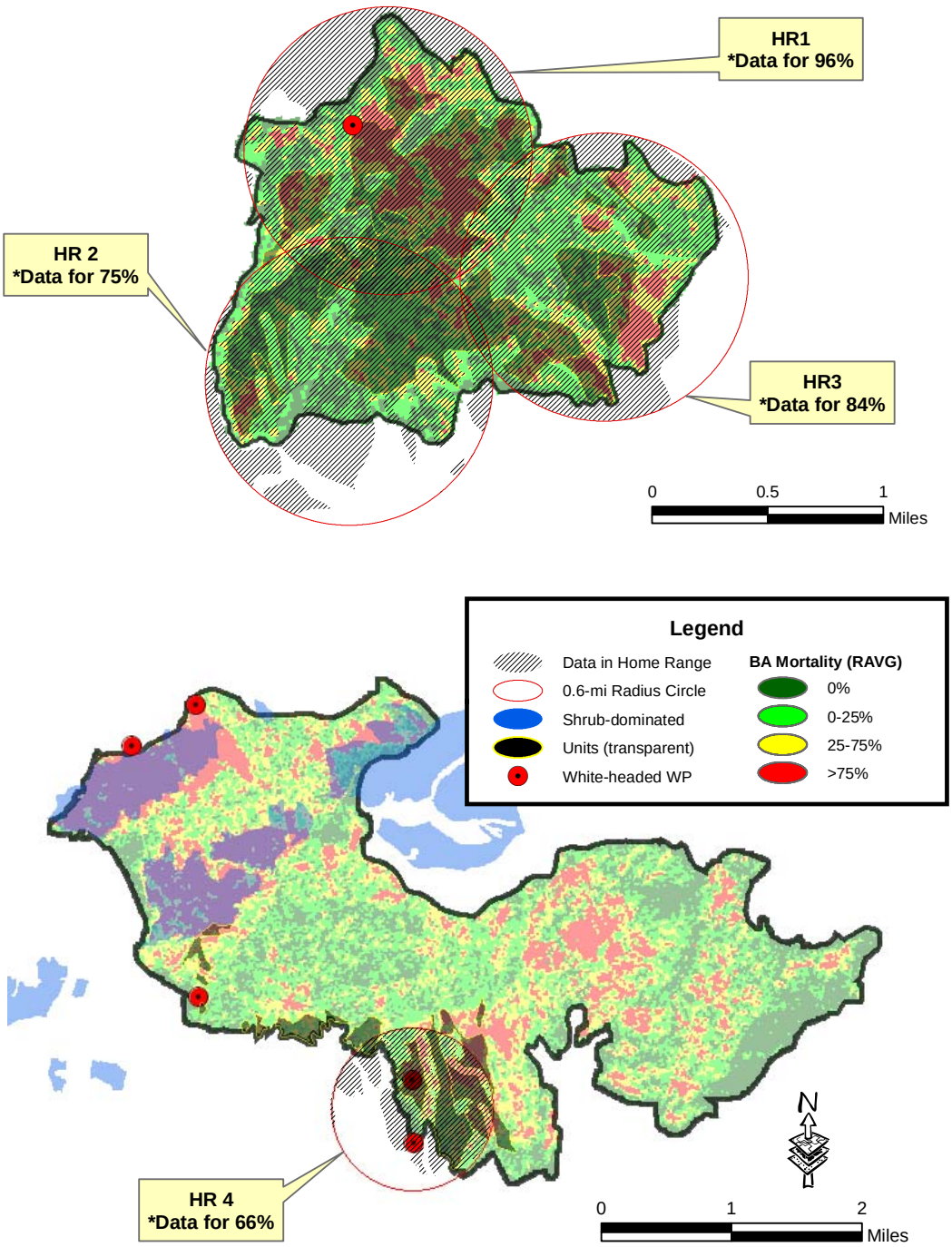


Figure 3.14 - Characterization of Habitat for Woodpeckers Relevant to the Middle Fork Salvage Project.

The analysis area for white-headed woodpeckers relative to the Middle Fork Salvage Project includes the project area for direct and indirect effects, while the combined extent of the project area and the four theoretical woodpecker home ranges was considered for cumulative effects.

Environmental Consequences and Cumulative Effects Common to All Action Alternatives
The Middle Fork Salvage Project would affect white-headed woodpeckers through the following:

- Salvage harvest will reduce snag densities in areas that are currently being used by white-headed woodpeckers.
- There is a slight chance that snag densities within salvage units would fall below Forest Plan desired conditions and levels recommended for white-headed woodpecker sooner than with Alternative A.
- There is a slight chance that snag densities within salvage units would exist below Forest Plan desired conditions and levels recommended for white-headed woodpecker for longer than with Alternative A.
- Occupied nest trees could be harvested during project implementation.
- Road densities will be reduced in the Lightning Fire area and remove areas from access to woodcutters.

Immediately following harvest, snag densities would be reduced on roughly 1,100 acres of harvest units (see Figure 3.12). However, retention of one to two large (>20 inches d.b.h.), fire-created snags/acre would ensure that these areas contain one recommendation for snag densities to support the maximum number of these woodpeckers (0.5 snag/acre >23 inches d.b.h.; NatureServe 2008a). However, retention of all of the fire-created ponderosa pine snags >20 inches d.b.h. (2.1/acre) will ensure that these areas contain one recommendation for snag densities to support the maximum number of these woodpeckers (0.5 snag/acre >23 inches d.b.h.; NatureServe 2008a). In addition to the aforementioned retention of the fire-created snags, 0.3 snag/acre >20 inches d.b.h. that were present before the 2007 fires would not be harvested (Design Feature WL-2). Overall, snag densities in harvest units would be reduced but design features would ensure enough snag retention that densities in units would (1) remain above large snag recommendations for this species and (2) fall within the desired conditions outlined in the Forest Plan for both size categories of snags. Snag densities within the four theoretical home ranges would remain above desired conditions described in the Forest Plan (Appendix A, Table A-8, p. A-9).

During the long-term (>15 years), the effects to white-headed woodpeckers within the salvage units may be negative as snag densities are lower with Alternatives B and C compared to Alternative A (see Figure 3.12 for projections) but the difference will be small when considering only snags > 20 inches d.b.h. Everett et al. (1999) observed 79 percent retention rates for fire-killed ponderosa pine trees >16 inches d.b.h. 60 years following fires in the Cascade Range in Washington state. Although smaller diameter snags will likely fall at a faster rate (Everett et al. 1999) and is illustrated with the ≥ 10 inches d.b.h. projections in Figure 3.12 (Russell et al. 2006), retention of all fire-killed ponderosa pine > 20 inches d.b.h. will result in only a small difference in the density of the large snags associated with this species 60 years following implementation. Furthermore, the projected decline in snag densities may be overestimated for all of the alternatives since bark beetles and other pathogens will likely result in mortality of weakened trees that are not salvaged over the next 2-3 years (Jorgensen 2008). Since it will take 80-100 years for regeneration of those stands that experienced 100 percent mortality from the fire to contain trees that are 20 inches d.b.h. (Dickerson, 2008 personal communication), it is possible that all alternatives may result in an overlap of standing fire-created snags and snag recruitment in this larger size class. However, there is a slightly greater chance that this condition will occur with Alternative A vs. Alternatives B and C. Existing snags within areas adjacent to the salvage units, as well as natural recruitment of snags in these areas, will partially mitigate the removal of snags in salvage units. Although white-headed woodpeckers could experience some long-term negative effects from the salvage harvest and may shift their use of habitat across the landscape, these birds will likely not be excluded from existing home ranges because of the following mitigating factors:

- Snag recruitment will occur in adjacent stands that experienced no and low fire mortality, as well as within salvage units that were less severely burned.

- Abundant snags will remain in nearby areas that experienced high mortality but will not be harvested (see Figure 3.14).

Productivity of white-headed woodpeckers could be impacted during implementation as snags used for nesting are harvested. Since live trees exist within and adjacent to units and these birds are associated with large, live trees for winter forage, nesting woodpeckers might utilize snags that would ultimately be harvested. Consequently, productivity of individuals may be affected during the 1-2 years of harvest implementation but absence of live tree harvest and the snag retention design feature would mean that source habitat would not be re-categorized as non-source habitat.

The reduction of open road densities in the Lightning Fire area would benefit white-headed woodpeckers as areas would be closed to access by woodcutters. There would be 1,031 acres within 300 feet of roads currently open during some portion of the year that would be removed from access to woodcutters because of road decommissioning or closing roads year-round (Table 3.14). This would result when 17.8 miles of road are removed from motorized access (9.4 miles decommissioned, 7.2 miles closed year-round, and 1.2 miles converted to nonmotorized trail). The enhancement of roughly 1,000 acres for snag maintenance and recruitment would benefit these woodpeckers and other snag-dependent species in the short- (3-15 years) and long- (>15 years) term.

Although snag densities would be reduced from existing conditions, there would be no net removal of source habitat for white-headed woodpeckers. Densities of fire-created snags in harvest units would fall below that needed to qualify them as source habitat sooner when compared to Alternative A (see Figure 3.12) but the presence of live trees in and adjacent to units means that natural recruitment would at least partially supplement this eventual deficit. Therefore, there might be some negative effects to these woodpeckers in the long-term if snag densities fall below that associated with source habitat and in the temporary term (0-3 years) if a nest tree is harvested during the 1-2 years of implementation. With the modification to roads, this project would incur indirect benefits to white-headed woodpeckers following implementation of either action alternative. Negative impacts from this project would not coincide with snag removal in source habitat for this species (i.e., PVGs 1, 2, 3, 5, and 6) from any project within the cumulative effects area (Appendix B). Consequently, any effects to this species from this project, when combined with others in the cumulative effects area (Garret et al. 1996, p. 12), would not contribute toward a net increase of negative impacts beyond the described direct effects and would partially mitigate any reduction of source habitat resulting from nearby projects (via open road reductions). Furthermore, the action alternatives would not result in cumulative effects that would modify the population trend of this species.

Wolverine *(Gulo gulo)*

Life History

Wolverines are the largest species in the mustelid family and one of the least described large carnivores in North America. The few studies that have examined wolverines show that they have large spatial requirements, exhibit low population densities, and show non-specific habitat associations (Copeland 1996, p. 3). Since wolverines usually subsist on carrion and likely rely on established networks that exhibit a high probability of supplying their diet (e.g., trap lines, ungulate calving/fawning areas; Copeland 1996, p. 85), wolverine home ranges are large (30 mi^2 – 250 mi^2; Banci 1994, pp. 117-118). Home ranges in Idaho were large relative to other studies (150 mi^2 for females, 590 mi^2 for males) and may indicate that resources were scarcer than in other areas of wolverine distribution (Copeland 1996). Although foraging habitat of wolverines is general, natal den associations are more specific. Subalpine cirque basins containing talus slopes or boulder fields are frequently selected for natal den sites (Copeland 1996, p. 94; Banci 1994, p 110) and are likely the most limiting factor for wolverine populations (Copeland 1996, p. 122). Loss of wilderness refugia that is free of human disturbance is suspected to be the greatest threat to wolverines, as well as critical to wolverine natal and maternal areas (Copeland 1996, p. 126).

Affected Environment
There are no subalpine cirque basins or talus slopes that would provide denning habitat in the MF Salvage Project area. The project area is characterized by road densities of 3.2 mi/mi^2 for the Lucky Fire area and 1.4 mi/mi^2 for the Lightning Fire area. The Lightning Fire area intersects the Peace Rock IRA. Although likely infrequent, forage and travel by wolverine could occur within both fire areas. Walk-through and snow machine surveys were conducted in proximity to the Lucky Fire area during the winters of 1999-2000 (two surveys; Baldwin 2000) and 2000-2001 (one survey; Johnson 2001), which revealed no wolverine tracks or sign. The nearest wolverine detection was roughly 1 mile northwest of the Lucky Fire area during 2007 (District Records: Stott, 2007). Additional surveys for wolverine were not warranted for this project because information from previous surveys provided sufficient information to indicate that this species could utilize the project area for forage activities.

The analysis area for wolverines relative to the Middle Fork Salvage Project includes the project area for direct and indirect effects, while a non-delineated 150 mi^2 area that includes the project area comprises the area considered for cumulative effects. Given the large area encompassed by a single female's home range (150 mi^2), the project area would contribute only 16 percent to that home range, and less to a male's (4 percent). Since the project will not negatively affect source habitat for this species, no attempt was made to delineate theoretical home ranges for wolverines (i.e., home range would not be spatially moved to compensate for activities).

Environmental Consequences and Cumulative Effects Common to All Action Alternatives
Both action alternatives could minimally affect wolverines as the amount of disturbance in the project area is increased (3 years for all activities; up to 2 for salvage harvest alone). Since there is no denning habitat proximate to either fire area, disturbance would not be expected to impact productivity but would have a slight chance of altering foraging behavior. Also, modifications to roads in the Lightning Fire area would benefit wolverines as access is reduced proximate to the Peace Rock IRA. The reduction of snags in the activity units would not affect the wolverines since they are generalists and able to forage in a variety of habitats. Furthermore, the use of strychnine for gopher control will not affect this species since an 18-26-pound wolverine (Banci 1994, p. 99) would need to consume 18-60 pocket gophers (extrapolated from mink study; see WSR/BE for Sixshooter Project; Schoeberl 2006) to reach LD_{50}. The probability of this occurring is extremely low, considering the large home range of wolverine, the application of strychnine underground, and the paucity of the project area that might be treated (up to 638 acres) and visited by a wolverine. Overall, only the following components of the proposed activities would be expected to incur direct or indirect effects to wolverines:

- Disturbance – slight negative effects up to 2 years proximate to activity units (only recognizing salvage harvest as a possible disturbance impact)
- Road Modifications – positive effects following implementation

Disturbance from implementation of this project is the primary vector for negative effects to wolverines. Appendix B includes a list of the past, ongoing and reasonably foreseeable future activities considered for this cumulative effects analysis. Ongoing activities (e.g., road maintenance, dispersed recreation) are associated with human disturbance and wolverines would have adapted to avoiding these activities. Consequently, these activities would not be considered for cumulative effects analyses. Considering that the project area will only be used for foraging by wolverines and that they could easily navigate and avoid coincident disturbance amongst widely spaced projects, the following were identified as proximate to the Middle Fork Salvage Project that could potentially contribute toward cumulative effects: reference to appendix

- Lucky Fire area
    - Three Sixshooter Project sales (1640 acres of harvest beginning in 2010)
    - Sixwest Thinning (2010)

- Lightning Fire area
  - Scott Mountain Whitebark Pine Restoration (2008-2014)
  - Potlatch Timber Harvest (2013)

The disturbance associated with the salvage harvest portion of the Middle Fork Salvage Project would likely occur during 2008 only but could extend into 2009. Since the actual harvest (excluding road building) of three of the four projects in and proximate to the Lucky Fire area would occur during 2010 and later, cumulative disturbance effects to wolverines from any combination of the Middle Fork Salvage Project and these projects would not occur. The Scott Mountain Whitebark Pine Restoration Project would overlap in time with the Middle Fork Salvage Project but will only include roughly 370 acres of whitebark pine release during 2008 and 150 acres during 2009 (Wier 2008). Pesticide application, planting, and burning will occur across additional acres but these activities were not considered measurably disturbing to wolverines. Since only a small amount of area would be harvested or manipulated at the same time (up to 760 acres) during the implementation of the Middle Fork Salvage (Lightning Fire area) and Scott Mountain Projects, wolverines would easily be able to avoid those areas and productivity will not be affected.

Beneficial effects would result in the Lightning Fire area as 17.8 miles of roads are decommissioned, closed, and converted to trails. These modifications would result in a slight amount of benefit to wolverines and would partially mitigate any negative effects occurring from other projects within any reasonable cumulative effects area (from 150 mi^2 up to 580 mi^2).

Overall, the combination of the effects from this project (negative and positive), when combined with other projects in any reasonable cumulative effects area (up to 150 mi^2), would not measurably affect productivity of wolverines that might use the project area.

Fisher *(Martes pennanti)*

Life History
The fisher is thought to be associated with late-seral stage forests in the western US where multi-layered forest structure and snags may be more important than the age of the stand (Powell and Zielinski 1994, p. 53). Fishers are also limited in their distribution by snow depth and are not generally found in areas with deep snow. Denning and resting habitats are most limiting to fishers because they are comprised of late-successional conifer forests that are usually more limiting than the variety of successional stages used for foraging. Viable populations (proposed to be minimum of 50) in the Rocky Mountains might require areas of interconnected, suitable habitat as large as 770 mi^2 (Powell and Zielinski 1994, p. 58). Individual fishers in Idaho exhibited median home ranges of 20,400 acres for males and 10,100 acres for females (Jones 1991). Vegetation management through the removal of large areas of unfragmented, late-successional forests is a major threat to fishers, as is mortality from incidental trapping (Powell and Zielinski 1994, pp. 63-64).

Affected Environment
Much of the Middle Fork Salvage Project area is comprised of the PVGs associated with fisher source habitat (PVGs 3, 6, 8, 9, and 10, as well as 1, 2, and 5 when outside HRV; Nutt et al. 2006f). However, surveys were not conducted for this species because source habitat would not be affected (see following Effects discussion). Surveys that would have identified fisher presence were conducted in the Lucky Fire area during 1999-2000 (two surveys; Baldwin 2000) and 2000-2001 (one survey; Johnson 2001), 2.5 miles southeast of the Lightning Fire area (Holbrook and Collette 2007), and 9 miles northeast of the Lucky Fire area (Schoeberl 2007). There were no fishers detected during any of these surveys. The nearest reported sighting of a fisher was 8 miles southeast of the Lightning Fire area (IDFG 2008). Additionally, the road density within the RCAs of the project area is 1.3 mi/mi^2 for the Lighting Fire area and 3.7 mi/mi^2 for the Lucky Fire area.

The analysis area for fishers relative to the Middle Fork Salvage Project includes the two fire areas for direct, indirect, and cumulative effects. Although home ranges would be delineated and used for

assessing cumulative effects for projects affecting source habitat for this species none were created for this project because it would only affect fishers through modifications to roads.

Environmental Consequences and Cumulative Effects Common to All Action Alternatives
Salvage harvest would not affect source habitat for fishers because of the following:

- Salvage harvest would occur in areas that experienced ≥ 50 percent mortality and will not affect fisher source habitat (40-100 percent canopy closure; Nutt et al. 2006f).
- Live trees would not be harvested.
- Absence of salvage harvest in RCAs would preclude removal of snags in riparian areas that could be used by fishers.

Additionally, the use of strychnine for gopher control would not affect fishers since fisher weigh 4.4-12 pounds and would need to consume the guts of 6-17 poisoned pocket gophers (extrapolated from mink study; see WSR/BE for Sixshooter Project; Schoeberl 2006) to reach LD_{50}. The probability of this occurring is extremely low, considering the large home range of fishers and the application of strychnine underground. Overall, fishers would not experience an alteration of their source habitat from the proposed harvest of either action alternative, nor would they be affected by reforestation activities. Road decommissioning, especially those near streams, is the only activity that could enhance source habitat for this species.

Modification to roads in the Lightning Fire area would indirectly benefit fishers as areas would be closed to access by woodcutters and trappers, especially those near streams. There will be 17.8 miles of road removed from motorized access (9.4 miles decommissioned, 7.2 miles closed year-round, and 1.2 miles converted to nonmotorized trail), of which 2.7 miles are within RCAs (0.7 mile of authorized and 2.0 of unauthorized). This project thus would directly (reduced vulnerability to trapping) and indirectly (short- and long-term snag retention and recruitment) benefit fishers.

Appendix B includes a list of the past, ongoing and reasonably foreseeable future activities considered for this cumulative effects analysis. Although the probability of fishers residing in either fire area is low (see occurrence information), the beneficial effects from road modifications, when combined with others in any reasonable cumulative effects area, would not contribute toward a net increase of negative impacts to this species and would partially mitigate any reduction of source habitat or creation of roads in RCAs.

Columbia Spotted Frog (*Rana luteiventris*)

Life History
Spotted frogs are distributed widely but southern Idaho represents the southernmost range of the spotted frog where they reside in isolated patches of suitable habitat (Gomez 1994). Spotted frogs have been found from sea level up to 10,000 feet elevation and are most likely to occur near permanent water along the edges of ponds or lakes or in pools along slower moving streams where algae persists. They breed between late February and early July. The primary threat to spotted frogs in southern Idaho is habitat loss (e.g., alteration of wetlands and grazing), while competition with northern leopard frogs (*Rana pipiens*) and bullfrogs (*Rana catesbiana*) also impact populations.

Affected Environment
Of the roughly 62 miles of stream within the Middle Fork Salvage area (6 miles in Lucky Fire area and 56 miles in Lightning Fire area), 32 miles are characterized as perennial streams. Streams in the project area are predominantly described as type A or B (see Figure 3-F in BA for this project; Rosgen 1996), which are characterized with flows that are faster than what is normally associated with this frog species. However, a previous detection of this frog species in a type B channel (10 miles northwest of Lucky Fire area; Schoeberl 2007) means that this frog species may inhabit both fire areas. Even though the assumption was made that spotted frogs inhabit perennial streams in the project area, surveys were not conducted because implementation activities would not affect this species.

Environmental Consequences and Cumulative Effects Common to All Action Alternatives
Implementation of both action alternatives would not affect spotted frogs because of the following:

- There will be no activities within perennial stream RCAs (240-foot buffer on both sides) see earlier comment re definition of RCAs except:
  - Reforestation – would preclude use of strychnine in RCAs and would only involve hand-carried auger planting.
  - Culvert replacements – would occur on intermittent streams (nearest perennial stream roughly 500 feet downstream).
  - Road decommissioning – sediment delivery would be immeasurable (see BA for this project).
- Salvage harvest activities would incur only an immeasurable amount of sediment delivery to streams (highest during temporary and short-term, followed by long-term reduction; see BA in Project Record).

Since the action alternatives would not have direct or indirect effects, there would be no cumulative effects to spotted frogs resulting from implementation.

3.13.3.4 Management Indicator Species and Other Species of Concern

The Boise Revised Forest Plan identifies the pileated woodpecker and white-headed woodpecker as MIS. The white-headed woodpecker has been discussed under Region 4 Sensitive Species. This section discusses the pileated woodpecker, neotropical migrant bird species, and black-backed woodpecker, a species of concern. Table 3.18 summarizes the effects conclusions for these species.

Table 3.18. Effects of the MF Salvage Project on MIS, Neotropical Migrant Bird Species, and Other Species of Concern

Species Category	Species	Effect's Conclusions [1]		Rationale for Determination
		Alt. A	Alt. B/C	
MIS	White-headed Woodpecker	N/A	0	See analyses in Sensitive Species section.
MIS	Pileated Woodpecker	N/A	0	Possible minimal impacts as snags adjacent to source habitat decreased (negative) and enhanced snag retention with reduced road densities (beneficial).
Neotropical Migrant Bird Species	Flammulated Owl	N/A	0	Possible minimal impacts as snags adjacent to source habitat decreased (negative) and enhanced snag retention with reduced road densities (beneficial).
Neotropical Migrant Bird Species	Lewis' Woodpecker	N/A	0	Possible minimal impacts as snags within harvest units removed (negative) and enhanced snag retention with reduced road densities (beneficial).
Other Species of Concern	Black-backed Woodpecker	N/A	-	May reduce carrying capacity with removal of hard, recently killed trees (negative) but enhanced snag retention with reduced road densities (beneficial); small effect to local population.
+ / - / 0 = Positive, Negative, or Immeasurable Effect to Population (non-TECS species only)				
N/A = Not Applicable – effects determination not required but effects discussed				

Pileated Woodpecker *(Dryocopus pileatus)*

Life History
Pileated woodpeckers were selected as a MIS because they represent species associated with mature stands containing large diameter trees and snags and down woody material in stands with moderate to high canopy closure (Roloff 1999). Nest trees are generally ponderosa pine or western larch (*Larix occidentalis*) that are dead, barkless, broken-topped trees that have been dead for 10 years or more and are 21 inches d.b.h. or greater (Bull 1987). Although ponderosa pines are preferred for nest trees, mixed conifer stands are used more often for nest areas compared to pure ponderosa pine stands. Because preference of nest tree species might vary by area, managing for a variety of tree species that are at least 21 inches d.b.h. is recommended. Carpenter ants (*Camponotus* spp.) are the primary forage for these woodpeckers but other insects may be eaten.

Affected Environment
The National BBS (Sauer et al. 2007) shows a very broad description of population trends of birds across the United States. For the pileated woodpecker, it shows an increasing trend for the Western Region of the BBS (1966-2006: +2.3 percent/year, P = 0.00) and an unchanging trend for Idaho (1966-2006: +1.2 percent/year, P = 0.67, 95 percent confidence interval includes 0.0). When Wisdom et al. (2000) assessed the source habitat for the pileated woodpecker for the Columbia Basin, it showed a decrease of greater than 20 percent from the historical source habitat. Most projected declines in source habitat basin-wide were due to losses of late-seral forest conditions (Wisdom 2000, Vol. 2-194). Densities of large diameter snags (>21 inches d.b.h.) have likely declined basin-wide as well (Wisdom 2000, Vol. 2-197). This pattern of change was variable across the basin, with the Central Idaho Mountains (ERU 13) showing a balanced mix of increases and decreases within more than 50 percent of the watersheds (Wisdom 2000, Vol. 2-194 and Vol. 2, figure 20), with the ERU as a whole showing an increase in habitat of greater than 20 percent (Forest Plan, p. E-4). Initial forest-wide surveys for white-headed and pileated woodpeckers occurred during 2004 across the Boise National Forest (500 stations surveyed) with detections (only represents those heard from stations) of 14 pileated woodpeckers during 2004 and 36 during 2005, while summaries for 2006 and 2007 are still pending. Subsequent, annual surveys will facilitate the calculation of trends for these species on the forest.

There is a large portion of the MF Salvage Project area that is comprised of PVGs that could potentially function as source habitat for this species (Figure 3.13; pileated woodpecker associated with PVGs 3, 6, 8, and 9, as well as 2 and 5 when outside historic range of variability {HRV}; Nutt et al. 2006g). Although no pileated woodpeckers have been heard along either of the routes along the boundary of the Lightning Fire area (Figure 3.13), evidence of this woodpecker was observed along the western boundary of the Lightning Fire area (Airline Project 2005) and detections have occurred along MIS routes roughly 2 miles north and 2 miles east of the Lucky Fire area (Schoeberl 2005, 2006, 2007). It is possible that both fire areas could overlap with portions home ranges for this species but since there was sufficient information to address the effects of activities from the action alternatives, additional surveys were not warranted for pileated woodpeckers.

The analysis area for pileated woodpeckers relative to the Middle Fork Salvage Project includes the two fire areas for direct, indirect, and cumulative effects. Home ranges were not delineated and used for assessing cumulative effects for this project because existing source habitat for this species will not be affected.

Environmental Consequences and Cumulative Effects Common to All Action Alternatives
Salvage harvest would have minimal negative impacts on pileated woodpeckers because of the following:

- Salvage harvest would occur in areas that experienced ≥ 50 percent mortality and would not affect source habitat for pileated woodpeckers (40-100 percent canopy closure; Nutt et al. 2006g).
- Live trees would not be harvested.

- Snag retention within harvest units (see prescriptions in Figure 3.12 and Design Feature WL-1) would provide forage snags if pileated woodpeckers inhabit adjacent habitat (but for a shorter time than with Alternative A).

These woodpeckers would not experience an alteration of their source habitat from the proposed harvest of either action alternative. However, pileated woodpeckers might occupy habitat adjacent to the harvest units and could forage on snags along the periphery of the salvage units. As with flammulated owls, these birds may be affected as snags (1) decline to lower levels immediately following implementation, (2) fall below desired conditions sooner than with Alternative A, and (3) exist in a declined condition longer (prior to recruitment from regeneration) than with Alternative A. Negative effects would be minimal and unlikely to alter existing home range configurations for birds inhabiting the project area.

As with white-headed woodpeckers, the reduction of open road densities in the Lightning Fire area would benefit these woodpeckers as areas are closed to access by woodcutters. There would be 1,031 acres within 300 feet of roads currently open during some portion of the year that will be removed from access to woodcutters (Table 3.14). This will result when 17.8 miles of road are removed from motorized access (9.4 miles decommissioned, 7.2 miles closed year-round, and 1.2 miles converted to nonmotorized trail). The enhancement of roughly 1,000 acres for snag maintenance and recruitment will benefit pileated woodpeckers and other snag-dependent species in the short- (3-15 years) and long- (>15 years) term.

Removing snags adjacent to pileated woodpecker source habitat might have slight negative effects to these birds in the long-term. Conversely, road modification would indirectly benefit pileated woodpeckers following implementation of either action alternative. Since the potential for negative effects are immeasurable (only possible effects to foraging) and because beneficial effects would also occur, any effects to this species from this project, when combined with others in any reasonable cumulative effects area (project area plus any home range extending up to 1,000 acres outside the project area; Roloff 1999), would not contribute toward a measurable increase of negative impacts to this species and would partially mitigate any reduction of source habitat resulting from nearby projects. Appendix B includes a list of the past, ongoing and reasonably foreseeable future activities considered for this cumulative effects analysis. Overall, these action alternatives would not result in cumulative effects that would modify the population trend of this species.

3.13.3.5 Neotropical Migratory Birds

Background

Some of the species that inhabit the Middle Fork Salvage area are neotropical migrants. This means they are only present during the spring, summer, and fall. Neotropical migratory birds have become a concern in recent years because of declining populations. The January 10, 2001 Executive Order (13186) on the responsibilities of federal agencies to protect migratory birds directs action agencies to “ensure that environmental analyses of Federal actions required by the NEPA or other established environmental review processes evaluate the effects of actions and agency plans on migratory birds, with emphasis on species of concern”.

In January 2000 the Idaho Partners in Flight Program published the Idaho Bird Conservation Plan (IDBCP). This plan identified the highest priority habitats and the associated priority bird species in need of conservation. Thus, this plan takes a habitat-based approach to conserving bird populations (IDPIF 2000). The use of the Idaho Bird Conservation Plan supports the goal of maintaining the long-term sustainability of migratory bird species and their habitats as specified by the Executive Order.

Affected Environment

Of the multiple priority habitats that have been identified by the Idaho Partners in Flight (IDPIF 2000), there are two that are most prominent in the Middle Fork Salvage Project area: (1) dry ponderosa pine/Douglas fir/grand fir (pp. 70-78) and (2) riparian habitats. Focal species that are neotropical migrants associated with the dry forest types and species of concern for Idaho Partners in Flight include the flammulated owl and Lewis’ woodpecker. The existing conditions for flammulated owls are addressed

in the Sensitive Species section of this report. In summary, there is a large percentage of the project area that has the potential to function as source habitat for flammulated owls and they likely utilize the area.

Lewis' woodpecker is a secondary focal species that is migratory and associated with the dry forest types (IDPIF 2000). Source habitat is low canopy closure (generally ≤ 30 percent, Abele et al. 2004) and large tree structure in PVGs 1, 2, and 5 (Nutt et al. 2007). These woodpeckers are weak, primary nest excavators more often found nesting disproportionately in partially decayed ponderosa pine snags (due to the softer sapwood) that are present in a microhabitat exhibiting higher snag densities (vs. random sites; i.e., clumps of snags) (Abele et al. 2004). Considering their large size, it is not surprising that they are positively associated with large diameter snags (mean=18.4 inches d.b.h., IDFG 2005) (Russell et al. 2007). Forage habits of this woodpecker are also unique in that they aerial-hawk insects, which are more abundant (due to increased shrub growth) and easily caught (by this direct-flying, long-winged bird) in more open habitat (Abele et al. 2004). Although recommendations vary, snag retention suggestions from one study in Idaho identified keeping at least 5.2 snags/acre > 21 inches d.b.h. (NatureServe 2008b). Habitat loss and degradation (e.g., loss of open habitats and large snags via fire suppression) are considered major issues of concern for this species (IDFG 2005). Conditions exist in both fire areas that would approximate source habitat for Lewis' woodpeckers, especially within the salvage units where basal tree mortality is ≥ 50 percent.

The project area also contains riparian habitat, specifically, narrow valley bottom riparian complexes contained in the Middle Rocky Mountain Steppe Region (IDPIF 2000, p. 29). There are roughly 62 miles of stream within the Middle Fork Salvage Project area, 32 of which are characterized as perennial streams. This is a lower priority category than other riparian types and does not have an identification of a focal bird species. Even though bird species are not emphasized for this riparian category, goals indicated by Idaho Partners in Flight are for (1) no additional loss of riparian habitat, (2) maintenance and restoration of riparian ecosystems to natural disturbance regimes, and (3) restoration of lost or degraded riparian habitats.

Environmental Consequences and Cumulative Effects Common to All Action Alternatives
The effects analyses of these alternatives for flammulated owls (in the dry forest types) are explained in the Sensitive Species section of this document. In summary, there would not be any modification to source habitat with the action alternatives but beneficial effects would be realized as road modifications remove roughly 1,000 acres of habitat from proximity to roads (decommissioning, year-round closures, and conversion to nonmotorized trail). Flammulated owls and other neotropical migrants that do not utilize areas with ≥ 50 percent mortality, (and likely less than 40 percent canopy closure) but do use snags, would benefit as snag retention and recruitment is enhanced (via less access to woodcutters). Conversely, negative impacts could be incurred since there is a slight chance that these owls could use snags that are along the periphery of their source habitat but within the harvest units.

Species like Lewis' woodpecker that use areas characterized with ≤ 40 percent canopy closure, as well as snags, might experience negative impacts during implementation as snags used for nesting are removed. Although Lewis' woodpeckers would not likely nest in snags targeted for salvage harvest (fire-killed only) during implementation (associated with advanced decay class), the following would minimize negative impacts to Lewis' woodpeckers and similar species:

- Snag retention within salvage units with following criteria (Design Feature WL-1):
  - Only fire-killed trees will count toward the snag retention design feature and not those that were snags prior to the fire (*unless a safety hazard, no removal of snags exhibiting advance decay*)
  - Retention will be minimized 300 feet from roads (*since more likely to be removed by woodcutters*)
  - Ponderosa pine will be the preferred leave tree species (*softer sapwood for excavation by Lewis' woodpecker*)
  - Snags should be retained in a clumping pattern of 3-6 snags/clump across a unit (*retain preferred clumpy pattern*)
- All trees that were dead before the fire will be left standing (Design Feature WL-2).

- Harvest units will adhere to the following snag retention design feature (SPA = snags per acre):
  - 10-20 inches d.b.h. - 2 SPA / >20 inches d.b.h. – all ponderosa pine (2.1 SPA)

As with all of the aforementioned snag-dependent species, reductions of open road densities in the Lightning Fire area would benefit this species as roughly 1,000 acres of habitat are removed from proximity to roads (decommissioning, year-round closures, and conversion to nonmotorized trail).

Overall, the effects to neotropical migrants from the action alternatives could have negative impacts (especially during implementation) along with short- and long-term benefits in the Lightning Fire area (open road density reduction). However, the impacts of the action alternatives to neotropical migrants will be immeasurable considering (1) the small amount of acres being treated (1,077 acres), (2) the nature of the harvest (fire-killed only and no change in canopy conditions), (3) the retention of some snags in the harvest units, and (4) the large, post-implementation snag densities within theoretical 0.6-mile radii circles (see White-headed Woodpecker discussion in Sensitive Species section). Since any negative impacts to either of the two neotropical migrants assessed (removal of existing nest snags) would not occur coincident with snag removal from any project within the cumulative effects area (snags retained during live tree harvests), any effects to these species from this project, when combined with others in the theoretical home ranges, will not contribute toward a net increase of negative impacts beyond the described direct effects. Appendix B includes a list of the past, ongoing and reasonably foreseeable future activities considered for this cumulative effects analysis. Furthermore, reduction of open road densities in the Lightning Fire area would partially mitigate any reduction of source habitat resulting from nearby projects.

Those neotropical migrant species that use the riparian areas would benefit in the Lightning Fire area as areas are removed from access by woodcutters via 2.7 miles of road decommissioning in RCAs. Thus, forage and shelter for neotropical birds that use snags would be protected. Impacts to neotropical migrants along the narrow valley bottom riparian habitat would be completely beneficial.

As with many of the other aforementioned species that would benefit from either of these action alternatives, combining the activities of these action alternatives with other projects within any reasonable cumulative effects area would not cumulatively degrade conditions for neotropical migrants associated with riparian areas. Conversely, either of the action alternatives would likely mitigate any negative impacts to neotropical migrants caused from any of the nearby projects.

3.13.3.6 Other Species of Concern

In addition to describing the effects of the two action alternatives to the species analyzed thus far, habitat families, as described by Wisdom et al. (2000), were assessed in the MF Salvage Project area. Subsequently, Listed, Sensitive, and Candidate species, as well as MIS were correlated with these families based on the work of Wisdom et al. and a review of the Key Ecological Components (KEC) and Key Ecological Functions (KEF) was conducted to determine if either were potentially affected by this project but not addressed by the analyses of those species analyzed in this report. The KECs describe strong correlations of species with environmental variables and KEFs describe roles performed by each species (Marcot et al. 1998). The habitat families that coincide with the MF Salvage Project area reside within Suites 1 (Forest Only) and 3 (Riparian and Wetland; Wisdom et al. 2000). The black-backed woodpecker was the only additional species identified because it has a strong correlation (KEC) with small (10-20 inches d.b.h.), hard snags (class 1; Brown 1985) at the elevation where the activity units exist (Marcot et al. 1997).

Black-backed Woodpecker *(Picoides articus)*

Life History
The black-backed woodpecker is a year-round resident of the Boise National Forest where it generally inhabits older-aged subalpine, montane, lower montane, and riparian forested areas and younger lodgepole pine stands (Wisdom et al. 2000, Vol. 2-209). More specific to the Boise National Forest, source habitat for this woodpecker species occurs in PVGs 1-11 where medium to large tree and

moderate canopy closure conditions exist (Nutt et al. 2006h). It is similar in appearance and associated habitat conditions as the three-toed woodpecker but is found in a wider range of habitat types. As with the three-toed woodpecker, the black-backed woodpecker relies on burned or insect-infested forests for foraging, as well as nesting, and consequently, exhibit higher densities in burned forests than unburned forests (Dixon and Saab 2000). Black-backed woodpeckers are highly adapted for extracting burrowing prey and feed primary on wood-boring beetle larvae found on both live and dead trees (Dixon and Saab 2000). Since these beetle foragers excavate nests in live trees with heart rot or those that have been dead less than 5 years (Wisdom et al. 2000, Vol. 2-210), they rapidly colonize within 1-2 years following a fire and reach their highest densities 2-4 years following a fire (Saab et al. 2007). In Idaho, nesting by black-backed woodpeckers was higher in unlogged burned stands compared to salvage logged stands with the average nest tree equaling 12.6 inches d.b.h. (Wisdom et al. 2000, Vol. 2-210). It is recommended that snags be retained in a clumped, rather than an evenly spaced, distribution. Home range sizes for black-backed woodpeckers range from 178 acres in Idaho (n = 1) to 810 acres in Oregon (mean = 306; n = 3) (Dixon and Saab 2000). As with other woodpeckers, habitat degradation is the largest threat to black-backed woodpeckers, with declines in old forests, snags, large stands containing bark beetles, and stand-replacing fires specified as issues of concern (Wisdom et al. 2000, Vol. 2-214).

Affected Environment

Most of the fire areas are characterized with the PVGs associated with this woodpecker species (Figure 3.13) and much of the habitat could be occupied. Although no black-backed woodpeckers have been observed along either MIS route within the Lightning Fire area (pre-fire data), at least three black-backed woodpeckers were observed along NFS road 668B during October 2007 (Schoeberl 2007). Additionally, a black-backed woodpecker was also observed in April 2005 during wildlife surveys in the adjacent Airline Project area west of the Lightning Fire area (Fochtman 2005) and multiple black-backed woodpeckers were observed on the Rattlesnake Trail MIS route (1.5 miles east of the Lucky Fire area) during May 2007 (Schoeberl 2007) within the area affected by the 2006 Rattlesnake Fire. Surveys specific to this species were not conducted in either fire area but incidental observations in and near both fire areas means that both are likely being used by this species.

Besides the 2007 fires comprising the Middle Fork Complex, over 42,000 acres were burned during 2006 with varying intensities (see Figure 9 in Wildlife Specialist Report and Biological Evaluation in the Project Record). The 2006 Rattlesnake Fire was located north of the Lightning Fire area and east of the Lucky Fire area. None of the habitat that was burned during the 2006 fire was salvaged.

Environmental Consequences and Cumulative Effects Common to All Action Alternatives

As with white-headed woodpeckers, the Middle Fork Salvage Project would affect black-backed woodpeckers through some of the same mechanisms:

- Salvage harvest would reduce snag densities in areas that are currently being used by black-backed woodpeckers.
- Snag densities within salvage units would <u>fall</u> below levels recommended for black-backed woodpecker <u>sooner</u> than with Alternative A.
- Occupied nest trees could be harvested during project implementation.
- Road densities would be reduced in the Lightning Fire area and remove areas from access to woodcutters.

Compared to white-headed woodpeckers, black-backed woodpeckers are associated with denser stands and nest in smaller live trees with heart rot or those that have been dead less than 5 years (Wisdom et al. 2000, Vol. 2-210). Therefore, effects from the salvage will be more negative in the temporary and short-term but less in the long-term.

Immediately following harvest, snag densities would be reduced on roughly 1,100 acres of harvest units (; see Figure 3.13). Within salvage units, retention of 4.1 (>10 inches d.b.h.), fire-created snags/acre (includes 2.1 snags/acre >20 inches d.b.h.) will be above some of the varying recommendations for snag densities for these woodpeckers (0.05 – 0.5 snag/acre >16 inches d.b.h.; NatureServe 2008c) but below some observed associations (129 snags/acre; Saab et al. 2007). Considering their association with

dense, recently-killed trees, the salvage harvest would likely reduce the quality of the habitat for these woodpeckers in those areas. Factors mitigating the likely impacts to habitat for black-backed woodpeckers in salvage units include the following:

- Source habitat will exist for this species within the areas adjacent to the units that also burned during 2007
- Source habitat will exist for this species within the 2006 Rattlesnake Fire.
- Bark beetles and other pathogens will likely result in additional mortality of weakened trees that are not salvaged over the next 2-3 years (Jorgensen 2008).

The salvage harvest would not exclude black-backed woodpeckers from using the habitat within the activity units but it might decrease their densities when compared to Alternative A.

Contrary to white-headed woodpeckers, long-term (>15 years) effects to black-backed woodpeckers would be minimal because fire-created snags would be less suitable for nesting and foraging beyond 5 years following the fire.

Productivity of black-backed woodpeckers could be impacted during implementation as snags used for nesting are harvested. Consequently, productivity of individuals may be affected during the 1-2 years of harvest implementation.

The reduction of open road densities in the Lightning Fire area would benefit black-backed woodpeckers as areas are closed to access by woodcutters. There would be 1,031 acres within 300 feet of roads currently open during some portion of the year that will be removed from access to woodcutters because of road decommissioning or closing roads year-round (Table 3.14). This will result when 17.8 miles of road are removed from motorized access (9.4 miles decommissioned, 7.2 miles closed year-round, and 1.2 miles converted to nonmotorized trail). Enhancing roughly 1,000 acres for snag maintenance and recruitment would benefit these woodpeckers in the short- (3-15 years) term when use by this species will be highest.

The reduction of snag densities within the salvage units would likely reduce the carrying capacity for this species and could result in removal of active nests during implementation but other project effects and adjacent habitat conditions would partially mitigate these negative impacts. Prescribed snag retention (Design Feature WL-1), nearby source habitat (nonharvest areas of the Middle Fork Complex and the 2006 Rattlesnake Fire), additional tree mortality 2-3 years after harvest, and road modifications in the Lightning Fire area would minimize effects to black-backed woodpeckers. There might be minimal negative impacts to black-backed woodpeckers from the salvage harvest but the effects from this project would not coincide with snag removal in source habitat for this species from any project within the cumulative effects area (up to 300 acres outside the project area; see mean described in Dixon and Saab 2000). Consequently, any effects to this species from this project, when combined with others in the cumulative effects area, would not contribute toward a net increase of negative impacts beyond those described above where densities may be slightly reduced compared to Alternative A.

3.14 OVERALL WILDLIFE CONCLUSION

The species likely to be most affected by the action alternatives comprise those cavity-nesting birds that are associated with the habitat in the activity units. Although other wildlife species might be impacted from the other project activities (i.e., road modifications, reforestation, disturbance), alterations to snag densities has the most potential to affect white-headed woodpecker, Lewis' woodpecker, and black-backed woodpecker. Considering the snag retention design feature (WL-1) (4.1/acre, comprising two in the 10-20 inches d.b.h. size class and all ponderosa pine >20 inches d.b.h. {2.1/acre}), the black-backed woodpecker will be most likely to experience negative impacts since it is positively associated with recently burned areas exhibiting dense snag conditions. Lewis' woodpeckers, along with white-headed woodpeckers, will be less likely to experience negative impacts because they are associated with more open stands containing large snags, with Lewis' showing an association of snags with advanced decay (weak excavators that aerial-hawk insects). The above analysis shows that the action alternatives have

the potential to negatively affect all three species but impacts will be localized and will have an inconsequential effect to their populations.

The following factors used to determine that impacts to the populations of the three woodpecker species will be negligible:

- The 1,100 acres that will undergo salvage harvest is surrounded by an additional 7,500 acres that burned during 2007 but will not be harvested.
- The salvage harvest is proximate to the Rattlesnake Fire that burned roughly 42,000 acres during 2006 (See Figure 9 in Wildlife Specialist Report/BE in project record) and was not salvaged.
- Bark beetles and other pathogens will likely result in additional mortality of weakened trees that are not salvaged over the next 2-3 years (Jorgensen 2008).
- Post-implementation snag densities within the four 1-km radii theoretical home ranges (more pertinent scale to woodpecker biology than activity units) will remain high following implementation (>10 inches d.b.h. range = 8.2-13.9/acre; >20 inches d.b.h. range = 1.9-2.7/acre;Table 3.17).
- Projections of large, fire-created snags that will be standing 60 years following the fire (Figure 3.12) indicates that there is only a slight difference among alternatives and only a slight chance that any alternative will result in a gap between losing all large snags and recruitment from regenerated stands 80-100 years post-fire (Dickerson, 2008 personal communication).
- All fire-killed ponderosa pine trees >20 inches d.b.h. will be retained within the salvage units.

This retention of all large ponderosa pine will shift the tree species composition (albeit snags) to more ponderosa pine within the salvage units. The warm Douglas fir/moist ponderosa pine vegetation group that comprises most of the salvage activity units (roughly 80% of the 75% classified via stand exam) were historically dominated almost entirely by ponderosa pine while Douglas fir was restricted to stream bottoms and northern aspects (Sloan 1998). Pre-fire, non-ponderosa pine composition in the salvage areas were higher than what would occur naturally so the emphasis on retention of ponderosa pine will result in post-fire conditions more like those presented to cavity-dependent species historically. One consequence of retaining only the ponderosa pine of the fire-killed trees >20” dbh may be a more variable retention of large snags across the activity units (i.e. very few in some units and many in others) than what would have resulted if large tree retention was spread across the five tree species encountered during stand evaluations. However, there will not be an absence of snags in any of the salvage units because pre-fire snags (10-20” dbh = 1.9/acre; >20” dbh = 0.3/acre) and 2 fire-killed trees/acre in the 10-20” dbh size class (clumpiness emphasized) will more consistently be retained across all of the salvage units.

Portions of the Middle Fork Salvage project will have beneficial effects to some species (e.g., cavity-dependent species from road modifications) and negative effects to others. The largest negative impact will likely occur to black-backed woodpeckers as a result of snag densities within salvage units would fall below levels recommended for black-backed woodpecker sooner than with Alternative A. Since this is the most negatively impacted wildlife species and the salvage activities are not projected to measurably affect the population of this woodpecker, it can be inferred that effects to other wildlife species will at most impact individuals and not their populations.

3.15 WATERSHED AND FISHERIES RESOURCES

3.15.1 Scale of Analysis

For the purposes of the watershed and fisheries assessment, the 6th Field Hydrologic Unit Code (HUC) or subwatershed scale, unless otherwise stated, was used as the analysis area for depicting existing resource conditions and potential direct, indirect, and cumulative effects from implementation of the Middle Fork Salvage Project.

3.15.2 Affected Environment

3.15.2.1 RCA Delineation

RCAs are defined in the Boise National Forest Plan (2003) as portions of watersheds encompassing riparian ecosystems, where riparian-dependent resources receive primary emphasis, and management actions are subject to specific goals, objectives, standards, and guidelines. RCAs include traditional riparian corridors, perennial and intermittent streams, wetlands, lakes, springs, reservoirs, and other areas where proper riparian functions and ecological processes are crucial to maintenance of the area's water, sediment, woody debris, nutrient delivery system, and associated biotic communities and habitat (Forest Plan, p. GL-34). Aquatic and riparian systems are easily affected by land management activities on the surrounding hillslopes. RCAs provide both a linkage and transitional habitat between hillslopes and upland terrestrial habitats and the aquatic habitats within the stream channels.

The Boise National Forest Plan (2003) outlines criteria to aid interdisciplinary teams (IDT) in delineating RCAs for perennial and intermittent streams, ponds, lakes, reservoirs, and wetlands. The RCAs within the *MF Salvage Project* area have been identified using the Option 2 delineation method for forested streams by the IDT. Option 2 requires field verification of certain site characteristics and provides a more site-based delineation of RCA boundary for a specific site (Forest Plan, p. B-32 to B-34). Table 3.19 describes the RCA distances for project area streams.

Table 3.19. MF Salvage Project RCA Distance by Water Source

Water Source	RCA Distance*
Perennial Stream	240-foot slope distance (two site-potential tree heights based on PVG 2)
Intermittent Stream providing seasonal rearing and spawning habitat	240-foot slope distance (two site-potential tree heights based on PVG 2)
Intermittent Stream	120-foot slope distance (one site-potential tree height based on PVG 2)
Ponds, Lakes, Reservoirs, and Wetlands	120-foot slope distance (one site-potential tree height based on PVG 2)

* Distance from ordinary high water mark.

3.15.2.2 Watershed Condition Indicators

Watershed Condition Indicators (WCIs) are an integrated suite of aquatic (including biophysical components), riparian (including riparian associated vegetation species), and hydrologic (including uplands) condition measures that are intended to be used at a variety of scales. WCIs assist in determining the current condition of a watershed and should be used to help design appropriate management actions, or to alter or mitigate proposed and/or ongoing actions, to move watersheds toward desired conditions. WCIs represent a diagnostic means to determine factors of current condition and assist in determining future conditions associated with implementation of management actions or natural restoration over time (Forest Plan, GL-40).

There are 24 WCIs outlined in the Boise National Forest Plan to characterize current SWRA conditions and the effects of land management activities on subpopulation character, water quality, habitat access, habitat elements, channel conditions, flow/hydrology, and watershed conditions (Forest Plan, p. B-12 to B21).

A SWRA Report was completed by the Hydrologist and Fisheries Biologist to determine the relevant, relevant and influenced and not influenced WCIs. This report was completed in order to complete a focused and rational watershed and fisheries analysis for this project. The SWRA Report is available in

the project record as part of both the Watershed and Soils Specialist Report and the Fisheries Specialist Report.

3.15.2.3 Municipal Watersheds

The Middle Fork Salvage project area is comprised of two fire areas of the Middle Fork Complex Wildfire (2007): Lucky Fire and Lightning Fire. The Lucky fire area is located in the Sixmile subwatershed (HUC 170501210301) and the Lightning fire area is located in the Anderson (HUC 170501210103), Lightning (HUC 170501210204), and Pyle (HUC 170501210101) subwatershed. All of these subwatersheds are within the municipal watersheds for the Rivers Point Property Owners Association and the Horseshoe Bend Water Supply (Watershed and Soil Resources Specialist Report in Project Record).

3.15.2.4 Beneficial Uses

Surface water classifications or beneficial uses are intended to protect surface waters. The beneficial use for a water body is dependent on the actual use, the ability of a water body to support a non-existing use and the likelihood of the water being used in a given manner (State of Idaho, Department of Environmental Quality, 2003a, p. 4 (IDAPA 58.01.02.03.04)). The designated beneficial uses for the streams within the MF Salvage project are outlined in Table 3.20 No specific beneficial uses have been designated for streams in the Sixmile and Pyle subwatersheds. However, those waterbodies within the MFPR that do not have designated beneficial uses have the following designations of existing uses; cold water biota, secondary contact recreation and primary contact recreation when enough flow is present (i.e., 5 cfs or greater) (State of Idaho, 1998b, p. 21 and State of Idaho, 2003a, p. 23-24 9 (IDAPA 58.01.02.101)). There are several beneficial uses that apply to all of the surface waters of the State of Idaho; agriculture water supply (AWS), industrial water supply, wildlife habitats, and aesthetics (State of Idaho, 2003a, p. 23 (IDAPA 58.01.02.100)).

Table 3.20. Designated Beneficial Uses for the Middle Fork Payette River, Anderson Creek, and Lightning Creek

Waterbody	Beneficial Use*					
	COLD	SS	PCR	SCR	DWS	SRW
MFPR	✓	✓	✓		✓	✓
Anderson	✓	✓	✓			
Lightning	✓	✓	✓			

*Beneficial Use: COLD= Cold Water Biota, SS= Salmonid Spawning, PCR = Primary Contact Recreation, SCR = Secondary Contact Recreation, DWS = Domestic Water Supply, and SRW = Special Resource Water.

3.15.2.5 Middle Fork Payette River Sub-Basin Assessment and TMDL

In 1998, DEQ completed a Sub-basin Assessment and Total Maximum Daily Load (TMDL) for the MFPR. The EPA approved the TMDL (State of Idaho, 1998b) in July 2000 and DEQ issued a TMDL Implementation Plan in 2003. An addendum to the MFPR Sub-Basin Assessment and Total Maximum Daily Load was prepared by DEQ and submitted to EPA in 2007 with a TMDL for Temperature. EPA subsequently approved the TMDL in December 2007 (US EPA Temperature TMDL Approval Letter, 2007). The MFPR Temperature TMDL was prepared to address the 1998 EPA addition of the MFPR (headwaters to confluence with the SFPR) to the State of Idaho's 303(d) list for exceedance of the temperature standard. The TMDL and TMDL Implementation Plan are, in essence, water quality management plans which allocate responsibility for pollutant reduction with a goal of achieving water quality standards within a specified period of time (State of Idaho, 1998b, p. 20).

3.15.2.6 State of Idaho Integrated Report

DEQ submits an "Integrated Report" to the Environmental Protection Agency (EPA) for approval every 2 years as required by the Federal Clean Water Act (CWA). The U.S. Environmental Protection Agency (EPA) approved the State of Idaho's 2002/2003 Integrated report in December 2005 (State of Idaho, 2005). DEQ has prepared a Draft Principles *and Policies for the 2008 Integrated (303(d)/303(b)) Report* (Integrated Report) (State of Idaho, 2008). There are several changes between the 2002/2003 report and the newly-prepared revised draft. For subwatersheds within the Middle Fork Salvage analysis area, these

changes include the listing of Sixmile Creek and West Fork Creek within the Sixmile subwatershed, and Anderson Creek within the Anderson Creek subwatershed, as "impaired" with temperature listed as the pollutant of concern (see Watershed and Soil Resources Specialist Report in Project Record).

3.15.2.7 Middle Fork Salvage Project Sediment Modeling

The methodology used to estimate the sediment yield from land management activities for this project is the BOISED sediment model, which was developed for use on the Boise and Payette NFs to evaluate alternative land management scenarios on 1 to 50 square mile forested watersheds associated with the Idaho Batholith (USDA, Forest Service, 1991, p. 2-3). Although not intended for use as a highly reliable predictor of absolute quantities of sediment delivered to area streams, BOISED provides an appropriate means by which to compare management alternatives within a watershed (USDA, Forest Service, 1991, p. 2).

Pyle subwatershed was eliminated from the sediment analysis based on the project activities occurring on approximately 53 acres (or 0.3 percent of the subwatershed). Lightning Creek subwatershed was eliminated from the sediment analysis based on the project activities including salvage harvest, road work, and reforestation would occur on a very small portion of the subwatersheds acres about 77 acres or 0.4 percent in Lightning subwatershed. In both of these subwatersheds, the project activities would occur in the upper portions of the subwatershed and given the limited amount of activities a measurable increase in sediment delivery the Middle Fork Payette River would not be expected.

Sixmile Subwatershed

The BOISED model was completed for the Sixmile subwatershed. The existing condition for BOISED modeled sediment yields in the Sixmile subwatershed is 19.8 percent over natural (ON). The existing conditions for sediment yields were modeled using historic wildfires (1900–2006), the Lucky Wildfire (2007), Sixshooter Project timber harvest and road work (2006), and Forest Service authorized road system (Watershed and Soil Resources Specialist Report in Project Record).

Anderson Subwatershed

The BOISED model was completed for the Anderson Creek subwatershed. The existing condition for BOISED modeled sediment yields in the Anderson Creek subwatershed is 24.8 percent over natural (ON). The existing conditions for sediment yields were modeled using historic wildfires (1900–2006), the Lightning Wildfire (2007), and Forest Service authorized road system information (Watershed and Soil Resources Specialist Report in Project Record).

Roads in both subwatersheds were the primary source of management-induced sediment (BOISED model outputs in Project Record). These results are supported by the available scientific literature, which clearly identifies roads and road construction, and not timber harvest, as the primary sources of sediment on managed and developed lands (Megahan and Kidd, 1972, p. 139-140; Swanson et al., 1987, p. 20; Ketcheson et al., 1999, p. 83). Megahan and Kidd (1972, p. 136, 140) showed that long-term sediment production from logging roads in the Idaho Batholith was accelerated by a factor of 750 times the natural rate as compared to a factor of 0.6 times on the area disturbed by cutting and skidding. Protection of streams from road-induced sediment is important in forest practices and involves the use of buffer zones and other mitigation practices, particularly in areas with highly erodible granitic soils (Ketcheson and Megahan, 1996, p. 1).

3.15.3 Fisheries

The Fish and Wildlife Service (FWS) maintain the current Proposed/Listed Threatened-Endangered/Candidate species list and publish the information in the Federal Register. A species list for each Ranger District is provided to the Boise National Forest by the Snake River Basin Office of the FWS, and is updated quarterly. The list used for this document is species list 2008-SL-0268.

The Middle Fork Complex Salvage Project was introduced in a Phase 1 meeting to the Level 1 consultation team on February 5, 2008. A BA/BE was completed and submitted to USDI Fish and Wildlife Service on May 9, 2008.

3.15.3.1 Bull Trout

Bull trout are the only known federally listed fish species in the Middle Fork Payette River system. In 1998, the FWS listed bull trout (*Salvelinus confluentus*) as Threatened (USDI FWS 1998). Bull trout were also identified as an MIS in the revised 2003 Boise National Forest Land and Resource Management Plan (Forest Plan).

The Middle Fork project area is within the Middle Fork Payette River Core Area, which is within the Payette River Recovery Subunit of the Southwest Idaho Recovery Unit for bull trout (USFWS 2002). Chapter 18 in the *Bull Trout* (*Salvelinus confluentus*) *Draft Recovery Plan* (USDI FWS 2002a) identified the Upper Middle Fork Payette River (drainage upstream of and including Bull Creek and Sixteen to One Creek) as a local population and serves as spawning and rearing habitat for adult, juvenile, and young of the year bull trout. Lightning, Sixmile, and West Fork Creeks were identified as potential local populations. A potential local population is one that does not presently support bull trout spawning and rearing but would likely support a local population if restored (USDI FWS 2002c). In comments to the FWS, the Boise NF suggested that this habitat designation be removed, given the large, impassable waterfalls that exist on both creeks near the confluence with the Middle Fork Payette River. In the final rule issued by the FWS on November 5, 2004, no designated Critical Habitat was identified in the Middle Fork Payette River system (USDI FWS 2004).

In the final rule issued by the FWS on November 5, 2004, no designated Critical Habitat was identified in the Middle Fork Payette River system (USFWS 2004).

The Middle Fork Payette River is considered migratory (nodal) bull trout habitat to accommodate fluvial life-history expression from source areas in the upper Middle Fork Payette River and the potential for straying from South Fork Payette local populations (Burton 2000). However, genetic analysis by DeHaan and Ardren (2008) indicate that Big Falls isolates the South Fork Payette core area from the Middle Fork Payette core area. Anecdotal accounts of larger bull trout in the lower Middle Fork Payette River have been made as recently as 1998, indicating recent expression of a fluvial migratory life history (Flatter, 2004).

The closest known bull trout local population in the Upper Middle Fork Payette River is located over 15 miles upstream from the confluence with streams in the Sixmile subwatershed, over 20 miles from the confluence with Lightning Creek, and over 33 miles from the confluence with Anderson Creek. District surveys have not observed bull trout in any of the streams in any of the subwatersheds in the Middle Fork Salvage Project.

Three bull trout patches have been identified that are near the Middle Fork Salvage project area. One patch is located in the headwaters of Anderson Creek (East Fork Anderson Creek patch, Strata 4 – unsurveyed) and two are located in the Lightning Creek subwatershed; the Lightning Creek patch (Strata 2 – surveyed unoccupied) and the Onion Creek patch (Strata 2 – surveyed unoccupied). No bull trout patches were identified in the Sixmile subwatershed (GIS coverages). A bull trout patch is an area that is believed suitable for spawning and rearing at least 500 hectares in size above 1,600 meters in elevation (Rieman and McIntyre, 1995). All of the patches are located upstream from ground-disturbing project activities.

Bull trout distribution is strongly influenced by summertime maximum temperatures. On the Boise National Forest, resident populations and spawning and rearing habitat is generally restricted to streams above 5000 feet in elevation (Rieman and McIntyre, 1995) with maximum summertime temperatures below 15° C. Bull trout spawn in cold headwater streams with temperatures between 5° and 9° C as optimal. This normally occurs from August to November (Rieman and McIntyre, 1993). More information on the life history and habitat needs for bull trout can be found in Quigley and Arbelbide (1997).

Sixmile Subwatershed
In the Sixmile subwatershed, bull trout are considered present in the migratory corridor of the Middle Fork Payette River (USDA, Forest Service (WARS Database), 2003h). One DEQ BURP survey conducted in Wet Foot Creek in 2006 captured one subadult bull trout in the drainage (State of Idaho, 2008b). However, district surveys have not observed bull trout in the subwatershed and IDFG database (State of Idaho, 2003b) information indicate that bull trout are 'suspected not present' in Sixmile, West Fork Sixmile, West Fork, and Wet Foot Creeks.

Lightning Creek Subwatershed
District surveys in 1993, 1994, 2002, and 2004 did not find bull trout in the Lightning Creek subwatershed. IDFG database information indicates that bull trout are 'suspected not present' in both Lightning and Onion Creeks. The WARS database indicates that bull trout are absent from the Lightning Creek subwatershed.

Anderson Creek Subwatershed
The WARS database indicates that bull trout are considered present in the Anderson Creek subwatershed. However, district surveys in 1994 and 2003 did not observe any bull trout in Anderson Creek or Granite Creek. IDFG database also indicates that bull trout are 'suspected not present' in the area. Three DEQ BURP surveys conducted in Anderson Creek in 1996, 1999, and 2004 also did not find bull trout in the drainage (State of Idaho, 2008).

Pyle Subwatershed
The WARS database indicates that bull trout are considered present in the migratory corridor of the MFPR in the Pyle subwatershed.

3.15.3.2 Management Indicator Species

The bull trout is the only aquatic MIS in the 2003 BNF Forest Plan (Vol. 2, p. E-3).

3.15.3.3 Other Fishes

Other fishes known to the Middle Fork Payette River drainage include rainbow/redband trout (*O. mykiss*), whitefish (*Prosopium williamsoni*), sculpin (*Cottus spp*.), sucker (*Catostomus* spp.) and dace (*Rhinichthys spp*.). Stocking records were found for Sixmile Creek, Anderson Creek and the Middle Fork Payette River (State of Idaho, 2007b). Rainbow trout were stocked in Sixmile Creek in 1970. In Anderson Creek several strains of rainbow trout were stocked from 1969 to 1989. Brook trout were stocked in 1981. Rainbow/cutthroat hybrids and several strains of rainbow have been stocked in the Middle Fork Payette River since 1968. No stocking records exist for Lightning Creek, Onion Creek, Wet Foot, or West Fork Creek.

Sixmile Subwatershed
Fish surveys conducted in 1993, 1994, 1999, 2000, and 2002 found only rainbow trout within Sixmile Creek and no fish within West Fork Creek. Several anecdotal accounts have described fishes in West Fork Creek although the species composition is unknown. The maximum size of rainbow trout in Sixmile Creek is relatively small; most fish are less than 8 inches in length.

Anderson Creek Subwatershed
Fish surveys completed in the Anderson Creek subwatershed in 1994 and 2003 found only rainbow trout and sculpin (USDA, Forest Service, 2006c). In addition, two DEQ BURP surveys in 1996 and 1999 (State of Idaho, 2008) found only rainbow trout and shorthead sculpin in the Anderson Creek drainage. One DEQ BURP survey (2004) conducted in Anderson Creek near the confluence with the Middle Fork Payette River found chiselmouth (*Acrocheilus alutaceous*), longnose dace (*Rhinichthys caractae*), speckled dace (*Rhinichthys osculus*), redside shiner (*Richardsonius balteatus*), mottled sculpin (*Cottus bairdii*), dace (*Rhinichthys spp*.), and sculpin (*Cottus spp*).

Lightning Creek Subwatershed

Fish surveys in the Lightning Creek subwatershed in 1993, 1994, 2002, and 2004 found rainbow trout within Lightning Creek and no fish in Onion Creek, a tributary to Lightning Creek. One survey completed at the mouth of Lightning Creek in 1993 found sculpin and suckers (*Catostomus spp*.). Densities of rainbow trout in Lightning Creek range from one to four fish per $100m^2$ with an average of two fish per $100m^2$. IDFG database information also indicates that rainbow/redband trout have been 'documented present' in the area.

Additionally, during the 2007 Middle Fork Complex Fire, an unknown amount of fire retardant was released from a helicopter into mainstem Lightning Creek approximately 2 miles downstream from the confluence with Onion Creek. A fish kill was observed with about 125 dead rainbow trout found at varying locations downstream from the release point. No other fish species were found.

Pyle Subwatershed

Redband/rainbow trout exist within the Pyle subwatershed (USDA, Forest Service, 2003h).

3.15.4 Environmental Baseline

Tables C.1 and C.2 in Appendix C of this document outline the current baseline conditions in the Sixmile and Anderson Subwatersheds, respectively. The tables were taken and modified, where appropriate, from Appendix B, p. 22 of the 2003 Forest Plan.

The Sixmile subwatershed baseline was taken from the Sixshooter EIS (USDA, Forest Service, 2006) and updated to include projects and events that have occurred since the Sixshooter decision. Current WCI functionality ratings for the Sixmile subwatershed are summarized below. See Table C.1 in Appendix C for current Sixmile subwatershed baseline.

- **WCIs Functioning Acceptably (FA)**: Large Woody Debris, Pool Frequency, Off Channel Habitat, Width/Depth Ratio, and Stream Bank Condition.
- **WCIs Functioning at Risk (FR)**: Life History Diversity, Persistence and Genetic Integrity, Refugia, Floodplain Connectivity, Changes in Peak/Base Flows, Disturbance History, RCAs, and Species and Habitat.
- **WCIs Functioning at Unacceptable Risk (UR)**: Local Population Size, Growth and Survival, Temperature (Bull Trout), Temperature (Other Fishes), Sediment (Other Fishes), Contaminants/Nutrients, Physical Barriers, Substrate Embeddedness, Large Pools, Drainage Network Increase, Road Density and Location, and Disturbance Regime.
- **WCIs Not Applicable to this project**: Sediment – Bull Trout spawning areas.

The Anderson Creek baseline was taken from the Scott Mountain Whitebark Pine Restoration EA completed by the BNF, Lowman Ranger District (USDA, Forest Service, 2008b) and updated to include projects and events that have occurred since that decision. Data used to complete the baseline includes the BNF Aquatic Survey Database, the BNF LRMP WARS database, Emmett Ranger District surveys, GIS coverages, and online information. Habitat data were collected using modified methods described within the *R1/R4 Fish and Fish Habitat Inventory Procedures Handbook* (Overton et al. 1997). Current WCI functionality ratings for the Anderson subwatershed are summarized below. See Table C.2 in Appendix C for current Anderson subwatershed baseline.

- **WCIs Functioning Acceptably (FA)**: Temperature (Other Fishes), Sediment (Other Fishes), Pool Frequency, Off-Channel Habitat, and Width/Depth Ratio.
- **WCIs Functioning at Risk (FR)**: Life History Diversity, Persistence and Genetic Integrity, Large Woody Debris, Large Pools, Refugia, Stream Bank Condition, and Floodplain Connectivity.

- **WCIs Functioning at Unacceptable Risk (UR)**: Local Population Size, Growth and Survival, Temperature (Bull Trout), Contaminants/Nutrients, Physical Barriers, Changes in Peak/Base Flows, Drainage Network Increase, Road Density and Location, Disturbance History, RCAs, Disturbance Regime, and Species and Habitat Conditions.

- **WCIs Not Applicable to this project**: Substrate Embeddedness (Rearing Areas) and Sediment (Bull Trout).

Pyle Creek and Lightning Creek Subwatersheds
There would be no effect to the WCIs and bull trout have not been found in the Pyle Creek or the Lightning Creek subwatersheds there would be no effect to bull trout or their habitat. Pyle and Lightning Creek subwatersheds were eliminated from detailed analysis for the following rationale; all project harvest activities are outside of RCAs (including reforestation), project activities are located near ridgetops and at least 6 stream miles from the confluence with the Middle Fork Payette River and migratory bull trout habitat, and project activities would occur on a very small portion of the subwatersheds, about 53 acres or 0.3 percent in Pyle and 77 acres or 0.4 percent in Lightning subwatershed. A Matrix (Appendix B, page B-8) will not be prepared for the Pyle Creek or the Lightning Creek subwatersheds for the MF Salvage Project. The Forest Plan states that if "Management actions **Will Not** result in quantifiably measurable, or clearly defined qualitative, negative effects (temporary, short-term, or long-term) on WCIs and ESA-listed species are not present. **USE OF MATRIX NOT NEEDED**." For additional information, see the Watershed and Soil Resources Specialist Report or Fisheries Specialist Report in the Project Record.

3.15.5 Environmental Consequences

3.15.5.1 Environmental Consequences Specific to Alternative A

Alternative A (no action alternative) does not propose any new management activities, although, natural processes and ongoing management activities such as recreation, public firewood gathering, fire suppression, and routine road maintenance are expected to continue. The transportation system within the analysis area would remain at the current level with this alternative.

By 2018, the modeled sediment yield in the Sixmile subwatershed would be reduced to 11.8 percent over natural (ON) from the current 19.8 percent ON. By 2014, the modeled sediment yield in the Anderson Creek subwatershed would be reduced to 12.3 percent ON from the current 24.8 percent ON. The sediment yield reduction in both subwatersheds is a result of the amelioration of wildfire effects overtime. In addition, the Sixmile subwatershed sediment yield recovery may be attributable to implementation of ongoing projects (Sixshooter Project 2006).

The WCIs would remain on their current trajectories with implementation of Alternative A in both the Sixmile and Anderson Creek subwatersheds. Under this alternative, there would be no road improvements, decommissioning or yearlong road closures and consequently stream sediment sources from roadways would persist. Additionally, road density and RCA road miles would remain the same. Roads within RCAs have a negative impact to stream dynamics and fish habitat. The negative impacts include delivery of sediment to streams, increased stream temperature, limited access to habitat due to improperly installed culverts, limited large woody debris recruitment, streambank impacts, and limited riparian functions and processes.

Implementation of the no action alternative would not affect municipal watersheds or designated beneficial uses within the Middle Fork Salvage Project area.

3.15.5.2 Environmental Consequences Common to All Action Alternatives

3.15.5.2.1 Municipal Watersheds
Implementation of the Middle Fork Salvage Project (any action alternative) is unlikely to affect the identified municipal watershed. There is potential for unforeseen accidental spills of chemical contaminants/nutrients into stream corridors within the municipal watershed. An emergency spill containment kit will be on site. There would be no fuel storage, refueling, equipment storage, or servicing

equipment within any RCA unless there is no other alternative. Small leaks and drips are likely, but may not measurable. All machinery would be inspected prior to use to ensure they are free from drips and leaks. All pumps used within the RCA shall have a spill-containment basin with absorbent pads in place to prevent contamination of ground or surface waters. An accident could take place that would deliver fuel or other chemicals to streams and RCAs. Depending on the chemical, the amount spilled, and the location spilled, the effects could range from negligible to serious. However, the likelihood of a spill is discountable, given design feature SW-7 pertaining to spill prevention/containment.

Contract provisions will require a spill prevention/containment plan that meets applicable EPA requirements. For all associated and other activities where those contract provisions do not apply, spill prevention and containment plans will be developed based upon the type and quantities of chemicals expected and approved by a Forest Service representative. The Spill Containment Plan for the Middle Fork Salvage project is located in the Project Record. Any contaminant spill within the municipality's 24-hour response area will be reported to the proper authorities, should one occur.

3.15.5.2.2 Beneficial Uses

As shown above in the municipal watersheds discussion and below in the sediment modeling discussion, beneficial uses for the Middle Fork Payette River and for the waterbodies the Sixmile, Anderson, Pyle, and Lightning Creek subwatersheds would not be degraded by implementation of any of the action alternatives with implementation of design features and BMPs.

3.15.5.2.3 Sediment Modeling – Sixmile Subwatershed

Both Alternatives B and C would result in immeasurable sediment delivery to intermittent and perennial streams in the temporary and short-term after project implementation in the Sixmile subwatershed, based on modeling results and application of design features and mitigations, such as BMPs, RCA widths, and additional erosion control mitigations. In addition, field work completed as part of the MF Complex BAER and post-fire soil health assessments indicated that there is adequate effective ground cover (rock, litter, woody debris and living plants) in the Lucky Fire area to dissipate overland flow and consequently sediment delivery to streams (Watershed and Fisheries Specialist Report in Project Record). It is expected that implementation of these alternatives would have an immeasurable increase in sediment delivery to streams in the temporary and short-term timeframes. BOISED results for these alternatives show small decrease sediment in 2008 to 19.1 percent ON from 19.8 percent ON in 2007. This reduction can be attributed to amelioration of the effects from both the 2007 Lucky Fire and Sixshooter activities modeled to have occurred in 2006. In both action alternatives, Sixmile subwatershed sediment would stabilize below existing conditions at 12.1 percent ON in 2015. While the BOISED model results for these alternatives illustrates a reduction to below existing conditions it is difficult to determine if the reduction is the result of this project, Sixshooter Project or recovery of the Lucky Wildfire effects. It is likely, that the long-term reduction of sediment production is a combination of all three projects/events. Roads within this subwatershed would continue to be the primary source of management-induced sediment as modeled by BOISED (BOISED Outputs in Project Record).

Based on proposed activities, M-K modeling completed for the Sixshooter Project (2006) in the Sixmile subwatershed indicates that sediment delivery lengths range from 7 to 121 feet for diffuse runoff (harvest activities) and up to 197 feet for concentrated runoff situations (roads, skid roads, landings, and trails) (USDA, Forest Service (Sixshooter EIS), 2006). The M-K field data and modeling was completed in the Sixmile subwatershed on unburned slopes prior to the Lucky Fire. It is likely that some hillslope obstructions were consumed by the wildfire in high severity areas (43 acres) and that erosion rates have increased from unburned conditions. However, given that the high severity acreage is approximately only 3 percent of the fire area it is assumed that the M-K field data in the Sixmile subwatershed is still relevant for the analysis area. The Middle Fork Salvage Project RCA widths are 240 feet slope distance for perennial streams and 120 feet slope distance for intermittent streams. There is the potential for sediment delivery to intermittent streams if the project design features and BMPs are not applied in both diffuse and concentrated runoff situations based on the M-K maximum modeled sediment delivery lengths and the intermittent RCA width. With implementation of BMPs and project design features including slash filter windrows on any landings in RCAs (SW-3), cross-ditching of skid roads over 20 percent slope (SW-13), and erosion control devices at culvert removals (SW-12) and road decommissioning adjacent to

streams (SW-10), sediment delivery to project area intermittent streams would be immeasurable in the temporary (0 to 3 years), short-term (3 to 15 years), and long-term (15 years or longer) timeframes.

3.15.5.2.4 Sediment Modeling – Anderson Subwatershed

Both Alternative B and C would result in immeasurable sediment delivery to intermittent and perennial streams in the temporary and short-term after project implementation in the Anderson subwatershed, based on modeling results and application of design features and mitigations, such as BMPs, RCA widths, and additional erosion control mitigations. In addition, field work completed as part of the MF Complex BAER and post-fire soil health assessments indicated that there is adequate effective ground cover (rock, litter, woody debris and living plants) in the Lightning Fire area to dissipate overland flow and consequently sediment delivery to streams (Watershed and Fisheries Specialist Report in Project Record). It is expected that implementation of these alternatives would have an immeasurable increase in sediment delivery to streams in the temporary and short-term timeframes and in the long-term have an immeasurable decrease in sediment delivery to streams. BOISED results for these alternatives show small decrease sediment in 2008 to 20.2 percent ON from 24.8 percent ON in 2007. This reduction can be attributed to amelioration of the effects from the 2007 Lightning Fire. In both action alternatives, Anderson subwatershed sediment would stabilize below existing conditions at 12.3 percent ON in 2014 as a result of yearlong road closures to motorized use and road decommissioning activities. Roads within these subwatersheds are the primary source of management-induced sediment as modeled by BOISED (BOISED Outputs in Project Record).

3.15.6 Fisheries and Watershed

The Dichotomous Key for Making ESA Determination of Effects can be found in the Fisheries Specialist Report (Project Record). This analysis is based on the assumption that all activities would be completed within the temporary timeframe.

3.15.6.1 Sixmile Subwatershed – Watershed Condition Indicators

All WCIs evaluated for the action alternatives were found to be maintained or not influenced with implementation of this project (Table 3.21). The analysis illustrated that many of the WCI would have immeasurable effects in one or more of the timeframes. The Integration of Species and Habitat Conditions WCI discussion is presented here as a summary WCI discussion of the anticipated effects to the fish species and watershed/habitat conditions in the Sixmile subwatershed. Detailed discussion of each of the WCIs evaluated for this project is available in the Watershed and Soil Resources Specialist Report and the Fisheries Specialist Report in the Project Record.

Integration of Species and Habitat Conditions. Habitat conditions would be maintained at the subwatershed scale. Sediment delivery to stream in the temporary and short-term timeframes is expected to be immeasurable based on M-K modeling, RCA widths, design features, and BMPs. There would be an immeasurable reduction in sediment delivery to project area streams and migratory bull trout habitat in the long-term. Reforestation would result in a site-specific immeasurable improvement in RCA conditions in the long-term. Hazard tree removal is expected to result in an immeasurable effect to LWD.

Table 3.21. Effects Summary for Alternatives B and C in the Sixmile Subwatershed

Pathways Indicators [a]	Effects of the Management Action(s)		
	Effects [b,c]	Alternative B[d] T/S/L [+]	Alternative C[d] T/S/L [+]
Subpopulation Character			
Subpopulation size	N	N/N/N	N/N/N
Growth and Survival	N	N/N/N	N/N/N
Life History Diversity and Isolation	N	N/N/N	N/N/N
Persistence and Genetic Integrity	N	N/N/N	N/N/N
Water Quality			
Temperature (bull trout)	N	N/N/N	N/N/N

Pathways Indicators [a]	Effects of the Management Action(s)		
	Effects [b,c]	Alternative B[d] T/S/L [+]	Alternative C[d] T/S/L [+]
Temperature (other fishes)	M	-*/+*/+*	-*/+*/+*
Sediment (bull trout spawning areas)	N	N/N/N	N/N/N
Sediment (other fishes)	M	-*/-*/+*	-*/-*/+*
Chemical Contaminants/Nutrients	M	-*/N/+*	-*/N/+*
Habitat Access			
Physical Barriers	N	N/N/N	N/N/N
Habitat Elements			
Substrate Embeddedness – Rearing Areas	M	-*/-*/+*	-*/-*/+*
Large Woody Debris	M	-*/N/+*	-*/N/+*
Pool Frequency and Quality	M	-*/-*/+*	-*/-*/+*
Large Pools	M	-*/-*/+*	-*/-*/+*
Off-Channel Habitat	N	N/N/N	N/N/N
Refugia	N	N/N/N	N/N/N
Channel Condition and Dynamics			
Width/Depth Ratio	M	-*/-*/+*	-*/-*/+*
Stream Bank Condition	N	N/N/N	N/N/N
Floodplain Connectivity	N	N/N/N	N/N/N
Flow/Hydrology			
Changes in Peak/Base Flows	M	N/N/+*	N/N/+*
Drainage Network Increase	N	N/N/N	N/N/N
Watershed Conditions			
Road Density and Location	N	N/N/N	N/N/N
Disturbance History	M	N/N/+*	N/N/+*
Riparian Conservation Areas	M	-*/+*/+*	-*/+*/+*
Disturbance Regime	N	N/N/N	N/N/N
Integration of Species and Habitat Conditions	M	-*/-*/+*	-*/-*/+*

a. Matrix checklist adapted from USFWS and NMFS 1998
b. This displays the potential effects of the action on habitats or individuals, and not on the status of the entire local population/watershed. I = Improve, M = Maintain, D = Degrade, N = No Influence
c. Evaluated against local criteria where appropriate and available
d. * denotes immeasurable change
\+ T = Temporary, S = Short-term, L = Long-term Timeframe

3.15.6.2 Anderson Creek Subwatershed – Watershed Condition Indicators

All WCIs evaluated for the action alternatives were found to be maintained or not influenced with implementation of this project (Table 3.22). The analysis illustrated that many of the WCI would have immeasurable effects in one or more of the timeframes. The Integration of Species and Habitat Conditions WCI discussion is presented here as a summary WCI discussion of the anticipated effects to the fish species and watershed/habitat conditions in the Anderson subwatershed. Detailed discussion of each of the WCIs evaluated for this project is available in the Watershed and Soil Resources Specialist Report and the Fisheries Specialist Report in the Project Record.

Integration of Habitat and Species. Habitat conditions would be maintained at the subwatershed scale. RCA road decommissioning, culvert removals, and reforestation within RCA would immeasurably improve habitat conditions within the Anderson Creek subwatershed in all three timeframes.

Table 3.22. Effects Summary for Alternatives B and C in the Anderson Creek Subwatershed

Pathways Indicators [a]	Effects of the Management Action(s)		
	Effects [b,c]	Alternative B [d] T/S/L Timeframe[+]	Alternative C [d] T/S/L Timeframe[+]
Subpopulation Character			
Subpopulation size	N	N/N/N	N/N/N
Growth and Survival	N	N/N/N	N/N/N
Life History Diversity and Isolation	N	N/N/N	N/N/N
Persistence and Genetic Integrity	N	N/N/N	N/N/N
Water Quality			
Temperature (bull trout)	N	N/N/N	N/N/N
Temperature (other fishes)	M	-*/+*/+*	-*/+*/+*
Sediment (bull trout spawning areas)	N	N/N/N	N/N/N
Sediment (other fishes)	M	-*/-*/+*	-*/-*/+*
Chemical Contaminants/Nutrients	M	-*/N/+*	-*/N/+*
Habitat Access			
Physical Barriers	M	+*/+*/+*	+*/+*/+*
Habitat Elements			
Substrate Embeddedness (rearing areas)	M	-*/-*/+*	-*/-*/+*
Large Woody Debris	M	N/N/+*	N/N/+*
Pool Frequency and Quality	M	-*/-*/+*	-*/-*/+*
Large Pools	M	-*/-*/+*	-*/-*/+*
Off-Channel Habitat	M	+*/+*/+*	+*/+*/+*
Refugia	M	+*/+*/+*	+*/+*/+*
Channel Condition and Dynamics			
Width/Depth Ratio	M	-*/-*/+*	-*/-*/+*
Stream Bank Condition	M	-*/+*/+*	-*/+*/+*
Floodplain Connectivity	M	+*/+*/+*	+*/+*/+*
Flow/Hydrology			
Changes in Peak/Base Flows	M	+*/+*/+*	+*/+*/+*
Drainage Network Increase	M	+*/+*/+*	+*/+*/+*
Watershed Conditions			
Road Density and Location	M	+*/+*/+*	+*/+*/+*
Disturbance History	M	+*/+*/+*	+*/+*/+*
Riparian Conservation Areas	M	-*/+*/+*	-*/+*/+*
Disturbance Regime	N	N/N/N	N/N/N
Integration of Species and Habitat Conditions	M	+*/+*/+*	+*/+*/+*

e. Matrix checklist adapted from USFWS and NMFS 1998
f. This displays the potential effects of the action on habitats or individuals, and not on the status of the entire local population/watershed. I = Improve, M = Maintain, D = Degrade, N = No Influence
g. Evaluated against local criteria where appropriate and available
h. * denotes immeasurable change
\+ T = Temporary, S = Short-term, L = Long-term

3.15.6.3 Effects to Bull Trout

The determination for Columbia River bull trout (Threatened) and their potential habitat is a May Affect, Not Likely to Adversely Affect (NLAA) based on the following rationale:

- Bull trout have not been documented within any streams in project area streams. The Middle Fork Payette River is designated migratory and overwintering habitat for bull trout. The closest known bull trout local population in the Upper Middle Fork Payette River is located over 15 miles upstream from the confluence with streams in the Sixmile subwatershed and over 33 miles upstream from the confluence with Anderson Creek.
- Sediment delivery to project area streams and migratory and overwintering bull trout habitat in the Middle Fork Payette River is expected to be immeasurable in the temporary and short-term timeframes due to project-area stream channel storage, RCA widths, BMPs, and project design features. It is expected that there would be an immeasurable decrease in sediment delivery to project area streams and the Middle Fork Payette River in the long-term timeframe as a result of natural recovery from the fire.
- Hazard tree removal would occur on a very small portion of the Sixmile subwatershed RCAs which may result in a localized, immeasurable increase in stream temperatures in (other fishes) the temporary and short-term. LWD may also decrease in site-specific areas in the temporary and short-term in the Middle Fork Payette River and its tributaries.
- No ground-based harvest would occur within RCAs.
- RCA road decommissioning in the Anderson Creek subwatershed will result in immeasurable improvements for several WCIs including drainage network increase, RCA road density and location, sediment and RCAs in the Anderson Creek subwatershed.
- Riparian functions and processes would be maintained in all subwatersheds.
- Turbidity would increase temporarily downstream from culvert removals and replacement during and immediately after in-channel work. Sediment control design features would reduce the amount of sediment produced during culvert removals and replacement (see design features).

3.15.6.4 Effects to Other Fishes

In the Sixmile subwatershed, the project activities are located primarily outside of RCAs. Effects from the Middle Fork Salvage project are expected to habitat conditions only . See effects to habitat in the Sixmile subwatershed described above. The rainbow trout population within the project area may be temporarily displaced during implementation activities adjacent to (such as road decommissioning) and within streams (such as culvert removal) but streams within the Anderson Creek drainage may provide diversity and refuge habitat that would not likely result in mortalities. It is expected that implementation of either action Alternative would be immeasurably beneficial to fish in the Anderson Creek drainage. Some direct sources of sediment would be removed and large woody debris recruitment potential would be immeasurably improved as a result of road decommissioning and reforestation within RCAs. Further, some in-stream barriers would likely be removed. This would reestablish access to additional habitat within the project area for rainbow trout. Effects to habitat are described above by subwatershed.

3.15.7 Environmental Consequences Specific to Alternative C

3.15.7.1 Sixmile Subwatershed

The MF Salvage Project activities are identical in the Sixmile subwatershed for both Alternative B and Alternative C. Therefore, the effects would be identical for both action Alternatives in the Sixmile subwatershed.

3.15.7.2 Anderson Creek Subwatershed

In the Anderson Creek subwatershed, Alternative C includes all of the actions proposed in Alternative B except approximately 132 acres (72 acres within RCAs) of reforestation within MPC 4.1c. The effects from the implementation of Alternative C would be the same as the effects from Alternative B, except that there would be slightly less beneficial effects to temperature (other fishes), large woody debris, pool frequency and quality, change in peak/base flows, disturbance history, and RCAs. Because there is a relatively small difference in reforestation acres it is not possible to quantify and compare the difference in effects of the action alternatives.

3.15.8 Watershed and Fisheries Cumulative Effects

The Middle Fork Salvage Project watershed and fisheries cumulative effects analysis area is the 6th field HU (subwatershed) for all WCIs unless otherwise specified (see Appendix B). The subwatershed scale was chosen for the cumulative effects analysis area because it that is the largest spatial extent that direct and indirect effects would be observed. Cumulative effects occur when existing water resource and aquatic conditions from past land management activities are further affected by the proposed activities and activities planned in the reasonable and foreseeable future.

The cumulative effects analysis in the Middle Fork Salvage Project is based upon past, present and foreseeable future projects within the identified cumulative impact area(s). Appendix B lists of all potential activities that were considered in the watershed and fisheries cumulative effects analyses. Some activities listed in the Appendix B may be outside the cumulative impact areas considered in the watershed and fisheries analysis.

Past Actions
There have been a variety of land management activities within the cumulative effects analysis area in the past. Existing water resource and aquatic conditions, attributed to past and present actions, are included in the watershed and fisheries existing resource condition section of this document. See the Appendix B for a detailed summary of the past activities in the Lucky Fire and Lightning Fire areas.

In the case of past activities, the impacts of any given action are difficult to impossible to individually quantify and disclose. There are many reasons, including: inconsistent data collection methodology in earlier days, data that has become lost or missing over time, and the lack of data in the case of unplanned events (wildfire). Therefore, this analysis does not attempt to quantify specific impacts for each past activity. Rather, the most current and scientifically accurate data available was used to identify the existing condition of each resource. It is anticipated that although the incremental impacts of each past activity are not known, the existing condition (baseline) is representative of those past activities.

Present Actions
Existing water and aquatic resource conditions, attributable to past and present actions, are included in the existing condition section of this document. See the Appendix B for a detailed summary of the past activities in the Lucky Fire and Lightning Fire areas.

Reasonable and Foreseeable Actions
For purposes of this analysis, projects currently under contract were considered ongoing and those listed in the 5-year action plan, or otherwise funded, were considered foreseeable future activities. The information available regarding project specific impacts of present and foreseeable future projects being considered in this analysis is variable. In all cases, resources utilized the best, most current information available. However, in some cases, there is little currently known about the specific impacts of foreseeable activities and details will not become available until those projects undergo their individual analysis as required by NEPA. It is assumed that future projects will stand on their own merit with regard to cumulative effects. See the Appendix B for a detailed summary of the past activities in the Lucky Fire and Lightning Fire areas.

3.15.8.1 Cumulative Effects Specific to Alternative A

3.15.8.1.1 Municipal Watersheds and Beneficial Uses

Implementation of Alternative A would have no effect to municipal watersheds or beneficial uses in the Middle Fork Salvage Project area and, therefore, no cumulative effects would be expected.

3.15.8.1.2 Sixmile Subwatershed (Lucky Fire Area)

Alternative A (no action alternative) does not propose any new management activities, although, natural processes and ongoing management activities are expected to continue. Under this alternative, there would be no road improvements or additional maintenance.

Integration of Species and Habitat Conditions
The cumulative effects analysis for this alternative considered the existing conditions of the WCIs for the Sixmile watershed and the potential effects for the reasonably foreseeable actions. The baseline conditions would be expected to continue on their current trajectory and be maintained in all three timeframes with implementation of this alternative and the foreseeable actions. In all three timeframes, there is the potential for the negative and positive incremental effects, as well as no effect, from foreseeable actions on the habitat conditions based on the potentially affected WCIs. See Watershed and Soil Resources Specialist Report and/or Fisheries Specialist Report in the Project Record for a discussion of the foreseeable actions, potential activities, potential WCIs affected, and the potential incremental effects in each timeframe. No synergistic effects are anticipated with implementation of this alternative and the foreseeable actions.

3.15.8.1.3 Anderson Creek Subwatershed (Lightning Fire Area)

Alternative A (no action alternative) does not propose any new management activities, although, natural processes and ongoing management activities are expected to continue. The transportation system within the Anderson Creek subwatershed would remain at the current levels with this alternative. Under this alternative, there would be no road decommissioning or additional maintenance, no culvert removals or reforestation within RCAs. Existing sediment sources and culvert barriers would persist.

Integration of Species and Habitat Conditions
The cumulative effects analysis for this alternative considered the existing conditions of the WCIs for the Anderson Creek subwatershed and the potential effects for the reasonably foreseeable actions. The baseline conditions would be expected to continue on their current trajectory and be maintained in all three timeframes with implementation of this alternative and the foreseeable actions. In all three timeframes, there is the potential for the negative and positive incremental effects, as well as no effect, from foreseeable actions on the habitat conditions based on the potentially affected WCIs. See Watershed and Soil Resources Specialist Report and/or Fisheries Specialist Report in the Project Record for a discussion of the foreseeable actions, potential activities, potential WCIs affected, and the potential incremental effects in each timeframe. No synergistic effects are anticipated with implementation of this alternative and the foreseeable actions.

3.15.8.1.4 Lightning and Pyle Subwatersheds (Lightning Fire Area)

Alternative A (no action alternative) does not propose any new management activities, although, natural processes and ongoing management activities are expected to continue. The transportation system within the Lightning Creek and Pyle subwatersheds would remain at the current levels with this alternative. Under this alternative, there would be no road decommissioning or additional maintenance.

Integration of Species and Habitat Conditions
The cumulative effects analysis for this alternative considered the existing conditions of the WCIs for the Lightning Creek and Pyle subwatersheds and the potential effects for the reasonably foreseeable actions. The baseline conditions would be expected to continue on their current trajectory and be maintained in all three timeframes with implementation of this alternative and the foreseeable actions. In all three timeframes, there is the potential for the negative and positive incremental effects, as well as no effect, from foreseeable actions on the habitat conditions based on the potentially affected WCIs. See Watershed and Soil Resources Specialist Report and/or Fisheries Specialist Report in the Project Record for a discussion of the foreseeable actions, potential activities, potential WCIs affected, and the potential incremental effects in each timeframe. No synergistic effects are anticipated with implementation of this alternative and the foreseeable actions.

3.15.8.2 Cumulative Effects Common to All Action Alternatives

3.15.8.2.1 Municipal Watersheds and Beneficial Uses

Implementation with action alternative would have no effect to municipal watershed or Beneficial Uses with implementation of project design features and BMPs. Therefore, no cumulative effects would be expected with implementation of this project.

3.15.8.2.2 Sixmile Subwatershed (Lucky Fire)

Cumulative effects analysis for all action alternatives considered the existing conditions for the Sixmile subwatershed, the direct and indirect effects of these alternatives, and the potential effects of the reasonably foreseeable actions. Each of the reasonable and foreseeable actions was evaluated for the potential mechanism of effect and the potential WCI that could be affected with the exception of projects where NEPA has already been completed but not implemented to date. The effects of those projects where NEPA has already been completed but not implemented to date are included in the current conditions (baseline). The direct and indirect effects were then analyzed with the potential effects of the foreseeable actions to determine the cumulative impact to each WCI at each temporal scale. Cumulative impacts for the WCIs will be addressed as part of the Integration of Species and Habitat Conditions WCI.

Integration of Species and Habitat Conditions

The cumulative effects analysis for these alternatives considered the existing conditions of the WCIs for the Sixmile subwatershed, direct and indirect effects for these alternatives and the potential effects for the reasonably foreseeable actions. The baseline conditions for two of the four species specific WCIs (local population size and growth and survival) are functioning at unacceptable risk (UR) and two (life history diversity and persistence and genetic integrity) are functioning at risk (FR) (Table C.1 in Appendix C) and would be expected to be maintained at that level in all three timeframes with implementation of these alternatives and the foreseeable actions. Subpopulation character pathway WCIs, temperature (bull trout), sediment (bull trout), physical barriers, off-channel habitat, refugia, streambank condition, floodplain connectivity, drainage network increase, road density and location, and disturbance regime would result in a no effect with implementation of these alternatives. The rest of the WCIs including temperature (other fishes), sediment (other fishes), chemical contaminants/nutrients, substrate embeddedness, large woody debris, pool frequency and quality, large pools, width to depth ratio, change in peak/base flows, disturbance history, and RCAs would have the existing functionality rating maintained with implementation of the action Alternatives.

In all three timeframes, there is the potential for the negative and positive incremental effects, as well as no effect, from foreseeable actions on the habitat conditions based on the potentially affected WCIs. Based on potential effects anticipated from foreseeable actions it is expected that with implementation of State of Idaho BMPs, common design features/mitigations, and natural recovery, the habitat WCIs would continue to maintain and/or continue the trajectory established by implementation of these alternatives to the affected WCIs in all three timeframes. See Watershed and Soil Resources Specialist Report and/or Fisheries Specialist Report in the Project Record for a discussion of the foreseeable actions, potential activities, potential WCIs affected, and the potential incremental effects in each timeframe. No synergistic effects are anticipated with implementation of these alternatives and the foreseeable actions.

3.15.8.2.3 Anderson Creek Subwatershed (Lightning Fire)

Cumulative effects analysis for all action alternatives considered the existing conditions for the Anderson Creek subwatershed, the direct and indirect effects of these alternatives, and the potential effects of the reasonably foreseeable actions. Each of the reasonable and foreseeable actions was evaluated for the potential mechanism of effect and the potential WCI that could be affected with the exception of projects where NEPA has already been completed but not implemented to date. The effects of those projects where NEPA has already been completed but not implemented to date are included in the current conditions (baseline). The direct and indirect effects were then analyzed with the potential effects of the foreseeable actions to determine the cumulative impact to each WCI at each temporal scale. Cumulative impacts for the WCIs will be addressed as part of the Integration of Species and Habitat Conditions WCI.

Integration of Species and Habitat Conditions.

The cumulative effects analysis for these alternatives considered the existing conditions of the WCIs for the Anderson Creek subwatershed, direct and indirect effects for these alternatives and the potential effects for the reasonably foreseeable actions. The baseline conditions for two of the four species specific WCIs (local population size and growth and survival) are functioning at unacceptable risk (UR) and two (life history diversity and persistence and genetic integrity) are functioning at risk (FR) (Table C.2 in Appendix C) and would be expected to be maintained at that level in all three timeframes with implementation of these alternatives and the foreseeable actions. Subpopulation character pathway

WCIs, temperature (bull trout), sediment (bull trout), and disturbance regime would result in a no effect with implementation of these alternatives. The rest of the WCIs including temperature (other fishes), sediment (other fishes), chemical contaminants/nutrients, physical barriers, substrate embeddedness, large woody debris, pool frequency and quality, large pools, off-channel habitat, refugia, width to depth ratio, streambank condition, floodplain connectivity, change in peak/base flows, drainage network increase, road density and location, disturbance history, and RCAs would have the existing functionality rating maintained with implementation of the action Alternatives (Table 4-7)

In all three timeframes, there is the potential for the negative and positive incremental effects, as well as no effect, from foreseeable actions on the habitat conditions based on the potentially affected WCIs. Based on potential effects anticipated from foreseeable actions it is expected that with implementation of State of Idaho BMPs, common design features/mitigations, and natural recovery, the habitat WCIs would continue to maintain and/or continue the trajectory established by implementation of these alternatives to the affected WCIs in all three timeframes. See Watershed and Soil Resources Specialist Report and/or Fisheries Specialist Report in the Project Record for a discussion of the foreseeable actions, potential activities, potential WCIs affected, and the potential incremental effects in each timeframe. No synergistic effects are anticipated with implementation of these alternatives and the foreseeable actions.

3.15.8.2.4 Lightning Creek Subwatershed (Lightning Fire)

Cumulative effects analysis for all action alternatives considered the existing conditions for the Lightning Creek subwatershed, the direct and indirect effects of these alternatives, and the potential effects of the reasonably foreseeable actions. Each of the reasonable and foreseeable actions was evaluated for the potential mechanism of effect and the potential WCI that could be affected with the exception of projects where NEPA has already been completed but not implemented to date. The effects of those projects where NEPA has already been completed but not implemented to date are included in the current conditions (baseline). The direct and indirect effects were then analyzed with the potential effects of the foreseeable actions to determine the cumulative impact to each WCI at each temporal scale. Cumulative impacts for the WCIs will be addressed as part of the Integration of Species and Habitat Conditions WCI.

Integration of Species and Habitat Conditions

The cumulative effects analysis for these alternatives considered the existing conditions of the WCIs for the Lightning Creek subwatershed, direct and indirect effects for these alternatives and the potential effects for the reasonably foreseeable actions. A baseline table was not developed for this subwatershed as outlined in Section 3.14.6 of this document.

There are no direct or indirect effects expected within the Lightning Creek subwatershed. Therefore, the MF Salvage project, when combined with other actions, would have no cumulative effects in the Lightning Creek subwatershed.

3.15.8.2.5 Pyle Subwatershed (Lightning Fire)

Cumulative effects analysis for all action alternatives considered the existing conditions for the Pyle subwatershed, the direct and indirect effects of these alternatives, and the potential effects of the reasonably foreseeable actions. Each of the reasonable and foreseeable actions was evaluated for the potential mechanism of effect and the potential WCI that could be affected with the exception of projects where NEPA has already been completed but not implemented to date. The effects of those projects where NEPA has already been completed but not implemented to date are included in the current conditions (baseline). The direct and indirect effects were then analyzed with the potential effects of the foreseeable actions to determine the cumulative impact to each WCI at each temporal scale. Cumulative impacts for the WCIs will be addressed as part of the Integration of Species and Habitat Conditions WCI.

Integration of Species and Habitat Conditions

The cumulative effects analysis for these alternatives considered the existing conditions of the WCIs for the Pyle subwatershed, direct and indirect effects for these alternatives and the potential effects for the reasonably foreseeable actions. A baseline table was not developed for this subwatershed as outlined in Section 3.14.6 of this document.

In all three timeframes, there is the potential for the negative and positive incremental effects, as well as no effect, from foreseeable actions on the habitat conditions based on the potentially affected WCIs. See Watershed and Soil Resources Specialist Report and/or Fisheries Specialist Report in the Project Record for a discussion of the foreseeable actions, potential activities, potential WCIs affected, and the potential incremental effects in each timeframe. No synergistic effects are anticipated with implementation of these alternatives and the foreseeable actions.

The Pyle subwatershed includes an area on both the west and east sides of the Middle Fork Payette River. The IDL and BLM projects are located on the west side of the Middle Fork Payette River and the private timber project is located close to and just east of the Middle Fork Payette River. There would be no spatial overlap of the Middle Fork Salvage project with these reasonable foreseeable future projects in the Pyle subwatershed. Since there is no spatial overlap and there are no direct or indirect effects within the Pyle subwatershed there would be no cumulative effects associated with the Middle Fork Salvage Project.

3.16 SOIL RESOURCES

3.16.1 Affected Environment

3.16.1.1.1 Scale of Analysis

The scale of analysis for soil resources was dependent on the parameter being evaluated. Discussion of the analysis areas for each parameter is discussed below and in the Watershed and Soil Resources Specialist Report in the project record.

3.16.1.1.2 Detrimental Disturbance

The scale of analysis for detrimental disturbance (DD) is the activity area scale. The DD activity area for this project is the individual salvage harvest units based on this being the smallest area that detrimental soil impacts from proposed activities would be expected.

The Boise National Forest soil productivity standard (SWST02) for DD states: (1) In an activity area where existing DD area below 15 percent of the area, management activities shall leave the area in a condition of 15 percent or less detrimental disturbance following completion of activities; or (2) In an activity area where existing conditions of DD exceeds 15 percent of the area, management activities shall include mitigation and restoration so that DD levels area moved back toward 15 percent of less following completion of the activities (Forest Plan, p. III-21). The DD activity area is defined as the specific area where proposed actions may have detrimental soil impacts, such as harvest units within a timber sale area, an individual pasture unit within a grazing allotment, or a burn block within a prescribed burn project area (Forest Plan, p. GL-1). Management activities that occurred in the past 20 years were used to calculate current DD (see Watershed and Soil Resources Specialist Report and Soil Productivity Calculation in the Project Record). A soil monitoring project on the Payette National Forest and Boise Cascade Lands showed that recovery of the first few inches of loamy sand granitic soils and volcanic soils required 20 years and 37 years, respectively, for recovery of soil compaction. The soils in both fire areas can be characterized as sandy loam based landtypes (USDA, Forest Service, 1973). It is assumed based on Froehlich et al., 1980 and the prominent soil types in both fire areas that DD associated with sales older than 20 years would be recovered.

3.16.1.1.3 Lucky Fire Area

DD attributable to ongoing and past management activities was based on the analysis completed for the Sixshooter Project EIS (2006) where known DD sources were identified as sheep grazing, dispersed recreation, and past timber harvest. Based on field work completed for the Sixshooter Project DD associated with ongoing and past management activities was found to be limited, i.e., 0.5 percent of activity areas in DD condition, with an overall soil health rating of the project area to be satisfactory with a stable soil health trend.

Water repellent soils associated with severely burned soils from the 2007 Lucky Fire was used to estimate the DD acres for each salvage harvest unit (activity area). Based on the field data collected by

the Middle Fork Complex BAER team the following values were used to define DD resulting from water repellent soils by burn severity, as defined by the Middle Fork Complex Soil Burn Severity maps (USDA, Forest Service, 2007):

- Low Burn Severity: 18.5 percent of the area assumed to be DD based on strong water repellency observations in low burn severity areas.
- Moderate Burn Severity: No Detrimental Disturbance because no strong water repellency observations were made in moderate burn severity areas.
- High Burn Severity: 30 percent of the area assumed to be DD a based on strong water repellency observations in high burn severity areas.

Existing DD for the Lucky Fire area is displayed in Table 3.23 by Activity Unit (see Watershed and Soil Resources Specialist Report in the Project Record). All activity units (i.e., salvage units) with the exception of Units 43, 50, 56, and 60 meet Forest Plan Standard SWST02. The units where the estimated DD currently exceeds Forest Plan Standard SWST02 is attributable to the amount of soils in severely burned conditions.

Table 3.23. Lucky Fire Area Existing Detrimental Disturbance Conditions by Salvage Unit

Activity Area (Unit)	DD Activity Unit Acres*	Yarding System	Existing DD (Acres)			Existing Percent DD
			Lucky Fire	Past Activities	Total Existing	
40	24.0	heli	1.4	0.1	1.5	6.3%
41	52.0	heli	5.5	0.3	5.7	11.0%
42	20.8	heli	1.2	0.1	1.3	6.1%
43	2.0	heli	0.3	0.0	0.3	17.2%
44	54.2	heli	3.9	0.3	4.2	7.8%
45	45.3	heli	2.1	0.2	2.4	5.2%
46	26.7	heli	2.1	0.1	2.3	8.5%
47	9.4	heli	0.8	0.0	0.8	8.7%
48	23.9	heli	1.7	0.1	1.9	7.8%
49	7.9	heli	0.5	0.0	0.6	7.0%
50	6.0	heli	1.0	0.0	1.0	17.5%
51	14.9	heli	1.8	0.1	1.9	12.4%
52	1.1	heli	0.1	0.0	0.1	8.7%
53	3.3	heli	0.4	0.0	0.5	13.9%
54	27.9	heli	2.7	0.1	2.8	10.0%
55	3.7	heli	0.1	0.0	0.1	3.7%
56	2.0	heli	0.4	0.0	0.4	19.5%
57	37.1	heli	3.6	0.2	3.8	10.2%
58	12.5	orj	0.4	0.1	0.5	4.1%
59	280.9	orj	26.0	1.4	27.4	9.7%
60	5.7	orj	1.0	0.0	1.0	18.4%
61	7.9	orj	0.6	0.0	0.6	7.8%

* DD Activity Unit Acres = Unit Acres – TSRC acres in the Unit

3.16.1.1.4 Lightning Fire Area

Past timber sale boundaries within Lightning Fire area are known, however, delineation of the actual harvest units for these past sales were not available. Therefore, the assumption was made that all area

for past sale areas that overlap proposed salvage units were previously harvested. All of the past timber sales occurred 20 or more years ago. Therefore, DD associated with those sales would be recovered and do not contribute to existing DD values. Water-repellent soils associated with severely burned soils from the 2007 Lightning Fire were used to quantify the DD acres for each salvage harvest unit (activity area). Based on the field data collected by the MF Complex BAER team the following values were used to define DD resulting from water repellent soils by burn severity, as defined by the MF Complex BARC maps (USDA, Forest Service, 2007):

- Low Burn Severity: 18.5 percent of the area assumed to be DD based on strong water repellency observations in low burn severity areas.
- Moderate Burn Severity: No Detrimental Disturbance because no strong water repellency observations were made in moderate burn severity areas.
- High Burn Severity: 30 percent of the area assumed to be DD a based on strong water repellency observations in high burn severity areas.

Existing DD for the Lightning Fire area is displayed in Table 3.24 by Activity Unit (see Watershed and Soil Resources Specialist Report in the Project Record). All activity units (salvage harvest units) currently meet Forest Plan Standard SWST02.

Table 3.24. Lightning Fire Area Existing Detrimental Disturbance Conditions by Salvage Unit

Activity Area (Unit)	DD Activity Unit Acres*	Yarding System	Existing DD (Acres)			Existing Percent DD
			Lightning Fire	Past Activities	Total Existing	
15	46.6	ORJ	5.4	0.0	5.4	11.6%
16	5.6	ORJ	0.4	0.0	0.4	6.6%
17	72.0	ORJ	4.7	0.0	4.7	6.6%
18	96.1	ORJ	8.6	0.0	8.6	9.0%
19	43.4	ORJ	2.0	0.0	2.0	4.5%
20	30.2	ORJ	3.2	0.0	3.2	10.7%
21	37.1	ORJ	3.8	0.0	3.8	10.1%
22	5.0	ORJ	0.1	0.0	0.1	2.3%
23	2.6	ORJ	0.2	0.0	0.2	8.6%
24	2.5	ORJ	0.4	0.0	0.4	14.2%
25	3.3	ORJ	0.4	0.0	0.4	12.9%
26	14.0	ORJ	1.4	0.0	1.4	10.1%
27	8.1	ORJ	0.3	0.0	0.3	3.8%

* DD Activity Unit Acres = Unit Acres – TSRC acres in the Unit

3.16.1.2 Total Soil Resource Commitment

The scale of analysis for total soil resource commitment (TSRC) is the activity area scale. The TSRC activity area for this project is the project area scale, i.e., Lucky Fire project area is 1,582 acres and Lightning Fire project area is 13, 853 acres. This activity area was delineated, as directed by the forest plan, based on this being the all-inclusive area where proposed activities could result in commitment of soil resources.

The Boise National Forest soil productivity standard (SWST03) for TSRC states (1) In an activity area where existing conditions of TSRC area below 5 percent of the area, management activities shall leave the area in a condition of 5 percent or less TSRC following completion of the activities; or (2) In an activity area where existing conditions of TSRC exceeds 5 percent of the area, management activities shall include mitigation and restoration so that TSRC levels area moved back toward 5 percent of less following completion of the activities (Forest Plan, p. III-21). TSRC is generally measured across an all-

inclusive area such as a timber sale area, a prescribed burn area, or grazing allotment, where effects to soil commitment could occur or are occurring (Forest Plan, p. GL-1).

Lucky Fire Area
The acres committed to roads and landings in the Lucky Fire project area (1,582 acres) were used to calculate the existing TSRC. There are no developed recreational facilities within the analysis area. However, user developed off highway vehicle (OHV) trails may exist within the project area but were not included in the calculations due to unknown locations and/or extent.

Existing TSRC in the Lucky Fire area is 1.0 percent or about 16.6 acres and meets the Forest Plan Standard (SWST03). See Watershed and Soil Resources Specialist Report in the Project Record.

Lightning Fire Area
The acres committed to roads and landings in the Lightning Fire project area (13,853 acres) were used to calculate the existing TSRC. There are no developed recreational facilities within the analysis area. However, user developed off highway vehicle (OHV) trails may exist within the project area but were not included in the calculations due to unknown locations and/or extent.

Existing TSRC in the Lightning Fire area is 0.5 percent or about 67.1 acres and meets the Forest Plan Standard (SWST03). See Watershed and Soil Resources Specialist Report in the Project Record.

3.16.1.3 Coarse Woody Debris (CWD)

The scale of analysis for coarse woody debris (CWD) is the activity area scale. The CWD activity area for this project is the area proposed to be salvage harvested. Approximately 696 acres and 381 acres are proposed to be salvage harvested in the Lucky Fire and Lightning Fire project areas, respectively. CWD is an important ecosystem parameter and would not be expected to be evenly distributed across every acre of the forested landscape. As directed by the forest plan, the CWD analysis areas were chosen based on these being the smallest areas that CWD and future CWD recruitment would be affected by proposed salvage harvest activities.

The Forest Plan defines coarse woody debris as pieces of woody material having a diameter of at least 3 inches and a length greater than 6 feet. Appendix A of the Forest Plan discloses desired ranges for coarse wood in decay classes I and II for individual potential vegetation groups (PVGs), and goes on to explain that those desired ranges are not meant to provide an even distribution across every acre of the forested landscape, but to provide numbers that serve as a guide to approximate an average condition for an activity area (Forest Plan, Appendix A, pg. A-8). Appendix A goes on to state that although coarse wood is managed at the activity area, it is useful to have some knowledge of the larger landscape to assist in determining the appropriate amount that falls within the desired range in order to provide context (Forest Plan, Appendix A, pg. A-10).

Lucky Fire Area
Only PVG 2 was considered in the Lucky Fire area CWD analysis because the majority of the timber cruise plots were in this PVG. The CWD data from the 36 timber cruise plots in the Lucky Fire area were evaluated to estimate the average tons/acre of CWD over the Lucky Fire area. The data for fire-killed trees (3- to 8-inch size class) and pre-fire snags were used to determine future CWD recruitment (see Watershed and Soil Resources Specialist Report in the Project Record).

The average tons/acre of CWD over the Lucky Fire analysis area is 4.7 tons/acre based on the timber cruise data in the Lucky Fire area. This value falls within the desired range for CWD of 4 to 14 tons/acres for PVG 2 (USDA, Forest Service, Appendix A, p. A-9). The Boise NF LMRP also indicates that greater than 75 percent of the CWD tons/acre or (3 to 10.5 tons/acre) should be contributed by coarse wood pieces greater than 15 inches in diameter. The tons/acre associated with CWD pieces greater than 15 inches in diameter can not be distinguished from the CWD data as collected. Fire-killed trees in the 3- to 8-inch size class and the existing pre-fire snags in both the 10- to 20-inch and greater than 20-inch size classes are considered CWD recruitment and are anticipated to contribute to the CWD values in the

future. Timber cruise data indicates that on average there are 19.6 snags/acre (fire-killed) in the 3- to 8-inch size class, 2.8 snags/acre (pre-fire) in the 10- to 20-inch size class, and 0.3 snag/acres (pre-fire) in the greater than 20-inch size class within the Lucky Fire analysis area.

Lightning Fire Area

There are two PVGs in the Lightning Fire area; PVG2 – Warm, Dry Douglas Fire – Moist Ponderosa Pine and PVG 4 – Cool, Dry Douglas Fir. The CWD data from the 24 timber cruise plots in the Lightning Fire area were evaluated to estimate the average tons/acre of CWD by PVG over the Lightning Fire area. The data for fire-killed trees (3- to 8-inch size class) and pre-fire snags were used to determine future CWD recruitment existing in the fire area (see Watershed and Soil Resources Specialist Report in the Project Record).

The average tons/acre of CWD over the Lightning Fire area for PVG 2 is about 3.6 tons/acre based on the timber cruise data. CWD for PVG 2 does not currently fall within the desired range for CWD of 4 to 14 tons/acres for PVG 2 (USDA, Forest Service, Appendix A, p. A-9). The average tons/acre of CWF over the Lightning Fire area for PVG 4 is about 7.0 tons/acre based on the timber cruise data. This value falls within the desired range for CWD of 4 to 14 tons/acres for PVG 2 (USDA, Forest Service, Appendix A, p. A-9). The Boise NF LMRP also indicates that greater than 75 percent of the CWD tons/acre (or 3 to 10.5 tons/acre) in PVG 2 and that 65 percent of CWD tons/acre (or 2.6 to 9.1 tons/acre) in PVG 4 should be from coarse wood pieces greater than 15 inches in diameter. The tons/acre associated with CWD pieces greater than 15 inches in diameter can not be distinguished from the CWD data as collected. Fire-killed trees in the 3- to 8-inch size class and the existing pre-fire snags in both the 10- to 20-inch and greater than 20-inch size classes are considered CWD recruitment and will contribute to the CWD in the future.

3.16.1.4 Slope Stability (Landslide Prone Areas)

The scale of analysis for slope stability is the activity area scale. The slope stability activity area for this project is the project area scale, i.e., Lucky Fire project area is 1,582 acres and Lightning Fire project area is 13, 853 acres. As directed by the forest plan, this activity area was chosen based on this being the all-inclusive area where proposed activities could affect slope stability.

Landslide prone areas for the Middle Fork Salvage Project were analyzed using the Southwest Idaho Ecogroup (SWIE) modeled slope stability hazard for the Forest Plan revisions on the Payette, Boise, and Sawtooth National Forests (USDA, Forest Service, 2003i). The slope stability hazed for the Forest Plan revisions used the SINMAP (Stability Index MAPping) model (Pack et al., 1998), a terrain stability mapping tool that has application for areas that experience shallow translational landslides, the dominant type form in the SWIE. SINMAP, a GIS based infinite plane slope stability model used to identify areas with high instability (Pack et al., 1998). The results of SWIE analysis produced a map of the ecoregion with four categories of hazard class: stable, low, moderate, and high.

The SINMAP modeling has data limitations, and should only be used as one tool to identify areas with high slope stability hazards. The reliability of the analysis is dependent upon the data accuracy, including the DEMs and landslide initiation points. The SWIE analysis was done at a large scale and should be further refined for application at the project level. In addition, the analysis is a computer simulation and should not be used to replace ground investigations (Dixon et al., 1999, p. 5).

Lucky Fire Area

The programmatic map produced by SWIE was clipped to the Lucky fire boundary using a GIS, and total acres were calculated for each stability class, or risk/hazard category within the project area. SINMAP identified approximately 110 acres with a high landslide prone hazard and an additional 86 acres with a moderate landslide prone hazard. The modeled high-landslide-prone areas were intersected with the existing road layer to identify current conditions. This analysis shows that about 1.3 miles of road currently exist on moderate- and high-landslide-prone areas. There are documented cut and fill slope failures on NFS roads 621 and 621A within or immediately adjacent to the Lucky Fire area.

Lightning Fire Area
The programmatic map produced by SWIE was clipped to the Lightning fire area using a GIS, and total acres were calculated for each stability class, or risk/hazard category within the project area. SINMAP identified approximately 418 acres with a high landslide prone hazard and an additional 290 acres with a moderate landslide prone hazard. The modeled high-landslide-prone areas were intersected with the existing road layer to identify current conditions. This analysis shows that about 5.5 miles of road currently exist on moderate- and high-landslide-prone areas. There are documented cut and fillslope failures on roads within and immediately adjacent to the Lightning Fire area including FR 668 and FR 668C.

3.16.2 Environmental Consequences Specific to Alternative A

3.16.2.1 Long-term Soil Productivity

Alternative A (No Action) would be expected to result in no change to the long-term soil productivity as a result of management activities. CWD would be expected to increase overtime in the activity areas with implementation of the no action alternative with recruitment of snags to CWD. Based on snag longevity, the predicted half-life for ponderosa pine and Douglas fir snags in salvage logged areas are 7-8 year and 12-13 years, respectively (Russell et al., 2006). DD in both the Lucky and Lightning fire areas are expected to remain at current levels for 1 to 2 years. Robichaud 2000 found that water repellency is broken or washed away within 1 to 2 years after a fire. It is expected that the DD in the Lucky Fire area activity units (salvage units) would drop from the current levels to 0.5 percent in each unit by 2011. In the Lightning Fire area, it is expected that DD in the activity units (salvage units) would drop from current levels to 0.0 percent in each unit by 2011. DD reduction in both fire areas would be attributable to the recovery of the water repellent or hydrophobic soils. Total soil resource commitment (TSRC) in the Lucky and Lightning Fire areas would remain current levels, 1.0 percent and 0.5 percent, respectively (see Watershed and Soil Resources Specialist Report in Project Record).

3.16.2.2 Slope Stability

Implementation of Alternative A (No Action) would result in no change to slope stability from management actions. Mass wasting events are naturally occurring disturbances that may have occurred in the past and may have influence on the project area in the future.

3.16.3 Environmental Consequences Common to All Action Alternative

3.16.3.1 Long-term Soil Productivity

3.16.3.1.1 Detrimental Disturbance

Lucky Fire Area
Detrimental Disturbance (DD) was estimated for each proposed salvage unit in Alternatives B and C in the Lucky Fire area. For this analysis, it was assumed that the salvage harvest would occur in 2008 and reforestation activities would occur in 2010. It is estimated that past management activities account for the existing 0.5 percent DD in each salvage unit. It was assumed that approximately 8 percent of each off road jammer units and 0 percent of each helicopter units would be in a detrimentally disturbed condition following salvage harvest operations. These assumptions are based on Boise National Forest detrimental disturbance monitoring data (see Watershed and Soil Resources Specialist Report in the Project Record).

Following completion of all project activities the DD percent in 2011 would be estimated at 0.5 percent in all helicopter units (Units 40–57). Following completion of all project activities in 2011, it is estimated that the DD percentage for each off road jammer units (Units 58–61) would be 8.5 percent. All harvest units would be meet DD levels of 15 percent or less following completion of project activities and would meet Forest Plan Standard SWST02 (see Watershed and Soil Resources Specialist Report in the Project Record).

Lightning Fire Area
DD was estimated for each proposed salvage unit in Alternatives B and C in the Lightning Fire area. For this analysis, it was assumed that the salvage harvest and associated activities would occur in 2008, road decommissioning would occur in 2009, and reforestation activities would occur in 2010. It was assumed that approximately 8 percent of each off road jammer units would be in a detrimentally disturbed condition following ground-based salvage harvest operations. This assumption is based on Boise NF DD monitoring data (see Watershed and Soil Resources Specialist Report in the Project Record).

Following completion of all project activities in 2011, it is estimated that the DD percentage for each Lightning salvage unit would be 8.0 percent. All harvest units would be meet DD levels of 15 percent or less following completion of project activities and would meet Forest Plan Standard SWST02 (Watershed and Soil Resources Specialist Report in the Project Record).

3.16.3.1.2 Total Soil Resource Commitment

Lucky Fire Area
TSRC for Alternatives B and C is estimated to be 1.9 percent after implementation of project activities in the Lucky Fire area. Project area roads, landings, and primary skid trails were included in TSRC levels for these alternatives. The Lucky Fire area TSRC acres would increase to approximately 31 acres (or 1.9 percent of the activity area) from the current condition of 17 acres (or 1.0 percent of the activity area). Alternatives B and C meet the Forest Plan Standard (SWST03) with TSRC remaining below 5 percent for the Lucky Fire activity area (see Watershed and Soil Resources Specialist Report in the Project Record).

Lightning Fire Area
TSRC for Alternatives B and C is estimated to be 0.4 percent after implementation of project activities in the Lighting Fire area. Project area roads, proposed road decommissioning, landings, and primary skid trails were included in TSRC levels for these alternatives. The Lightning Fire area TSRC acres would be reduced with implementation the proposed road decommissioning activities to approximately 52 acres (or 0.4 percent of the activity area) from the current condition of 67 acres (or 0.5 percent of the activity area). Alternatives B and C meet the Forest Plan Standard (SWST03) with TSRC remaining below 5 percent for the Lightning Fire activity area (see Watershed and Soil Resources Specialist Report in the Project Record).

3.16.3.1.3 Coarse Woody Debris

Lucky Fire Area
CWD levels would be anticipated to continue to meet the desired future condition (DFC) of 4 to 14 tons/acre for PVG 2 recommended by the forest plan given that all existing CWD would remain in the salvage units. CWD recruitment from existing 3- to 8-inch fire-killed snags within the fire area would remain with implementation of Alternatives B and C (see Watershed and Soil Resources Specialist Report in the Project Record). In the short- to long-term timeframe (3 to 15 years), the snag retention design feature WL-1 would provide recruitment of CWD greater than 15 inches in diameter. Two snags per acre would be retained in the 10- to 20-inch size class and all ponderosa pine greater than 20-inch size class (on average 2.2 snags per acre) would be retained over the analysis area. CWD greater than 15 inches in diameter would be expected to increase overtime with implementation of this design feature. CWD would trend toward meeting the PVG 2 DFC of 75 percent (or 3 to 10.5 tons/acre) of CWD greater than 15 inches in diameter. Since the burn in the Lucky Fire project area was a mosaic of burn severities (unburned to high severity), in the long-term timeframe (greater than 15 years), it is likely that there would be additional CWD or CWD recruitment (snags) of residual green trees due to future tree mortality (see Watershed and Soil Resources Specialist Report in the Project Record).

Lightning Fire Area
CWD levels would be anticipated to continue to meet the desired future condition (DFC) of 4 to 14 tons/acre for PVG 2 recommended by the forest plan given that all existing CWD would remain in the salvage units. CWD recruitment from existing 3- to 8-inch fire-killed snags within the fire area would

remain with implementation of Alternatives B and C (see Watershed and Soil Resources Specialist Report in the Project Record). In the short- to long-term timeframe (3 to 15 years), the snag retention design feature WL-1 would provide recruitment of CWD greater than 15 inches in diameter. Two snags per acre would be retained in the 10- to 20-inch size class and all ponderosa pine greater than 20-inch size class (on average 2.2 snags per acre) would be retained over the analysis area. CWD greater than 15 inches in diameter would be expected to increase overtime with implementation of this design feature. CWD would trend toward meeting the PVG 2 DFC of 75 percent (or 3 to 10.5 tons/acre) of CWD greater than 15 inches in diameter. Since the burn in the Lightning Fire project area was a mosaic of burn severities (unburned to high severity), in the long-term timeframe (greater than 15 years), it is likely there would be additional CWD or CWD recruitment (snags) of residual green trees due to future tree mortality (see Watershed and Soil Resources Specialist Report in the Project Record).

3.16.3.2 Slope Stability (Landslide Prone Areas)

Mass wasting events are naturally occurring disturbances that may have occurred in the past, and their frequency, intensity, and resulting impacts may be influenced by proposed activities. Field observations of the Airline Vegetation Management Project in the Lightning Creek subwatershed, after timber harvest operations did not indicate any increased instability (Yenko, 2007). The areas treated in the Airline Project have similar landtypes and PVGs as the MF Salvage Project areas. Design features and BMPs, applied to this project are expected to reduce the potential for negative effect to slope stability with implementation of either action alternative. Timber field crews would be trained to identify high and moderate landslide prone areas in the field and would be provided with a map of potential moderate- and high- landslide prone areas as modeled by SINMAP. Design feature SW-11 provides for modification of management actions in the event field identified moderate or high landslide-prone areas are found during project implementation.

3.16.4 Cumulative Effects

The cumulative effects analysis in the Middle Fork Salvage Project is based upon past, present and foreseeable future projects within the identified soil resource cumulative impact area(s). See Appendix B for a list of all potential activities that were considered in the soil resources cumulative effects analyses. Some activities listed in the cumulative effects list and associated map may be outside the cumulative impact areas considered in the soil resources cumulative effects analysis.

Past Actions
There has been a variety land management activities within the cumulative effects analysis area in the past. Existing soil conditions, attributed to the past and present actions, are included in the existing soil resource condition section of this document. Summary of past activities in soils cumulative effects analysis area are available in Appendix B.

Present Actions
Existing soil conditions, attributed to the past and present actions, are included in the existing soil resource condition section of this document. Summary of present activities in soils cumulative effects analysis area are available in Appendix B.

Reasonable and Foreseeable Actions
For purposes of this analysis, projects currently under contract were considered ongoing and those listed in the 5-year action plan, or otherwise funded, were considered foreseeable future activities. The information available regarding project specific impacts of present and foreseeable future projects being considered in this analysis is variable. In all cases, resources utilized the best, most current information available. However, in some cases there is little currently known about the specific impacts of foreseeable activities and details will not become available until those projects undergo their individual analysis as required by NEPA. It is assumed that future projects will stand on their own merit with regard to cumulative effects. See Appendix for a more detailed summary of the foreseeable future activities for the Lucky and Lightning Fire areas.

3.16.4.1 Cumulative Effects Specific to Alternative A

Alternative A (no action alternative) does not propose any new management activities, although, natural processes and ongoing management activities are expected to continue. The current long-term soil productivity trend would be maintained (Watershed and Soil Resources Specialist Report in Project Record). There is a short-term spike in DD acres associated with severely burned soils with recovery expected by 2011. In addition, existing DD acres from past and/or ongoing activities would continue naturally ameliorate over time. TSRC would be expected to remain stable. CWD would be expected to increase over time with recruitment of snags. No soil resources cumulative effects are expected with implementation of this alternative.

3.16.4.2 Cumulative Effects Common to All Action Alternatives

3.16.4.2.1 Detrimental Disturbance

Lucky Fire Area
All Lucky Fire salvage harvest units would trend toward DD levels of 15 percent or less following completion of project activities and would meet Forest Plan Standard SWST02 (see Watershed and Soil Resources Specialist Report in the Project Record). Past actions and present/ongoing actions that overlap spatially with the Lucky Fire area were included in the DD existing condition (see Appendix B – Cumulative Effects List and Map). Therefore, effects associated with those activities to this resource are accounted for. Foreseeable projects that may overlap spatially with the Lucky Fire area include Sixwest Thinning and E Area Analysis (see Appendix B – Cumulative Effects List and Map). Sixwest Thinning is a precommercial thinning project and no DD effects are anticipated with implementation of this project hence no cumulative DD impacts. The E Area Analysis is a motorized route designation project and there is potential for changes in DD associated with trail work completed with machinery and from changes in management of dispersed recreation.

Lightning Fire Area
All Lucky Fire salvage harvest units would trend toward DD levels of 15 percent or less following completion of project activities and would meet Forest Plan Standard SWST02 (see Watershed and Soil Resources Specialist Report in the Project Record). Past actions and present/ongoing actions that overlap spatially with the Lightning Fire area were included in the DD existing condition (see Appendix B – Cumulative Effects List and Map). Therefore, effects associated with those activities to this resource are accounted for. One foreseeable project may overlap spatially with the Lightning Fire area: E Area Analysis Project (see Appendix B – Cumulative Effects List and Map). The E Area Analysis is a motorized route designation project and there is potential for effects to DD associated with trail work completed with machinery and from changes in management of dispersed recreation.

3.16.4.2.2 Total Soil Resource Commitment

Lucky Fire Area
Existing TSRC for the analysis area is 1.0 percent. TSRC would increase to 1.9 percent percent with implementation of either Alternative B or C. Implementation of Alternative B or C meets Forest Plan TSRC Standard (SWST03), not to exceed 5 percent of the TSRC activity area. Past actions and present/ongoing actions that overlap spatially with the Lucky Fire area were included in the TSRC existing condition (see Appendix B – Cumulative Effects List and Map). Therefore, effects associated with those activities to this resource are accounted for. Foreseeable projects that may overlap spatially with the Lucky Fire area include Sixwest Thinning and E Area Analysis (see Appendix B – Cumulative Effects List and Map). Sixwest Thinning is a precommercial thinning project and no TSRC effects are anticipated with implementation of this project hence no cumulative TSRC impacts. The E Area Analysis is a motorized route designation project and there is potential for effects to TSRC with motorized trail designations and closures in the long-term.

Lightning Fire Area
Existing TSRC for the analysis area is 0.5 percent. TSRC would decrease to 0.4 percent percent with implementation of either Alternative B or C. Implementation of Alternative B or C meets Forest Plan TSRC Standard (SWST03), not to exceed 5 percent of the TSRC activity area. Past actions and present/ongoing actions that overlap spatially with the Lightning Fire area were included in the TSRC existing condition (see Appendix B – Cumulative Effects List and Map). Therefore, effects associated with those activities to this resource are accounted for. One foreseeable project may overlap spatially with the Lightning Fire area: E Area Analysis Project (see Appendix B – Cumulative Effects List and Map). The E Area Analysis is a motorized route designation project and there is potential for effects to TSRC with motorized trail designations and closures in the long-term.

3.16.4.2.3 Coarse Woody Debris

Lucky Fire Area
Implementation of Alternative B or C would trend CWD toward meeting desired ranges as defined by the forest plan. Past actions and present/ongoing actions that overlap spatially with the Lucky Fire area were included in the CWD existing conditions (see Appendix B – Cumulative Effects List and Map). Therefore, effects associated with those activities to this resource are accounted for. Foreseeable projects that may overlap spatially with the Lucky Fire area include Sixwest Thinning and E Area Analysis (see Appendix B – Cumulative Effects List and Map). Sixwest Thinning is a pre-commercial thinning project in which thinned trees would be left onsite and would likely benefit the tons/acre of CWD contributed by woody debris less than 15 inches in diameter within the analysis area. The E Area Analysis is a motorized route designation project that would have no effect to CWD in the analysis area.

Lightning Fire Area
Implementation of Alternative B or C would trend CWD toward meeting desired ranges as defined by the forest plan. Past actions and present/ongoing actions that overlap spatially with the Lightning Fire area were included in the CWD existing conditions (see Appendix B – Cumulative Effects List and Map). Therefore, effects associated with those activities to this resource are accounted for. One foreseeable project may overlap spatially with the Lightning Fire area: E Area Analysis Project (see Appendix B – Cumulative Effects List and Map). The E Area A is a motorized route designation project that would have no effect to CWD in the analysis area.

3.16.4.3 Slope Stability (Landslide Prone Areas)

Modeled landslide prone areas would be field verified during timber layout and marking. Any landslide prone areas identified in the field will be mitigated by avoidance or modified treatment (Design Feature **SW-11** and LSP Prone Checklist). Implementation of either Alternative B or C is not expected to effect slope stability within the either fire area and consequently there would not be any slope stability cumulative effects.

3.17 TRANSPORTATION SYSTEM

3.17.1 Affected Environment

The transportation system analysis area for direct, indirect, and cumulative effects is the Lightning Fire area (about 13,853 acres) as defined in the Lightning Fire Roads Analysis Process (RAP). The long-term transportation management needs within the Lucky fire area were not addressed by this project since the Sixshooter RAP (USDA, Forest Service, 2000b) recommendations are currently being implemented through the Sixshooter Project (2006).

The Lightning Fire RAP identified management opportunities and recommendations for roads through the six-step interdisciplinary process identified in *Roads Analysis: Informing Decisions About Managing the National Forest Transportation System (*USDA, Forest Service, 1999*).* The Lightning Fire RAP

interdisciplinary team (IDT) provided recommendations for the road system needed to facilitate land management activities in the long-term (USDA, Forest Service, 2007b). These recommendations were incorporated into the proposed action for this project (Section 2.3.3.2).

The existing road system in the Lightning fire area consists of about 23.0 miles of authorized roads and 7.2 miles of unauthorized roads. Approximately 4.2 miles of roads (2.2 miles authorized and 2.0 unauthorized) are located within RCAs.

3.17.2 Environmental Consequences Specific to Alternative A

Alternative A would not change the current long-term road system in the project area.

3.17.3 Environmental Consequences Common to All Action Alternatives

Implementation of either Alternative B or C would reduce the miles of authorized roads from 23.0 to 19.6 miles. About 7.2 miles of known unauthorized roads would be decommissioned (7.0 miles) or blocked from motorized access (0.2 miles). RCA road miles would be reduced from 4.2 miles to 2.0 miles. Approximately 0.2 miles of authorized RCA road would be decommissioned and 2.0 miles of unauthorized roads within RCAs would be decommissioned. In addition, about 7.2 miles of authorized roads would be closed yearlong to motorized use. Section 2.3.3.2 describes the proposal for each road in the analysis area.

3.17.4 Cumulative Effects Specific to Alternative A

Alternative A does not propose any changes to the transportation system and therefore would have no cumulative effects.

3.17.5 Cumulative Effects Common to All Action Alternatives.

Appendix B includes a list of the past, ongoing and reasonably foreseeable future activities included in the cumulative effects analysis. This project would reduce road miles within the analysis area. The E Area Analysis (Travel Management) Project, planned for 2009 overlaps spatially with this project and has the potential to reduce road miles available for use in the area long-term; however, no environmental analysis, public involvement, or decision on this project has yet been made. The cumulative effects associated with these actions is the long-term reduction of road miles available for use within the analysis area.