Threatened and Endangered Wildlife Species

Introduction

There are three threatened and endangered wildlife species (TES) that may be found in the Hemlock Elk Project Area and throughout the Upper Swan Valley: Canada lynx, gray wolf, and grizzly bear. Life history information on these species can be found in the reference document "Distribution, Life History, and Recovery Objectives For Region One Threatened and Endangered Terrestrial Wildlife Species Occurring on the Flathead National Forest" (Project File Exhibit F-10). The bald eagle was delisted on August 8, 2007. Effects analyses for the bald eagle are described in the Sensitive Species Section of this document.

TABLE 3-51
THREATENED, ENDANGERED, AND PROPOSED SPECIES KNOWN OR SUSPECTED TO OCCUR WITHIN THE INFLUENCE AREA OF THE PROPOSED ACTION

Species	Status	Occurrence
Canada Lynx (*Lynx canadensis*)	Threatened; proposed Critical Habitat	Resident
Grizzly Bear *(Ursus arctos*)	Threatened	Resident
Gray Wolf (*Canis lupus*)	Endangered	Resident

Canada Lynx

Analysis Area

Spatial Bounds

In accordance with the Lynx Conservation Assessment and Strategy (LCAS 2000), 109 Lynx Analysis Units (LAUs) were identified and mapped on NFS lands on the Flathead National Forest. The proposed Hemlock Elk Fuels Reduction and Forest Health Project is located in the South Cold and Elk Lynx Analysis Units (Map 3-3). These units approximate the size of an area used by an individual lynx and encompass both lynx habitat and areas classified as non-habitat. The LAUs are the geographic area used to analyze direct, indirect, and cumulative effects for Canada lynx.

Temporal Bounds

The length of time for the effects analysis is approximately 5 years. This is based on the probable contract length for the proposed project, the timeframes for related activities, and the reasonably foreseeable actions identified.

Data Sources, Methods, and Assumptions Used

Data used included aerial photography, stand exams, Vector Map (VMAP) data, field surveys of snags and downed logs, old growth surveys, project area field visits, research literature, and GIS and

dataset information for features such as general forest attributes, slope, aspect, habitat type, forest type, elevation, and mapped lynx habitat.

Description of Measurement Indicators

Based on current knowledge of the life history, biology, and ecology of lynx, certain elements are thought to be essential to the conservation of the species. These elements include the presence of snowshoe hares and their preferred habitat conditions (forage), sites for denning, and other habitats that do not necessarily support snowshoe hare or denning, but occur in close juxtaposition to such habitat, enabling lynx to access various portions of their home range. These elements of lynx habitat, and the anticipated effects to these elements from project implementation, are the measurement indicators used in this analysis.

Affected Environment

Historic Condition

In the past, Canada lynx are known to have been residents in the Swan Valley. There would have been ample denning habitat for lynx; forage opportunities would have been dependent on vegetative patterns across the landscape at the time (e.g., snowshoe hare habitat). It is likely that the first non-Indians to visit the Upper Swan Valley were French-Canadian trappers, in the mid-1800's (SEC 2004). With Congress' passing of the Homestead Act in 1862, the way was paved for human development in the valley. As human activity levels in the Swan Valley increased, mortality risk for the lynx increased as well. In 1864, the Federal government granted land to the Great Northern Railroad for railway right-of-way development. The checkerboard ownership pattern found in the Upper Swan Valley today is largely the result of this rail development and later land exchanges. In the early 1900's, people began to move into the Swan Valley in greater numbers and active forest management began. By the mid-1900's aggressive fire suppression was already changing the landscape, as was active timber management and a recreating public.

Existing Condition

Canada lynx habitat is widespread across the Flathead National Forest. Canada lynx are known to occur in the Swan Valley, especially in the southern portion of the valley (Seeley/Swan Area). They are usually found at higher elevations where their distinctive physiology gives them an advantage over other predators (LCAS 2000).

Lands within the South Cold and Elk LAUs have been delineated into lynx habitat and non-lynx habitat. This delineation is based on both elevation and snow depth, and on site characteristics. Dry site forest communities are not considered lynx habitat. The treatment units proposed are all located within designated lynx habitat.

The following table (Table 3-52) displays the current condition of lynx habitat in the Hemlock Elk Area, in both the South Cold and Elk LAUs. Permanent non-lynx habitat refers to areas that will probably never be lynx habitat due to dry forest types, low elevation (snow depth factor), or physical character (rock, water, etc.). Potential lynx habitat includes areas within an LAU that are potentially lynx habitat and could potentially provide forage habitat, denning habitat, or other habitat for lynx.

Foraging habitat includes sapling size stands that would likely support snowshoe hare (USDA 1999, pp.136-140, 184-195) and multistory forest stands that include dense patches of trees or shrubs, or overstory trees with limbs that touch the ground. Denning habitat includes older forest stands where larger amounts of down woody material would be expected to occur (USDA 1999, pp. 346-347). It should be noted that the estimates for forage and denning habitat at the LAU scale are probably conservative. Foraging and denning habitat was only counted on NFS lands, and then only outside of

the Mission Mountains Wilderness. Undoubtedly, there are stands within the wilderness boundary that provide lynx foraging or denning habitat, but they have not been verified with field surveys. The general category of "other lynx habitat" includes a matrix of forest stands that would allow unimpeded movement of lynx across the home range. Unsuitable lynx habitat would be areas within an LAU that are potential lynx habitat (not permanent non-lynx habitat), but which do not presently provide forage or denning habitat for lynx, or other lynx habitat.

TABLE 3-52
CANADA LYNX HABITAT CONDITION IN THE HEMLOCK ELK AREA

Lynx Analysis Unit	Total Area (Acres)	Permanent Non-Lynx Habitat (Acres)	Potential Lynx Habitat (Acres)	Potential Foraging Habitat		Potential Denning Habitat		Other Lynx Habitat*		Unsuitable Habitat	
				Treatment		Treatment		Treatment		Treatment	
				Pre	Post	Pre	Post	Pre	Post	Pre	Post
South Cold	24,414	3,452	20,962	1%	1%	10%	10%	75%	75%	14%	14%
Elk	31,350	9,725	21,625	1%	1%	5%	5%	81%	80%	13%	14%

* Other lynx habitat includes lynx habitat in the wilderness. It is probable that a portion of these acres provide lynx forage or denning habitat.

The Canada lynx was listed as threatened in 2000. The LCAS (2000) was developed to guide lynx conservation and management. Recently, the Northern Rockies Lynx Management Direction (NRLMD) (USDA Forest Service 2007) was approved and incorporated as lynx management direction into the Flathead National Forest Plan. The NRLMD directs the continued use of LAUs for effects analysis. On February 28, 2008, critical habitat was proposed for Canada lynx. In the Hemlock Elk Area, all of the lands that are designated as lynx habitat are also proposed as critical lynx habitat. Consequently, all of the proposed units under the Hemlock Elk Project proposal would be located in proposed critical lynx habitat.

Environmental Consequences

The Hemlock Elk Project consists of three action alternatives and a No Action Alternative. The alternatives are described in detail in Chapter 2 of this EA. The Cumulative Effects Worksheet, located in the Wildlife Project File (Project File Exhibit F-3) considers and describes proposed activities in addition to the past, current, and reasonably foreseeable activities listed at the beginning of this chapter in Tables 3-1 and 3-2. Those activities that cumulatively contribute indiscernible effects to threatened and endangered species are not included in this section. Those activities that cumulatively affect these species are listed below.

Alternative A - No Action
Direct and Indirect Effects

There would be no fuel reduction or forest health treatments or associated activities proposed with this alternative. There would be no direct effects to lynx or lynx habitat. It is possible that an indirect effect of Alternative A would be an increase in the potential for a larger, stand-replacing wildfire to occur in this area.

Alternative A - No Action
Cumulative Effects

Past land management activities in the area, including timber harvest, pre-commercial thinning, road construction, residential development, and agricultural conversion, have decreased and fragmented

potential foraging, denning, and hiding/travel cover for lynx. Timber harvest activities on PCTC and NFS lands in the Hemlock Elk Area peaked during the mid to late 1980s, and continue into the present on all lands.

By not implementing the Hemlock Elk Project, there could be an increase in the potential for a larger, stand-replacing wildfire to occur in the Hemlock Elk Area. Historically, wildfire positively affected Canada lynx by providing large areas of potential forage in the form of sapling stands (snowshoe hare habitat). Unfortunately, a large intense wildfire would potentially decrease overall cover and potential denning habitat as well, at least short term.

Plum Creek Timber Company is in the process of selling some of their land to private individuals and to conservation buyers, including the Forest Service. The Lands Section of this EA provides a detailed discussion of this change in land ownership. The existing intermingled ownership pattern in the Upper Swan Valley presents difficulties in managing habitat connectivity with patch sizes that occurred historically. As the Forest Service and other land conservation groups acquire lands in the Swan Valley, it may become easier to manage for historical levels of habitat connectivity.

The Hemlock Elk Area is located near the community of Condon, Montana. There are part-year and year-long residences in the area, as well as many recreational opportunities. The level of human activity in the area increases the chance for disturbance or displacement of lynx. Other human activity in the area includes various road use permits and easements.

The effects discussed in Alternative A would be in addition to the cumulative effects described here. Alternative A would not contribute significantly to cumulative effects in the Hemlock Elk Area.

Alternative B
Direct and Indirect Effects

Forage Habitat

Lynx foraging habitat consists of dense young trees or shrubs tall enough to protrude above the snow. These dense concentrations of trees or shrubs can be found in young regenerating forests, in multistoried forests with dense pockets of young trees or shrubs, or in older age class multistory forests where tree boughs touch the snow surface, but stem density is low (Squires 2006). Lynx productivity is highly dependent on the quantity and quality of winter snowshoe hare habitat (USDA 2007).

Alternative B proposes no treatment units or temporary roads in existing lynx foraging habitat. The forest stands proposed for treatment do not have the vegetative characteristics associated with snowshoe hare habitat. There are five units where the proposed treatment prescription is Pre-Commercial Thinning (Units 3a, 3b, 6, 12, and 13). These stands do not presently provide lynx forage habitat; they do not have adequate stems per acre, are too open, or they are older pole-sized stands with little to no undergrowth. Field surveys confirmed that there would be no effect to lynx foraging habitat as a result of implementing Alternative B.

Denning Habitat

Lynx den sites are found in mature and younger boreal forest stands that have a large amount of cover and abundant, coarse, woody debris, such as downed trees and root wads. Den sites have also been associated with moister forest stands containing denser understory cover (Squires 2006).

In the South Cold LAU, there are two units proposed in lynx denning habitat. Unit 7 (20 acres) is a Thin From Below Treatment and Unit 10 (24 acres) is a Clearcut with Reserves Treatment. Unit 7 would still function as other lynx habitat. Unit 10 would become unsuitable lynx habitat and would remain so until the vegetation grows in, and the stand begins to function as either forage or other lynx

habitat, in approximately 10 or more years. Temporary road construction in the South Cold LAU would not decrease denning habitat for lynx. Overall, there would be a decrease of 44 acres of potential denning habitat for lynx in the South Cold LAU as a result of implementing Alternative B.

In the Elk LAU, there is one unit proposed in lynx denning habitat. Unit 16 (38 acres) is a proposed Seed Tree with Reserves Treatment. Unit 16 would become unsuitable habitat for lynx and would remain so until the vegetation grows in and the stand begins to function as either forage or other lynx habitat, in approximately 10 or more years. There would be a decrease of 38 acres of potential denning habitat for lynx in the Elk LAU with implementation of Alternative B. Temporary road construction in the Elk LAU would not decrease denning habitat for lynx.

Other Lynx Habitat

These other lynx habitat areas include habitats that provide a measure of cover such that they allow unimpeded movement of lynx across the home range area (USFWS 2008).

South Cold LAU: In the South Cold LAU, there are 125 acres of treatment proposed in other lynx habitat: Units 1, 2, 3a, 3b, 5a, 5b, 6, and 9. The treatments proposed in these units are Thin From Below, Salvage, Pre-Commercial Thin, and Sanitation. The stands treated would retain sufficient vegetation following treatment to continue functioning as other lynx habitat. There would be no decrease in the amount of other lynx habitat in the South Cold LAU. Sufficient habitat would remain to allow unimpeded movement of lynx in the LAU.

Temporary road construction is proposed into Units 1, 7, and 10. The temporary road into Unit 1 is across lands that are currently unsuitable lynx habitat. The temporary road into Unit 7 goes through an area that provides other lynx habitat. The temporary road construction would only minimally impact the stand it is in; the stand would still provide lynx habitat following proposed activities. The temporary road into Unit 10 follows an old road/skid trail (no trees) and then enters the proposed unit. There would be no decrease in lynx habitat as a result of this temporary road.

Elk LAU: In the Elk LAU, there are 532 acres of treatment proposed in other lynx habitat: Units 11 through 15 and Units 17 through 28. There are 8 units (141 acres) where the treatment is a Seed Tree or Clearcut with Reserves. There would not be sufficient vegetation remaining for these stands to function as other lynx habitat supporting movement of lynx across the home range. There would be an increase of 141 acres of unsuitable habitat in the Elk LAU as a result of treatment in proposed Units 11, 14, 20, 21, 22, 25, 27, and 28. There are an additional 11 units (391 acres) where either a Thin From Below Treatment or a Pre-Commercial Thin is proposed. These treatments (Units 12, 13, 15, 17, 18a, 18b, 19, 23, 24a, 24b, and 26) would retain sufficient vegetation following treatment to continue to function as other lynx habitat.

Temporary road construction in the Elk LAU is proposed into Units 11, 12, 15, 16, 18a, 18b, 19, 20, 21, 23, 24a, 24b, 25, 26, 27, and 28. The temporary roads into Units 18a, 18b, and 19 go through areas that provide other lynx habitat. The temporary road construction would only minimally impact the stands; they would still provide lynx habitat following proposed activities. The other temporary roads into Units 11, 12, 15, 16, 20, 21, 23, 24a, 24b, 25, 26, 27, and 28, are located within the units themselves. There would be no additional affects to other lynx habitat than what has already been described above. No additional decrease in lynx habitat would occur due to temporary road construction in the Elk LAU.

The following table summarizes the expected effects of the Hemlock Elk Project with implementation of Alternative B.

TABLE 3-53
POTENTIAL EFFECTS ON CANADA LYNX HABITAT
ALTERNATIVES B AND C

LAU	FORAGE				DENNING				OTHER			
	Treated in WUI		Treated Outside WUI		Treated in WUI		Treated Outside WUI		Treated in WUI		Treated outside WUI	
	Acres	% of LAU	Acres	% of LAU	Acres	% of LAU	Acres	% of LAU	Acres	% of LAU	Acres	% of LAU
South Cold	0	0	0	0	20	<1	24	<1%	103	<1%	22	<1
Elk	0	0	0	0	0	0	38	<1%	113	<1%	419	1

Alternative B
Cumulative Effects

There is a history of timber harvest and road building on all ownership lands in the Hemlock Elk Area; it is anticipated that this would continue into the future. The effects of past timber harvest and road building in the South Cold and Elk LAUs have been accounted for in the existing information on forage, denning, and non-suitable habitat for lynx. There are also ongoing activities in the South Cold and Elk LAUs that would be included in the cumulative effects analysis; these ongoing activities include existing special use permits, road maintenance activities, noxious weed treatments, potential resource enhancement projects (culvert replacements, stream stabilization), and planting of shrubs and trees. Plum Creek Timber Company is in the process of offering some of their lands for sale to the Forest Service, to conservation buyers, and to other private individuals. Many of the lands offered for sale have been located in the lower valley area, generally outside of designated lynx habitat.

Under Alternative B, there would be no new over-the-snow routes created. It is possible that dispersed snowmobile use in the Hemlock Elk Area could increase due to more open stand conditions. Dispersed recreation activities seldom result in a direct loss of habitat (LCAS 2000), but could indirectly increase competition for prey as a result of snow compaction. The possibility of increased snowmobile use would decline as vegetation grows in and stand conditions change.

Alternative B would not increase potential lynx mortality. Cover for lynx would remain connected and continuous, occurring in a pattern that follows stream courses in the lower elevations and then more variably and continuous on upland tracts of land. Non-target trapping mortality may occur in the area, but it is outside the control of the proposed project.

Alternative B is consistent with the standards and guidelines described in the NRLMD. Implementation of Alternative B would not preclude lynx use of habitats in the area. There would be no increase in mortality risk. Adverse cumulative effects are not expected.

Alternative C
Direct and Indirect Effects

Alternatives B and C are almost identical in the number and placement of cutting units and the prescribed treatments. The biggest difference between these two alternatives is that in Alternative C, there are 12 units that are required to be logged in the winter; Units 18a through 27. There is also a slight difference in the anticipated amount and location of temporary road: Under Alternative C, the access to Unit 10 would include road access across PCTC (Section 9). There would be no temporary stream crossing in Section 8, as is proposed under Alternative B.

Forage Habitat

There are no treatment units or temporary roads proposed in existing lynx foraging habitat under Alternative C.

Denning Habitat

As described in Alternative B, there would be a decrease of 44 acres of potential denning habitat for lynx in the South Cold LAU as a result of implementing Alternative C. There would be a decrease of 38 acres of potential denning habitat for lynx in the Elk LAU with implementation of Alternative C.

Other Lynx Habitat

Effects to other lynx habitat as a result of implementing Alternative C would be similar to those described above in Alternative B. There would be no decrease in the amount of other lynx habitat in the South Cold LAU.

In the Elk LAU, there are 532 acres of treatment proposed in other lynx habitat: Units 11 through 15, and Units 17 through 28. There are 8 units (141 acres) where the treatment is a Seed Tree or Clearcut with Reserves. There would not be sufficient vegetation remaining for the stand to function as other lynx habitat supporting movement of lynx across the home range. There are an additional 11 units (391 acres) where either a Thin From Below Treatment or a Pre-Commercial Thin is proposed. These treatments (Units 12, 13, 15, 17, 18a, 18b, 19, 23, 24a, 24b, and 26) would retain sufficient vegetation following treatment to continue to function as other lynx habitat.

Winter Logging Requirement

Short term displacement and disturbance potential for Canada lynx is greater under Alternative C than under Alternative B due to the winter logging required under Alternative C. Lynx have a competitive advantage in environments with deep soft snow. Human activities that lead to snow compaction in lynx habitat may decrease the value of that habitat for lynx as the snow compaction enables competing predators such as coyotes, cougar, and bobcats to occupy lynx habitat (LCAS 2000). Potential negative effects to Canada lynx from logging disturbance in potential denning stands would be greater in the winter than during the summer months; kittens are older, more self-sufficient, and move further away from the den site during the summer. Winter logging may also increase trapper access, which may in turn increase the risk for incidental trapping mortality of lynx.

Alternative C
Cumulative Effects

As described above under the Alternative B cumulative effects discussion, there is a history of timber harvest and road building on all ownership lands in the Hemlock Elk Area. It is anticipated that this would continue into the future. Other ongoing activities include existing special use permits, road maintenance activities, noxious weed treatments, potential resource enhancement projects, and planting of shrubs and trees. As mentioned previously, PCTC is in the process of offering some of their lands for sale to the Forest Service, to conservation buyers, and to other private individuals. There would be no new over-the-snow routes created as part of Alternative C.

Alternative C is consistent with the standards and guidelines described in the NRLMD. Adverse cumulative effects are not expected.

Alternative D
Direct and Indirect Effects

Alternative D differs from Alternative B and C in number of units, acres, and in proposed treatment prescriptions. There is no regeneration harvest proposed in Alternative D.

Forage Habitat

There are no treatment units or temporary roads proposed in existing lynx foraging habitat under Alternative D. The forest stands proposed for treatment do not have the vegetative characteristics associated with snowshoe hare habitat. There are five units where the proposed treatment prescription is Pre-Commercial Thinning (Units 3a, 3b, 6, 12, and 13). These stands do not presently provide lynx forage habitat; they do not have adequate stems per acre, are too open, or they are older pole-size stands with little to no undergrowth. Field surveys confirmed that there would be no effect to lynx foraging habitat as a result of implementing Alternative D.

Denning Habitat

In the South Cold LAU, there are two units proposed in lynx denning habitat; Unit 7 (20 acres) is a Thin-From-Below Treatment and Unit 10 (17 acres) is a Salvage Treatment. Both units would still function as other lynx habitat following treatment, but would not provide potential denning habitat for lynx. Temporary road construction in the South Cold LAU would not decrease denning habitat for lynx. Overall, there would be a decrease of 37 acres of potential denning habitat for lynx in the South Cold LAU as a result of implementing Alternative D.

There are no activities in potential denning habitat in the Elk LAU under Alternative D.

Other Lynx Habitat

South Cold LAU: In the South Cold LAU there are 125 acres of treatment proposed in other lynx habitat: Units 1, 2, 3a, 3b, 5a, 5b, 6, and 9. The treatments proposed in these units are Thin From Below, Salvage, Pre-Commercial Thin, and Sanitation. The stands treated would retain sufficient vegetation following treatment to continue to function as other lynx habitat. Alternative D would not decrease the amount of other lynx habitat in the South Cold LAU. Sufficient habitat would remain to allow unimpeded movement of lynx in the LAU.

Temporary road construction is proposed into Units 1, 7, and 10. The temporary road into Unit 1 is across lands that are currently unsuitable lynx habitat. The temporary road into Unit 7 goes through an area that provides other lynx habitat. The temporary road construction would only minimally impact the stand it is in; the stand would still provide lynx habitat following proposed activities. The temporary road into Unit 10 follows an old road/skid trail (no trees) and then enters the proposed unit. There would be no decrease in lynx habitat as a result of this temporary road.

Elk LAU: In the Elk LAU, there are 501 acres of treatment proposed in other lynx habitat: Units 11, 12, 13, 15, 17 through 24b, and 26 through 28. There are no regeneration harvests proposed in Alternative D. There would be no increase in unsuitable lynx habitat under this alternative. The 17 units proposed in the Elk LAU under this alternative have either a Thin From Below or a Pre-Commercial Thin Treatment. These treatments would retain sufficient vegetation following treatment to continue to function as other lynx habitat.

Temporary road construction in the Elk LAU would only minimally impact the existing forest stands; they would still provide lynx habitat following proposed activities. No additional decrease in lynx habitat would occur due to temporary road construction in the Elk LAU under Alternative D.

The following table summarizes the expected effects of the proposed Hemlock Elk Project with implementation of Alternative D.

TABLE 3-54
POTENTIAL EFFECTS ON CANADA LYNX HABITAT

LAU	FORAGE				DENNING				OTHER			
	Acres Treated in WUI		Treated outside WUI		Treated in WUI		Treated outside WUI		Treated in WUI		Treated outside WUI	
	Acres	% of LAU	Acres	% of LAU	Acres	% of LAU	Acres	% of LAU	Acres	% of LAU	Acres	% of LAU
South Cold	0	0	0	0%	20	<1	17	<1	103	<1	22	<1
Elk	0	0	0	0	0	0	0	0	97	<1	404	1

Alternative D
Cumulative Effects

There is a history of timber harvest and road building on all ownership lands in the Hemlock Elk Area; it is anticipated that this would continue into the future. The effects of past timber harvest and road building in the South Cold and Elk LAUs have been accounted for in the existing information on forage, denning, and non-suitable habitat for lynx. There are also ongoing activities in the South Cold and Elk LAUs that would be included in the cumulative effects analysis. These ongoing activities include existing special use permits, road maintenance activities, noxious weed treatments, potential resource enhancement projects (culvert replacements, stream stabilization), and planting of shrubs and trees. Plum Creek Timber Company is in the process of offering some of their lands for sale to the Forest Service, to conservation buyers, and to other private individuals. Many of the lands offered for sale have been located in the lower valley area, generally outside of designated lynx habitat.

There would be no new over-the-snow routes created under Alternative D. It is possible that dispersed snowmobile use in the Hemlock Elk area could increase due to more open stand conditions. Dispersed recreation activities seldom result in a direct loss of habitat (LCAS 2000), but may indirectly increase competition for prey as a result of snow compaction. The possibility of increased snowmobile use would decline as vegetation grows in and stand conditions change.

Alternative D would not increase potential lynx mortality. Cover for lynx would remain connected and continuous, occurring in a pattern that follows stream courses in the lower elevations and then more variably and continuous on upland tracts of land. Non-target trapping mortality may occur in the area, but it is outside the control of the proposed project.

Alternative D would be less impactive to Canada lynx than either Alternative B or Alternative C and is consistent with the standards and guidelines described in the NRLMD. Implementation of Alternative D would not preclude lynx use of habitats in the area. There would be no increase in mortality risk. Adverse cumulative effects are not expected.

Regulatory Framework and Consistency

On July 8, 1998, the USFWS published a proposed rule to list the Canada lynx as a threatened species under the ESA, as amended. The normal 12-month rule-making process was extended for an additional 6 months to allow for consideration of new scientific information and additional public

comments on the proposed rule. An interagency lynx coordination effort was initiated in March 1998. The USFWS, Forest Service, Bureau of Land Management (BLM), and the National Park Service participated in this effort. Three products important to the conservation of lynx on Federally-managed lands were produced:

1. "The Scientific Basis for Lynx Conservation – Ecology and Conservation of Lynx in the United States" (Ruggiero et.al. 2000),

2. The Lynx Conservation Assessment and Strategy (LCAS), and

3. The Lynx Conservation Agreement (CA).

The Canada lynx was classified as "threatened" in Montana on March 24, 2000, and is currently protected under the ESA. A recovery plan for the Canada lynx has not yet been completed.

The USFWS has estimated that more than 70 percent of the lynx habitat in the Northern Rockies is on NFS and BLM lands. Further, the USFWS determined that the existing land management plans for these two agencies allow actions that cumulatively could adversely affect lynx. Forest Service and BLM Biologists also analyzed the plans and came to the same conclusion. Therefore, the plans are being amended to provide management direction for the conservation of lynx. In September 2001, the Northern Rockies Lynx Amendment (NRLA) was proposed for 18 national forests (including the Flathead National Forest) and four BLM units. Subsequently, there has been analysis and a decision. The NRLA would add management direction to land management plans that will conserve and promote recovery of the Canada lynx by reducing or eliminating adverse effects from land management activities.

The alternatives comply with Section 9, ESA of 1973 as amended. Conservation measures, including standards and guidelines outlined in the previous LCAS, have been followed. In addition, the Hemlock Elk Project is consistent with the standards and guidelines outlined in the NRLA. A BA for Threatened and Endangered Wildlife Species was prepared. The USFWS concurred with the **"may affect—not likely to adversely affect"** determination.

Gray Wolf

Data Sources, Methods, and Assumptions Used

Data used included open road densities, stand exam surveys, aerial photography, Vector Map (VMAP) data, project area field visits, research literature, and GIS and dataset information for features such as white-tailed deer winter range, deer summer range, and general forest attributes like habitat type, forest type, elevation, and slope.

Description of Measurement Indicators

Based on current knowledge of the life history, biology, and ecology of the gray wolf, certain elements are thought to be essential to the conservation of the species. These elements include an adequate prey base, secure den sites, rendezvous areas, whelping sites, and a low mortality risk. These elements of gray wolf habitat, and the anticipated effects to these elements from project implementation, are the measurement indicators used in this analysis.

Affected Environment

Historic Conditions

Historically, the gray wolf is known to have been a resident of the Swan Valley. The wolf moved freely throughout the valley in the absence of human development feeding mostly on ungulate species inhabiting the valley. As human activity levels in the Swan Valley increased, mortality risk for the gray wolf increased as well.

Existing Condition

The wolf population in the northern Rocky Mountains has generally increased over the last 7 years, with a notable increase in 2005 over 2004 (USFWS et al. 2006). There were a total of 46 packs (3 or more wolves) in 2005, resulting in an estimated minimum of 256 wolves in Montana. The average number of wolves per pack increased from about 4.5 wolves per pack in 2004 to 5.5 wolves per pack in 2005. There were 19 breeding pairs statewide. In 2006, the minimum wolf population estimate increased about 19 percent from 256 wolves to 316. The number of packs increased from 46 in 2005 to 60 in 2006, with 21 breeding pairs statewide. The Montana wolf population is secure, but very dynamic (Sime et. al. 2007). Some packs do not persist from year to year for many reasons, including mortalities and poor pup production/survival due to parasites and disease, and lethal control to address conflicts with livestock.

Wolves are known to use the Swan Range, Mission Mountains, and Swan Valley. Attempts to confirm a pack in the Swan Valley were unsuccessful until 2006. By the end of December 2006, 4 wolves were documented in the Swan Valley. As of the summer of 2008, there are 2 known wolf packs in the Swan Valley. There are no known depredations from these packs. Wolves are known to move through the Hemlock Elk Area. There are no known current or historical denning sites, whelping areas, or rendezvous sites in the Hemlock Elk Area.

Environmental Consequences

Alternative A - No Action
Direct, Indirect, and Cumulative Effects

There would be no vegetation treatments or associated activities proposed with this alternative, so there would be no direct effects to gray wolf or gray wolf habitat because of proposed actions in the Hemlock Elk Area. As natural vegetative succession occurs, ungulate use patterns would change and wolves would vary their use patterns as well. Indirectly, as a result of not implementing the proposed vegetation management, there may be an increased risk of stand replacement fire in the project area. A large intense wildfire could potentially decrease overall cover for ungulate species, at least short term. This would potentially cause a short term decrease in wolf prey species. Much of the existing winter range areas for white-tailed deer in the Swan Valley are located adjacent to private corporate lands. Many of these lands have been heavily managed and do not currently carry heavy fuel loading. Alternative A would not contribute significantly to cumulative effects in the Hemlock Elk Area.

Alternative B
Direct and Indirect Effects

Key components of wolf habitat are: (1) a sufficient, year-round prey base of ungulates and alternate prey, (2) suitable and somewhat secluded denning and rendezvous sites, and (3) security; sufficient space with minimal exposure to humans (USFWS 1987, Sime et. al. 2007).

Prey Base

White-tailed deer make up the greatest proportion of the wolf diet in northwestern Montana, followed by elk and moose (Kunkel 1997). Mule deer and smaller mammals or birds may also be preyed upon opportunistically throughout the year. The Swan Valley has historically provided spring, summer, fall, and winter range for white-tailed deer, mule deer, and elk. White-tailed deer sightings are common and their numbers are thought to be stable. The 2003 Elk Annual Report (MDFWP 2003) discussed how total elk observed in the Swan Valley was 35 percent above the 10-year average (1993 to 2002), including the antlerless and bull segments. No estimates are available for the resident mule deer population size. However, Forest-wide population trends are thought to be stable, and a relatively constant total mule deer harvest has been observed (Project File Exhibit F-11).

The mature and immature forest stands where vegetative treatment is proposed currently provide hiding and/or thermal cover for wolf prey species, including deer and elk. Hiding cover for deer and elk would be retained in the commercial Thin From Below, Sanitation, Salvage, and the non-commercial Thin From Below and Pre-Commercial Thin Units. Hiding cover would not be retained in the Clearcut or Seed Tree Units. There would be a short-term (10 to 15 years) decrease in hiding cover of 203 acres in the Hemlock Elk Project Area under Alternative B. This decrease in hiding cover would not be expected to decrease ungulate population numbers in the area, although ungulate distribution may change. An adequate prey base for wolves would be maintained across the southern end of the Swan Valley and any effects to the wolf ungulate prey base would be minimal.

Key Habitat Areas (Denning Sites, Rendezvous Areas, and Whelping Sites)

There are no known or historical den sites, rendezvous areas, or whelping sites in the proposed Hemlock Elk Project Area. Wolves commonly den in undisturbed sites, usually within 400 yards of water. A wolf pack will move up to 6 miles to a number of rendezvous sites, typically meadows, until the pups can travel with the adults. Potential denning and rendezvous habitat sites are not considered limiting across the Swan Valley. There would be no direct or indirect effect on wolf security from disturbance to these key habitat areas with the implementation Alternative B. It should be noted that, under any alternative, the contract for operations would include provisions to cease activity or otherwise protect any denning, rendezvous, or whelping site that may be discovered.

Security/Mortality Risk

Implementing Alternative B could displace wolves. In addition to the actual logging activity (vegetative treatments), approximately 4.8 miles of temporary road would be needed to access units. All temporary roads would be reclaimed and public use of temporary roads would be prohibited.

There are no proposed treatments in riparian areas or old growth habitats under Alternative B. If these areas presently provide cover, forage, and security for gray wolf, or gray wolf prey, they would continue to do so.

Because wolves are adaptable animals, the expected increase in activity level within the project area would only result in temporary displacement of wolves from habitats that they might otherwise use. Wolves occupying the project area would likely move to adjacent areas further from human development and disturbance. Implementing Alternative B would not significantly increase the mortality risk for the gray wolf. Any increased chance for an encounter between wolves and humans because of the proposed project would present a low risk of mortality for the wolf since the encounter would center around land management activities and not livestock depredation or other high risk activities commonly associated with wolf mortality.

Alternative B
Cumulative Effects

The project proposal would not increase cumulative effects to the gray wolf, due, in large part, to its location in an area where wolves are already accustomed to human activity.

Under Alternative B, the existing wolf prey base would be maintained. There are no livestock (cattle) grazing concerns associated with this project. Road closures in the Swan Valley that have been implemented to increase grizzly bear security have increased wolf security as well. There would be no increase in mortality risk as a result of the implementation of Alternative B.

There is the potential for increased human occupancy of private lands near the project area due to sales of commercial timber lands. The conditions placed on lands sold to private individuals are highly variable. All development is regulated by State of Montana and county regulations specific to particular developmental activities. As previously stated, many acres of industrial forest lands have also been sold to public land management agencies. The cumulative effect of private land development in or near the project area with the project itself and coupled with previous land management projects are not likely to measurably affect the gray wolf on a population basis. There appears to be little risk of population loss, and species viability would be maintained (Project File Exhibit F-11).

Alternative C
Direct and Indirect Effects

Alternative C is similar to Alternative B, except that winter logging is required on 281 acres of the proposed sale (12 Units; 41 percent of the sale area).

Prey Base

As described under Alternative B, hiding cover for deer and elk would be retained in the commercial Thin From Below, Sanitation, Salvage, and the non-commercial Thin From Below and Pre-Commercial Thin Units. Hiding cover would not be retained in the Clearcut or Seed Tree Units. There would be a short-term (10 to 15 years) decrease in hiding cover of 203 acres in the Hemlock Elk Project Area under Alternative C. This decrease in hiding cover would not be expected to decrease ungulate population numbers in the area, although ungulate distribution may change.

There is a possibility that the winter logging requirement in Alternative C may have a positive effect on the gray wolf. White-tailed deer are often attracted to logging activity in the winter, where they can more readily feed on lichen from felled trees. This may increase prey abundance for gray wolf, on a short-term basis, in the Hemlock Elk Area during logging operations.

Key Habitat Areas (denning sites, rendezvous areas, and whelping sites)

There would be no direct or indirect effect on wolf security from disturbance to key wolf habitat areas as a result of implementing Alternative C, since there are no known or historical denning sites, rendezvous areas, or whelping sites in the proposed Hemlock Elk Project Area.

Security/Mortality Risk

Some displacement of wolves could occur as a result of implementing Alternative C. In addition to the actual vegetative treatments, approximately 4.7 miles of temporary road would be needed to access units under Alternative C. All temporary roads would be reclaimed and public use of temporary roads would be prohibited.

As described above in Alternative B, under Alternative C there are no proposed treatments in riparian areas or in old growth habitat. If these areas presently provide cover, forage, and security for gray wolf, they would continue to do so.

The mortality risk for the gray wolf, as a result of implementing Alternative C, would not be significantly increased.

Alternative C
Cumulative Effects

Under Alternative C, the existing wolf prey base would be maintained. There are no livestock (cattle) grazing concerns associated with this project. Road closures in the Swan Valley that have been implemented to increase grizzly bear security have increased wolf security as well. There would be no increase in mortality risk as a result of implementation.

There is the potential for increased human occupancy of private lands near the project area due to sales of commercial timber lands. As previously stated, many acres of industrial forest lands have also been sold to public land management agencies. The cumulative effect of private land development in or near the project area with the project itself and coupled with previous land management projects are not likely to measurably affect the gray wolf on a population basis.

Adverse cumulative effects are not expected. There appears to be little risk of population loss and species viability would be maintained with implementation of Alternative C.

Alternative D
Direct and Indirect Effects

Prey Base

Under Alternative D, no Clearcuts or Seed Tree Harvest would occur. Alternative D would have less potential for affecting the wolf prey base than Alternatives B or C because there would be no decrease in forest stands providing hiding cover under Alternative D. An adequate prey base for wolves would be maintained.

Key Habitat Areas (Denning Sites, Rendezvous Areas, and Whelping Sites)

There would be no direct or indirect effect on wolf security from disturbance to key wolf habitat areas as a result of implementing Alternative D, since there are no known or historical den sites, rendezvous areas, or whelping sites in the Hemlock Elk Project Area.

Security/Mortality Risk

Some displacement of wolves may occur as a result of implementing Alternative D. The least amount of temporary road would be needed to access units under Alternative D (4.5 miles). All temporary roads would be reclaimed and public use of temporary roads would be prohibited. Under Alternative D, there are no proposed treatments in old growth or riparian areas, and the mortality risk for the gray wolf would not be significantly increased.

Alternative D
Cumulative Effects

The project proposal would not increase cumulative effects to the gray wolf, due, in large part, to its location in an area where wolves are already accustomed to human activity. The existing wolf prey base would be maintained. There are no livestock (cattle) grazing concerns associated with this project. Road closures in the Swan Valley that have been implemented to increase grizzly bear

security have increased wolf security as well. There would be no increase in mortality risk as a result of implementing this alternative.

As described under Alternatives B and C, the cumulative effect of past activities, the proposed project, and future activities, would not preclude or negatively affect gray wolf use of habitats in the area. Adverse cumulative effects are not expected. There appears to be little risk of population loss and species viability would be maintained (Project File Exhibit F-11).

Determination

Endangered Species Act protections were reinstated for the northern Rocky Mountain gray wolf on July 18th, 2008. The reinstatement follows a granted Preliminary Injunction and is in effect pending final resolution. A BA for Threatened and Endangered Species was prepared. The USFWS concurred with the **"may affect – not likely to adversely affect"** determination for the gray wolf.

Grizzly Bear

Analysis Area

Spatial Bounds

The Hemlock Elk Project is located in the Northern Continental Divide Grizzly Bear Ecosystem (NCDE), as identified in the Recovery Plan for grizzly bear. The NCDE has been divided into Bear Management Units (BMUs), Areas (BMAs), and Subunits. The BMU Subunits approximate the size of a female grizzly bear's home range. The Hemlock Elk Project lies within the Hemlock Elk Grizzly Bear Subunit. This subunit was used to analyze direct, indirect, and cumulative effects to the grizzly bear. Cumulative effects were also analyzed at the larger BMA and BMU scale. Conservation measures for the grizzly bear, including standards and guidelines, have been addressed at the subunit, BMA, and BMU scale (e.g. Interagency Grizzly Bear Guidelines, Amendment 19 to the Forest Plan, and the SVGBCA).

Temporal Bounds

The length of time for effects analysis is approximately 5 years. This is based on the probable contract length for the proposed project, the timeframes for related activities, and the reasonably foreseeable actions identified.

Data Sources, Methods, and Assumptions Used

Data used included aerial photography, stand exams, Vector Map (VMAP) data, project area field visits, research literature, and GIS and dataset information for features such as general forest attributes, slope, aspect, habitat type, forest type, elevation, and mapped security core and road density information.

Description of Measurement Indicators

Based on current knowledge of the life history, biology, and ecology of grizzly bear, certain elements are thought to be essential to the conservation of the species. These elements include adequate amounts of denning and forage habitat, and a level of security within their territory that provides for a low risk of displacement or mortality. These elements of grizzly bear habitat, and the anticipated

effects to these elements from project implementation, are the measurement indicators used in this analysis

Affected Environment

Historic Condition

In the past, the grizzly bear would have moved freely throughout the Swan Valley in the absence of human development. With Congress' passing of the Homestead Act in 1862, the way was paved for human development in the valley. In 1864, the Federal government granted land to the Great Northern Railroad for railroad right-of-way development. The checkerboard ownership pattern found in the Upper Swan Valley today is largely the result of this rail development and later land exchanges. In the early 1900's, people began to move into the Swan Valley in greater numbers and active forest management began. By the mid-1900's aggressive fire suppression was already changing the landscape, as was active timber management and a recreating public. As human-activity levels in the Swan Valley increased, the mortality risk for the grizzly bear increased as well.

Existing Condition

The proposed Hemlock Elk Fuels Reduction and Forest Health Management Project lies within the NCDE. It appears that in the NCDE, grizzly bears are increasing their range and have a population beyond recovery plan levels (USFS 2002, USFS 2006). The Grizzly Bear Recovery Plan (USFWS 1993) identifies a minimum NCDE-wide grizzly bear population of 391 (211 bears outside Glacier National Park [GNP] and 180 bears inside GNP). Grizzly bear population monitoring using a DNA sampling technique was carried out in 1998 and 2000 in approximately the northern third of the NCDE. The sample area included the North Fork of the Flathead River. The population estimates from this study area cannot be simply extrapolated to the rest of the NCDE, but it does serve to indicate a population exists in the study area that is contributing substantially to the NCDE-wide population goal. A provisional population point estimate of 319 (9 percent CV) bears was derived from the 1998 work and 339 (9 percent CV) from the 2000 data (Kate Kendall, personal communication 10/3/07 NCDE Fall 2007 Meeting). The Flathead National Forest was an active participant in the 2004 Northern Divide Grizzly Bear Project, which is designed to derive a population estimate for grizzly bears in the entire Northern Continental Divide Grizzly Bear Ecosystem based on a DNA sampling technique. At a recent Interagency Grizzly Bear Committee meeting, DNA analysis of a 2004 US Geological Survey (USGS) study showed a minimum of 545 individual bears with 100 percent of the samples completed. This minimum number was revised by 18 to 563 by Kate Kendall to include known management bears that were not sampled during the 2004 DNA study (Kate Kendall, personal communication 10/3/07 NCDE Fall 2007 Meeting).

The Hemlock Elk Project is located in lands that have been designated as Management Situation 1 (MS-1) for grizzly bears, which is identified as areas needed for the survival and recovery of the species (Forest Plan). The Hemlock Elk Project is also located within the SVGBCA Area.

The situation for grizzly bears in the Hemlock Elk Area is summarized in the following table.

TABLE 3-55
GRIZZLY BEARS, POPULATION, AND HABITAT STATUS

Bear Mgmt Unit (BMU)	Subunit	Visual Sightings	Den Sites	Mortality
Mission Range	Hemlock Elk	Grizzly bear are known to use lands in this subunit. There have been reliable visual sightings and information on radio-collared grizzlies.	There are no known den sites in the vicinity of the proposed Hemlock Elk Project.	In 2004, there were 5 mortalities in the Swan Valley. From fall 2003 through winter 2005, there were 9 grizzly bear mortalities in the Swan Valley. Most of the mortalities were management actions resulting from conflicts near human dwellings.

Environmental Consequences

Alternative A - No Action
Direct, Indirect, and Cumulative Effects

Since there would be no vegetation treatments or associated activities proposed with this alternative, there would be no direct effects to grizzly bear as a result of implementing the No Action Alternative. Indirectly, not implementing the fuel reduction and forest health treatments could increase the risk of a wildfire burning more intensely in the Hemlock Elk Area, which would result in a change in available forage and cover for grizzly bear over the short and long term. Fires have historically produced both positive and negative effects for grizzly bears. On the negative side, there could be a loss in hiding cover and security. On the positive side, forage habitat would be potentially increased.

Alternative B
Direct and Indirect Effects

Denning Habitat

Denning habitat has been characterized as steep (> 45 percent slope), relatively inaccessible slopes with northern and western aspects at or above 5,900 feet in elevation (Mace 1997). The proposed Hemlock Elk Project is outside of areas that would be expected to provide potential denning habitat for grizzly bear. There is no proposed commercial harvest or non-commercial treatment in known or potential grizzly bear denning habitat under Alternative B. There would be no direct or indirect effects to grizzly bear denning habitat as a result of proposed commercial or non-commercial vegetative treatments or associated activities.

Food Production/Cover

Implementation of Alternative B includes 668 acres of commercial harvest in mature forest stands and 71 acres of non-commercial treatment in immature forest stands. The mature and immature forest stands where vegetative treatment is proposed currently provide hiding cover for grizzly bear. The commercial treatments include 404 acres of Thin From Below, 129 acres of Seed Tree with Reserves, 58 acres of Clearcut with Reserves, 51 acres of Sanitation, 16 acres of Patch Clearcut with Reserves, and 10 acres of Salvage. Non-commercial treatments include 61 acres of Pre-Commercial Thinning and 10 acres of Thin From Below proposed in immature forest stands. Hiding cover for grizzly bear would be retained on 536 acres, in the commercial Thin From Below, Sanitation, and Salvage Units and in the non-commercial treatment units. Hiding cover would not be retained on 203 acres in the Clearcut and Seed Tree Units. There would be an immediate decrease in hiding cover of 203 acres

on NFS lands in the Hemlock Elk Subunit. Currently, hiding cover is not a limiting factor in the subunit. The SVGBCA has established that each major landowner (e.g. Forest Service and PCTC in the Hemlock Elk Subunit) will maintain at least 40 percent of the area in cover. There is currently approximately 83 percent hiding cover on NFS lands in the subunit and approximately 56 percent hiding cover on PCTC lands, for an average of approximately 70 percent hiding cover across the subunit (SVGBCA Monitoring Report 2007). Hiding cover would take approximately 10 to 15 years to recover, depending on stand conditions.

As per the SVGBCA, vegetative screening, where it currently exists, would be retained along open roads in the project area, and Clearcut and Seed Tree Units would be laid out so that no point in the unit is more than 600 feet from hiding cover (See Design Criteria, Table 2-15). These design criteria help to mitigate potential effects to grizzly bear from a short term (10 to 15 years) loss of overall hiding cover in the subunit.

Grizzly bears are opportunistic feeders and will prey or scavenge on almost any available food. Plants with high crude protein content and animal matter are the most important food items. The mature and immature stands where vegetative treatments are proposed offer foraging opportunities for grizzly bear, although vegetative forage may be limited due to thick canopy covers. Proposed vegetative treatments would initially decrease the amount of available forage due to ground disturbance; however, forage opportunities would increase over existing conditions within 1 to 5 years as a greater amount of sunlight and moisture reach the forest floor. As with hiding cover, forage is not limited across the subunit.

There are no proposed treatments in riparian areas or old growth forest stands, which are important components of suitable grizzly bear habitat. If these areas presently provide hiding cover and forage, they would continue to do so.

Displacement/Mortality Risk/Security

There is a potential for short term displacement of bears from the immediate area during implementation of Alternative B. Implementation may begin in 2008 with sale layout and preparation. Harvest operations are could begin in 2009 to possibly 2010 and would likely continue for approximately 3 years, through 2011. If harvest activity is not completed by 2011, proposed actions would comply with SVGBCA guidelines for subunit rotation. According to the rotation schedule set up in the SVGBCA, the Hemlock Elk Subunit is “inactive” from 2006 through 2008, becoming “active” again from 2009 through 2011. Commercial use, defined as major forest management activities (including road construction and timber harvest), is not permitted in an “inactive” subunit except during the denning period (November 16 through March 31). Consequently, all major forest management activities occurring as part of the Hemlock Elk Project would be conducted from November 16 through March 31, during the grizzly bear denning period. Minor activities (e.g. pre-commercial thinning, road maintenance, slash disposal, tree planting, jackpot and underburning), that are less than 2 weeks in duration, may be conducted in an “inactive” subunit. In 2009, when the subunit is “active,” major forest management activities may be conducted throughout the year, with few limitations. These design criteria limit potential long term displacement of grizzly bears, reduce the mortality risk as a result of project implementation, and help provide for grizzly bear security. There is still a potential for short term displacement of bears from the immediate area during actual implementation of the proposed activities.

In order to avoid the potential disturbance of grizzly bears in important spring habitat, management activities that are planned in spring habitat, which is defined as areas within designated linkage zones and below 5,200 feet (USFWS 1997), would not occur within the Spring Period (April 1 through June 15) (See Design Criteria, Table 2-15).This timing restriction would apply to 10 out of the 30 units (approximately 35 percent of the treated acres): Units 1, 19, 20, 21, 22, 23, 25, 26, 27, and 28.

Alternative B does not propose permanent road construction. Approximately 4.8 miles of temporary road would be needed to access treatment units (approximately 16 temporary roads). Out of the total

4.8 miles, 4.0 miles of temporary road would be located within the treatment units themselves. Temporary roads would be constructed to the minimum standards necessary for log hauling. Public access would be prohibited on temporary roads and proposed temporary roads would be reclaimed following use. The reclamation work would include the removal of any culverts, water bar placement, seeding, re-contouring, and the placement of large woody debris on the reclaimed road.

The temporary roads are not located near security core. Construction and use of the temporary roads would not decrease security core in the subunit.

Existing open roads and closed roads (currently bermed or gated) would be used to conduct the proposed vegetation management operations. Use of open roads would not be a change from the existing condition. Roads that are currently closed, but that would be used for proposed activities, would be closed to the public during the time they are used for timber management activities (See Design Criteria, Table 2-15).

Actions implemented under Alternative B would not increase the total road density (TRD) in the subunit and would not decrease Security Core for the grizzly bear. Open road densities (ORD) would increase temporarily during sale activities; this is allowed under the SVGBCA in an Active Subunit.

Existing areas that provide grizzly bear security are located outside of the Hemlock Elk Project Area, in adjacent inactive grizzly bear subunits. There would be no significant increase in the mortality risk for grizzly bears as a result of project implementation. The contract for the Hemlock Elk Project would include a clause for the temporary suspension or cessation of activities, if needed, to resolve any grizzly bear/human conflict (See Design Criteria, Table 2-15).

A Special Order is in effect requiring all users of NFS lands within the NCDE to store food, garbage, and other bear attractants in a bear resistant manner. Contractors, and others implementing the proposed project, would be required to comply with this order.

Alternative B
Cumulative Effects

The Hemlock Elk Area contains established human activities, including vegetation management, road management, private land development, and recreational use. Between 1956 and 2007, approximately 2,800 acres of regeneration and intermediate harvest occurred on NFS lands. Over 1,000 acres of pre-commercial thinning occurred between 1966 and 1996. Between 1974 and 2004, approximately 6,400 acres of regeneration and intermediate harvest occurred on PCTC lands. Road construction and logging activity have occurred on Federal and private forested land throughout the lower portion of the Swan Valley. Most major logging activity on NFS lands, including road building, occurred almost a decade ago. Logging and road construction have continued on private timberlands up to the present time.

Recently, PCTC has offered up tracts of land in the southern portion of the Swan Valley for sale to the Forest Service, conservation buyers, or other private individuals. From 1995 to 2007, 44 parcels, totaling approximately 15,705 acres, of PCTC lands in the Swan Valley were sold to conservation buyers, private parties, or private parties with conservation easements. Of this amount, approximately 1,280 acres were sold in the Hemlock Elk Project Area. Deed restrictions on the land sales include set-back standards for streams and sanitation guidelines (e.g., no outdoor barbecue pits, no birdfeeders within reach of bears, and fenced gardens). In Missoula County, a subdivision review is required if parties propose to subdivide 160 acres or more. Despite these provisions, there is the risk that an increase in private parcels of land in the Swan Valley may further fragment wildlife habitat and increase human-bear encounters. As described above, many of the land sales by PCTC have been to conservation buyers, which should help mitigate the risks associated with private land development. During the period 1995 to 2008, the Forest Service has acquired approximately 2,570 acres of PCTC lands within the Hemlock Elk Project Area, with a total of almost 8,000 acres in the Swan Valley over

the same time period. The acquisition of lands by the Forest Service has helped to maintain natural landscape linkages and to reduce the risk of private land development. Future additional potential land sales to public agencies appear to be possible under the recently announced Montana Legacy Project which is discussed in more detail in the Lands section of this chapter.

In 1995, a Conservation Agreement was entered in to by PCTC, DNRC, the U.S. Forest Service, and the USFWS. The purpose of the agreement has been to adopt an adaptive management approach to manage the integrated pattern of ownership and development in such a way as to reduce the impact of activities on the grizzly bear in the Swan Valley. Since 1995, the different timberland managers have adhered to the Agreement. Adherence to the agreement has helped to ensure that negative cumulative impacts to the grizzly bear due to land management activities do not occur.

The primary cause of grizzly bear mortality in the Swan Valley, at least recently, has been human related. Grizzly bear mortalities have occurred as a result of food conditioning and habituation and the ultimate removal from the population due to human safety concerns or as a result of poaching/illegal actions. Occasionally, grizzly bear mortalities have occurred in the Swan Valley because of livestock depredation, but those instances have been rare. To minimize the risk of human-grizzly conflicts in the Swan Valley, and in the Hemlock Elk Area, the Forest Service and local residents have become very active in providing information and educational programs on living in grizzly bear country and on food storage techniques. In addition, the Forest and local partners have provided bear-proof storage containers and employed a Bear Ranger to educate and enforce a Forest Food Storage Order. There is currently a multi-party monitoring / research effort being conducted in the SVGBCA area. The objective of the study is to gain information that will ultimately help landowners in the Swan Valley understand and mitigate human-caused grizzly bear mortality.

Security for the grizzly bear would not be significantly reduced with implementation of Alternative B. This alternative would not contribute significantly to cumulative effects in the area.

Alternative C
Direct and Indirect Effects

Denning Habitat

There is no proposed commercial harvest or non-commercial treatment in known or potential grizzly bear denning habitat under Alternative C. There would be no direct or indirect effects to grizzly bear denning habitat because of proposed commercial or non-commercial vegetative treatments or associated activities.

Food Production/Cover

Implementation of Alternative C includes 668 acres of commercial harvest in mature forest stands and 71 acres of non-commercial treatment in immature forest stands; the same as is proposed under Alternative B. As described in Alternative B, hiding cover for grizzly bear would be retained on 536 acres, in the commercial Thin From Below, Sanitation, and Salvage Units, and in the non-commercial treatment units. Hiding cover would not be retained on 203 acres, in the Clearcut and Seed Tree Units. There would be an immediate decrease in hiding cover of 203 acres on NFS lands in the Hemlock Elk Subunit under Alternative C. Hiding cover would take approximately 10 to 15 years to recover, depending on stand conditions.

As per the SVGBCA, vegetative screening would be retained along open roads in the project area and Clearcut and Seed Tree Units would be laid out so that no point in the unit is more than 600 feet from hiding cover. These design criteria help to mitigate potential effects to grizzly bear from a short-term (10 to 15 years) loss of overall hiding cover in the subunit.

Proposed vegetative treatments in Alternative C would initially decrease the amount of available forage due to ground disturbance; however, forage opportunities would increase over existing conditions within 1 to 5 years as a greater amount of sunlight and moisture reach the forest floor.

As in Alternative B, Alternative C proposes no treatments in riparian areas or old growth forest stands, which are important components of suitable grizzly bear habitat.

Displacement/Mortality Risk/Security

As described above in Alternative B, there is a potential for short-term displacement of bears from the immediate area during implementation of Alternative C. However, under Alternative C, winter logging is required on 12 units (281 acres), approximately 41 percent of the sale area. The winter logging of almost half of the project area would decrease the potential for displacement or disturbance of grizzly bears because the activity in these units would take place while the bears are in their dens.

In order to avoid the potential disturbance of grizzly bears in important spring habitat, management activities that are planned in spring habitat would not occur within the Spring Period (April 1 through June 15).

Under Alternative C, there is no permanent road construction proposed; however, approximately 4.7 miles of temporary road would be needed to access treatment units. Temporary roads would be constructed to the minimum standards necessary for log hauling. Public access would be prohibited on temporary roads and proposed temporary roads would be reclaimed following use. The reclamation work would include the removal of any culverts, water bar placement, seeding, re-contouring, and the placement of large woody debris on the reclaimed road. The temporary roads are not located near security core. Construction and use of the temporary roads would not decrease security core in the subunit.

Existing open roads and closed roads (currently bermed or gated) would be used to conduct the proposed vegetation management operations. Roads that are currently closed, but that would be used for proposed activities, would be closed to the public during the time that they are used for timber management activities. Again, winter logging and use of temporary roads or roads that are normally closed would decrease the potential for disturbance or displacement of grizzly bears.

Actions implemented under Alternative C would not increase the total road density (TRD) in the subunit and would not decrease Security Core for the grizzly bear. Open road densities (ORD) would increase temporarily during sale activities; this is allowed under the SVGBCA in an Active Subunit.

As in Alternative B, existing areas that provide grizzly bear security are located in adjacent inactive grizzly bear subunits.

Alternative C
Cumulative Effects

Cumulative effects in Alternative C would be the same as the cumulative effects described above in Alternative B. The Hemlock Elk Area contains established human activities, including vegetation management, road management, private land development, and recreational use.

Security for the grizzly bear would not be significantly reduced with implementation of Alternative C. This alternative would not contribute significantly to cumulative effects in the area.

Alternative D
Direct and Indirect Effects

Denning Habitat

As described under the other action alternatives, there is no proposed commercial harvest or non-commercial treatment in known or potential grizzly bear denning habitat under Alternative D. There would be no direct or indirect effects to grizzly bear denning habitat as a result of proposed commercial or non-commercial vegetative treatments or associated activities.

Food Production/Cover

The greatest difference between Alternative D and the other two action alternatives is that no regeneration harvest is proposed in Alternative D. The amount of acres treated and the type of harvest prescription is different under Alternative D: Implementation of Alternative D includes 592 acres of commercial harvest in mature forest stands (76 less acres than either Alternative B or C), and 71 acres of non-commercial treatment in immature forest stands. The mature and immature forest stands where vegetative treatment is proposed currently provide hiding cover for grizzly bear. Hiding cover for grizzly bear would be retained in treated stands, because the proposed treatments are all intermediate harvests and not regeneration harvests. There would be no significant decrease in hiding cover on NFS lands in the Hemlock Elk Subunit under Alternative D.

As per the SVGBCA, vegetative screening would be retained along open roads in the project area and Clearcut and Seed Tree Units would be laid out so that no point in the unit is more than 600 feet from hiding cover. These design criteria help to mitigate potential effects to grizzly bear from a short-term (10 to 15 years) loss of overall hiding cover in the subunit.

Proposed vegetative treatments would initially decrease the amount of available forage due to ground disturbance, however forage opportunities would increase over existing conditions within 1 to 5 years as a greater amount of sunlight and moisture reach the forest floor.

There are no proposed treatments in riparian areas or old growth forest stands, which are important components of suitable grizzly bear habitat. If these areas presently provide hiding cover and forage, they would continue to do so.

Displacement/Mortality Risk/Security

There is a potential for short term displacement of bears from the immediate area during implementation of Alternative D. Implementation may begin in 2008 with sale layout and preparation. Harvest operations are expected to begin in 2009 to possibly 2010 and continue for approximately 3 years, through 2011 to possibly 2012. If harvest activity is not completed by 2011, proposed actions would comply with SVGBCA guidelines for subunit rotation. According to the rotation schedule set up in the Agreement, the Hemlock Elk Subunit is “inactive” from 2006 through 2008, becoming “active” again from 2009 through 2011. Commercial Use, defined as major forest management activities (including road construction and timber harvest), is not permitted in an “inactive” subunit except during the denning period (November 16 through March 31). Consequently, all major forest management activities occurring as part of the Hemlock Elk Project would be conducted from November 16 through March 31, during the grizzly bear denning period. Minor activities (e.g., pre-commercial thinning, road maintenance, slash disposal, tree planting, jackpot and under-burning), that are less than 2 weeks in duration, may be conducted in an “inactive” subunit. In 2009, when the subunit is “active,” major forest management activities could be conducted throughout the year, with few limitations. These design criteria limit potential long term displacement of grizzly bears, reduce the mortality risk as a result of project implementation, and help provide for grizzly bear security. There is still a potential for short term displacement of bears from the immediate area during actual implementation of the proposed activities.

In order to avoid the potential disturbance of grizzly bears in important spring habitat, management activities that are planned in spring habitat (which is defined as areas within designated linkage zones and below 5,200 feet [USFWS 1997]), would not occur within the Spring Period (April 1 through June 15). This timing restriction would apply to Units 1, 19, 20, 21, 22, 23, 26, 27, and 28, approximately 35 percent of the treated acres.

There is no permanent road construction proposed under Alternative D. Approximately 4.5 miles of temporary road would be needed to access treatment units (slightly less than Alternatives B and C). Temporary roads would be constructed to the minimum standards necessary for log hauling. Public access would be prohibited on temporary roads and proposed temporary roads would be reclaimed following use. The temporary roads are not located near security core. Construction and use of the temporary roads would not decrease security core in the subunit.

Existing open roads and closed roads (currently bermed or gated) would be used to conduct the proposed vegetation management operations. Use of open roads would not be a change from the existing condition. Roads that are currently closed, but that would be used for proposed activities, would be closed to the public during the time that they are used for timber management activities.

Actions implemented under Alternative D would not increase the TRD in the subunit and would not decrease Security Core for the grizzly bear. Open road densities would increase temporarily during sale activities; this is allowed under the SVGBCA in an Active Subunit.

Existing areas that provide grizzly bear security are located outside of the Hemlock Elk Project Area, in adjacent inactive grizzly bear subunits. There would be no significant increase in the mortality risk for grizzly bears because of project implementation. The contract for the Hemlock Elk Project would include a clause for the temporary suspension or cessation of activities, if needed, to resolve any grizzly bear/human conflict.

A Special Order is in effect that requires all users of NFS lands within the NCDE to store food, garbage, and other bear attractants in a bear resistant manner. Contractors, and others implementing the proposed project, would be required to comply with this order.

Alternative D
Cumulative Effects

Cumulative effects in Alternative D would be the same as the cumulative effects described above in Alternative B. The Hemlock Elk Area contains established human activities, including vegetation management, road management, private land development, and recreational use.

Security for the grizzly bear would not be significantly reduced as a result of implementing Alternative D. This alternative would not contribute significantly to cumulative effects in the area.

Regulatory Framework and Consistency

The grizzly bear is currently classified as Threatened in Montana and is protected under the ESA. The Hemlock Elk Project is located in lands that have been designated as MS 1, which is identified as an area needed for the survival and recovery of the species (Forest Plan). The Hemlock Elk Project is also located within the SVGBCA area.

Forest-wide management direction for grizzly bear is included in the Forest Plan, including Amendments 8, 9, 11, and 19. Interagency Grizzly Bear Guidelines (1986) were adopted as Forest Plan Appendix OO.

The alternatives comply with Section 9, ESA of 1973, as amended, Forest Plan, as amended, the Interagency Grizzly Bear Guidelines, and the SVGBCA. A BA for Threatened and Endangered Wildlife Species was prepared. The USFWS concurred with the "**may affect—not likely to adversely affect"** determination.

Old Growth Associated Wildlife Species

Introduction

Forest Plan Amendment 21 defines old growth as "a community of forest vegetation that has reached a late stage of plant succession." The generic description follows:

- The age of the dominant cohort of trees is significantly older than the average time interval between natural disturbances (interval will vary depending upon forest cover type and habitat type);
- The dominant trees are approaching their average life expectancy on the site;
- Forest composition and structure are different from younger stands;
- Rates of change in composition and structure of the stand are slow relative to younger forests;
- There is a significant showing of decadence (wide range of defect and breakage in both live and dead trees).

In *The Dictionary of Forestry* (Helms 1998), old growth forests are described as having:

- Large trees for the species and site;
- Accumulations of large dead standing and fallen trees;
- Decay or breakage of tree tops, boles, or roots;
- Multiple canopy layers;
- A wide variation in tree size and spacing; and
- Canopy gaps and understory patchiness.

The characteristics of old growth forest described above provide habitat for many plant and animal species. For the purpose of this discussion, old growth associated species includes any wildlife species that use the various attributes of old growth forests for some or all of their ecological needs. These needs may include nesting, denning, security, or foraging habitat. For some species, closed canopy old growth provides snow capture and reduces snow depths, insulates the animals from cold winds, and provides protection from predators. Other species, such as the fisher, are strongly tied to canopy cover and mature forest structure for the majority of their habitat needs. More open canopies, or open understories, provide foraging opportunities for prey and predator species alike. Wildlife may use interior old growth habitat as shelter from sun, heat, dryness, or wind. Interior old growth may also provide protection from predators. Some old growth associated wildlife species need only a portion of their home range to be in old growth. Examples include the Canada lynx, northern goshawk, American marten, pileated woodpecker, and bald eagle. Other species such as southern red-backed voles, chestnut-backed chickadee, Swainson's thrush, and northern flying squirrels, have relatively small home range sizes (less than 100 acres), with the necessary proportion of this home range being in old growth unknown.

The following table displays 31 old growth associated species, designated in the Forest Plan's Amendment 21 that may be found in the Swan Valley, along with their associations with various habitat elements.

TABLE 3-56
HABITAT REQUIREMENTS OF OLD GROWTH ASSOCIATED WILDLIFE SPECIES
(BASED ON WARREN 1998 AND LRMP AMENDMENT 21 FEIS

Species	Cover Type in Affected Area	Canopy	Edge	Larger Patches	Snag	Down Log	Occurrence
American Marten	Mixed mesic, lodgepole, spruce/fir forests	Closed	-	+	X	X	Known current
Bald Eagle (S)	Mixed mesic forests, near large lake or river	Open		+	X		Known current
Black-backed Woodpecker (S)	Lower Montane & Montane; post-fire or insect-epidemic forests	Open			X		Known current
Boreal Owl	Mixed mesic and spruce/fir forest mosaic	Closed			X	X	Known current
Brown Creeper	Mixed mesic, lodgepole, and spruce/fir forests	Closed	-		X		Known current
Canada Lynx (T†)	Mixed mesic, lodgepole, and spruce/fir forests; gentle terrain		+‡	+	X§	X	Known current
Chestnut-Backed Chickadee	Mixed mesic and spruce/fir forests, especially cedar-hemlock	Closed	-**		X		Known current
Fisher (S††)	Mixed mesic and lodgepole forests	Closed				X	Known current
Flammulated Owl (S, F‡‡)	Lower Montane and Montane, single-story.	Open			X		Known current
Golden-crowned Kinglet	Mixed mesic, lodgepole, and spruce/fir forests	Closed		+	X		Known current
Hairy Woodpecker	Mixed mesic, lodgepole, and spruce/fir forests	Open			X	X	Known current
Hammond's Flycatcher (F)	Mixed mesic and spruce/fir forests	Closed					Known current
Harlequin Duck (S)	Swift mountain streams, riparian old growth (weak association)	Open				X	Known current
Hermit Thrush	Dry mixed mesic and spruce/fir forests	Open		+			Known current
Lewis' Woodpecker	Lower Montane ponderosa pine and old burns	Open			X		Known current

† T = Threatened
‡ + = positive correlation (where known)
§ X = important habitat component;
** - = negative correlation (where known)
†† S = Sensitive
‡‡ F = Forest-dwelling Neotropical migrant with apparently declining populations.

TABLE 3-56
HABITAT REQUIREMENTS OF OLD GROWTH ASSOCIATED WILDLIFE SPECIES
(BASED ON WARREN 1998 AND LRMP AMENDMENT 21 FEIS

Species	Cover Type in Affected Area	Canopy	Edge	Larger Patches	Snag	Down Log	Occurrence
Northern Flying Squirrel	Mixed mesic and lodgepole forests			+	X	X	Known current
Northern Goshawk	Single or multistory old growth; clear forest floor	Closed		+	X		Known current
Pileated Woodpecker	Mixed mesic forests	Closed		+	X	X	Known current
Pine Grosbeak	Mixed mesic, lodgepole, and spruce/fir forests						Known current
Pygmy Nuthatch	Large single-story ponderosa pine and mixed mesic forests	Open			X		Known current
Red-Breasted Nuthatch	Mixed mesic, lodgepole, and spruce/fir; relatively dry	Open		+	X		Known current
Silver-haired Bat	Mixed mesic and lodgepole forests; caves and snags				X		Suspected
Southern Red-backed Vole	Mixed mesic, lodgepole, and spruce-fir forest				X	X	Known current
Swainson's Thrush (F)	Mixed mesic and lodgepole forest with shrub understory			+			Known current
Tailed Frog	Cold, high gradient headwater streams					X	Known current
Three-toed Woodpecker	Mixed mesic, lodgepole, and spruce/fir forests; post-fire				X		Known current
Townsend's Warbler	Mixed mesic and lodgepole forest; dense understory	Closed	-	+			Known current
Varied Thrush	Mixed mesic and spruce/fir forests, especially cedar-hemlock	Closed		+			Known current
Vaux's Swift (F)	Mixed mesic and spruce/fir forests; large hollow snags				X		Known current
White-breasted Nuthatch	Large single-story ponderosa pine	Open			X		Known current
Winter Wren	Mixed mesic and spruce/fir forests, especially cedar-hemlock		-	+	X		Known current

Stands across the analysis area were screened for old growth characteristics. The Western Montana Zone Old Growth Type Characteristics were used to classify old growth forests (Green et al. 1992 [updated 2005]). The Western Montana Zone definition uses certain criteria, including forest type, tree age and diameter, trees per acre, number and diameter of snags, amount of down woody, and tree canopy layer structure. Field surveys were done for every stand which appeared to be close to the

minimum criteria and for all stands where stand replacement treatment was proposed (e.g. seed tree cuts).

Analysis Area

Spatial Bounds

The effects analysis area for direct, indirect, and cumulative effects to old growth associated wildlife species is the Hemlock Elk Project Area (approximately 36,653 acres). This old growth analysis area is large enough to include the home ranges of old growth associated species, and is representative of the effects of fire, natural tree mortality, timber harvest, and road management, across the landscape. At the same time, this analysis area is small enough to not obscure the effects of the alternatives. A multi-scale assessment has also been conducted to address habitat diversity concerns.

Temporal Bounds

The length of time for effects from the proposed activities is approximately 5 years. This is based on the probable contract length for the proposed fuels reduction/forest health project, the timeframes for related activities, and the reasonably foreseeable actions identified.

Data Sources, Methods, and Assumptions Used

Data used included stand exams, field surveys of snags and downed logs, old growth surveys, project area field visits, research literature, and GIS and dataset information for features such as general forest attributes, habitat type, and forest type.

Description of Measurement Indicators

The effects analysis focuses on (1) effects to old growth habitat, and (2) potential effects to old growth associated wildlife species.

Affected Environment

Historic Condition

Historically, old growth forests in the Swan Valley ranged from open, patchy stands, maintained by frequent low-severity fire, to a mosaic of dense and open stands maintained by mixed-severity fires (Freedman and Habeck 1985; Arno et al 1995). Old growth structure and composition, and the amount of old growth in a watershed, varied strongly with topography and elevation, and were shaped by a complex disturbance regime of fire, insects, and disease. Historically, old growth was most likely to develop in the valley bottoms and along streams, where fires burned less frequently and usually with less intensity. Because severe, stand-replacing fires burn at irregular intervals in response to weather patterns and fuel accumulations, variations in the amount of old growth in a local area could be expected over time. Based on various information sources, the amount of old growth on the Flathead National Forest historically would have been on the order of 15 to 60 percent (USDA 1999). Generally, across the Flathead National Forest and the entire Columbia River Basin, there was a higher percentage of old forest across the landscape than there is currently. For more information on old growth habitat conditions across the Flathead National Forest, see the Final EIS for Forest Plan Amendment 21 (USDA 1999).

Existing Condition

Over the last 100 years, old forests in the Interior Columbia Basin have declined by 27 to 60 percent and large residual trees and snags have decreased by 20 percent (Quigley et al. 1996). These changes have contributed to declining habitat conditions for numerous species of wildlife associated with old growth forests. This decrease in old growth forest has occurred within all sub-basins of the Flathead National Forest (Forest Plan Amendment 21). Based on a broad Regional review using Forest Inventory and Analysis (FIA) data, approximately 10.1 percent of the Flathead National Forest is old growth forest, with a range from 8.2 to 12.0 percent (USDA 2006). Although there are no detailed records that compare exact changes in old forest across the Swan Valley, the overall trend findings are consistent between various analyses (Freedman and Habeck 1985, Hart 1994, USFS 1994, Swan Ecosystem Center 2004).

In the Upper Swan Valley, the major differences today from historical conditions are that the total amount of old growth forest habitat covers less land area, the patches of old growth forest are smaller in size, and remaining old growth forest habitat has changed both structurally and in distribution (Hart 1994). This translates into smaller blocks of older forest that are not as “secure” as larger blocks of old growth forest with more interior area. This change in the amount and character of old growth forest can be largely attributed to land clearing in the valleys, timber harvest activities, and natural disturbances (e.g., fire, windstorms, disease).

Old growth forest was identified within the Hemlock Elk Project Area using *The Western Montana Zone Old Growth Type Characteristics* (Green et al. 1992 [updated 2005]). Approximately 770 acres of old growth forest was identified on NFS in Sections 4, 8, and 10, T20N, R17W; Section 12, T20N, R18W; and Section 22, T21N, R17W, in the vicinity of the proposed cutting units. There is undoubtedly additional old growth forest located on other NFS lands within the 36,653 acre Hemlock Elk Analysis Area. Old growth on individual private lands and on PCTC lands has not been included in the old growth analysis because the availability of old growth on these lands is uncertain.

Patch size of old growth forest is an important characteristic in its function as habitat. As mentioned previously, one of the changes from historical conditions is the fragmentation, or disruption of continuity, of old growth forest patches that are presently available across the Swan Valley. Old growth associated wildlife species use other habitats as well, but rely on old growth for at least a portion of their habitat needs. Many of these species are sensitive to fragmentation. For example, research suggests that 250 to 500 acres of old growth is required for the pine marten, and approximately 100 to 250 acres for the pileated woodpecker (McClelland 1999). The average patch size (uninterrupted continuity) of old growth in the immediate Hemlock Elk Project Area (near and adjacent to cutting units) is 100 acres, with patch sizes ranging from 14 acres to 297 acres. It is likely that patch sizes of old growth in other portions of the analysis area, outside of the heavily managed, roaded area, are similar or larger.

The northern goshawk, as mentioned previously, is associated with old growth habitats for a portion of its territory, specifically closed-canopy old growth in larger patch sizes. Consequently, the goshawk can be used as an indicator species for old growth conditions with these characteristics. The overstory canopy is usually a relatively closed canopy (50 to 90 percent), with a more open understory for foraging (Squires and Reynolds 1997, USFWS 1998, Samson 2005, Squires and Kennedy 2006, Beier and Drennan 1997). The average patch size of core nesting areas appears to be somewhat dependent on available habitat conditions;

- 30 acres recommended in the southwestern United States (Reynolds et al. 1992),
- 40 acres found by Clough (2000) in west central Montana,
- 148 acres found by McGrath et al. (2003) in Oregon and Washington, and approximately
- 80 acres found by Patla (1997) in Idaho.

Live trees large enough to support a large platform nest are required. Hayward and Escano (1989) found that nest sites in northwest Montana were often located in older stands that support widely spaced large trees, and which had water and large forest openings within 0.3 miles of the nest. Adjacent to the nest site, there is a post-fledging area (approximately 200 to 500 acres), which is, along with the nesting area, usually defended by an adult pair. The size, shape, and habitat composition of these areas varies with local conditions, but is generally in pole-sized or larger forest with closed (50 percent to greater than 70 percent) canopies. Northern goshawk foraging areas are heterogeneous, with goshawks preying on a variety of medium-sized forest birds and mammals, and hunting forest edges and openings, as well as forest cover.

At a minimum, within the overall Hemlock Elk Analysis Area, there is one potential goshawk territory block in the immediate project vicinity (Sections 4, 8, and 10, T20N R17W). This potential territory block has approximately 160 acres of old growth forest sufficient for nesting habitat and approximately 400 acres of post- fledging habitat. Private lands, both corporate and individual, were included as foraging habitat. However, due to the uncertainty of conditions on private lands, potential nesting and post-fledging habitat were only identified on NFS lands. In other portions of the analysis area, outside of the heavily managed, roaded area, there is sufficient mature closed canopy forest and old growth forest to support other potential northern goshawk pairs.

The Flathead NF examined the amount and distribution of goshawk habitat found on NFS lands within the Flathead NF (USDA 2000). Goshawk habitat was summarized for individual sub-basins; in the 469,280 acre Swan Valley Sub-basin, approximately 203,972 acres of suitable habitat were identified. Northern goshawks are known to occur in the Swan Valley. There are no known nest sites in any of the proposed Hemlock Elk treatment units.

Environmental Consequences

Alternative A - No Action
Direct and Indirect Effects

There would be no fuel reduction/forest health treatment, or associated activities, proposed with this alternative. There would be no direct effects to old growth habitats on NFS lands or to old growth associated wildlife species using these lands. This alternative would sustain habitat for old growth associated species, at least over the shortterm.

It is possible that an indirect effect of Alternative A would be an increased likelihood of a larger, more intense wildfire event in the Hemlock Elk Area. Indirectly, taking no action to reduce fuel buildups could increase the potential for a loss of old growth forest in the Hemlock Elk Area. The level of effects would depend on the size and intensity of the wildfire.

Alternative A - No Action
Cumulative Effects

Alternative A would contribute to cumulative effects to the degree that it does not alter current and ongoing increases in fuel buildup and ladder fuels within and immediately adjacent to some old growth stands where, historically, fuel build up and ladder fuels would have been periodically removed in less intense wildfire events. The specific cumulative effects of Alternative A are not possible to predict, however, as they would depend on the actual location, intensity, moisture and weather conditions associated with a presently unknown future fire event. Increased risk of larger more intense fires may be foreseeable, but specific affects are not.

Natural vegetative processes would continue on NFS lands in the Hemlock Elk Area. Older mature forest stands would become old growth stands. Existing old growth forest would experience increased tree mortality in the overtstory, with younger trees growing into the natural openings. Replacement of

the older trees would take many decades and the stands would take on an uneven-aged character. The amount of old growth habitat across the landscape would fluctuate as older trees are replaced by younger trees and as younger forests grow into future old growth.

Cumulative affects from possible future changes in land ownership are reflected in the old growth analysis. Old growth and mature forests on private lands are not assumed to contribute to present or future old growth in the analysis area. Possible cumulative affects of the potential for increased human occupancy related to changes in land ownership and or increased development of existing private lands do not have a foreseeable effect on the amount or distribution of old growth on the NFS lands. On private lands it is assumed, for cumulative effects purposes, that old growth does not exist.

Alternatives B and C
Direct and Indirect Effects

The difference between Alternative B and Alternative C is that Alternative C proposes winter logging in 12 units (281 acres). These same units (18a through 27) would not require winter logging under Alternative B. Since the winter logging restriction would not significantly change the potential effects to old growth associated species, Alternatives B and C will be analyzed together.

There is no fuels reduction or forest management activity proposed in old growth forest stands under Alternative B or Alternative C.

Interior Integrity of Existing Old Growth

New “edge” is created when stands adjacent to old growth habitat are converted from a late- or mid-seral structural stage to an early-seral structural stage. The creation of high contrast edge adjacent to old growth forest has two negative effects on old growth:

1. It directly affects the adjacent old growth stand or old growth block by reducing the interior integrity of the stand or block, and

2. It narrows or eventually severs the connection between different old growth patches.

In Alternatives B and C, new high contrast edge would be created adjacent to existing old growth stands by proposed Clearcut and Seed Tree Treatments in Units 10 and 11. This edge would be created adjacent to portions of 2 old growth patches for a total edge distance of approximately 0.74 miles. Of this total, 0.04 miles are associated with Unit 11 and 0.7 miles are a result of implementing Unit 10.

Units 5b, 6, 7, 9, 12, and 13 are also adjacent to existing old growth stands. The treatments in these units, however, are partial cuts (e.g. Thin From Below, Sanitation, Pre-Commercial Thinning) and would not create high contrast edge. These stands would continue to provide mature forest habitat conditions after treatment and could potentially provide future old growth habitat for associated species. The interior integrity of existing old growth stands would not be significantly affected by partial cutting.

Old Growth Recruitment

In the Commercial Thin From Below Treatments (404 acres), the existing tree canopy closure would be reduced to 80 to 120 square feet of basal area per acre, or approximately 100 trees per acre. Generally, all dominant and most co-dominant trees would be retained. The purpose of this treatment is to enlarge the growing space for desirable trees by reducing excessive tree competition for limited site resources, which allows for improved tree growth and vigor. With the Sanitation (51 acres) and Salvage (10 acres) treatments, the existing stand structure would generally remain intact; scattered overstory and understory trees that are heavily infested with dwarf mistletoe or affected by mountain

pine beetle would be removed. These proposed partial cutting treatments would keep the stands on a trajectory towards providing old growth habitat conditions for old growth associated wildlife species in the future. In most cases, the units where partial cutting is proposed would continue to provide potential habitat for northern goshawk post-fledging areas (PFA). Untreated, existing old growth stands would continue to provide potential nesting habitat for the goshawk.

The Seed Tree Harvest (129 acres), Clearcut (58 acres), and Patch Clearcut (16 acres) Treatments would remove most of the trees from the site to facilitate regeneration of a new age class. These stands would not be potential old growth habitat for a very long time (approximately 200 years). Treatment in these stands would also decrease the amount of potential PFA habitat for the northern goshawk. Generally these treatments have been proposed where stand conditions are in decline and contain large components of mature lodgepole pine.

Under Alternatives B and C, there would be 10 acres of non-commercial Thin From Below Treatment and 61 acres of Pre-Commercial Thinning. There would be little to no short term effects on old growth associated species as a result of implementing the proposed Pre-Commercial or Thin From Below Treatments. In the long term, the effects would be beneficial as the removal of excess trees at this stage in forest stand development reduces growth stagnation and enables the retained trees to grow vigorously.

Species Displacement

In Alternatives B and C, proposed activities may temporarily displace old growth associated wildlife species if they occur near or adjacent to old growth forest stands. The displacement would probably be short term and would not significantly affect wildlife species associated with old growth habitats.

Temporary Road Construction

No temporary road construction is proposed in old growth forest stands in Alternatives B or C. There is one temporary road in Alternative B, accessing Unit 10, that would be constructed near or adjacent to an old growth stand. The high contrast edge resulting from the proposed Clearcut Treatment would include the edge effects resulting from the temporary road.

Alternatives B and C
Cumulative Effects

Past land management activities in the area, including timber management, road construction, residential development, and agricultural conversion, have decreased the amount of available old growth forest and have fragmented the patches of old growth that are left into smaller blocks. Fire suppression has contributed to increased understory growth and denser mid-canopy trees (Lesica 1996), making foraging more difficult for species that apparently use a more open understory (e.g. flammulated owls and northern goshawks). The risk of stand-replacing fire in and adjacent to old growth stands has also increased. Alternatives B and C would reduce the risk of stand replacement fire within those stands treated and would reduce the risk of stand replacement fire spreading to adjacent stands, including old growth stands.

Timber harvest activities on PCTC lands and on NFS lands in the Hemlock Elk Area peaked during the mid to late 1980's, and continue up to the present on all ownership lands.

Plum Creek Timber Company is in the process of selling some of their land to private individuals and to conservation buyers, including the Forest Service. The Lands Sections of this EA provides a detailed discussion of this change in land ownership. Land sales, or timber harvest on other ownerships, may break up the continuity of mature forest near and adjacent to old growth patches on NFS lands. The existing intermingled ownership pattern in the upper Swan Valley presents difficulties in managing old growth habitat connectivity with patch sizes that occurred historically.

The Hemlock Elk Area is located near the Community of Condon, Montana. There are part-year and yearlong residences in the area, as well as many recreational opportunities. The level of human activity in the area increases the chance for disturbance or displacement of old growth associated species. There is also an increased risk for the removal of snags (firewood), an important component of old growth habitat. Other human activity in the area includes various road use permits and easements. The recently announced Montana Legacy Project may result in an increased proportion of PCTC lands within the project area.

The direct and indirect effects discussed in Alternatives B and C would be in addition to the cumulative effects described here. Significant negative cumulative affects to old growth habitat as a result of implementing Alternatives B and C, in combination with the potential changes in land ownership, and/or increases in human occupancy of private lands in or adjacent to the project area, are not anticipated. The rationale for this conclusion is, as in the discussion above, that old growth on private lands is not relied upon in this analysis and is modeled as if it did not exist, and there is no proposed treatment in old growth on NFS lands.

As described above, many of the proposed treatments in mature forest stands (536 acres) are designed to leave the more vigorous, healthy trees, and the more wind-firm, fire-resistant and longer-lived species. This method of "Thinning From Below" would likely tend to increase the amount of old growth forest over the long term, as mature forested stands are put on a trajectory where they should become future old growth habitat. In cases where the stands treated by this prescription are dominated by lodgepole pine, the intent of the prescription is to improve general stand health while removing commercial timber and to reduce the susceptibility of such stands to large scale insect mortality.

Significant adverse cumulative effects to old growth associated species are not expected as a result of implementing Alternative B or C.

Alternative D
Direct and Indirect Effects

Similar to Alternatives B and C, there is no fuels reduction or forest management activity proposed in old growth forest stands under Alternative D.

Interior Integrity of Existing Old Growth

Under Alternative D, there is no regeneration cutting proposed. There would be no high contrast edge created adjacent to existing old growth stands. The interior integrity of existing old growth stands would not be significantly affected because all of the treatments proposed in Alternative D are partial cutting.

Old Growth Recruitment

All of the treatments proposed in Alternative D are partial cut treatments; treated stands would remain on a trajectory towards providing future old growth habitat conditions for old growth associated wildlife species. There would be no decrease in the amount of nesting or potential post-fledging habitat for the northern goshawk.

Species Displacement

In Alternative D, proposed activities may temporarily displace old growth associated wildlife species if they occur near or adjacent to old growth forest stands. The displacement would probably be short term and would not significantly affect wildlife species associated with old growth habitats.

Temporary Road Construction

No temporary road construction is proposed in old growth forest stands in Alternative D. There is one temporary road, accessing Unit 10, that would be constructed near or adjacent to an old growth stand. The temporary road would result in a narrow "edge" being created adjacent to the old growth stand. The temporary road would be approximately 800 feet long. The width would be truck bunk width, plus 4 feet. Following sale activity, the temporary road would be reclaimed.

Alternative D
Cumulative Effects

As described above, past land management activities in the area, including timber management, road construction, residential development, and agricultural conversion, have decreased the amount of available old growth forest and have fragmented the patches of old growth that are left into smaller blocks. Fire suppression has contributed to increased understory growth and denser mid-canopy trees (Lesica 1996).

The Hemlock Elk Area is located near the Community of Condon, Montana. There are part-year and yearlong residences in the area, as well as many recreational opportunities. The level of human activity in the area increases the chance for disturbance or displacement of old growth associated species. There is also an increased risk for the removal of snags (firewood).

Significant negative cumulative affects to old growth habitat as a result of implementing Alternative D, in combination with the potential changes in land ownership, and/or increases in human occupancy of private lands in or adjacent to the project area, are not anticipated.

As described above, the proposed treatments in mature forest stands are designed to leave the more vigorous, healthy trees, and the more wind-firm, fire-resistant and longer-lived species. These treatments would likely tend to increase the amount of old growth forest over the longterm, as mature forested stands are put on a trajectory where they should become future old growth habitat. As discussed above the Thinning From Below commercial treatments in stands dominated by lodgepole pine are intended to improve stand health while removing commercial products, and to reduce the potential of large scale insect infestations in these stands.

Regulatory Framework and Consistency

The NFMA requires that the Forest Service "provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives." In addition, NFMA regulations state, "the overall goal of the ecological element of sustainability is to provide a framework to contribute to sustaining native ecological systems by providing ecological conditions to support diversity of native plant and animal species in the plan area." According to NFMA; "This will satisfy the statutory requirement to provide for diversity of plant and animal communities based on suitability and capability of the specific land area in order to meet multiple use objectives."

Amendment 21 to the Forest Plan was signed in January 1999. It has a goal to "maintain and recruit old growth forests to an amount and distribution that is within the 75 percent range around the median of the HRV. Where current conditions are below this amount, actively manage to recruit additional old growth." Amendment 21 further states that management actions within old growth stands should be limited to those actions that "maintain or restore old growth composition and structure consistent with native disturbance and succession regimes, or reduce risks to sustaining old growth composition and structure."

Implementation of all alternatives would comply with the standards contained in the Forest Plan relative to old growth. However, Alternative D would be the least impactive. Old growth characteristics would be maintained under all alternatives.

This page intentionally left blank.

Wildlife

Sensitive Species

Introduction

Sensitive wildlife species are those species that may show evidence of a current or predicted downward trend in population numbers or in habitat suitability that could substantially reduce species distribution. The Regional Forester has identified 12 wildlife species as sensitive, including the de-listed bald eagle. The northern goshawk is no longer a sensitive species in Region One; it has been determined that the goshawk population is not in a downward trend and goshawk species distribution is not in danger of reduction. Potential effects to the northern goshawk will be analyzed with old growth associated species.

The bald eagle, common loon, flammulated owl, harlequin duck, northern bog lemming, northern leopard frog, and peregrine falcon are sensitive wildlife species that have been determined to not be affected by this project and will not be discussed further in this report.

Analysis Area

Spatial Bounds

The Hemlock Elk Project Area, approximately 36,653 acres, was the area considered for the evaluation of direct, indirect, and cumulative effects on sensitive wildlife species. This project area is large enough to include the home ranges of several individuals or pairs of a species, and is representative of the effects of fire, natural tree mortality, timber harvest, road management, and other potential effects, across the landscape. The actions proposed that could directly, indirectly, or cumulatively affect sensitive species are contained within this area. The larger Upper Swan Valley was also considered in the cumulative effects analysis.

Temporal Bounds

The length of time for effects in this cumulative effects analysis is approximately 5 years. This is based on the probable contract length for the proposed Hemlock Elk Project, the timeframes for related activities, and the reasonably foreseeable actions identified.

Black-backed Woodpecker

Data Sources, Methods, and Assumptions Used

Data used included stand exams, Vector Map (VMAP) data, field surveys of snags and downed logs, old growth surveys, project area field visits, research literature, and GIS and dataset information for features such as general forest attributes, habitat type, and forest type.

Description of Measurement Indicators

Based on current knowledge of the life history, biology, and ecology of the black-backed woodpecker, certain elements are thought to be essential to the conservation of the species. These elements include the presence of dead and dying, insect-infested trees (forage), and large snags (nesting). The effects analysis for the black-backed woodpecker focused on the presence of insects and potential nesting trees and the potential effects the Proposed Action could have on these habitat characteristics.

Affected Environment

Historical Condition

Black-backed woodpeckers forage in areas with concentrations of dead or decaying trees and logs, often in recently burned forests. The trees in which they feed have frequently only been dead for 2 to 3 years, since these trees harbor the most insects. They use live or dead trees (usually 8 to 12 inches DBH) for nesting. Black-backed woodpecker populations have always been transitory. When an epidemic, windstorm, or fire occurred in the past, black-backed woodpeckers would move into that area. As time went on and the insect numbers decreased, the woodpeckers would move on to another area. There was probably more feeding habitat historically. Fire suppression efforts and salvage of fire-killed or insect-infested trees has reduced the habitat potential for black-backed woodpeckers in the Swan Valley and across northwest Montana.

Existing Condition

Habitat for the black-backed woodpecker is abundant and well distributed across the Northern Region and by Forest (Samson 2005, USDA 2007). In addition, habitat amounts are expected to increase as fires and insect outbreaks continue to increase in size and in a pattern distinctly different from that evident historically (Gallant 2003, Hessburg and Agee 2003 and others). No scientific evidence exists that the black-backed woodpecker population is decreasing in numbers (Samson 2005).

Black-backed woodpeckers are known to occur throughout the Swan Valley, usually in low numbers. Mature and old growth forest stands in the Hemlock Elk Area provide potential habitat conditions for a low-density population. Black-backed woodpeckers have been observed recently in the Crazy Horse Fire Area, due to the recent increase in dead or decaying trees. For additional information on the status of the black-backed woodpecker on the Flathead National Forest, and the status at broader scales, reference the document, Flathead National Forest Evaluation and Compliance with NFMA Requirements to Provide for Diversity of Animal Communities (Project File Exhibit F-11).

Environmental Consequences

The Hemlock Elk Project consists of three action alternatives and a No Action Alternative. The alternatives are described in detail in Chapter 2 of this EA. The Cumulative Effects Worksheet, located in the Wildlife Project File (Project File Exhibit F-4) considers and describes proposed activities in addition to the past, current, and reasonably foreseeable activities listed at the beginning of this chapter in Tables 3-1 and 3-2. Those activities that cumulatively contribute indiscernible effects to Sensitive Wildlife Species are not included in this section. Those activities that cumulatively affect these species are listed below.

Alternative A - No Action
Direct, Indirect, and Cumulative Effects

Alternative A would maintain the existing situation. There would be no direct physical change to the landscape and no direct effect on black-backed woodpeckers. Indirectly, if a wildfire occurs in the future and spreads to become a large fire on the landscape because of fuel buildup in the Hemlock Elk Area (i.e., no forest health or fuel reduction treatment), it would not be a negative circumstance for the black-backed woodpecker since this woodpecker responds positively to wildfire events. The probability of this condition occurring is somewhat increased under the No Action Alternative.

Timber harvest on NFS lands and on private and State lands in the Swan Valley would continue, probably salvaging a portion of the potential feeder and nesting trees for black-backed woodpeckers. High levels of human activity would continue, with the potential for prospective feeder trees to be taken out as firewood. Although there may be an increase in firewood cutting from open roads, no additional access for such activities would occur as a result of Alternative A.

Fire suppression efforts would continue, and to the extent that they are successful, black-backed woodpecker population levels would remain low. Since 2001, there have been a number of large wildfires on the Flathead National Forest and throughout western Montana. For the next 2 to 3 years, and possibly longer, black-backed woodpecker numbers in the Flathead should remain high.

Alternative A would not contribute significantly to cumulative effects on black-backed woodpecker in the Hemlock Elk Area.

Alternatives B, C, and D
Direct and Indirect Effects

As a result of implementing the Hemlock Elk Project, a direct effect to the black-backed woodpecker would be the reduction of potential feeder trees and nesting trees in the Clearcut, Seedtree, Sanitation, Salvage, and Commercial Thin From Below Units. Project Design Criteria common to all action alternatives to offset this impact is the requirement to retain snags and recruitment snags in sufficient numbers to meet the wildlife objectives of Amendment 21 of the Forest Plan (See Design Criteria, Table 2-15). Amendment 21 Design Criteria for tree and snag retention were created to insure that project areas would retain sufficient trees and snags to meet the basic habitat requirements of many species including the black-backed woodpecker. The proposed non-commercial Thin From Below and Pre-Commercial Thin Treatments would not have any measurable effects on the black-backed woodpecker due to the lack of black-backed woodpecker habitat characteristics (e.g., small trees).

In each of the action alternatives, there is no proposed treatment in old growth or riparian stands, which have a higher potential for providing both nesting and feeding habitat. This would help to mitigate potential direct effects to black-backed woodpecker habitat.

An indirect negative effect may be the decreased chance of a large stand-replacing wildfire. Larger wildfires on the landscape would be beneficial to black-backed woodpeckers since the fires increase the amount of potential feeding and nesting habitat.

Temporary road construction is proposed. Other roads that are managed as closed roads would be used for accessing units. An increase in public access increases the risk of losing high quality snags to firewood cutters. Public use of closed roads would not be permitted and temporary roads would be reclaimed following use. Reclaiming roads following use should help reduce the risk of snag loss over the long-term (See Design Criteria, Table 2-15).

Proposed timber management operations and associated human activity may temporarily displace individual black-backed woodpeckers that are foraging in the area. Short term displacement of individual birds would not be significant; there would be no long term impact from this kind of displacement.

Alternatives B, C, and D
Cumulative Effects

Fire suppression has been the greatest factor limiting the distribution of potential black-backed woodpecker habitat. Prior to 2001, there were few wildfires of considerable size since 1926. Then, across the Flathead National Forest and most of western Montana, large acreages of black-backed woodpecker habitat were created by wildfires. Between 2001 and 2004, approximately 200,000 acres in over 70 fires burned on the Flathead NF, creating a substantial amount of black-backed woodpecker habitat. Less than 5 percent of this habitat was salvage harvested, leaving the vast majority of potential black-backed woodpecker habitat intact. Partially within the Hemlock Elk Project Area and adjacent to the area, the 11,000-acre 2003 Crazy Horse Fire created thousands of snags with only a portion of the snags removed through salvage on about 600 acres. In 2006, about 1,800 acres containing thousands of trees were burned in the Holland Peak Fire, east of the Hemlock Elk Project Area. Most of these snags remain on site.

As discussed in Westerling et al. (2006), virtually all climate model projections indicate that warmer springs and summers will occur over the region in coming decades:

> "These trends will reinforce the tendency toward early spring snowmelt and longer fire seasons. This will accentuate conditions favorable to the occurrence of large wildfires, amplifying the vulnerability the region has experienced since the mid-1980's."

Furthermore, a recent state insect and disease condition report shows dramatic increases in acreages of tree mortality from 2002 to 2005 (USDA 2006).

Because the potential direct and indirect affects to black-backed woodpecker as a result of implementing the Hemlock Elk Project are minimal, and because broad scale analysis has demonstrated that there appears to be little risk of population loss (Project File Exhibit F-11), it is unlikely that Alternatives B, C, or D would contribute significantly to cumulative effects on black-backed woodpeckers or black-backed habitat in the Swan Valley.

Determination

In accordance with FSM 2673.42, a determination has been made as to the degree of impact the activities proposed might have on sensitive species. Based on available information on the black-backed woodpecker's distribution, presence/absence from the project area, habitat requirements, and management strategies, as well as project design and location, the determination for Alternative A is **"no impact"** and the determination for each of the action alternatives is **"may impact individuals or habitat, but will not likely contribute to a trend towards Federal listing or loss of viability to the population or species."**

Fisher

Data Sources, Methods, and Assumptions Used

Data used included aerial photography, Vector Map (VMAP) data, project area field visits, research literature, and GIS and dataset information for features such as general forest attributes, habitat type, forest type, and mapped riparian areas.

Description of Measurement Indicators

Based on current knowledge of the life history, biology, and ecology of fisher, certain elements are thought to be essential to the conservation of the species. These elements include the presence of denser canopy cover forest, snag and down woody habitat characteristics, and adjacent riparian habitats. These elements of fisher habitat, and the anticipated effects to these elements from project implementation, are the measurement indicators used in this analysis.

Affected Environment

Historical Condition

Fishers are large, weasel-like predators that occupy a variety of upland and lowland forests, with an affinity for forested riparian habitats. Fishers have been found to prefer to rest in stands that exceed 60 percent canopy cover, and avoid stands with less than 40 percent canopy cover (Jones 1991). The highest quality fisher habitat is dense (60 to 80+ percent cover) coniferous and mixed-coniferous/deciduous forest with an available water source (Ruggerio et. al. 1994). They very rarely stray far from streams (within 328 feet [100 meters]) or other wet sites (Powell and Zielinski 1994). Fishers need good snow interception in the winter months (Allen 1983). Sites used by the fisher for shelter or sleeping include hollow logs, tree cavities, brush piles, and used burrows and/or dens. In a study done in Idaho, the average diameter of trees used by fisher as resting sites was 22 inches (Jones 1991). Maternity dens tend to be hollow cavities high in trees. The fisher preys on small mammals (snowshoe hare, grouse, voles, squirrels, mice, etc.) and carrion.

In the Northern Rockies, fishers have existed under a disturbance regime that has created numerous openings in a matrix of mature forested habitats. The denser, coniferous stands near water, which are preferred by fisher, would have experienced longer fire intervals than drier, more open forest lands. The increased pulse of large logs on the ground that would have followed a fire or insect event would have been beneficial.

During the late 19th and early 20th century, trapping, logging, and the conversion of forested areas to agricultural lands contributed to the fisher being extirpated from much of its range in the United States and eastern Canada. The fisher appeared to be eliminated from Montana at one time, as there were no trapping records in Montana from 1920 to1960. Within Montana and Idaho, over a million acres of mature coniferous forest burned in the early part of the 20th century. This may have played a role in the decline of fisher populations.

Existing Condition

Fishers are common in the northeastern and midwestern portions of the United States, but rarer in the West. Restrictions on harvesting, and re-introduction programs in the late 1950s, have contributed to population recovery in portions of the fisher's historic range. In the Rocky

Mountains, they occur in Idaho, Wyoming, and Montana. Since 1968, fisher occurrence has been verified in the Flathead, Mission, Swan, and Whitefish Ranges (Vinkey 2003). Fishers are known to occur in the Hemlock Elk Project Area, but probably at fairly low population densities. It is believed that fisher population density is usually low due to a relatively large home range which can vary from 16 to 32 square miles (USFS 1994).

The fisher habitat assessment in the Swan Valley (USDA 1994) described how, due to numerous wetlands in the Swan Valley and the availability of moist forest conditions, fisher habitat appeared to be extensive and well distributed in the valley's lower elevation zones. Although fisher in the Swan Valley are not likely to be restricted to stream course zones, riparian habitats in the valley are important and provide key travel and movement corridors in light of the intermingled land ownership. Riparian habitats in the Swan Valley are also more likely to provide the dense canopy cover and complex structure (e.g., snags, broken tops, down woody material) that fisher are associated with. Moister old growth habitats in the Swan Valley would also be very important for the fisher, for the same reasons.

Environmental Consequences

Alternative A - No Action
Direct, Indirect, and Cumulative Effects

No fuels reduction or forest health activities would be implemented in the Hemlock Elk Area under this alternative. There would be no direct effect to canopy cover on NFS lands in the Hemlock Elk Area, and any existing or potential den sites would be maintained. Human activity and associated disturbance would be less under this alternative.

Indirectly, under the No Action Alternative, it could be anticipated that larger more intense fires could occur within the project area than would have occurred under more historic fire and fuel loading conditions. Though precise impacts of such fires is dependent on location and many other conditions, to the degree that such fires were stand replacing, they would tend to reduce the amount of fisher habitat available.

Alternative B
Direct and Indirect Effects

Commercial Harvest

A direct effect to fisher from implementation of Alternative B would be the reduction of canopy cover. In the stands where Clearcut with Reserves and Seed Tree with Reserves Treatments are proposed (203 acres in Alternative B), the stands would become unsuitable fisher habitat following the proposed treatment.

In stands where Sanitation, Salvage, and commercial Thin From Below Treatments are proposed (465 acres), a significant amount of trees would remain following treatment; fisher would probably still use these stands for travel and perhaps for foraging, but they would not be as high quality as stands with denser canopy cover.

Snags and down woody material are important components of fisher habitat and are used for resting, denning, and shelter. They are also important components for fisher prey habitat. The following snag and down woody retention guidelines would be followed:

> Six snags average per acre that are 12 to 20 inches DBH would be left. If existing snag densities are below these densities, live trees would be substituted. All snags greater than 20 inches DBH would be left, where available. In addition, all standing dead cull western larch,

ponderosa pine, and Douglas-fir trees 16 inches DBH or greater may be retained, and all hardwood trees would be designated to be left. The minimum retention for down woody material would be, where available, 32 pieces average per acre that are 9 to 20 inches diameter and 15 pieces average per acre greater than 20 inches diameter. This amount of down woody material equates to 8 to 21 tons per acre (See Design Criteria, Table 2-15).

Alternative B proposes no treatment in old growth or riparian habitats. As described previously, old growth and riparian habitats have a high potential of providing quality fisher habitat.

Non-Commercial Treatment

In the non-commercial treatment areas, Thin From Below and Pre-Commercial Thinning, the affects to fisher would be minimal; these stands are presently only marginal fisher habitat due to the size of the trees. They would still provide travel cover following treatment.

Temporary Road Construction

There are 4.8 miles of temporary road proposed under Alternative B. Temporary roads would be reclaimed following use. Other roads that are managed as closed roads would be used for accessing treatment areas. Public use of closed roads or temporary roads would not be permitted, reducing the risk of losing high quality snags (denning habitat) to firewood cutters.

Alternative C
Direct and Indirect Effects

Winter Logging

The main difference between Alternative B and Alternative C is that under Alternative C winter logging is required in 12 units (281 acres); approximately 41 percent of the proposed treatment area. Potential negative effects to fisher are increased in Alternative C in the areas where winter logging is required (Units 18 through 27), because fisher are more vulnerable in the winter. Important denning habitat may be disturbed during the winter months, fisher energy expenditure may be increased as they are displaced, and the potential for kit mortality would be increased.

Commercial Harvest

On 465 acres in Alternative C, in stands where Sanitation, Salvage Harvest, and commercial Thin From Below Treatments are proposed, the canopy cover would be reduced as a result of proposed treatments. Fisher would probably still use these stands for travel and perhaps for foraging, but they would not be as high quality as stands with denser canopy cover. The same snag and down woody guidelines described under Alternative B would be implemented under Alternative C.

As described under Alternative B, in Alternative C there are 203 acres of Clearcut with Reserves, Patch Clearcut with Reserves, and Seed Tree with Reserves Treatments proposed. These stands would be unsuitable fisher habitat following the proposed treatment.

There is no proposed treatment in old growth or riparian habitats under Alternative C.

Non-Commercial Treatment

In the non-commercial treatment areas, Thin From Below and Pre-Commercial Thinning, the affects would be minimal; these stands are presently only marginal fisher habitat due to the size of the trees. They would still provide travel cover following treatment.

Temporary Road Construction

There are 4.7 miles of temporary road proposed under Alternative 3. Temporary roads would be reclaimed following use. Other roads that are managed as closed roads would be used for accessing treatment areas. Public use of closed roads or temporary roads would not be permitted, reducing the risk of losing high quality snags (denning habitat) to firewood cutters.

Alternative D
Direct and Indirect Effects

Commercial Harvest

Under Alternative D, there is no regeneration harvest proposed; there would be no Clearcut with Reserves or Seed Tree with Reserve Treatments. Consequently, all treatment areas would retain sufficient canopy cover that fisher would probably still use these stands for travel and perhaps for foraging. The treated stands would not be as high quality as stands with denser canopy cover, but they would not become entirely unsuitable. The same snag and down woody guidelines described under Alternative B and Alternative C would be implemented under Alternative D.

There is no treatment proposed in old growth or riparian habitats under Alternative D. As described previously, old growth and riparian habitats have a high potential for providing quality fisher habitat.

Non-Commercial Treatment

In the non-commercial treatment areas, Thin From Below, and Pre-Commercial Thinning, the affects would be minimal; these stands are presently only marginal fisher habitat due to the size of the trees. They would still provide travel cover following treatment.

Temporary Road Construction

There are 4.5 miles of temporary road proposed under Alternative D. Temporary roads would be reclaimed following use.

Alternatives B, C, and D
Cumulative Effects

The Swan Valley has a well-developed system of glacial potholes, wet meadows, seeps, and riparian connections throughout the valley floor along both sides of the Swan River. The ecological contribution that these wetland habitats contribute to various wildlife species, including fisher, is very important (SEC 2004). There has been a loss of ecological integrity to many of these complexes as a result of residential development, forest management, permanent road construction, drought, and both fire suppression on the one hand and large-scale wildfire on the other. All of these factors combined have undoubtedly affected the amount and the connectivity of potential fisher habitat in the Upper Swan Valley.

Hillis and Lockman (2003) mapped fisher habitat in Region One, where fishers are generally limited to west of the Continental Divide. Fisher habitat was defined as low-to-mid elevation, mesic, mature, and old forests, within 328 feet (100 meters) of streams. To address patch size and habitat connectivity relevant for fishers, they excluded any patch of habitat that was less than 160 acres and more than 600 feet from the nearest patch of adjacent cover (Jones 1991, Ruggiero et al. 1994). That habitat was compared against levels of habitat that would have been available in pre-fire suppression/pre-logging periods. What they found was that fisher habitat occurs at historically normal levels at both the Flathead National Forest and Region One scales.

This should not be interpreted that management activities have not had adverse effects on fisher habitat. Rather, when fisher habitat was mapped, it clearly showed portions of Region One where timber harvest activities on both corporate and NFS lands had fragmented and reduced the acres of existing fisher habitat. Hillis and Lockman (2003), however, point out that even during the 1970s and 1980s, when timber harvest was intensive, riparian zones were generally avoided, which could explain why habitat loss and fragmentation were not greater. More recently, Samson (2006) showed that on the Forests and the Region as a whole, forested ecosystems are more extensive now than in historic times. Research on fisher is ongoing. Multiple agencies and organizations, including the Forest Service, are currently conducting surveys to detect fisher in the Rocky Mountains. The goals of this current research are to:

- Delineate the geographic range of fisher;
- Determine which Rocky Mountain fisher populations have native genes; and
- Index the abundance of fisher in the different populations.

Proposed design criteria for the retention of large snags and coarse woody debris would help to mitigate negative effects to fisher. No treatment is proposed in riparian habitats or in old growth habitats. Retaining these important habitats for fisher would also help to mitigate any negative impacts from implementation of the Hemlock Elk Project. Extensive roadless and wilderness habitat reduces the risks of mortality attributed to humans such as vehicle collisions, trapping and predator control needs, and reduces the potential negative effects of fragmenting small populations. These attributes are present on the Flathead National Forest, in the Swan Valley, and in the Hemlock Elk Area. Road closures for grizzly bear security have also benefited the fisher.

Determination

In accordance with FSM 2673.42, a determination has been made as to the degree of impact the activities proposed may have on sensitive species. Based on available information on the fisher's distribution, and on project design, Alternative A would have **"no impact"** on fisher. The action alternatives **"may impact individuals or habitat, but will not likely contribute to a trend towards Federal listing or loss of viability to the population or species."**

Western (Townsend's) Big-Eared Bat

Data Sources, Methods, and Assumptions Used

Data used included bat surveys in the Swan Valley, project area field visits, research literature, and GIS and dataset information for features such as riparian habitats, snags, down wood and general forest attributes like habitat type, forest type, elevation, and slope.

Description of Measurement Indicators

Based on current knowledge of the life history, biology, and ecology of the western big-eared bat, the only likely habitat parameter that could be affected by project implementation would be individual summer roost sites. The anticipated effects to these habitats were the measurement indicators used in this analysis.

Affected Environment

Historical Condition

Western big-eared bats may be found in a variety of habitats and have a wide distribution, but they are uncommon or rare. The current range extends throughout western North America with isolated populations further east. A notable decline has been reported in the western United States (Dobkin et al. 1995). Western big-eared bats are very sensitive to human disturbance, with probably the most serious factor leading to population decline being the loss and disturbance of suitable roosting habitat (Genter and Jurist 1995).

This species uses a variety of roosts for different purposes. They spend winters roosting communally (hibernacula) in caves, abandoned mine tunnels, rock outcrops, lava tubes, bridges, and abandoned buildings. In the summer, the female bats roost with their young in nursery colonies, using the roosts for whelping and raising the young. During the summer period, the males and non-reproductive females roost alone. There are smaller roosts used during the day by individuals for sleeping and resting that provide security from predators and prevent exposure to sunlight. Smaller roosts are also used at night when resting from hunting and for feeding on captured prey. Nursery colonies disband in August (USDA 1989).

Western big-eared bats do not migrate long distances, but may move from roost site to roost site. They are insectivores, foraging after dark, and capturing insects in flight. Occasionally, they glean insects from leaves. They feed almost exclusively on small moths (Dobkin et al. 1995). Foraging habitat is typically level riparian sites.

The relatively large maternity roosts and hibernacula are the habitats of primary importance.

The amount of natural potential big-eared bat maternity roost and hibernacula habitat on the Flathead National Forest and throughout northwest Montana has probably not changed significantly over time since they tend to be geologic features (e.g., cave habitats). However, many cave habitats, which once provided suitable bat habitat, now have high levels of human activity and do not provide secure bat habitat. The loss of cave habitat may have been compensated for by the increase in artificial maternity roost and hibernacula habitat, including mine tunnels and buildings. However, artificial roost/hibernacula habitat is often not secure from human activity.

Existing Condition

There are no known natural sites for big-eared bat maternity or over-wintering roosts (caves, rock outcrops, lava tubes) in the Hemlock Elk Area. There are also no known suitable artificial sites for large maternity roosts or hibernacula (e.g., mine tunnels, large bridges). There are probably abandoned buildings that may be suitable but these would be located mostly on private property and could not be considered secure maternity or over-wintering habitat.

There are potential individual day/night roost sites (snag habitat) in the Hemlock Elk Area and throughout the Upper Swan Valley.

Surveys for the western big-eared bat are ongoing on NFS lands in Montana and Idaho. There have been no reports of western big-eared bats in the Hemlock Elk Project Area, and surveys for these bats (2005) did not detect any in the Swan Valley.

Environmental Consequences

Alternative A - No Action
Direct, Indirect, and Cumulative Effects

Under this alternative, there would be no project implementation. There would be no direct affects to potential roosting or hibernacula sites and no direct disturbance of western big-eared bats in the Hemlock Elk Area. Indirectly, vegetative succession or a decrease or increase in wildfire potential would not significantly affect big-eared bats due to the nature of their important habitat characteristics (e.g., caves, rock outcrops, tunnels, bridges). Alternative A would not contribute significantly to cumulative effects on the western big-eared bat in the Swan Valley.

Alternatives B, C, and D
Direct, Indirect, and Cumulative Effects

There would be no potential direct, indirect, or cumulative effects to important big-eared bat maternity roost or hibernacula habitat due to the lack of suitable habitat in the proposed project area. Although it is unlikely that big-eared bats occur in the Hemlock Elk Area, the possibility exists that individual roosting bats may be disturbed from day/night roost sites due to activities associated with the proposed project. Disturbance of individual roost sites would only minimally affect big-eared bats because the bats commonly change day/roost sites and breeding or winter security would not be affected.

The proposed fuels reduction and forest health treatments would decrease the number of potential day/night roost sites by decreasing the number of available snags across the landscape. This would be partially mitigated by the required snag retention guidelines described in the Snag and Down Woody Dependent Species Wildlife Report (Project File Exhibit F-13).

Foraging sites for the western big-eared bat are usually associated with riparian features. There is no treatment proposed, under any of the action alternatives, in riparian areas.

Due to the low potential for negative direct or indirect effects to the big-eared bat, adverse cumulative effects as a result of project implementation are not expected.

Determination

In accordance with FSM 2673.42, a determination has been made as to the degree of impact the activities proposed may have on the western big-eared bat. The determination is **“no impact**” for Alternative A and “**may impact individuals or habitat, but will not likely contribute to a trend towards Federal listing or loss of viability to the population or species”** for Alternatives B, C, and D.

Western (Boreal) Toad

Data Sources, Methods, and Assumptions Used

Data used included open road densities, aerial photography, amphibian survey data, project area field visits, research literature, and GIS and dataset information for riparian habitats and general forest attributes.

Description of Measurement Indicators

Based on current knowledge of the life history, biology, and ecology for the western boreal toad, certain elements are thought to be essential to the conservation of the species. These elements are secure breeding and nursery habitat. Effects to these elements because of project implementation are the measurement indicators used in this analysis.

Affected Environment

Historical Condition

Adult western toads are largely terrestrial, will travel considerable distances from water, and are found in a variety of habitats from valley bottoms to high elevations. They breed in lakes, ponds, slow streams, and roadside ditches, where they prefer shallow areas with mud bottoms.

Historical data indicates that boreal toads were widely distributed and very common in Montana and other western states, but the species has apparently undergone severe population declines in the past 25 years (Currim 1996). Surveys in the late 1990s indicate that they are absent from many historic locations and that they now occupy less than 10 percent of suitable habitat (Maxell 2000). Factors associated with population declines range from natural population fluctuations to the effects of human-induced factors such as pollution, pesticides, habitat destruction/alteration, increases in UV radiation, and the introduction of predators or competitors.

The Swan Valley has a well-developed system of glacial potholes, wet meadows, seeps, and riparian connections (SEC 2004). Historically, there would have been abundant western toad habitat in the Upper Swan Valley.

Existing Condition

Cumulative impacts related to forest management, residential development, and drought, have affected the hydrologic integrity of some of the riparian systems in the Upper Swan Valley. Over time, the overall abundance of potential breeding habitat across the Swan Valley may not have changed much, but pre-settlement riparian habitats were undoubtedly more secure for the western toad. Disturbance of wet areas that are important to the western toad, and lands adjacent to wet areas, has increased. Timber management, road building, livestock grazing, residential development, agriculture, and recreational activities have decreased the amount of functional breeding habitat for the western toad throughout the Upper Swan Valley. Roads can be obstacles for toads as they are slow moving and vulnerable to being run over by vehicles and may be more susceptible to predation when crossing roads.

Western toads were once common and widespread in western Montana, but are now becoming uncommon and local. Amphibian surveys have documented the occurrence of western toads in the Upper Swan Valley and the Hemlock Elk Area. The ponds, wetlands, and streams occurring in or adjacent to the proposed project area provide potential breeding habitat for the western toad.

Environmental Consequences

Alternative A - No Action
Direct, Indirect, and Cumulative Effects

Under the No Action Alternative, there would be no fuels reduction or forest health activity. There would be no direct effects on the western toad and less overall human disturbance in the Hemlock Elk Area from project implementation.

Indirectly, there would probably be an increased risk (compared to historic conditions) of more stand replacement fires in the project area. Depending on the specific location and extent of such fires, there is the possibility that such fires could change vegetation enough to trigger hydrologic affects that may affect boreal toad habitat. However, specific effects are not possible to predict.

Alternatives B, C, and D
Direct and Indirect Effects

There are no vegetative treatments or associated activities, proposed in riparian areas under any of the action alternatives. There would be no direct or indirect effects to important toad breeding habitat associated with streams, ponds, or other natural wetland areas. Protection of breeding and nursery habitat would occur through a combination of protective measures in the Montana Streamside Management Zone Law, Montana Water Quality Act, and INFISH standards. Roadside ditches that hold water long enough into the summer to provide breeding sites would not be protected unless they were associated with streams or other protected sites.

The proposed commercial and non-commercial treatments, and the associated temporary road construction, are likely to alter existing non-breeding habitat for the western toad. Based on this species' ability to occupy a wide variety of habitats, western toad use would probably still occur in the treatment area, although at lower population levels until vegetation recovers. If adult western toads are present during actual logging or road building activity or during temporary road construction, individual mortality could occur.

Alternatives B, C, and D
Cumulative Effects

In addition to activities associated with the proposed Hemlock Elk Project, there are other established human activities and developments in the area, including timber management, road building and maintenance, residential development, agricultural use, and recreational activities, that have decreased the amount of functional breeding habitat and have decreased the security on non-breeding habitat in the Hemlock Elk Area and throughout the Upper Swan Valley.

The action alternatives (Alternatives B, C, and D) would not contribute significantly to these cumulative effects, because there would be no additional cumulative effects to breeding habitat as a result of the proposed project, and individual western toad mortality would be infrequent; not affecting the species at the population level.

Determination

In accordance with FSM 2673.42, a determination has been made as to the degree of impact the activities proposed might have on sensitive species. Based on available information on the western toad's distribution, habitat requirements, and project design and location, the No Action Alternative would have **"no impact**" on the western toad. Alternatives B, C, and D **"may impact individuals or habitat, but will not likely contribute to a trend towards Federal listing or loss of viability to the population or species."**

Wolverine

Data Sources, Methods, and Assumptions Used

Data used included open road densities, aerial photography, carnivore survey data, project area field visits, research literature, and GIS and dataset information for general forest attributes.

Description of Measurement Indicators

Based on current knowledge of the life history, biology, and ecology of the wolverine, certain elements are thought to be essential to the conservation of the species. These elements are denning habitat security, isolation from human impacts and activities, a diverse prey base, and ungulate carrion. Effects to these elements as a result of project implementation are the measurement indicators used in this analysis.

Affected Environment

Historical Condition

Wolverines occur in Montana in coniferous forest and alpine tundra. Wolverine habitat typically encompasses large areas of rugged, remote terrain, and populations naturally exist at relatively sparse densities. Wolverines are generally associated with remote wilderness areas, and are considered sensitive to human development, especially with respect to selection of denning sites (Banci 1994). Wolverines are solitary except during breeding. Wolverine home ranges are very large relative to other species their size, more on the order with that required by larger carnivores. Wolverine home ranges vary from less than 37 square miles to greater than 347 square miles (Banci 1994). Denning occurs at high elevations, frequently above 8,000 feet, in cirque basins and other high elevation, steep slope habitats. Wolverine dens are usually associated with large accumulations of snow around log jams, rocks, or boulders. Den site elevations are generally found at higher elevations well away from development or human activity.

Wolverine do not “hunt” in the usual sense, but are opportunistic, eating anything edible they can catch, find, or steal. Ungulate carrion seems to be particularly important to wolverine in the winter and movements to lower elevations during the winter months probably occur so wolverine can take advantage of ungulate mortalities on winter ranges. Additionally, the wolverine is a proficient predator capable of killing large ungulates, primarily in deep snow. More commonly, they prey on smaller species such as snowshoe hares, cottontails, ground squirrels, porcupines, marmots, skunks, and weasels (Banci 1994). They also opportunistically consume berries, insects, fish, birds, and eggs.

Historically, the upper slopes of both the Swan Range and the Mission Mountains provided wolverine denning habitat. The Swan Valley has historically provided winter range for white-tailed deer. A sufficient prey base for wolverine was available.

Existing Condition

Probably the greatest change for wolverine has been the increase in human activity levels in potential denning habitat. This increase in activity may limit reproduction in some areas (Banci 1994). Female wolverines appear to be extremely sensitive to human disturbance at the natal den site and have been known to move kits in response to disturbance, potentially increasing kit mortality. Given the wolverine’s low fecundity, any reproductive losses could be significant.

Hillis and Kennedy (2002) mapped wolverine natal den habitat in Region One using three criteria;

1. Minimum elevation,
2. Degree of concavity, and
3. Degree of slope.

The minimum elevation west of the Continental Divide used was 6,200 feet. Slope concavity is a feature unique to glaciated landscapes and, thus, a good predictor of cirque basins. Maximum slope was limited to 30 percent. Cirque basins identified by this method were then buffered for 2 miles above 6,200 feet. The result revealed a mix of potentially suitable natal den habitat (cirques and avalanche chutes) across the landscape. Nearly 75 percent of the identified natal den habitat on the Flathead National Forest was protected by designated wilderness. The Forest Plan was reviewed to identify those MAs (not designated wilderness) that precluded snowmobiles. When those restrictions were considered, the percentage of natal den habitat protected increased from 73.1 percent to approximately 90 percent (Hillis and Kennedy 2002).

High elevation cirque basins have traditionally received little human activity in late winter with the exception of downhill ski areas. Kennedy, however, demonstrated that the recent popularity of backcountry snowmobiling, and the advent of more powerful snowmobiles, has resulted in substantially increased late-winter disturbance into areas suitable for denning female wolverines. Trapping may also be a threat to wolverines as they are easily trapped (Ruggiero et al. 1994).

Even in areas that have not been subjected to human encroachment, wolverines naturally exist at very low densities. It is known that wolverine occur in low densities in the Upper Swan Valley.

Isolation from human impacts and activities, a diverse prey base, ungulate carrion, and natal security seem to be the primary factors associated with effective wolverine habitat.

Environmental Consequences

Alternative A - No Action
Direct, Indirect, and Cumulative Effects

Under Alternative A, there would be no fuel reduction or forest health activities on NFS lands in the Hemlock Elk Area. There would be no negative direct effects to the wolverine associated with this alternative. Effective wolverine habitat is not associated with a specific vegetative type. In the absence of the proposed treatments, natural vegetative succession or an increase in wildfire potential would not produce significant indirect effects on the wolverine or wolverine habitat. Alternative A would not contribute significantly to cumulative effects on wolverine in the Hemlock Elk Area or Upper Swan Valley.

Alternatives B, C, and D
Direct and Indirect Effects

Natal Security

Denning occurs at high elevations, frequently above 8,000 feet. There would be no commercial or non-commercial treatments, and no temporary road construction, in potential natal den areas. There would be no negative direct or indirect effects to wolverine natal denning security.

Prey Base

The average understory canopy closure and the overstory tree canopies would be reduced to varying degrees because of proposed commercial and non-commercial treatments. There would be no change expected in ungulate population numbers resulting from implementation of the proposed project, however these vegetative treatments could alter white-tailed deer and elk use patterns, as the ungulates adjust their behavior to avoid human presence or disturbance in the short term, and as they adjust to changes in forage availability over the long term. There would be no measurable effect on potential wolverine prey base.

Security

Wolverines are generally associated with remote, isolated areas away from human development. Many of the proposed treatment units are in the lower valley, adjacent to private property and in high human use areas. Wolverine use of these areas would be uncommon. It is still possible that short term displacement of wolverine could occur in the valleys or in treatment areas on the mid to upper slopes. This short term displacement would not be significant.

Temporary road construction is proposed under the action alternatives. Temporary roads would be closed to the public during use and would be reclaimed following use.

Alternatives B, C, and D
Cumulative Effects

Historically, prior to settlement of the Swan Valley, wolverine had unlimited access to a variety of habitats and most likely traveled from high elevation summer habitats to low elevation winter big game ranges. Management actions such as road building, and other human developments, such as residential development, winter recreational activities (e.g., snowmobiling), campgrounds, hiking trails, and trapping, have had far reaching effects by increasing human presence in once remote areas. This increase in human activity levels in once remote areas has fragmented wolverine habitat and probably created barriers to travel.

Future road building, snowmobile use, and other human activities in the area would have cumulative effects on the effectiveness of wolverine habitat. Management for grizzly bear security core areas on NFS lands in the Upper Swan Valley undoubtedly benefits wolverine, as does the increases in public land ownership through land acquisition. Road closures designed for grizzly bear security (SVGBCA) on NFS and PCTC lands, also provides wolverine security.

Wolverine is probably little affected by vegetation management on the forest and in the region (Project File Exhibit F-11). The Hemlock Elk Project would not contribute significantly to cumulative effects for wolverine in the Hemlock Elk Area. The greatest potential threats to wolverine are the increase in human activity levels in potential denning habitat (e.g., snowmobiling in high elevation cirque basins) and the threat from trapping. Within the project area, high elevation areas are within proposed wilderness under the Forest Plan and snowmobiling is not permitted. Secure habitat for wolverine also occurs in other portions of the Upper Swan Valley in adjacent wilderness areas. Adverse cumulative effects are not expected as a result of the proposed project.

Determination

In accordance with FSM 2673.42, a determination has been made as to the degree of impact the activities proposed might have on sensitive species. Based on available information on the wolverine's distribution, presence/absence from the project area, habitat requirements, and project design and location, Alternative A would have **"no impact"** on the wolverine. Alternatives

B, C, and D **"may impact individuals or habitat, but will not likely contribute to a trend towards Federal listing or loss of viability to the population or species."**

Regulatory Framework and Consistency

The USDA Forest Service is bound by Federal statutes (ESA, NFMA), regulation (USDA 9500-4), and agency policy (FSM 2670) to conserve biological diversity on NFS lands. Federal laws and direction applicable to sensitive species include the NFMA and FSM direction 2670. Amendment 21 to the Forest Plan has standards to conduct analyses to review programs and activities, to determine their potential effect on sensitive species, and to prepare a BE. The Flathead Forest Plan also states that "adverse impacts to sensitive species or their habitats should be avoided." A goal in Forest Plan Amendment 21 is to "ensure that Forest Service actions do not contribute to the loss of viability of native species."

In accordance with FSM 2673.42, determinations have been made as to the degree of impact the proposed activities may have on sensitive species.

This page intentionally left blank.

Wildlife

Snag and Down Woody Dependent Species

Introduction

Snags, broken-topped live trees, downed logs, and other woody material are required by a wide variety of species for nesting, denning, roosting, perching, feeding, and cover (Bull et al. 1997). Snags and down, dead, material are also used for communication purposes:

- Singing, (songbirds),
- Drumming (grouse and woodpeckers),
- Calling (squirrels, jays, birds of prey), and
- Sight recognition posts.

Small mammals and birds use standing and down dead material for food storage and for hunting. Downed logs and stumps are important for travel, both below the snow in the winter, and as travel cover throughout the year. It is estimated that about one-third of the bird and one third of the mammal species living in the forests of the Rocky Mountains use snags for nesting or denning, foraging, roosting, cover, communication, or perching. On the Flathead National Forest, at least 42 species of birds and 10 species of mammals are dependent on dead wood habitat for nesting, feeding, or shelter (USDA 1999). The more mobile species that depend on dead wood habitat include:

- Black bears,
- Canada lynx,
- Wolverines,
- Marten,
- Fisher,
- Bats,
- Woodpeckers, and
- Small owls.

Less mobile species that depend on dead wood include:

- Snowshoe hares (the primary prey of Canada lynx),
- Red-backed voles (the primary prey of marten, fisher, boreal owl, and several other species),
- Shrews,
- Bryophytes,
- Lichen,
- Fungi, and
- Protozoa.

As down woody material further decays, it plays an important role in nutrient cycling, soil fertility, and erosion control.

Snags and their management have become a major conservation issue in managed forests across the western United States. For a long time, biologists have recognized that snags and down woody material provide important wildlife habitat; but only in the last decade or so, have managers begun to understand that not only is tree decay an important ecological process that affects wildlife habitat (Bull et al. 1997), but snags and dead wood are an essential, important part of the larger ecosystem. An insufficient number of suitable snags may limit or eliminate populations of cavity-using species (Thomas et al. 1979, Saab 1998).

Although various sizes of snags and down woody are used, larger birds and mammals require larger dead trees. The larger-diameter downed trees provide stable and lasting structure and offer better protection from weather extremes (Bull 2002). Longer down woody pieces provide better runways, shelter, and under-snow access.

Analysis Area

Spatial Bounds

The Hemlock Elk Project Area was used for the evaluation of direct and indirect effects on snag and down woody dependent species. This approximately 36,653 acre area is large enough to include the home ranges of several individuals or pairs of a species, and is representative of the effects of fire, natural tree mortality, timber harvest, and road management across the landscape. The actions proposed in the alternatives that could directly or indirectly affect snag or down woody dependent wildlife species are contained within this area. The Upper Swan Valley was considered in the cumulative effects analysis. A multi-scale assessment was also conducted to address habitat diversity concerns for dead tree dependent species (Project File Exhibit F-4).

Temporal Bounds

The length of time for effects in this cumulative effects analysis for mechanical treatments is approximately 5 years. This is based on the probable contract length for the proposed fuel reduction and forest health activities, and the reasonably foreseeable actions identified.

Data Sources, Methods, and Assumptions Used

Data used included stand exams, field surveys of snags and downed logs, old growth surveys, project area field visits, research literature, and GIS and dataset information for features such as general forest attributes, habitat type, and forest type.

Description of Measurement Indicators

The effects analysis will focus on: 1) effects to snag and downed woody habitat, concentrating on old growth and riparian habitats, and 2) potential effects to snag dependent wildlife species.

Affected Environment

Historic Conditions

Forest ecosystems in the western United States have adapted in response to disturbances such as wildfire, insects, disease, windstorms, etc. Snags and down woody material have always occurred on the landscape, a direct result of these disturbance factors, either on a large scale, or on a very small scale, as individual trees grow old and die. Ritter and others have described snag populations as occurring in either “pulses” of snags following a large disturbance event, or as “continuous” populations of scattered individuals (Ritter et al. 2000).

Historically, in the Swan Valley, snag habitat and down woody material, though always present in varying amounts, experienced greater ”pulses” across the landscape and in localized areas as a result of natural disturbances. Warmer and drier areas historically underwent more frequent, lower-intensity fires, and typically supported fewer snags and large downed logs than cooler and moister environments, where the stands reached climax conditions before experiencing stand-replacing fire. In the Swan Valley, western larch, ponderosa pine, and cottonwood snags appear to receive the most

use by wildlife, with lesser use of Douglas-fir, other true fir species, spruce, and lodgepole pine trees. Wildlife populations have historically adapted to these natural fluctuations in the availability of snag and down woody habitat.

Existing Conditions

Hillis, Pengeroth, and Leach (2003) assessed the status of snag habitat and snag-dependent species across the Forest Service's Region One. West of the continental divide, the analysis was designed to address the habitat needs of the pileated woodpecker, a keystone species, whose needs meet or exceed those of other cavity nesters, with very few exceptions. Hillis, Pengeroth, and Leach (2003) concluded that:

- The distribution of mature/old forest that provides nesting habitat for pileated woodpeckers has not changed substantially since pre-fire-suppression/pre-logging periods;
- The ratio of mature to old forest has changed substantially on low elevation forests west of the Continental Divide;
- Partial removal timber harvest and woodcutting (as facilitated by road access) accounted for an additional loss of 28 percent of the snags across Region One lands; and
- Fire exclusion, particularly as it affects the occurrence of low-to-moderate severity fires, has severely threatened the recruitment and durability of snags.

The following table compares the status of snags at both the Forest and Regional scales.

TABLE 3-57
LEVELS OF MATURE AND OLD FOREST AT THE FOREST AND REGIONAL (WEST OF THE CONTINENTAL DIVIDE) SCALES RELATIVE TO THE HISTORIC RANGE OF VARIABILITY

	Flathead National Forest	Region One
Acres of potential habitat	1,455,982 acres	10,520,384 acres
Acres of existing habitat	720,062 acres	5,128,766 acres
Existing – potential	49.5%	48.8%
Historic Range of Variability	24.7 to 72.1%	24.7 to 72.1%

Table 3-57 suggests that there has been no substantial departure in snag densities from historic levels at either the Forest or Regional scale.

Recently, large fires in Montana have created a "pulse" of snag habitat across the landscape. The Crazy Horse Fire burned over 11,000 acres with some of this acreage located in the Hemlock Elk Area. This fire burned in the Upper Swan Valley in late summer 2003 and created a large amount of snags. In 2006, the Holland Peak Fire burned over 1,800 acres east of the project area, in the Swan Range. Most of this acreage was heavily forested. As the dead standing trees continue to fall to the ground within the Crazy Horse Fire Area and Holland Peak Fire Area, there will be an increase in down woody material.

Environmental Consequences

The Hemlock Elk Project consists of three action alternatives and a No Action Alternative. The alternatives are described in detail in Chapter 2 of this EA. The Cumulative Effects Worksheet, located in the Wildlife Project File (Project File Exhibit F-5) considers and describes proposed activities in addition to the past, current, and reasonably foreseeable activities listed at the beginning of this chapter in Tables 3-1 and 3-2. Those activities that cumulatively contribute indiscernible effects

to Snag and Down Woody Species, such as the resource enhancement projects, are not included in this section. Those activities that cumulatively affect these species are listed below.

Alternative A - No Action
Direct, Indirect, and Cumulative Effects

Under this alternative there would be no reduction of snags as a result of proposed management activities. Snags would eventually fall over and add to the down woody material in the Hemlock Elk Area. There would be less potential displacement of wildlife species from snag/down woody habitat under this alternative.

No direct effects to wildlife that depend on snag or down woody material for all or part of their habitat needs are anticipated as a result of implementing Alternative A. Indirectly, there may be an increased likelihood under the No Action Alternative of more intense, stand replacing fires in some habitats within the project area, due to the increased risk compared to historic conditions. Such fires would have the effect of increasing the amount of snag habitat and reducing the amount of down woody debris (at least short-term) compared to current conditions.

Alternatives B, C, and D
Direct and Indirect Effects

These alternatives are discussed together due to the similarity of their effects on snag and down woody dependent wildlife species.

Commercial Treatments: Commercial harvest activities proposed under Alternatives B, C, and D would reduce the amount of snags and down woody material in the cutting units. Although snags are not usually targeted for removal, they are sometimes removed inadvertently to increase logging efficiency; or if they are deemed a hazard to the woods workers, they are removed for safety reasons. If snags are recently dead, they may be removed for commercial reasons. In cutting units near private property, where the main purpose is fuel reduction, snags may be removed to meet the objective of reducing the potential fuels in an area. Down woody material suitable for wildlife use is usually reduced during logging activity as a result of heavy equipment use, purposeful removal to reduce fuels, or removal to facilitate reforestation. The effect to snag and down woody dependent species would be a potential decrease in available habitat.

Effects to snag and down woody dependent species would be the least in the Salvage, Sanitation, and Commercial Thin-From-Below treatments because less overstory trees would be removed, and there is less potential for disturbing existing snag and down woody habitat. The proposed Clearcut, Patch Clearcut, and Seed Tree treatments would have the greatest effect on snag/down woody dependent species because they are regeneration harvests; most of the overstory would be removed, and there is a higher potential for disturbing snag and down woody habitat.

Old growth habitats and riparian habitats are very important to snag and down woody dependent wildlife species. These habitats frequently have abundance of larger snags and down woody material. There would be no vegetation treatments in riparian or old growth habitats under any of the alternatives.

Snags and down woody material would be retained in all cutting units. The prescriptions would be designed to retain 6 snags average per acre 12 to 20 inches DBH. If existing snag densities are below these densities, live trees would be substituted. All snags greater than 20 inches DBH would be left, where available. In addition, all standing dead cull western larch, ponderosa pine, and Douglas-fir trees 16 inches DBH or greater would be retained, and all hardwood trees would be designated to be left. The minimum retention for down woody material would be, where available, 32 pieces average

per acre 9 to 20 inches diameter and 15 pieces average per acre greater than 20 inches diameter. This amount of down woody material equates to 8 to 21 tons per acre.

Alternative D has no regeneration cutting proposed (e.g., no Clearcuts or Seed Tree cuts) and would be the least impactive alternative relative to snag/down woody related wildlife species because there would be more overstory trees retained and less potential disturbance of snag and down woody habitats. Alternatives B and C have the most potential to impact snag and down woody dependent wildlife species because they have the most regeneration cutting and the most acreage treatment overall.

Non-Commercial Treatments: Direct and indirect effects from the proposed non-commercial treatments would be minimal. The trees in these stands, and the available down woody material, are small and do not currently provide quality snag/down woody habitat. In the long-term, the effects of the proposed treatment would be beneficial to wildlife species dependent on snag and down woody habitats because the removal of excess trees reduces growth stagnation and enables the retained trees to grow more vigorously. The amount of proposed non-commercial treatment is the same in Alternatives B, C, and D.

Temporary Roads: There would be no new permanent road construction with implementation of the proposed Hemlock Elk Project. There would be approximately 4.8 miles of temporary road constructed in Alternative B, 4.7 miles of temporary road in Alternative C, and approximately 4.5 miles of temporary road in Alternative D. Some snags may be cut down to put in the temporary roads. They would be left on the ground as down woody. The roads would be reclaimed following vegetative treatments. Public use of closed roads would not be permitted, reducing the risk of losing potential snag tree habitat to firewood cutters.

Security/Mortality Risk: For each of the action alternatives, it is possible that project implementation would directly affect snag or down woody dependent wildlife species through disturbance or incidental mortality.

Alternatives B, C, and D
Cumulative Effects

Human caused threats to snag and down woody dependent species include activities that reduce the availability or use of snag/down woody habitat. Activities that have reduced dead tree habitat in the Hemlock Elk Area, and throughout the Swan Valley, are timber management, road building, agricultural conversion, residential development, firewood cutting, fire suppression, and disease control.

On many of the roads in the Hemlock Elk Area, public access has been restricted through seasonal or yearlong road closures. This has helped to reduce the loss of important snag habitat to firewood cutters.

Recently, PCTC has offered up tracts of land in the southern portion of the Swan Valley for sale to the Forest Service, conservation buyers, or other private individuals. There is a concern that an increase in private parcels of land in the Swan Valley may further fragment wildlife habitat and reduce the availability of snag and down woody habitat. Many of the land sales by PCTC have been to conservation buyers, which should help mitigate the risks associated with private land development. The acquisition of lands by the Forest Service has helped to maintain natural landscape linkages and to reduce the risk of private land development. As discussed in the Lands Section of this document, the recently announced Montana Legacy Project has the potential to further increase Forest Service ownership of PCTC lands in the project area which would likely increase the potential of snag retention on those lands.

When the emphasis on managing old growth forests (USDA 1999) is considered, and the large number, acreage, and distribution of recent fires on the Flathead National Forest in 1988, 1994, 2000, 2001, 2003, 2006, and 2007 that recruited large numbers of snags, it can be concluded that at the Flathead National Forest scale, snag habitat is being both recruited and retained. At the Flathead National Forest scale, fires within the last 6 years within stands greater than 9 inches (trees large enough to provide a potentially suitable snag) occurred at 125.5 percent of the average historic conditions (Hillis, Pengeroth, and Leach 2003).

Each of the action alternatives would reduce the risk of more intense wildfires through reduction in ground fuels and ladder fuels. This would, in turn, reduce the potential for increased snag creation.

Unharvested, live trees would be available to provide fairly uniformly distributed future snags and would provide recruitment of future down woody habitat. Site preparation prescriptions would be designed to maintain as much of the larger down material as possible and practicable, given other resource objectives such as fire hazard reduction and reforestation.

Alternatives B, C, and D, would not contribute significantly to negative cumulative effects on snag or down woody habitats, or dependent wildlife species, in the Swan Valley. Existing old growth forest and riparian habitat, both within and outside of the project area, would continue to provide important dead tree habitat for a large suite of wildlife species. Adverse cumulative effects are not expected.

Regulatory Framework and Consistency

The Forest Service is required by the NFMA, to

> “provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives.”

A wide variety of wildlife species are dependent on the existence of standing snags and downed woody material. Forest Plan Amendment 21 (USDA 1999) provides the current direction for snags and down woody material. Sufficient vegetation structure is to be retained, including large diameter trees, in timber harvest areas. To comply with Amendment 21, the retention amount must be consistent with native disturbance and succession regimes. It must also provide for long-term snag and coarse woody debris recruitment, essential soil processes, species habitat (including feeding and dispersal habitat for small mammals and birds), and long-term structural diversity of forest stands. In the absence of a site-specific landscape analysis to derive snag retention levels, minimum retention levels have been established as the standard.

All of the Hemlock Elk alternatives would comply with standards in the Forest Plan for wildlife snag and down woody habitat and dependent wildlife species.

Management Indicator Species – Commonly Hunted Big Game

Introduction

White-tailed deer, mule deer, and elk are Management Indicator Species (MIS) for commonly hunted big game species on the Flathead National Forest (USDA 1985). At the forest level, meeting the habitat needs for white-tailed deer, mule deer, and elk would indicate that the habitat needs for other commonly hunted big game species, such as black bear, mountain lion, and moose, would also be met. Habitat needs that each of these species has in common would include cover (hiding and thermal), forage, and security (Witmer et al. 1998).

Natural disturbances such as fire or major insect infestations, and man-caused disturbances, including timber harvest, road construction, agricultural conversion, or residential development, alter the landscape, changing the amount and juxtaposition of cover and forage. These changes affect big game use patterns as they search out forage and cover, and can affect habitat security.

Analysis Area

Spatial Bounds

The effects analysis area for direct, indirect, and cumulative effects to white-tailed deer, mule deer, and elk is the Hemlock Elk Analysis Area, which corresponds with the Hemlock Elk Grizzly Bear Subunit. This area (approximately 36,653 acres) is large enough to be representative of the effects of fire, natural tree mortality, timber harvest, and road management across the landscape. The actions proposed that could affect white-tailed deer, mule deer, or elk, are contained within this area. In addition, the area is sufficiently large enough to evaluate the ability of the habitat to support other big game species considered under the MIS umbrella.

Temporal Bounds

The length of time for effects analysis is approximately 5 years. This is based on the probable contract length for the proposed project, the timeframes for related activities, and the reasonably foreseeable actions identified.

Data Sources, Methods, and Assumptions Used

Data used included open road densities, stand exam surveys, aerial photography, Vector Map (VMAP) data, project area field visits, research literature, and GIS and dataset information for features such as riparian habitats, wet areas, old growth stand layers, white-tailed deer winter range, deer summer range, elk winter range, and general forest attributes like habitat type, forest type, elevation, and slope.

Description of Measurement Indicators

Important considerations for summer range habitat for deer and elk include moist sites or riparian habitat, hiding cover, forage, and general habitat security, especially during hunting season. These elements of deer and elk summer habitat, and the anticipated effects to these elements from project implementation, are the measurement indicators used in this analysis.

Affected Environment

Historic Condition

The Swan Valley has historically provided year-round habitat for deer and elk, as well as for other big game species covered under the MIS umbrella. White-tailed deer habitat consists of a mixture of various forested communities that provide cover, foraging habitat, and water within a reasonable distance. While elk and mule deer use similar habitats, white-tailed deer are more closely associated with riparian features than elk or mule deer. White-tailed deer exhibit a broad range of summer and fall habitat use, but are commonly associated with warm and moist mixed-species coniferous forest and lowlands interspersed with aquatic wetlands, meadows, and stream bottoms. The wetland complexes in the Upper Swan Valley, including river and stream riparian zones, fens or peat lands, marshes, vernal pools, ponds and lakes, are quite extensive (SEC 2004). Habitats favored by elk during the summer months include moist parks, meadows, and riparian areas, offering succulent forage and bedding sites. Elk remain on higher elevation summer ranges until forced down to lower elevations by snow and severe weather. Both elk and mule deer are also commonly associated with shrub, seedling, and sapling habitats. Mule deer have similar seasonal habitat and elevational range preference as elk. Like elk, mule deer elevational range is dictated by food availability and weather conditions.

In the past, ungulate populations undoubtedly fluctuated between mild-winter years and hard-winter years. The use patterns of deer and elk have also undoubtedly shifted as a result of natural disturbances such as wildfire, windfall, and insect infestations, which typically remove or alter hiding cover, thermal cover, and forage. Thermal cover describes the ability of a forested stand to intercept snow and provide winter protection for deer or elk (e.g., shallow snow depths, warmth). Winter thermal cover is very important to white-tailed deer populations. Hiding cover for both deer and elk refers to trees of sufficient size and density to conceal an animal from view at approximately 200 feet. Forage areas, as the name implies, are habitats that provide food for deer and elk.

Historically, there were large patch sizes of thermal and hiding cover, interspersed with patches of forage. As mentioned previously, the pattern across the landscape of cover and forage naturally fluctuated in response to winter severity, wildfire, insect and disease, windstorms, etc. Early surveys indicate that the white-tailed deer population in the Swan Valley ranged from approximately 4,000 to 8,000 animals in the 1930s, when surveys were first initiated, up to the 1990s. There are few reliable estimates for elk or mule deer. It was believed that white-tailed deer reached a population high in 1900 to 1915. Large scale logging was at its peak in 1917 (on private land holdings), and it was the opinion of the local people that this reduced cover to such an extent that the deer population suffered (Studies 1976, Freedman 1983, Mundinger 1982). Mundinger (1981) described the Swan Valley white-tailed deer population as one that is characterized by low and stable annual turnover and recruitment. He concluded that the population was stable, with an annual recruitment rate of 29 percent, and an annual survival rate of approximately 70 percent.

The Hemlock Elk Area has historically provided spring, summer, fall, and winter range for white-tailed deer, mule deer, elk, and other big game species. White-tailed deer have probably always been the most numerous of the big game species occurring in the Hemlock Elk Area and throughout the Swan Valley; however, the Cold Creek and Elk Creek Areas are known to support numerous elk as well.

Existing Condition

The greatest change from historic to current conditions for deer and elk throughout the Swan Valley has been the change in human activity. The level of human activity in the Swan Valley has obviously increased over early settlement and pre-settlement conditions. The result of increased human activity has been an increase in the amount of timber harvest, road construction, recreational use, residential development, grazing, and agriculture. Residential and agricultural developments have permanently altered potential deer and elk habitats. Timber harvest across the valley has altered the amount and juxtaposition of thermal cover, hiding cover, and forage. Timber harvest typically removes big game

cover and creates foraging areas by reverting forest succession to its earliest stage. As these foraging areas go through succession and become reforested, they again begin to provide cover, first hiding, and then thermal cover. Where cover exceeds forage by a wide margin, removal of cover may enhance deer and elk habitat by increasing edge, increasing diversity, and increasing forage. In contrast, when an adequate distribution of cover is not present, additional removal of cover can reduce habitat values for deer and elk. The blocks of cover were more connected in the absence of timber management and residential development (SEC 2004).

The increase in miles of road, largely a result of land management activities, has resulted in a decrease in security for deer and elk, especially during hunting season. Security was higher in the absence of extensive road building and recreational hunting. In recent years, road closures for grizzly bear in the Swan Valley have undoubtedly benefited both deer and elk. Currently, in the Hemlock Elk Project Area, only 6 percent of the area exceeds 1 mile/square mile open motorized access. Approximately 65 percent of the area is free from motorized access and is at least 2,500 acres in size.

Historically, prior to fire suppression management, many forested stands experienced frequent under-burns, and shrubs and grasses grew up under more open canopies. Under existing conditions, many of these historically open stands have become ingrown and stand conditions are no longer open; shrubs and other forage vegetation have declined and any wildfire at this point would probably be stand replacing instead of a lower intensity underburn.

In 1986, the Forest Plan allocated approximately 12,000 acres of NFS land in the Upper Swan Valley as white-tailed deer winter range (MA 9). The Forest Plan also allocated lands in the Swan Valley as elk and mule deer winter range areas (MA 13). None of the activities proposed in the Hemlock Elk Fuels Reduction and Forest Health Project are located in white-tailed deer or elk winter range. The proposed activities are located in lands that have been designated as timberlands for timber management (MA 15) or timberlands that are also key white-tailed deer summer range (MA 15C). Approximately 91 percent of the unit acres are located in white-tailed deer summer range.

As stated previously, exact numbers of deer and elk using the Hemlock Elk Area or the Upper Swan Valley are not known. White-tailed deer sightings are common and their numbers are thought to be stable (MDFW&P 2006). Based on 2006 post-hunting season data, MDFWP estimated that there were between 4,000 to 6,000 white-tailed deer in Hunting District 130 in the Swan Valley (MDFW&P 2006). They estimated mule deer populations in the Swan at 200 to 300 for the same time period. The population size estimates were generated using a population reconstruction model based on bucks and does harvested. The range represents a 20 percent confidence interval. The estimates for Region One (northwestern Montana) were 8,500 to 12,500 mule deer and approximately 48,000 to 72,000 white-tailed deer. Elk numbers in the Swan Valley were estimated at between 200 to 250 individuals (10 percent confidence interval). The estimates for Region One were approximately 10,000 to 12,400 elk. The elk population estimate was generated by MDFW&P based on ground and aerial survey information, anecdotal reports, and professional judgment.

Environmental Consequences

The Hemlock Elk Project consists of three action alternatives and a No Action Alternative. The alternatives are described in detail in Chapter 2 of this EA. The Cumulative Effects Worksheet, located in the Wildlife Project File (Project File Exhibit F-6) considers and describes proposed activities in addition to past, current, and reasonably foreseeable activities listed at the beginning of this chapter in Tables 3-1 and 3-2. Those activities that cumulatively contribute indiscernible effects to MIS are not included in this section. Those activities that cumulatively affect these species are discussed below.

Alternative A - No Action
Direct, Indirect, and Cumulative Effects

There would be no proposed activities under this alternative. The occurrence and abundance of forage and cover would fluctuate and change over time as the area progresses through various successional stages. There would be no direct effects to existing hiding cover and thermal cover; and no direct effects to white-tailed deer summer range as a result of implementing the No Action Alternative. Security for white-tailed deer and elk/mule deer would remain the same. There would be no changes in the level of general motorized access or hunting access.

Indirectly, the likelihood of stand replacement fires may be increased under Alternative A as compared to the action alternatives, with increased risk of cumulative effects to hiding and thermal cover.

Changes in landownership and continued likely increases in human occupancy of private lands in the Swan Valley are likely to lead to more human use and possible associated disturbance of deer and elk, even under the No Action Alternative. However, nothing about the No Action Alternative is likely to interact with these in such a way as to cumulatively increase impact beyond that which would intrinsically exist independent of any of the alternatives considered, including the No Action Alternative.

Alternative B
Direct and Indirect Effects

Alternative B proposes 668 acres of commercial harvest in mostly mature forest stands, and 71 acres of non-commercial treatment. None of the proposed units or temporary roads are located in areas designated as white-tailed deer winter range or mapped as elk winter range in the Forest Plan. As described previously, the units are located in areas designated as timber management (MA 15) or timber management with an emphasis on white-tailed deer summer range (MA 15C). Important considerations for summer range habitat for deer and elk include moist sites or riparian habitat, hiding cover, forage, and general habitat security, especially during hunting season.

Proposed commercial treatments include intermediate harvest (Sanitation, Salvage, and Thin From Below Treatments) and regeneration harvest (Clearcuts and Seed Tree Treatments). Non-commercial treatments include Thin From Below harvest and Pre-Commercial Thinning.

Moist Sites/Riparian Habitats

Riparian zones, an important component of deer and elk habitat, would not be included in any of the units. There are no proposed treatments in riparian areas. This would include small wetlands, ponds, and streams. If these areas presently provide cover, forage, and security, they would continue to do so. There would also be no treatment in old growth forest habitats in the Hemlock Elk Area. These habitats frequently provide important overstory cover with moist sites.

Hiding Cover

Most of the mature and immature forest stands where vegetative treatment is proposed currently provide hiding cover for big game species, including deer and elk. Hiding cover for deer and elk would be retained with the Sanitation, Salvage, Thin From Below, and Pre-Commercial Thinning Treatments. Hiding cover would not be retained in the Clearcut or Seed Tree Treatments. There would be a short-term (10 to 15 year) decrease in hiding cover of 203 acres in the Hemlock Elk Project Area under Alternative B. Currently; hiding cover is not a limiting factor in the Hemlock Elk Area (SVGBCA Monitoring Report 2006). Hiding cover would take approximately 10 to 15 years to recover, depending on stand conditions. Vegetative screening would be retained along open roads in the project area and the Clearcut and Seed Tree Units would retain hiding cover such that no point in the unit is more than 600 feet from hiding cover (See Design Criteria, Table 2-15).

Forage

The mature and immature stands where vegetative treatments are proposed offer foraging opportunities for deer and elk; although vegetative forage may be limited where thick canopy cover occurs. Although proposed vegetative treatments would initially decrease the amount of available forage due to ground disturbance, forage opportunities would increase over existing conditions within 1 to 5 years as a greater amount of sunlight and moisture reach the forest floor.

Habitat Security

There is a potential for short-term displacement of deer and elk from the immediate area during proposed activities. It is expected that deer and elk use patterns would change slightly as the animals avoid areas of high human activity. There are large blocks of unroaded land and wilderness adjacent to the proposed project that could provide secure habitat for deer and elk. In addition, design criteria in place for grizzly bear protection would benefit deer and elk, and other big game species. For instance, in order to avoid the potential disturbance of grizzly bears in important spring habitat, management activities planned in spring habitat, which is generally defined as areas below 5,200 feet, would not occur within the Spring Period (April 1 through June 15). This timing restriction would be beneficial to deer and elk. Road closures in effect for grizzly bear in the Hemlock Elk Area would provide security for deer and elk (See Design Criteria, Table 2-15).

Alternative B proposes no permanent road construction. Approximately 4.8 miles of temporary road would be needed to access treatment units under Alternative B. Proposed temporary roads would be reclaimed following use.

Existing open roads and closed roads would be used to conduct the proposed vegetation management operations. Use of open roads would not be a change from the existing condition. Vegetative screening, where it currently exists, would be maintained along open roads. This would help to provide habitat security for deer and elk, especially during hunting season. Roads that are currently closed, but that would be used for proposed activities, would be closed to the public during the time that they are used for timber management activities (See Design Criteria, Table 2-15).

Alternative C
Direct and Indirect Effects

Alternative C is very similar to Alternative B, except that in Alternative C there are 281 acres of required winter logging. Alternative C proposes the same amount of regeneration and intermediate harvest treatments. There is no proposed treatment in white-tailed deer or elk winter range.

Moist Sites/Riparian Habitats

As in Alternative B, there would be no proposed treatments in riparian areas or old growth habitats under Alternative C. If these areas presently provide cover, forage, and security, they would continue to do so.

Hiding Cover

As described in Alternative B, hiding cover for deer and elk would be retained with the Sanitation, Salvage, Thin From Below, and Pre-Commercial Thinning Treatments. Hiding cover would not be retained in the Clearcut or Seed Tree Treatments. There would be a decrease in hiding cover of 203 acres in the Hemlock Elk Project Area under Alternative C. Vegetative screening would be retained along open roads in the project area, and the Clearcut and Seed Tree Treatments would retain hiding cover such that no point in the unit is more than 600 feet from hiding cover.

Forage

Proposed vegetative treatments would initially decrease the amount of available forage due to ground disturbance; however, forage opportunities would increase over existing conditions within 1 to 5 years as a greater amount of sunlight and moisture reach the forest floor. Lichen that grows in the conifer branches and treetops would become available to deer as the trees are felled. Lichen is an important food source for many ungulates, and it's availability to the animals in the winter months can be very beneficial.

Habitat Security

It is expected that deer and elk use patterns would change slightly as the animals avoid areas of high human activity. As described in Alternative B, under Alternative C, secure habitats for deer and elk exist in adjacent unroaded lands and wilderness; additional security is provided through grizzly bear spring habitat guidelines and road closures that have been implemented for the bear.

There would be no permanent road construction under Alternative C. Approximately 4.7 miles of temporary road would be needed to access treatment units. These temporary roads would be reclaimed following use.

Existing open roads and closed roads would be used to conduct the proposed vegetation management operations. Use of open roads would not be a change from the existing condition. Vegetative screening would be maintained along open roads. This would help provide habitat security for deer and elk, especially during hunting season. Roads that are currently closed, but that would be used for proposed activities, would be closed to the public during the time that they are used for timber management activities.

Alternative D
Direct and Indirect Effects

Alternative D has less acres overall of treatment and does not propose any regeneration harvest. Alternative D proposes 592 acres of commercial harvest in mostly mature forest stands and 71 acres of non-commercial treatment. None of the proposed units or temporary roads are located in areas designated as white-tailed deer winter range or mapped as elk winter range in the Forest Plan. As described previously, most of the units are located in areas designated as timber management with an emphasis on white-tailed deer summer range (MA 15C).

Proposed commercial treatments include intermediate harvest (Sanitation, Salvage, and Thin From Below Treatments). Non-commercial treatments include Thin From Below and Pre-Commercial Thinning.

Moist Sites/Riparian Habitats

Riparian zones, an important component of deer and elk habitat, would not be included in any of the units. There are no proposed treatments in riparian areas. This would include small wetlands, ponds, and streams. If these areas presently provide cover, forage, and security, they would continue to do so. There would also be no treatment in old growth forest habitats in the Hemlock Elk Area. These habitats frequently provide important overstory cover with moist sites.

Hiding Cover

Most of the mature and immature forest stands where vegetative treatment is proposed currently provide hiding cover for big game species, including deer and elk. Hiding cover for deer and elk would be retained in all of the units where it currently exists. Vegetative screening would be retained along open roads in the project area.

Forage

The mature and immature stands where vegetative treatments are proposed offer foraging opportunities for deer and elk; although vegetative forage may be limited where thick canopy cover occurs. Although proposed vegetative treatments would initially decrease the amount of available forage due to ground disturbance, forage opportunities would increase over existing conditions within 1 to 5 years, as a greater amount of sunlight and moisture reach the forest floor.

Habitat Security

There is a potential for short-term displacement of deer and elk from the immediate area during implementation of Alternative D. It is expected that deer and elk use patterns would change slightly as the animals avoid areas of high human activity. There are large blocks of unroaded land and wilderness adjacent to the proposed project that could provide secure habitat for deer and elk. In addition, design criteria in place for grizzly bear protection would benefit deer and elk, and other big game species. For instance, in order to avoid the potential disturbance of grizzly bears in important spring habitat, management activities planned in spring habitat, which is generally defined as areas below 5,200 feet, would not occur within the Spring Period (April 1 through June 15). This timing restriction would be beneficial to deer and elk. Road closures in effect for grizzly bear in the Hemlock Elk Area would provide security for deer and elk.

Alternative D proposes no permanent road construction; however, approximately 4.5 miles of temporary road would be needed to access treatment units under Alternative D. Proposed temporary roads would be reclaimed following use.

Existing open roads and closed roads would be used to conduct the proposed vegetation management operations. Use of open roads would not be a change from the existing condition. Vegetative screening would be maintained along open roads. This would help to provide habitat security for deer and elk, especially during hunting season. Roads that are currently closed, but that would be used for proposed activities, would be closed to the public when they are used for timber management activities.

Alternatives B, C, and D
Cumulative Effects

Past land management activities in the area, including timber management, road construction, residential development, and agricultural conversion, have decreased and/or fragmented hiding cover, thermal cover, and forage. With increased human activity, have come decreased security levels for most wildlife species, including white-tailed deer, mule deer, and elk.

The Hemlock Elk Project Area is located near the community of Condon, Montana. Part-year and yearlong residences are in the area, as well as other established human activities, including residential development, recreational trails, campgrounds, and a major highway. The level of human activity in the area increases the chance for disturbance or displacement of wildlife species. Other human activity in the area includes firewood cutting, hunting, various road use permits and easements, and road maintenance.

Timber harvest activities on PCTC lands and on NFS lands in the Hemlock Elk Area peaked during the mid to late 1980s, although lower levels of timber harvest continue up to the present on all ownership lands.

Recently, PCTC has offered up tracts of land in the southern portion of the Swan Valley for sale to the Forest Service, conservation buyers, or other private individuals. Between 1995 and 2008, approximately 2,570 acres of PCTC lands have been acquired by the USFS in the Hemlock Elk Project Area. During this same time, approximately 1,278 acres of PCTC land have been sold to private individuals in the Hemlock Elk Project Area. Deed restrictions on the land sales include set-back standards for streams and sanitation guidelines (e.g., no outdoor barbecue pits, no birdfeeders

within reach of bears, and fenced gardens). In Missoula County, a subdivision review is required if parties propose to subdivide 160 acres or more. Despite these provisions, there is a concern that an increase in private parcels of land in the Swan Valley could further fragment wildlife habitat. Many of the land sales by PCTC have been to conservation buyers, which should help mitigate some of the effects to wildlife that are associated with private land development. The acquisition of lands by the Forest Service and other conservation buyers has helped to maintain natural landscape linkages and to reduce the risk of private land development. The recently announce Montana Legacy Project may increase that trend.

Big game habitat is quite diverse and widespread in the Swan Valley and across the Flathead National Forest. It is conserved by the Forest through various forest management standards, including access management, riparian guidelines, and forest management practices. The cumulative effect of past activities, the proposed fuels reduction and forest health project, and future activities, would not preclude deer or elk use of habitats in the area. There appears to be little risk of population loss, and species viability would be maintained. For additional information on the status of deer and elk on the Flathead National Forest, and the status at broader scales, reference the document Flathead National Forest Evaluation and Compliance with NFMA Requirements to Provide for Diversity of Animal Communities (Project File Exhibit F-11).

Regulatory Framework and Consistency

Amendment 21 to the Forest Plan establishes a Forest-wide goal to “provide appropriate habitat and access to maintain desired hunting, fishing, and viewing opportunities, in coordination with the Montana Department of Fish, Wildlife and Parks.” The Forest Plan has identified white-tailed deer, elk, and mule deer as Commonly Hunted Big Game Management Indicator Species (MIS) that use general forest habitat. Conditions favorable to these species would generally also benefit other big game species found within the Hemlock Elk Project Area, such as moose, black bear, and mountain lion, which are considered under the umbrella of MIS evaluation. Goals, objectives, and standards in the Forest Plan, specific to managing white-tailed deer, elk, and mule deer have been followed in the preparation and analysis of the Hemlock Elk Project.

Migratory Birds

Introduction

Neotropical migratory birds (NTMB) are defined as those birds that regularly winter south of the Tropic of Cancer and summer in North America. In 1988, an amendment to the Fish and Wildlife Conservation Act mandated the USFWS to "identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act of 1973." The report, "Birds of Conservation Concern 2002," identified the migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent the highest conservation priority. In the report, the United States is broken down into Bird Conservation Regions (BCR's), with bird species of conservation concern identified for each region. The Swan Valley is located in BCR 10. The bird species of conservation concern for the Hemlock Elk Project Area are listed in Table 3-58. Table 3-59 lists other neotropical migratory birds (NTMB) with declining population trends. The bird species listed in Table 3-59 are associated with forest habitats.

TABLE 3-58.
NORTHERN ROCKIES "BIRDS OF CONSERVATION CONCERN"

Bird Name	General Habitat Summary	Relative Abundance on FNF
Swainson's Hawk	Plains, prairies; open pine-oak woodlands; cultivated lands	Rare
Ferruginous Hawk	Semi-arid plains and arid intermountain regions; tall trees along creek bottoms	Rare
Golden Eagle	Open country; open coniferous forests	Uncommon
Peregrine Falcon[+]	Open country with rocky cliffs and ledges near water	Rare
Prairie Falcon	Open country with canyons, cliffs; foothills	Rare
Yellow Rail	Marshes, wet meadows; highly secretive	Rare
Lesser (American) Golden-Plover	Dry, grassy tundra above treeline	Rare
Snowy Plover	Sandy, coastal beaches; alkali ponds	N/A
Mountain Plover	Short grass prairie/sagebrush; high plains and arid areas	N/A
Solitary Sandpiper	Muskegs in coniferous forest belt of boreal and subarctic	Rare
Upland Sandpiper	Open grasslands	Rare
Whimbrel	Marshes, mudflats, shores, and prairies	N/A
Long-billed Curlew	Moist to dry grasslands and meadows	Uncommon
Marbled Godwit	Prairies, meadows, and pastures	Rare
Sanderling	High arctic tundra	N/A
Wilson's Phalarope	Sloughs and ponds; prairies with small glacial potholes	Uncommon
Yellow-billed Cuckoo	Woods and brush	N/A
Flammulated Owl	Open ponderosa pine; mixed forest	Occasional
Black Swift	Crevices or ledges on rocky cliffs; near waterfalls	Rare
Lewis's Woodpecker	Open or park-like ponderosa pine; areas w/ scattered trees	Occasional
Williamson's Sapsucker	Pine forests; higher elevations	Uncommon
Red-naped (Yellow-bellied)	Coniferous forests; usually where aspen is present	Common

TABLE 3-58.
NORTHERN ROCKIES "BIRDS OF CONSERVATION CONCERN"

Bird Name	General Habitat Summary	Relative Abundance on FNF
Sapsucker		
White-headed Woodpecker	Pines and firs; open ponderosa pine forest; large trees with 40 to 70% canopy	Rare
Loggerhead Shrike	Open country with scattered shrubs or small trees	Occasional
Pygmy Nuthatch	Pine forests; open park-like conditions; ponderosa pine	Common
Virginia's Warbler	Arid, montane, woodlands; 6000 to 9000 feet	N/A
Brewer's Sparrow	Open, shrub-dominated habitats	Uncommon
McCown's Longspur	Dry, short grass prairie	N/A

+ Flathead National Forest Sensitive Species

TABLE 3-59.
NEOTROPICAL MIGRATORY BIRDS WITH DECLINING POPULATION TRENDS ASSOCIATED WITH FOREST HABITATS

Bird Name	General Habitat Summary	Old-Growth Associate	Snag Nester	Riparian Associate
Mourning Dove	Cottonwoods, edges, farmland			
Sharp-shinned Hawk	Dense forests			
Cooper's Hawk	Mature conifers/deciduous			
American Kestrel	Open ponderosa pine/cottonwood		X	
Flammulated Owl +	Open ponderosa pine/mixed forest	X	X	
Common Nighthawk	Open forests, grasslands			
Vaux's Swift	Forests of large trees with openings	X	X	
Eastern Kingbird	Farmland, riparian bottomlands			X
Olive-sided Flycatcher	Logged or burned forests		X	
Western Wood-pewee	Open conifer forests			
Hammond's Flycatcher	Tall trees with closed canopies	X		
Cordilleran Flycatcher	Conifers/deciduous			
Northern Oriole	Tall shrubs and trees near streams			X
Cassin's Finch	Conifer forests/early post-fire forest			
Chipping Sparrow	Open dry forests, edges			
Black-headed Grosbeak	Cut-over forests, riparian thickets/forests			X
Western Tanager	Dry, open mature conifers		X	
Red-eyed Vireo	Aspen, cottonwood, riparian habitat			X
Solitary Vireo	Young conifer forests, logged areas			
MacGillivray's Warbler	Moist conifer forests, dense shrubs			X
American Redstart	Riparian shrubs, aspen, cottonwood			X
Yellow-rumped Warbler	Young to mature open forest, edges			
Wilson's Warbler	Riparian thickets, willow			X
Gray Catbird	Dense riparian shrubs			X
Ruby-crowned Kinglet	Tall conifers with dense canopy			

TABLE 3-59.
NEOTROPICAL MIGRATORY BIRDS WITH DECLINING POPULATION TRENDS ASSOCIATED WITH FOREST HABITATS

Bird Name	General Habitat Summary	Old-Growth Associate	Snag Nester	Riparian Associate
Veery	Deciduous riparian forest			X
Swainson's Thrush	Conifer forests with dense shrubs	X		X
Western Bluebird	Open forests, edges, roadsides		X	

+ Flathead NF Sensitive Species

Analysis Area

Spatial Bounds

All lands in the Hemlock Elk Project Area were considered for the evaluation of direct and indirect effects on NTMB. This approximately 36,653 acre area is large enough to include the spring, summer, and fall home ranges of several individuals or pairs of a species, and is representative of the effects of fire, natural tree mortality, timber harvest, and road management across the landscape. The actions proposed in the alternatives that could directly or indirectly affect these species are contained within this area. The upper Swan Valley was considered in the cumulative effects analysis.

Temporal Bounds

Generally, the length of time for effects in this cumulative effects analysis is approximately 5 years. This is based on the probable contract length for the proposed fuels reduction and forest health activities, the timeframes for related activities, and the reasonably foreseeable actions identified.

Data Sources, Methods, and Assumptions Used

Data used included aerial photography, Vector Map (VMAP) data, field surveys of snags, old growth surveys, project area field visits, research literature, and GIS and dataset information.

Description of Measurement Indicators

The effects analysis will focus on:

1. Effects to bird habitat, concentrating on riparian and old growth habitats, and
2. Potential effects to bird populations.

Affected Environment

Historic Condition

Forest ecosystems in the western United States have adapted in response to disturbances, such as wildfire, insects, disease, and windstorms. A wide diversity of habitats existed across the landscape, providing habitat for a diverse suite of NTMB.

Historically, some habitats may have occurred in greater abundance on the landscape than now (e.g., snag and down woody habitat and old growth habitat). Population trends for different bird species

have generally followed the distribution and amounts of the different preferred habitats. For example, the olive-sided flycatcher and Cassin's finch are associated with post-fire habitats and would have been abundant in areas where there was a large, stand-replacing fire event. Species associated with open forests, such as the western tanager, Vaux's swift, chipping sparrow, yellow-rumped warbler, and western wood pewee, would have been found more in areas that experienced frequent, low-intensity fires that re-initiated the understory, but did not consume all of the large trees. Birds associated with dense forests, such as the sharp-shinned hawk, Cooper's hawk, or ruby-crowned kinglet, would have preferred older, closed-canopy forest habitats.

Existing Condition

Generally, bird populations that breed in the western United States appear to be suffering from forest fragmentation in breeding habitat (Hejl et al. 1995). Timber harvest and excessive tree mortality may contribute to short-term fragmentation (Rotenberry et al. 1995, Hejl et al. 2002). Problems associated with forest fragmentation include overall habitat loss, an increase in edge habitat and edge effects, isolation effects, and increased vulnerability to predators (Finch 1991).

The Swan Valley provides a considerable diversity of habitats for NTMB, including riparian areas, old growth habitat, and snag habitat. The Hemlock Elk Area also provides a wide diversity of habitats, including important riparian areas and old growth habitat. For more information on the existing condition of old growth habitats and snag habitat in the project area, refer to those separate sections.

Environmental Consequences

Alternative A - No Action
Direct, Indirect, and Cumulative Effects

Under this alternative, there would be no vegetation treatments. This alternative would leave habitats across the analysis area to continue with natural vegetative processes. Riparian areas and older forest stands would continue to provide important habitat for migratory birds, and there would be no direct reduction in the amount of snags as a result of management activities. A wide variety of habitats would be available across the upper Swan Valley to support multiple species of NTMB.

Indirectly, current fuel loadings and ladder fuels, in many stands, would probably contribute to an increased risk of more intense, stand replacing fires in the Hemlock Elk Area, compared to historic conditions. An increase in wildfire potential would benefit bird species associated with open conditions or snag habitat. On the other hand, an increase in the potential for large, stand-replacement fires would be negative for bird species associated with mature forest or closed canopy conditions.

Fragmentation of forested habitats on private lands in the area would probably continue. Many of these lands are being acquired by the Forest Service or sold under conservation easements, which would help to decrease further fragmentation in the area.

No significant cumulative effects to NTMB are anticipated with the implementation of Alternative A.

Alternatives B, C, and D
Direct and Indirect Effects

Thinning the overstory, understory, or both, in forested stands, would have a negative effect on some bird species and a positive effect on other bird species. As an example, there would be short-term negative effects to the ruby-crowned kinglet, which prefers closed-canopy conditions. Opening up the overstory, however, would produce positive effects for the yellow-rumped warbler, the western tanager, and the flammulated owl. Habitats shift over time with dynamics in age class, composition, and structure changing naturally. Bird populations in the Swan Valley have adapted to this change

with numbers of different species increasing or decreasing, depending on the availability of open forest, dense cover, old growth, snags, riparian habitats, or brush. If a variety of habitat conditions is maintained across the landscape, including old growth forest, riparian habitats, sufficient downed wood, understory trees, and windfirm live trees and snags, adequate habitat can be maintained with timber management. The proposed Hemlock Elk Project would not significantly change the amount or juxtaposition of open forest/dense forest across the upper Swan Valley. There would be no treatments in riparian or old growth habitats. These important bird habitats would remain in their current condition. Additional riparian and old growth habitat exists outside of the project area and throughout the Swan Valley and would continue to provide important habitat for a large suite of bird species.

Direct and indirect effects from the proposed non-commercial treatments would be similar to those described above for commercial treatments. In the long-term, the effects would be beneficial to birds associated with forested habitats, as the removal of excess trees at this stage in forest stand development reduces growth stagnation and enables the retained trees to grow more vigorously.

Reducing the amount of snags or down woody material can remove habitat features that are essential or very important to many bird species (Bull et al. 2005). Research suggests that retaining the bulk of the largest material may decrease these effects (Bull and Blumton 1999, Porter et al. 2005). In order to maintain sufficient snags and down woody material, a proportion of snags and downed wood would be retained in all of the proposed cutting units, with the number of snags and amount / size of material retained being dependent on the habitat type of the various stands. Please refer to the Design Criteria in Table 2-15 for the amount of snags and down woody material that would be retained in treatment units.

For all action alternatives, it is possible that project implementation would directly affect NTMB through disturbance and / or occasional mortality associated with project activities. There is the potential that timber harvest activities occurring during the nesting period may disrupt nesting activity and foraging activity, or that proposed activities would directly contribute to nest failure. Potential negative affects to nesting would be decreased by logging restrictions in grizzly bear spring habitats (<5,200 feet) from April 1 to June 15 (SVGBCA). Approximately 35 percent of the treated acres (Units 1, 19, 20, 21, 22, 23, 25, 26, 27, and 28) would be treated outside of the spring (April 1 to June15) period.

Existing open roads and closed roads would be used to conduct the proposed vegetation management operations. Use of open roads would not be a change from the existing condition. Vegetative screening would be maintained along open roads. This would help to provide habitat security for a variety of wildlife species, including birds. Roads that are currently closed, but that would be used for proposed activities, would be closed to the general public when they are used for timber management activities.

Alternatives B, C, and D
Cumulative Effects

There are part-year and yearlong residences in the area as well as other established human activities. Timber harvest activities on PCTC lands and on NFS lands in the Hemlock Elk Area peaked during the mid- to late-1980's, although timber harvest has continued up to the present on all ownership lands. There are other ongoing and planned fuels reduction and forest health timber harvest projects on NFS lands in the in the upper Swan Valley, including the Holland, Pierce, Cooney McKay, and the Meadow Smith Projects. Cumulative effects in the Hemlock Elk Analysis Area would include the effects of these other projects on NFS lands, as well as ongoing and proposed timber harvest on PCTC lands.

Recently, PCTC has offered up tracts of land in the southern portion of the Swan Valley for sale to the Forest Service, conservation buyers, or other private individuals. For more detail on this, reference the Lands Section of the EA. There is a concern that an increase in private parcels of land in the

Swan Valley may further fragment wildlife habitat. Many of the land sales by PCTC have been to conservation buyers, which should help mitigate the risks associated with private land development. In addition, it appears there is potential for further increased agency acquisitions of Plum Creek lands through the recently announced Montana Legacy Project. Details of this project are not entirely known, but it could increase the potential for public ownership and reduce the potential for extensive private land development on current Plum Creek lands. The acquisition of lands by the Forest Service has helped to maintain natural landscape linkages and to reduce the risk of private land development. Past land management activities in the area, including timber management, road construction, residential development, and agricultural conversion, have decreased and/or fragmented forested habitats.

Fire suppression has contributed to increased understory growth and denser mid-canopy trees in many forest stands that were historically open-grown (Lesica 1996). In many portions of the valley, the risk of stand-replacing fire is probably greater than what existed historically. This risk could be reduced under the action alternatives.

While factors outside of the Forest Service's control (e.g., deforestation of tropical wintering grounds, drought, exotic species, and parasitic species) may have negative effects on NTMBs, the actions taken in the Hemlock Elk Project are not expected to contribute significantly to negative effects on migratory birds. Sufficient habitat for a broad suite of NTMBs would be maintained. For more information about wildlife habitat conditions across the Flathead National Forest relevant to neotropical migratory birds, reference the FEIS for the Flathead's Forest Plan Amendment 21 (USFS 1999), and the Flathead National Forest Evaluation and Compliance With NFMA Requirements/Diversity document (Project File Exhibit F-4).

Regulatory Framework and Consistency

The 1988 amendment to the Fish and Wildlife Conservation Act mandates the USFWS to

> "identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act of 1973."

The Migratory Bird Treaty Act (MBTA) implements various treaties and conventions between the United States, Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Under the Act, taking, killing, or possessing migratory birds, including nests and eggs, is unlawful. A list of NTMB protected by the MBTA is provided in 50 CFR 10.13.

In January 2001, an EO was signed outlining responsibilities of Federal agencies to protect migratory birds under the MBTA (EO 13186). The report, "Birds of Conservation Concern 2002," is the USFWS's most recent effort to carry out this mandate and to meet their responsibilities under the 1988 amendment. The overall goal of this report is to accurately identify the migratory and non-migratory bird species (beyond those already designated as Federally threatened or endangered) that represent the highest conservation priority. In the report, the United States is broken down into BCAs, with bird species of conservation concern identified for each region. The Flathead National Forest is located in BCR #10. It is recommended that the Bird Conservation Regional lists, with bird species of conservation concern, be consulted in accordance with EO 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds."

As a complimentary measure to EO 13186, the Forest Service and the USFWS entered into a Memorandum of Understanding (MOU). The purpose of this MOU is to strengthen migratory bird conservation through enhanced collaboration between the agencies, in coordination with State, Tribal, and local governments.

Some migratory birds are covered by state hunting regulations; others are protected by non-game status with the MDFWP. There are currently no Flathead Forest Plan Standards specific to migratory

birds. The flammulated owl and the peregrine falcon are Forest sensitive species, and are discussed in the Biological Evaluation for the Hemlock Elk Project.

No substantial loss of migratory bird habitat is expected by implementing this project. The intent of the MBTA, the 2001 EO, and the MOU to conserve and protect NTMB, would be met under any of the Hemlock Elk Project alternatives.

This page intentionally left blank.