SENSITIVE AND THREATENED WILDLIFE SPECIES

Introduction

Four wildlife species that occur on the Flathead National Forest are federally listed as threatened: grizzly bear, bald eagle, gray wolf, and Canada lynx. No wildlife species are listed as endangered. The United States Fish and Wildlife Service (USFWS) concurs with the list of species that "may occur" in the analysis area (Exhibit Rt-1). Table 3-79 summarizes the current conditions for the four threatened species.

Table 3-79. Threatened wildlife species of the Flathead National Forest and their known and expected occurrence in the Logan Creek Area for each species and its habitat (Exhibits Rt-7, Rt-11, Rt-12, Rt-22).

Species	Observed	Habitat	Comments
Bald Eagle	Yes	Yes	One pair nests in the analysis area; at least 4 pairs may use parts of the area for breeding season foraging. Most sightings have been near Tally Lake or along the eastern edge of the Logan Creek drainage.
Canada Lynx	Yes	Yes	Scattered sightings include possible kittens; relatively rare. Snowshoe hares, the lynx's primary prey, appear to be common.
Gray Wolf	Yes	Yes	Scattered reports, apparently foraging or traveling. No denning expected.
Grizzly Bear	Yes	Yes	Scattered reports, apparently foraging or traveling. No denning expected.

All four threatened species will be covered in this chapter, with the subsection for grizzly bear combined with that for the gray wolf. A Biological Assessment for Threatened and Endangered Wildlife Species was prepared (Exhibit Rt-17). If the final project design changes so as to have effects on threatened or endangered species other than those described in the Biological Assessment, or if new information becomes available that reveals impacts not considered in the Biological Assessment, a revision or amendment would be required. Formal consultation with USFWS consisted of phone and e-mail conversations with Anne Vandehey, Ben Conard, and Scott Jackson in 2003 (Exhibit Rt-2). Consultation was completed with a Biological Opinion issued by the USFWS (Exhibit Rt-21.

Sensitive wildlife species (Table 3-80) are those that show evidence of a current or predicted downward trend in population numbers or habitat suitability that would substantially reduce species distribution. The Regional Forester identified 11 sensitive wildlife species on the Flathead National Forest (March 12, 1999). Due to habitat similarities, the northern bog lemming, northern leopard frog, boreal toad, and western big-eared bat were combined in one subsection of this chapter. The recently delisted peregrine falcon is likely to become a Region One sensitive species soon, so it is treated as such in this analysis. However, due to lack of effects on potential habitat or via disturbance (Exhibit Rs-23), it would not be affected by any alternative and will not be discussed further in the body of this EIS. The Biological Evalua-

tion for Sensitive Wildlife Species has been incorporated into the text of this document, with a separate signature page in the project file (Exhibit Rs-3).

Table 3-80. Sensitive wildlife species of the Flathead National Forest and their known and expected occurrence in the analysis area for each species and its habitat (Exhibits Rs-1, Rs-2, Rs-4, Rs-5, Rs-6, Rs-8, Rs-10, Rs-14, Rs-15, Rs-16, Rs-20, Rs-21, Rs-22, and Rs-23).

Species	Observed	Habitat	Comments (Occupancy or Habitat in the Logan Creek Area)
Black-backed woodpecker	Yes	Yes	Last observed in the analysis area near Tally Mountain in 1993, nesting in an area of lodgepole pine infested with mountain pine beetles. Observed in high numbers until 1999 in the Little Wolf Fire Area adjacent to the Logan Creek Analysis Area to the west.
Boreal toad	Yes	Yes	Expected to be common in the Logan Creek area. Scattered observations and some verified reproduction. Dense reproductive activity about 3 miles to the west in the Griffin drainage.
Common loon	Yes	Yes	Nests successfully on Tally Lake within the analysis area and in lakes to the north, east, and south.
Fisher	No	Yes	Potential habitat is spread across the analysis area.
Flammulated owl	No	Limited potential	Not located in analysis area by surveys in 2002. Vocal response to calls on the Kootenai National Forest about 10 miles west.
Harlequin duck	No	Yes	Possible habitat on Logan Creek; closest known reproduction is about 10 miles to the north.
Northern bog lemming	No	Yes	Only known occurrence on Flathead National Forest is in the Bowen Creek drainage about 10 miles to the northwest. Probable sites scattered across the analysis area.
Northern goshawk	Yes	Yes	Scattered sightings and potential habitat are well dispersed across the analysis area.
Northern leopard frog	No	Unknown	Not known on the Flathead National Forest. Closest reports are near Eureka, MT, and west of Kalispell, MT. Possible habitat scattered across the analysis area.
Peregrine Falcon	No	Possible	The only potential cliff nesting habitat on the Tally Lake Ranger District is west of Tally Lake. Surveys there have not detected peregrines, and this species has not been reported at Tally Lake. Only feeding observation was ten miles north; closest known nesting 40 miles southeast. Therefore, the Logan Creek Ecosystem Restoration Project would have no impact on this species.
Western big-eared bat	No	Unknown	Old mine shafts in the analysis area may provide roosting habitat, as may snags, scattered bridges, and abandoned buildings.
Wolverine	No	Dispersal only	Very low likelihood of wandering through; not expected to inhabit the analysis area. Possible dispersing subadult along Brush Divide 5 miles west in 1996. Closest confirmed observation 10 miles east.

This section on Sensitive and Threatened Wildlife Species is divided into separate subsections for each species or group of species. Information about the Regulatory Framework and Regulatory Consistency for all of these species is at the end of the section.

Differences Between the DEIS and FEIS

This Sensitive and Threatened Wildlife Species section of the FEIS differs from the same section in the DEIS primarily in that analysis for the new Alternative F was included. Information about recent consultation with the U.S. Fish and Wildlife Service was added.

Additional literature was used in the analysis (Dixon and Saab 2000; Wisdom et al. 2000; Witmer et al. 1998, Wright, Hejl, and Hutto 1997; Mace et al. 1999; Finn et al. 2002).

In addition, a number of points were corrected, clarified, or explained in greater detail in the FEIS:

- Correction in acres of potential future habitat for black-backed woodpeckers altered by alternative.
- Clarification of the kinds of lynx habitat and comparison of existing habitat with range of historical variation.
- Correction in the effects on temporary non-lynx habitat and on potential lynx denning habitat after implementation of Alternatives C, D, and E.
- Acres of lynx understory feeding habitat changed for Alternatives B, C, and E based on recent field review.
- New table of percentages of Lynx Analysis Units in lynx denning habitat.
- Correction in loon nesting history and in acres harvested upstream of loon habitat.
- Possible new flammulated owl location in Taylor Creek drainage and nearby effects.
- Clarification of potential positive effects of understory manipulation on flammulated owl habitat.
- Correction in effects on fisher habitat from implementation of Alternative C.
- Additional information about wolf locations near the analysis area.
- New table of open road densities by Forest Plan Geographic Unit.
- Correction in the level of mortality risk to wolves.
- Correction in cover changes by alternative for wolves and grizzly bears.
- Additional information on the effects of fragmentation on goshawks.
- Recent status information about amphibians.
- Recent wolverine sighting.
- Cumulative effects on upland toad habitat.

Information Sources

Information sources used for the assessment of current conditions and the analysis of effects varied considerably by species. The description of these sources and analysis methods is provided in the "Introduction" section for each of the species detailed below.

Analysis Area—Sensitive and Threatened Wildlife Species

The analysis area for direct and indirect effects on all sensitive and threatened wildlife species is the Logan Creek watershed down to its confluence with Good Creek, excluding the Griffin and Sheppard drainages. This area is the same as the Logan Geographic Unit used for Ecosystem Analysis at the Watershed Scale. At approximately 61,266 acres (96 square miles), it is large enough to include the home range of these species and is representative of effects of fires, natural tree mortality, timber harvest, firewood cutting, and other factors across the landscape. With the exception of grizzly bear denning habitat, all habitat attributes

used by these species are distributed across this area, within the bounds of natural physiographic variation. It is sufficiently large to evaluate the ability of the habitat to support populations of these species, but small enough to not obscure effects of the alternatives. All of the actions proposed in the alternatives are contained within this area. A larger-scale assessment for each of these species was also conducted to address cumulative effects and population viability concerns (Exhibit Rg-1). For Canada lynx, three Lynx Analysis Units were used in addition to the Logan Creek Analysis Area, as discussed below.

Introduction—Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) is federally listed as a threatened species on the Flathead National Forest. Timber harvest, underburning, and other vegetation manipulation can impact current and potential nesting habitat by removing nest trees and screening cover. Away from their nests, bald eagles are most likely to feel the effects of timber harvest and salvage or insect epidemics through indirect effects on their food sources, such as through changes in habitat quality for an aquatic prey species. Also, disturbance of eagles may increase and the availability of perch or roost trees or security near foraging sites may decline. Stand-replacing fire spreading to nest stands can eliminate potential nest trees and associated live vegetation and perches. Understory fires can create snags used for nesting or perching and can increase the chances that a forested stand would persist.

In Montana, bald eagles nest in stands containing large trees (greater than 30 inches DBH) with uneven canopy structure and in direct line of sight of a large river or lake generally less than one mile away (Montana Bald Eagle Working Group 1991). Bald eagles are opportunistic feeders. They prey on fish, waterfowl, and small mammals; steal food from other predators; and scavenge carrion. During the breeding season, important foraging habitat may be ten miles or further from their nest.

Effects on bald eagles tie most strongly to Issue #2: "Effects on existing old growth and on late-seral/structural stage forests," and Issue #5: "Water Quantity and Fine Sediment Deposition," as discussed in Chapter 1. This analysis considers whether the action alternatives might affect bald eagles; specifically, it evaluates whether some harvest operations and underburning could alter potential nesting habitat, disturb foraging bald eagles, and/or affect their aquatic prey base downstream.

Effects were determined by overlaying GIS layers of potential habitat with proposed unit locations (Exhibits Rt-5 and Rt-6). Open road information can be found in Exhibit Rg-8. See also the section on "Riparian and Wetland Wildlife Habitat" in this chapter.

Affected Environment—Bald Eagle

The Logan drainage is located in the Pacific States Bald Eagle Recovery Area and in Management Zone 7 (Upper Columbia Basin), which includes all of Montana west of the Continental Divide. This zone is in the middle of the core population and produces more than half of the eaglets in the state (Exhibit Rg-1). There are at least 138 active bald eagle nests in western Montana. Bald eagle populations and productivity are increasing in Zone 7, as well

as across the state (Exhibit Rg-1). Population growth has been attributed to the substantial reduction of environmental contaminants. There are six known nesting pairs in the Salish Mountain portion of the Tally Lake Ranger District and Stillwater State Forest. Four other active bald eagle nests are within ten miles of the Logan Creek area, to the north, east, and south. No nests are known downstream of the project, between Tally Lake and Flathead Lake. The Salish Mountains are not a documented migratory route, nor are there historical or currently known areas where bald eagles congregate to roost or feed.

Tally Lake is the only lake in the analysis area that is large enough to support bald eagles. The pair of eagles that nests close to this lake seems to do most of its foraging at the lake, in nearby reaches of Logan Creek, and in nearby meadows (Exhibit Rt-22). Food sources appear to be diverse and abundant. At least nine species of fish that grow large enough for eagles are either common or abundant in Tally Lake, and waterfowl are observed frequently. Most of the lake's surface is still frozen when the eagles arrive each spring, making the inlet and outlet areas, as well as Logan Creek downstream of the lake, very important in March and early April. There are no known concentrated feeding or roosting sites in the analysis area. Bald eagles are regularly seen perched in the Star Meadow area, apparently hunting ducks or small rodents or eating carrion.

Potential alternate nesting habitat is abundant in this territory. About 2000 acres of this encircles the lake and meets all of the nest stand characteristics. About 35 percent of the area identified as alternate nesting habitat for the bald eagles is within 1.5 miles of the Tally Lake Campground. It is likely bald eagles previously nested in what is now the campground area near the inlet. A nest management plan has not been prepared for the Tally Lake bald eagle territory. However, a report was done in 1991 that included maps of observed habitat use, potential nesting habitat, and sensitive areas (Exhibit Rt-14).

Bald eagles continue to attempt to nest on Tally Lake every year, and eagle nesting success on this lake seems to be on a stable trend (Exhibit Rt-22). Since the nest was discovered in 1990, 69 percent of nest attempts have been successful. Despite nest failures in 1998 and 1999, the success rate of the past five years is 71 percent. The nest failures seem most likely to be due to disturbance by boaters.

For more information about this species and its habitat at various scales, including that of the Flathead National Forest, see Exhibit Rg-1.

Environmental Consequences—Bald Eagle

Direct and Indirect Effects

Alternative A – No Action

No additional actions, such as salvage, harvest, or rehabilitation, are proposed in this alternative. Indirectly, taking no action to reduce fuels and tree mortality from Douglas-fir beetles would increase the potential for stand-replacing fires to occur, which could indirectly result in large areas of decreased suitability or unsuitable habitat. The level of effects would be

dependent on the size and intensity of such a wildland fire. No road repair and reclamation to improve aquatic habitat would occur, which would mean habitat conditions for fish species--eagles' primary food source in this area--would not improve.

Alternatives B, C, D, E, and F

None of the action alternatives would involve vegetation manipulation in the current bald eagle nest stand east of Tally Lake (Exhibit Rt-5). Underburning would occur in 109 acres of potential nest stands 811-01-072, 811-01-073, and 811-01-078, most of which are existing old growth habitat just north of the Tally Lake Campground. No timber harvest would occur in potential nesting habitat. Proposed road construction would all be over one mile from potential habitat. Indirectly, timber harvest and underburning would reduce the fire hazard to potential and current nesting stands.

The construction of about 2000 feet of new trail past the Tally Lake Overlook would occur in mapped potential bald eagle habitat. Tally Lake Campground lies directly between this location and Tally Lake, making it highly unlikely for bald eagles to nest in the part of the stand near the trail. In addition, this trail would be an extension of an existing heavily used trail.

Bald eagle foraging activity may overlap with potential disturbance due to harvest, underburning, thinning, or other activities. Units 1, 2, 4, 5, 7A, 8, 14, 26, 27, and 200 are all within a half mile of past bald eagle observations, and bald eagles have been seen in some of these stands (Exhibit Rt-6). The effects of possible displacement are expected to be minor because many high-quality foraging sites are closer to the Tally Lake nest and at Star Meadow. None of the proposed activities would occur within the primary use area associated with this nest (Exhibit Rt-14).

Implementation of rehabilitation actions associated with any of the action alternatives may improve habitat conditions for prey species such as ducks or trout. Overall, the proposed activities not expected to negatively affect the prey base or any key foraging area in the Logan Creek drainage. Yearlong closure of 4.2 miles of roads within the analysis area would benefit bald eagles by increasing habitat values for their prey, as would the proposed road reclamation. Eagles and many of their prey species would be expected to travel through and use the area more securely, more able to make use of large open areas and roads, and with less chance of displacement or mortality. Alternatives B, E, and F would reduce the fire hazard to potential and current nesting stands associated with Tally Lake more than Alternatives C and D, as described in the "Fire and Fuels" section of this chapter. Each of the action alternatives proposes to place large woody debris in up to 3.7 miles of streams in the analysis area and construct fish pools in Logan Creek; these actions would benefit bald eagles and their habitat.

The proposed project would have no negative direct, indirect, or cumulative effects to bald eagle roosting, migrating, or wintering habitat, nor would it have any anticipated effects on mortality risk.

Cumulative Effects

Cumulative effects in the area include timber harvesting, which may have increased the availability of upland prey while decreasing roost sites, screening cover, and potential nest trees. No vegetation management activities are planned on national forest lands in the analysis area in addition to those proposed in the action alternatives. There are corporate lands in the vicinity where timber management has occurred, as well as residential lands. Timber harvest and road construction in the adjacent Good Creek drainage is expected to continue under the 2000 Good Creek Resource Management Project Record of Decision. The extent of the effects of the Good Creek Project on bald eagles will in part depend on which alternative is selected in the Logan Creek Ecosystem Restoration Project. There have been no reports of bald eagles feeding on calves or other livestock and no predator control efforts are anticipated.

Historically, bald eagle habitat in and near the Logan Creek drainage was probably much as it exists now, except nesting habitat adjacent to Tally Lake apparently had relatively frequent low-severity ground fires with occasional large, stand-replacing crown fires. It was probably rare for this territory to not encompass some nesting habitat within one mile of this lake. Bald eagle habitat conditions in the analysis area appear to be stable. Although unlikely, if active bald eagle nesting is discovered in any proposed harvest or burn unit, activities would be modified, if needed, to protect nest stand conditions and maintain reproduction efforts.

Recreation activities in the area include boating, fishing, hiking, camping, hunting, and cycling. Building Tally Lake Campground at the north end of Tally Lake probably prevented future nesting on the northwestern shores. The bald eagle nest is only 340 feet from shore and is up on an open bench and highly visible from the lake. Speedboats have been reported several times to be making tight, fast circles near shore in attempt to flush the eagles from the nest. Public education focused on bald eagles and loons has been used on this lake since at least 1988. Shooting and poisoning of predators is known to occur within ten miles of the nest, and two dead bald eagles have been found within four miles of the nest in the past ten years.

This species' affected environment described above has been shaped by past and present cumulative effects to this species. These effects would be cumulative to those discussed above for each alternative. For an assessment of this species' viability at the Forest level, see the Final Environmental Impact Statement for the Flathead's LRMP Amendment 21 (USDA 1999) and Exhibit Rg-1.

Introduction—Black-backed Woodpecker

The black-backed woodpecker (*Picoides arcticus*) is a USFS Region One sensitive species that lives in boreal and montane conifer forests in Alaska, Canada, and the northern lower 48 states (Dixon and Saab 2000, and Exhibit Rs-9). This species appears in large concentrations in forest stands that have been disturbed, with a resultant abundance of beetles and wood-boring insects (Hutto 1995b). In western Montana, black-backed woodpeckers seem to depend on one- to six-year-old burns (Hejl and McFadzen 2000; Hitchcox 1996; Caton 1996; Hutto 1995a). Population spurts associated with large fires and insect epidemics may be

necessary for maintaining black-backed woodpecker populations (Hutto 1995a and 1995b, Dixon and Saab 2000). Large amounts of habitat are currently available in the areas of the 2001 Moose Fire and the 1999 Anaconda Fire, both about 10 to 20 miles to the northwest of the Logan Creek area (Exhibits Rg-1 and Rs-6). Numerous large fires burned throughout Western Montana in 2003, adding considerably to available habitat for this species.

Effects on black-backed woodpeckers have a loose tie to Issue #2: "Effects on existing old growth habitat and on late-seral/structural stage forests," and Issue #4: "Landscape dynamics--Seral/structural stage patch size and shapes." Because lodgepole pine stands affected by the mountain pine beetle epidemic of the 1980s are expected to no longer support black-backed woodpecker, direct harvest effects are limited to removal of possible food sources and trees that could be used as nests in the event of future wildland fire and/or insect epidemics (Exhibit Rs-10). Indirect effects focus on the reduction of fire hazard across the landscape. Open road density calculations are given in Exhibit Rg-8. Also see sections in this chapter on "Old Growth Habitat and Old Growth Associated Wildlife Species" and on "Snags and Downed Woody Material Wildlife Habitat."

Affected Environment—Black-backed Woodpecker

Black-backed woodpeckers were last reported in the analysis area in 1993, when they were seen nesting in stands of lodgepole pine infested with mountain pine beetles (Exhibit Rs-6). It is likely the mountain pine beetle epidemic areas across the Logan drainage supported elevated levels of black-backed woodpeckers for about five years after the epidemic peaked in 1986 or 1987. Currently, other than the small area burned by the Swaney fire on the north side of Star Meadow, no stands are likely to currently support black-backed nesting or feeding (Rs-10).

The black-backed woodpecker is thought to depend on areas of recent burns, but there has not been a major fire in the watershed for over 75 years. Sixty years of fire suppression in the analysis area have substantially reduced the availability of recent post-fire habitat. Since 1940, the largest fire in the Logan drainage was smaller than 30 acres. Black-backed woodpeckers were seen frequently in the Little Wolf fire area two to ten miles to the south-west from 1995 to 1999, including nesting observations (Exhibit Rs-6). Nearly 30 percent of the land in the Logan Creek area was regeneration harvested in the past 30 years, and offers nothing in the way of potential black-backed woodpecker habitat for at least 100 more years. As stated above, most of these stands have no visible snags at all, a very different condition from that left by most wildland fires.

Areas that would provide ideal black-backed woodpecker habitat in the case of a large wildland fire are extensive and well distributed across the analysis area. Sections on "Snags and Downed Woody Material Wildlife Habitat" and "Old Growth Habitat and Old Growth Associated Wildlife Species" further discuss the potential of the area to provide components of black-backed woodpecker habitat. For more information about this species and its habitat at various scales, including that of the Flathead National Forest, see Exhibits Rg-1, Rg-3, and Rs-24.

Environmental Consequences—Black-backed Woodpecker

Direct and Indirect Effects

Alternative A – No Action

Indirectly, taking no action to reduce fuels would increase the potential for stand-replacing fires to occur. This could result in large areas of highly suitable habitat for this species, depending on the size and intensity of such a wildland fire. The vulnerability of potential nest tree loss to firewood cutting would be as discussed in the section on "Snag and Downed Woody Material Wildlife Habitat" in this chapter.

Alternatives B, C, D, E, and F

Due to the lack of recent post-fire habitat in or near any of the proposed activities, implementation of any of the action alternatives would not remove any current potential feeding or nesting habitat for black-backed woodpeckers. Timber harvest may remove some the potential future nest trees. This would occur in approximately 4928 acres in Alternative B (Exhibit Rs-10). Due to dropping or modifying harvest units for other concerns, loss of potential future nest and feeding trees would occur on 2637 to 4410 acres in the other action alternatives. In all action alternatives, trees killed by prescribed underburns are not proposed for salvage and thus could become habitat for black-backed woodpeckers. Indirectly, the action alternatives would reduce the chance of large stand-replacing fire. This would be most effective under Alternative B, as shown in the "Fire and Fuels" section of this chapter.

All action alternatives would burn about 280 acres near Tally Mountain. Most of this is not expected to be stand-replacing fire, so there would probably not be enough habitat created to support black-backed woodpeckers. All action alternatives include measures to control bark beetle populations via trap trees, funnel traps, and pheromones. This may affect the risk of future wildland fire, but would not directly affect black-backed woodpeckers. Other actions would not have measurable effects on this species. The action alternatives would have the benefit of additional security for snag habitats through the year-round road closures on 4.2 miles of road (Exhibit Rd-1).

Cumulative Effects

Across the Interior Columbia River Basin, moderate or strong declines in unburned habitats used by black-backed woodpeckers were projected in nearly 70 percent of watersheds (Wisdom, et al. 2000). The most widespread declines were in the northern and far eastern parts of the Columbia River Basin. Moderate or strong declines were projected in over 90 percent of watersheds within the Northern Glaciated Mountains (Wisdom, et al. 2000). The natural pattern of beetle outbreaks has been altered through silvicultural and fire management practices. Silvicultural practices directed at maximizing wood production by harvesting trees before they are susceptible to bark beetle attacks and salvage logging of beetle-infested, fire-killed, and wind-killed trees reduced the occurrence of beetles in some areas. Fire manage-

ment policies have lengthened natural fire regimes and allowed more frequent occurrences of beetles (Wisdom, et al. 2000).

Across the Flathead National Forest, large acreages of black-backed woodpecker habitat were created by wildland fires such as the Little Wolf Fire (1994), the Red Bench Fire (1988), and the Moose Fire (2001), and by extensive acreages of trees killed by insects or disease. Dead trees were salvaged from Forest Service and State lands in these fire areas, at levels determined to be compatible with population viability concerns for this species.

Fire suppression has been the greatest factor limiting the current distribution of potential habitat in the analysis area, with a smaller effect from firewood cutting. Across the analysis area, open roads continue to provide access for firewood cutters, decreasing snags potentially used by black-backed woodpecker as feeding and nesting sites. The current density of roads open either summer or yearlong averages 1.27 miles per square mile. Timber harvest and road construction in the adjacent Good Creek drainage is expected to continue under the 2000 Good Creek Resource Management Project Record of Decision. The extent of the effects of the Good Creek Project on black-backed woodpeckers will in part depend on which alternative is selected in the Logan Creek Ecosystem Restoration Project. No vegetation management activities are planned on national forest lands in the analysis area in addition to those proposed in the action alternatives.

This species' affected environment described above has been shaped by past and present cumulative effects to this species. These effects would be cumulative to those discussed above for each alternative. For an assessment of this species' viability at the Forest level, see the Final Environmental Impact Statement for the Flathead's LRMP Amendment 21 (USDA 1999) and Exhibit Rg-1.

Introduction—Canada Lynx

The Canada lynx (*Felis lynx*) is a disturbance-dependent species (Ruggiero, et al. 2000). In the Northern Rockies, lynx evolved with a fire regime that created new foraging opportunities in young stands and along edges, while leaving behind a mosaic of travel connections and dense older stands with downed wood. Their habitats can be described as (Koehler 1990, Ruediger et al. 2000, and Ruggiero et al. 2000):

- **Feeding Habitat:** Lynx typically forage in areas that support their primary prey, the snowshoe hare. These are most often early successional sapling forest or older stands with a dense layer of saplings and lower branches that maximizes cover and browse at both the ground level and at varying snow depths throughout the winter. In the sapling stands, hares usually begin to recolonize areas six to seven years after succession is reinitiated.
- **Denning Habitat:** Lynx most often den in mesic old growth or mature forest, some of which also qualifies as feeding habitat.

- **Travel Habitat:** Lynx use forested cover for travelways, some of which is also denning habitat and/or late-successional feeding habitat. Lynx prefer to move through continuous live forest and frequently travel along forested saddles, ridges, and riparian areas.

The lynx is federally listed as a threatened species on the Flathead National Forest due largely to habitat changes, disturbance, and trapping. The elimination of cover for this species and its primary prey, the snowshoe hare, can have negative short-term effects on lynx (Koehler and Aubrey 1994). This is especially true where large openings are created without leaving travel connections between pockets of dense young forest and older forests used for denning. The causes of this include timber harvest, precommercial thinning, and wildland fire. Stands up to 15 years old, while unsuitable to lynx in the short term, are needed to provide foraging habitat in the future. Similarly, after a short-term loss of habitat value, precommercial thinning may extend the duration of hare use because hares are believed to return to the stand for a longer time after thinning (Squires, per. comm. 1998). Timber harvest or salvage generally reduces downed woody material, while in some cases accelerating regeneration of the green canopy cover used by lynx and its prey. An insect epidemic or fire can provide a great influx of downed logs, providing denning sites and cover for lynx kittens. Legal and non-target trapping mortality is correlated with ease of human access into an area during prime trapping season. Human use of roads and trails in spring and summer may force lynx to move kittens.

Following information found in Ruggiero et al. (2000), primary lynx habitat in the Rocky Mountains and on the Flathead National Forest includes lodgepole pine, subalpine fir, and Englemann spruce. Moist Douglas-fir types are considered secondary habitat that can support red squirrels, an alternate prey species for lynx during periods when snowshoe hare densities are low. In Montana west of the Continental Divide, lynx habitat is contained in subalpine fir habitat types, generally between 4000 and 7000 feet (Exhibit Rt-20).

Effects on lynx tie directly to four issues discussed in Chapter 1. These are Issue #1: "Wildlife Security"; Issue #2: "Effects on existing old growth habitat and on late-seral/structural stage forests"; Issue #3: "Landscape dynamics—connectivity"; and Issue #4: "Landscape dynamics--Seral/structural stage patch size and shapes." The No Action Alternative could affect lynx habitat through increased probability of intense fire. Ecological disturbances are often favorable to lynx, but the net effects could be negative in such a heavily managed landscape.

Lynx Analysis Units were used to assess the effects of proposed actions on lynx and lynx habitats, considering information found in the Lynx Conservation and Assessment Strategy (Ruediger, et al. 2000). Effects of vegetation manipulation were determined by overlaying coverages of potential lynx habitat with proposed unit locations (Exhibit Rt-10**)**. Whether units would retain current habitat status or change to "temporary non-lynx habitat" or "travel" habitat depended on the prescribed retention levels and types and amounts of leave trees (Exhibit Rt-8 and Rt-10). All harvest, burning, and precommercial thinning were modeled as occurring simultaneously. Open road information is in Exhibit Rg-8. See also the sections on "Snag and Downed Woody Material Wildlife Habitat" and "Old Growth and Old Growth Associated Wildlife Species" in this chapter. Evaluation of potential effects considered the Canada Lynx Conservation Assessment and Strategy (Lynx Biology Team 2000; Exhibit Rt-15) and the draft Forest-Plan Amendment process.

Affected Environment—Canada Lynx

Lynx range over much of Canada, Alaska, and the northern edges of the lower 48 states, although the only population strongholds in the United States are in Washington State, western Montana, and possibly northern Idaho (Claar, et al. 1999). Lynx are known to inhabit national forest lands in Region 1 and are scattered throughout western Montana (USFWS 1998). Trapping and sighting data from Idaho and Montana suggest a downward or stable trend in population since the mid-1980s, but accurate trend information is lacking.

Lynx and their sign have been recorded in and near the analysis area (Exhibit Rt-7). These reports include lynx kittens. Snowshoe hares, the primary prey of lynx, appear to be very common throughout the Tally Lake Ranger District, particularly along roads and in moderately dense sapling-to-pole sized stands. Numerous snowshoe hares and their tracks have been seen across the analysis area. Species that may compete with lynx for prey have been observed across the area.

Three contiguous Lynx Analysis Units (LAUs) are wholly or partially within the Logan Creek area, consistent with a forest-wide protocol developed in November 1999 (Exhibit Rt-8). Delineation of "lynx habitat" areas has been finalized in these LAUs, through consultation with the USFWS. All three of these LAUs are in "moderate" functioning condition (Exhibit Rt-19). These three LAUs were considered for the evaluation of effects on the lynx. Together they comprise the same land base as the Logan Creek area used for most other wildlife species, except the low-elevation land north and east of Tally Lake is excluded and the Mountain-Meadows area south of Tally Lake is added (Exhibit Rt-16). The approximately 114 square mile area of the three LAUs is about the size of three typical home ranges for female lynx in fragmented portions of northwestern Montana and eastern Washington (Koehler 1990; Koehler, et al. 1979; USFWS 1998) and is representative of effects of timber harvest, precommercial thinning, fires, and firewood cutting across the landscape. The analysis area is in a major watershed proposed as a "Primary Lynx Conservation Area" by the Interagency Forest Carnivore Committee.

A comparison of current amounts of older forest compared to reference historical conditions shows that the amount of older forest which can be found in the Logan Creek analysis area today is within the historical range of what would be expected (Exhibits P-23 and Q-8). There is sufficient denning habitat within the area to support a recovering lynx population.

The current situation for structural stages which would be expected to provide snowshoe hare habitat is also within the range of reference historical conditions. There should be adequate foraging habitat for lynx in the Logan Analysis Area, providing that an appropriate amount of managed sapling stands are not precommercially thinned.

Tables 3-81 and 3-82 summarize the current situation of potential habitat for lynx (Exhibit Rt-8), using descriptions from Ruggiero, et al. (2000) and from the Canada Lynx Conservation Assessment and Strategy (Lynx Biology Team 2000). About 27,472 acres in these three LAUs are "permanent non-lynx habitat." Most of this is Star Meadow and lower elevation, flat valley bottoms, as well as dry forest types or areas that are too rocky to support forests. The mosaic of successional stages of forests is largely the result of timber management

activities in the area. Currently, from 6.9 to 14.9 percent of lynx habitat, by LAU, is in early seral/structural stage condition and too young to be of use for lynx ("temporary non-lynx habitat"). Sapling foraging habitat appears to be limited in the northern and eastern part of the area and along Reid Divide. This is supplemented by foraging opportunities in some of the later-seral stands that also qualify as denning habitat. Over most of the area, denning habitat is well distributed, and many acres of heavy tree mortality can provide future structures for denning (Exhibit Rt-18). Most patches of denning habitat have feeding habitat nearby, with the exception of Tally Mountain, Johnson Peak, the Cyclone Creek drainage, and Reid Divide. However, parts of the area lack the continuous blocks of older forest cover, and many past harvest areas are likely to be poor future denning habitat due to low levels of large woody debris. Although Douglas-fir beetles have killed many of the larger trees, this natural disturbance did not change any areas to unsuitable habitat.

Table 3-81. Calculation of Suitable Lynx Habitat by Lynx Analysis Unit, and display of Temporary Non-lynx Habitat (i.e. recent stand-initiation areas) (Exhibit Rt-8).

Lynx Analysis Unit	Potential Habitat for Lynx (Acres or % of suitable habitat by LAU)				
	Acres in LAU	Permanent Non-lynx Acres	Suitable Habitat Acres	Potential Lynx Habitat %	Temporary Non-lynx Acres (and % of suitable)
Evers Reid	22,790 ac	11,375 ac	11,415 ac	53%	793 ac (6.9%)
Lost Tally	23,739 ac	12,678 ac	11,061 ac	47%	1647 ac (14.9%)
Upper Logan	26,763 ac	3,419 ac	23,344 ac	87%	2211 ac (9.5%)

Table 3-82. Calculation of Lynx Habitat Components by Lynx Analysis Unit and Percentage of suitable habitat within each LAU (Exhibit Rt-8).

Lynx Analysis Unit	Current Potential Lynx Habitat (and % of suitable habitat in each LAU)		
	Sapling Feeding	Denning	Travel
Evers Reid	3047 ac (26.7%)	1871 ac (16.4%)	5704 ac (50.0%)
Lost Tally	1046 ac (9.5%)	3070 ac (27.8%)	5372 ac (48.6%)
Upper Logan	5156 ac (22.1%)	6550 ac (28.1%)	9427 ac (40.4%)

According to an earlier analysis of lynx habitat connectivity at a larger scale, potential lynx habitat in the Logan Creek area is in a 653,700 acre "clump" of potential habitat that includes no lynx habitat separations wider than 300 feet (Exhibit Rt-9). This covered all ownerships of land in a 1.1 million acre "window" analyzed by GIS. This "clump" includes the bulk of the Tally Lake Ranger District; with broad connections with national forest land to the south and east, and across State land to the north. Refer to the section on "Old Growth Habitat and Old Growth Associated Wildlife Species" in this chapter for more information about the existing condition in terms of connectivity.

Sections in this chapter on "Snags and Downed Woody Material Wildlife Habitat" and "Old Growth Habitat and Old Growth Associated Wildlife Species" further discuss the potential of the area to provide habitat components for the lynx. For more information about this species and its habitat at various scales, including that of the Flathead National Forest, see Exhibits Rg-1, Rg-3, and Rs-20.

Environmental Consequences—Canada Lynx

Direct and Indirect Effects

Alternative A – No Action

No additional management that would directly or indirectly affect the lynx is planned with this alternative. The availability of denning and hiding sites would gradually increase, as would habitat used by numerous species preyed on by the lynx. In lieu of fire or other stand-replacing disturbance, feeding habitat would gradually diminish in quality and quantity. The high fuel loading in many stands would increase the chance of large hot fires in adjacent areas, which could have mixed results for lynx habitat. Stand-replacement disturbances are more likely to occur under this alternative, which would have the greatest and longest negative effect on potential denning habitat. However, this alternative would likely create the greatest amount of long-term future potential denning habitat, as there are many acres having high levels of tree mortality (Exhibit Rt-18). No additional road closures are planned with this alternative, leaving snags and downed logs vulnerable to firewood cutting in 3706 acres along open roads across the analysis area (Exhibits Rd-1 and Rg-8).

Alternative B – Proposed Action

Much of the commercial harvest, burning, and precommercial thinning in Alternative B would occur within stands identified as lynx habitat (Exhibits Rt-8 and Rt-10). Table 3-83 displays the amount of current habitat that implementation of Alternative B and the other action alternatives would be converted to temporary non-lynx habitat.

Table 3-83. Temporary Non-lynx (Unsuitable) Habitat and its Increase through Harvest, Underburning, and Precommercial Thinning as a percent of suitable habitat across the Analysis Area (Exhibit Rt-8 and Rt-10). [The numbers given are acres of change, with resultant percent of each type of habitat in parentheses. Assumes all vegetation manipulation occurs simultaneously (Exhibit Rt-10)].

Alternative	Temporary Non-lynx Habitat (Unsuitable), increase in acres (and resulting Percentage of suitable habitat within each LAU*)		
	Evers Reid LAU	Lost Tally LAU	Upper Logan LAU
A	+ 0 ac (6.9%)	+ 0 ac (14.2%)	+ 0 ac (9.5%)
B	+ 2139 ac (25.7%)	+ 74 ac (14.9%)	+ 4047 ac (26.8%)
C	+ 1859 ac (16.3%)	+ 74 ac (14.9%)	+ 3005 ac (22.3%)
D	+ 302 ac (9.6%)	+ 74 ac (14.9%)	+ 853 ac (13.1%)
E	+ 1944 ac (24.0%)	+ 74 ac (14.9%)	+ 3773 ac (25.6%)
F	+ 763 ac (13.6%)	+ 74 ac (14.9%)	+ 1006 ac (13.8%)

* = Percent of LAU does not include "permanent non-lynx habitat" such as dry Douglas-fir habitats, open water, and open rocky areas.

The longest-term effects would be on denning habitat (Table 3-84). Commercial harvest in denning habitat would change it to either temporary non-lynx habitat or to travel habitat. About 66 acres of denning habitat would be converted to temporary non-lynx habitat (all or parts of Units 16, 17, 20, 30, 52, 57, 99, and 99A). About 976 acres of denning would be changed to travel habitat (all or parts of Units 18, 29, 32, 32A, 33, 39, 39A, 50, 51, 55A, 56, 58, 66A, 67, 68A, 69, 73, 73A, 74A, 76, 76B, 101A, 111A, 112, 112A, 114, 117, 120A, 124,

124A, 127, 127A, 131, 132, 132A, 134, 135, 136, 136A, 137, 137A, and 203). Implementation of Alternative B and the other action alternatives would reduce the percentage of denning habitat in two of the three LAUs (Table 3-85). The loss of denning habitat would be partially balanced in that the removal of fuels would reduce the probability of fire spreading to remaining denning habitat of higher quality.

Table 3-84. Change in Potential Lynx Habitats through Harvest, Burning, and Precommercial Thinning. The numbers given are acres of change. Exhibit Rt-8 and Rt-10 include a breakdown of this information by Lynx Analysis Unit. Assumes all vegetation manipulation occurs simultaneously.

Alternative	Denning	Sapling Feeding	Understory Feeding	Travel
B (Proposed)	- 1043 ac	- 3414 ac	- 167 ac	- 2781 ac; + 976 ac
C	- 437 ac	- 3414 ac	- 147 ac	- 1476 ac; + 389 ac
D	- 773 ac	- 0 ac	- 0 ac	- 1219 ac; + 763 ac
E	- 989 ac	- 3414 ac	- 167 ac	- 2311 ac; + 923 ac
F	- 847 ac	- 0 ac	- 0 ac	- 1808 ac; + 812 ac

Table 3-85. Resulting Denning Habitat Percentages by Lynx Analysis Units (LAUs) in the Logan Creek Analysis Area.

Lynx Analysis Unit	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Evers Reid	16.4%	14.7%	15.0%	15.5%	14.7%	15.1%
Lost Tally	27.8%	27.8%	27.8%	27.8%	27.8%	27.8%
Upper Logan	28.1%	24.4%	26.9%	25.2%	24.6%	25.0%

The temporary loss in potential lynx feeding habitat is also shown in Table 3-84. This is mostly due to precommercial thinning in sapling feeding habitat. In precommercial thinning units adjacent to private land, thinning slash would be piled and burned in a 200- to 300-foot-wide fuel reduction zone. It is unknown what affect the piling and burning would have on lynx or hares. This alternative would also regenerate an additional 167 acres of mature forests with sapling understories and low conifer limbs, negating their value as lynx feeding habitat until saplings occupy the sites.

Tree planting and the removal of smaller-diameter downed wood in harvest units would accelerate regeneration into sapling stands preferred by snowshoe hares and hunting lynx.

The ability of lynx to travel across the analysis area would be most affected by commercial harvest, road construction, and human access. The temporary loss of a net of 1805 acres of travel habitat (Table 3-84) would be due to commercial harvest. The effects of cover loss on travel routes are discussed in the section above on "Old Growth Habitat and Old Growth Associated Wildlife Species." Road construction over or along ridgelines would occur for proposed Specified Roads 1 and 2. Most of the new road construction would cut through areas of potential lynx habitat, although all of these roads would be closed to motorized public access during and after implementation of the proposal. Road closures in this alternative would reduce the summertime Open Road Density (ORD) to 1.27 miles per square mile, with a fall-through-spring ORD of 0.99 (Exhibit Rg-8). This would help protect dead wood habitat components and somewhat reduce the lynx's vulnerability to trapping. Because of these road closures, lynx and many of their prey species would be expected to use the area more

securely, be better able to make use of large open areas and roads, and experience less risk of displacement or mortality.

In any one location, lynx presence may overlap with potential disturbance due to harvest, thinning, burning, road construction, or other activities. Most of the denning patches would have commercial harvest, burning, or precommercial thinning directly adjacent. If active lynx denning is discovered in any proposed harvest or burn unit, activities would be modified, if needed, to protect denning stand conditions and maintain reproduction efforts.

Other aspects of this alternative would not be expected to affect lynx. An indirect effect of construction of Proposed Roads 18 and 22 would be make possible some of the road construction and timber harvest in the adjacent Good Creek drainage, as disclosed in the Good Creek Resource Management Project Record of Decision (March 2000). Temporary roads and skid trails are not expected to receive use by oversnow recreationists.

For more information on effects relevant to the lynx, see the sections of this chapter on "Old Growth Habitat and Old Growth Associated Wildlife Species" and "Snag and Downed Woody Material Wildlife Habitat."

Alternative C – Wildlife Security

In Alternative C (Table 3-84), about 48 acres of denning habitat would be converted to temporary non-lynx habitat (all or parts of Units 20, 30, 57, 99, and 99A). About 388 acres of denning would be changed to travel habitat (all or parts of Units 16, 18, 29, 39, 39A, 56, 58, 67, 68A, 69, 73, 73A, 74A, 76, 76B, 101A, 124A, 127A, 132, 132A, 134, 136A, 137, 137A, and 203). Denning habitat in the Evers Reid and Upper Logan LAUs would be reduced (Table 3-85).

The ability of lynx to travel across the analysis area would be affected to the greatest extent by commercial harvest, road construction, and human access. The temporary loss of a net of 1087 acres of travel habitat (Table 3-84) would be due to commercial harvest. Road construction over or along ridgelines would occur for proposed Specified Road 1. Road closures in this alternative would reduce the summertime Open Road Density (ORD) to 1.26 miles per square mile, with a fall-through-spring ORD of 0.91 (Exhibit Rg-8).

Although Unit 17A was dropped from Alternative C, an additional 147 acres of mature forests with sapling understories and low conifer limbs would be regenerated, negating their value as lynx feeding habitat until saplings occupy the sites.

Other proposed activities and their effects on lynx, including precommercial thinning would be as described above for Alternative B, except that indirect effects on lynx in the Good Creek drainage from construction of Roads 18 and 22 would not occur. Other aspects of this alternative would not be expected to have an effect on lynx.

Alternative D – Old Growth and Connectivity

Part of the design of Alternative D involved reducing its effects on Canada lynx. About 10 acres of denning habitat (Table 3-84) would be converted to temporary non-lynx habitat (all

or parts of Units 52 and 57). About 763 acres of denning would be changed to travel habitat (all or parts of Units 16, 29, 32, 39, 39A, 50, 52, 55A, 56, 58, 66A, 67, 68A, 69, 69A, 73, 73A, 74A, 76, 76B, 85, 101A, 111A, 112A, 114, 117, 124A, 127, 127A, 131, 132, 132A, 134, 135, 136, 136A, 137, 137A, and 203). Denning habitat in the Evers Reid and Upper Logan LAUs would be reduced (Table 3-85). Most of the denning patches would not be adjacent to commercial harvest, burning, or precommercial thinning.

Sapling and mature feeding habitat would not be affected because all precommercial thinning and timber harvest was dropped from these areas (Table 3-84).

The ability of lynx to travel across the analysis area would be affected to the greatest extent by commercial harvest, road construction, and human access. The temporary loss of a net of 456 acres of travel habitat (Table 3-84) would be due to commercial harvest. Road construction over or along ridgelines would occur for proposed Specified Road 1. Road closures in this alternative would reduce the summertime Open Road Density (ORD) to 1.27 miles per square mile, with a fall-through-spring ORD of 0.91 (Exhibit Rg-8). Indirect effects on lynx in the Good Creek drainage from construction of Roads 18 and 22 would not occur.

Other aspects of this alternative would not be expected to have an effect on lynx.

Alternative E – Soil and Water

In Alternative E (Table 3-84), about 66 acres of denning habitat would be converted to temporary non-lynx habitat (all or parts of Units 16, 17, 20, 30, 52, 57, 99, and 99A). About 923 acres of denning would be changed to travel habitat (all or parts of Units 18, 29, 32, 32A, 33, 39, 39A, 50, 51, 55A, 56, 58, 66A, 67, 69, 73, 73A, 74A, 76, 76B, 101A, 111A, 112, 112A, 114, 117, 120A, 127, 127A, 131, 132, 132A, 134, 135, 136, 136A, 137, 137A, and 203). Denning habitat in the Evers Reid and Upper Logan LAUs would be reduced (Table 3-85).

The ability of lynx to travel across the analysis area would be affected to the greatest extent by commercial harvest, road construction, and human access. The temporary loss of a net of 1388 acres of travel habitat (Table 3-84) would be due to commercial harvest. Road construction over or along ridgelines would occur for proposed Specified Roads 1 and 2. Road closures in this alternative would reduce the summertime Open Road Density (ORD) to 1.26 miles per square mile, with a fall-through-spring ORD of 0.91 (Exhibit Rg-8).

Other proposed activities and their effects on lynx, including precommercial thinning, harvest of mature feeding stands, and indirect effects in the Good Creek drainage from construction of Specified Roads 18 and 22, would be as described above for Alternative B. Other aspects of this alternative would not be expected to have an effect on lynx.

Alternative F – Preferred

Part of the design of Alternative F involved reducing its effects on Canada lynx. About 35 acres of denning habitat (Table 3-84) would be converted to temporary non-lynx habitat (all or parts of Units 16, 17, 30, 52, 57, 99, and 99A). About 812 acres of denning would be changed to travel habitat (all or parts of Units 29, 32, 39, 39A, 51, 55A, 56, 58, 66A, 67, 68A,

69, 73, 73A, 74A, 76, 76B, 101A, 111A, 114, 117, 120A, 124, 124A, 127, 127A, 131, 132, 132A, 134, 135, 136, 136A, 137, 137A, and 203). Denning habitat in the Evers Reid, Lost Tally, and Upper Logan LAUs would be reduced (Table 3-85). Most of the denning patches would not be adjacent to commercial harvest, burning, or precommercial thinning.

Sapling and mature feeding habitat would not be affected because all precommercial thinning and timber harvest was dropped from these areas (Table 3-84).

The ability of lynx to travel across the analysis area would be affected to the greatest extent by commercial harvest, road construction, and human access. The temporary loss of a net of 996 acres of travel habitat (Table 3-84) would be due to commercial harvest.

Road construction over or along ridgelines would occur for proposed Specified Roads 18 and 22. Most of the new road construction (proposed System Roads 2, 18, 22) would cut through areas of potential lynx habitat, although all of these roads would be closed to motorized public access during and after implementation of the proposal. Indirect effects in the Good Creek drainage from construction of Specified Roads 18 and 22, would be as described above for Alternative B

Other aspects of this alternative would not be expected to have an effect on lynx.

Cumulative Effects

Fire suppression, timber harvest, and regeneration practices in the analysis area have altered the availability of lynx denning habitat, prey habitat, and forested connectivity. This is discussed in general in the sections on "Old Growth and Old Growth Associated Wildlife Species" and "Snag and Downed Woody Material Wildlife Habitat" in this chapter and for Canada lynx in Exhibit Rt- 20. Suitable denning, feeding, and travel habitat has been harvested or thinned across national forest, corporate, and private lands, generally leaving low amounts of snags and large downed wood. No vegetation management activities are planned on national forest lands in the analysis area in addition to those proposed in the action alternatives. Timber harvest and road construction in the adjacent Good Creek drainage is expected to continue under the 2000 Good Creek Resource Management Project Record of Decision. The extent of the effects of the Good Creek Project on lynx will in part depend on which alternative is selected in the Logan Creek Ecosystem Restoration Project. In past harvest units, snowshoe hare habitat would improve as hares recolonize. A reasonably foreseeable action would be measures to control tansy ragwort and other weed species, though this would have no effects on lynx.

During pre-European times, lynx were apparently much more common. Probably due to trapping, lynx were extremely scarce in the first half of the last century in Montana, with specimen records restricted to two western counties. Roads constructed across the analysis area have facilitated access for trappers and firewood cutters. Firewood cutting along open roads has decreased downed logs important for lynx and their prey species. Current open road density averages 1.27 miles per square mile in summer and 0.99 from fall to spring. Snowmobile access, which can provide easy winter access for trappers, is generally limited on Forest Service lands in the analysis area, due to short seasons and relatively shallow snows. The analysis area is close to several population centers and is easily accessed spring through

fall. Unless winter logging is occurring, winter activity is focused along the one paved and consistently plowed road that cuts across the northern portion. Many of the residents in the analysis area live there year round, but they are at a low density and most are clustered around Star Meadow. Over 80 percent of the analysis area is less than five miles from the plowed road, and thus most lynx using this area would be vulnerable to trapping. On about half of the roads in the area snowmobile use is not restricted; it is allowed only after November 30 on the remainder of the roads. The analysis area is part of MDFWP's Region 1, which, along with Region 2, has an annual quota of one lynx harvested through trapping.

This species' affected environment described above has been shaped by past and present cumulative effects to this species. These effects would be cumulative with those discussed above for each alternative. For an assessment of this species' viability at the Forest level, see the Final Environmental Impact Statement for the Flathead's LRMP Amendment 21 (USDA 1999) and Exhibit Rg-1.

Introduction—Common Loon

Common loons (*Gavia immer*) are USFS Region One Sensitive species. Loons are totally dependent on water and are exceedingly awkward on land. They typically nest in shallow bays with vegetative cover on lakes larger than 20 acres. Fish make up about 90 percent of a loon's diet, and clear water is required for their underwater foraging technique. The quality and quantity of water flowing into loon lakes affects their ability to support prey species as well as influences the water clarity required by loons for feeding. Water level fluctuations during nesting season can flood a nest or leave it high and dry, both of which are likely to cause abandonment. During the nesting season, they are extremely sensitive to human disturbance.

Timber harvest and salvage, insect epidemics, and fire can affect common loons by altering the quantity and quality of water flowing into their nesting lakes. Effects on common loons tie to Issue #5: "Water quantity and fine sediment deposition," as discussed in Chapter 1. Harvest in action alternatives could cause water quality changes. For more information about effects analysis methods, conclusions, and cumulative effects, see the "Water Resources" and "Fisheries" sections of this chapter.

Affected Environment—Common Loon

The southern edge of the loon's breeding range extends into the United States across many of the eastern states and into the Rocky Mountains. Northwest Montana supports nearly all of the loon reproduction in the western United States. The original extent of the population is unknown, although populations have declined with the settlement of the west. Currently, there are around 30 to 40 successfully breeding pairs and approximately 200 birds in the total Montana population. Loon chick fledging rate in this area suggests slightly increasing population.

The only lake large enough for loon nesting in the analysis area is Tally Lake, which is along the eastern edge of the analysis area and downstream of most of the Logan Creek drainage.

Loon nesting success on Tally Lake is on a notably declining trend. Although loons continue to attempt to nest on Tally Lake every year, no loon chicks were produced from 1993 to 2002, whereas the previous decade saw an average of one chick per year. This seems to be due to disturbance by boaters and predation on chicks by bald eagles. Chinook Lake, on private land about 0.5 miles east of the analysis area, has also supported loon reproduction in the recent past. In general, the water quality in the Logan Creek area is good, with monitoring suggesting healthy conditions for fish and other aquatic life. Sediment is normally low with the exception of some extreme springtime high flow periods, although natural turbidity is often relatively high. The closest loon nesting lake downstream of the Logan Creek drainage is nearly 30 air miles and would not be affected by any alternative. See Exhibit Rs-21 for location data. See the "Water Resources" and "Fisheries" sections of this chapter for more information. For more information about this species and its habitat at various scales, including that of the Flathead National Forest, see Exhibit Rg-1.

Environmental Consequences—Common Loon

Direct and Indirect Effects

Alternative A – No Action

No additional timber harvest, salvage, or rehabilitation actions are proposed in this alternative. The lack of reclamation for aquatic habitat could mean that water conditions for loons and their potential prey species would not improve. Indirectly, taking no action to reduce fuels would increase the potential for stand-replacing fires to occur, which would have negative effects on loons. Such fires could cause a short-term increase in nutrients. Depending on the size and intensity of a stand-replacing fire, it could cause a short-term increase in water yield that could cause stream channel erosion and sediment delivery to streams. The risk of increased sediment to streams would depend on the intensity and location of the fires. Where large fuel buildups have occurred and the duff is removed, an increased chance that intense rainstorms and accelerated snowmelt could cause increased sedimentation.

Alternatives B, C, D, E, and F

These alternatives would involve regeneration harvest or burning in 3236 to 5824 acres, most of which is upstream of known loon nesting habitat. Predicted changes in water yield associated with all of the action alternatives are within recommended limits for most drainages. Harvest operations in uplands and within one unit inside an RHCA (Unit 138A) are not expected to generate erosion**,** and thus water quality changes are not expected downstream because of these protective design criteria. Implementation of hydrologic and fisheries rehabilitation actions in these alternatives are expected to improve habitat conditions and possibly food sources for loons over time. See the "Water Resources" and "Fisheries" sections of this chapter for more information.

Cumulative Effects

A considerable amount of nesting habitat has been lost due to the development of shoreline areas on low-elevation lakes nearby, such as Ashley Lake, Whitefish Lake, and Lower

Stillwater Lake. Besides direct loss of nesting and nursery habitat, loon reproduction tends to be most seriously affected by disturbance from recreationists. A loon scared from its nest for even a short time during the 28-day incubation period can result in the loss of that year's chick production. The decline of loon nesting success on Tally Lake may be due largely to disturbance by boaters. Public education focused on loons and bald eagles has been used on this lake since at least 1988 in cooperation with the Montana Loon Society. Despite these efforts, boaters have been seen chasing loons, particularly on Memorial Day Weekends. Teenagers have been observed removing vegetation from a loon-nesting platform and having a grand time towing the platform about the lake.

See the "Water Resources" section for more information about cumulative effects on habitats used by loons. This species' affected environment described above has been shaped by past and present cumulative effects to this species. These effects would be cumulative to those discussed above for each alternative. For an assessment of this species' viability at the Forest level, see the Final Environmental Impact Statement for the Flathead's LRMP Amendment 21 (USDA 1999) and Exhibit Rg-1.

Introduction—Fisher

The fisher (*Martes pennanti*) is also a USFS Region One sensitive species. This larger, weasel-like predator has a strong affinity for forested riparian habitats (Witmer et al. 1998). Such areas are vulnerable to habitat fragmentation due to factors such as fire, timber harvest, and timber salvage (Powell and Zielinski 1994). Fishers avoid insular patches of forested habitat and may require forested riparian travelways between feeding and denning sites (Heinemeyer and Jones 1994, Witmer et al. 1998; Exhibit Rs-7). They rarely stray far from streams or other wet sites. Areas of otherwise suitable habitat can be isolated when cover in travelways between home ranges is removed leaving gaps 150 feet or wider.

In the Northern Rockies, fishers evolved under a disturbance regime that created numerous openings in a matrix of mature forested habitats. The conversion of some percentage of older age classes to younger age classes can promote a diversity of prey species and thus have long-term benefits for fisher populations (Jones 1991). A pulse of large logs on the ground due to fire or insect epidemics can provide denning structures and cover for fisher and several prey species, but these areas are likely to be avoided until the living canopy cover again exceeds 40 percent. Fishers would likely avoid stands up to 50 years old and probably not select them until 80 to 100 years for lodgepole pine or 120 to 160 years for mixed conifers (Jones 1991). Fishers are apparently tolerant of human activity, but the ease of human access into an area is correlated with fisher mortality through direct or incidental trapping (Claar, et al. 1999). See Exhibit Rs-7 for more information about this species.

Effects on fishers tie to three issues discussed in Chapter 1. These are Issue #2: "Effects on existing old growth habitat and on late-seral/structural stage forests;" Issue #3: "Landscape dynamics—connectivity;" and Issue #4: "Landscape dynamics--Seral/structural stage patch size and shapes." The No Action Alternative could affect fishers through increased probability of intense wildland fire and resulting loss of forested riparian habitat. The action alternatives could remove downed woody material and canopy cover used by fisher and their prey. In some stands this would accelerate regeneration of higher-quality potential habitat, as long

as sufficient dead material were left to provide habitat features (Witmer et al. 1998). The effects to the fisher were analyzed using GIS-generated predicted habitat (Exhibit Rs-8). Forested riparian connectivity was defined as pole-sized or larger tree canopies in a zone that extends 200 feet (91 meters) away from riparian features such as lakes, ponds, wetlands, and streams. This data layer was superimposed on digitized layers depicting the proposed units. Spatial effects were determined by manually overlaying the map of predicted habitat with large-scale alternative maps (Exhibit Rs-8). Open road density calculations are given in Exhibit Rg-8. See also the sections in this chapter on "Snags and Downed Woody Material Wildlife Habitat" and "Old Growth Habitat and Old Growth Associated Wildlife Species."

Affected Environment—Fisher

The analysis area is in a major watershed proposed as a "Primary Fisher Conservation Area" by the Interagency Forest Carnivore Committee. There have been several attempts to reintroduce fishers in Montana, including one effort about 25 years ago just three or four miles to the northwest of the analysis area. This species has been reported three times in the Griffin Creek drainage, adjacent to the west of the analysis area. Forest Service Files also contain one possible report of fisher tracks in the Miller Creek drainage about 7 miles northwest of the Logan area, although these could easily have been the tracks of a large male marten. In 1995, an unconfirmed fisher was reported near Pilot Knob, near the eastern edge of the analysis area. For these sightings, plus historical and trend information, see Exhibits Rs-7 and Rs-14.

In defining potential fisher habitat for this analysis, only intermediate forests (pole-sized and immature) and older forests (mature and old growth) within 300 feet of riparian features were included. The intermediate forests conservatively approximate winter habitat, while the older forests are likely summer habitat. Within 300 feet of water, there are 4299 acres of pole and immature forests and 8957 acres of mature and old growth forests (Exhibits Q-17 and Rs-8). Forested connectivity within and beyond 300 feet of riparian features is sufficient for the bulk of the drainage to be available as fisher habitat (Exhibits Rg-9 and Rs-8). This connectivity has been severed or narrowed by past timber harvest in some areas of the Logan Creek watershed. In particular, these are along Meadow, Taylor, Reid, and Sanko Creeks, as well as a tributary south of Oettiker Creek. Forested saddles may contribute to connectivity for dispersal (Powell and Zielinski 1994) and thus the analysis of forested connectivity in uplands as well as riparian zones was also used for the fisher.

It appears the current distribution of habitat for breeding pairs of fishers would allow dispersal to continue between remaining home range areas within the analysis area and in neighboring areas. Suitable denning and feeding habitat occurs in adjacent drainages in all directions except to the west, where the "Little Wolf Fire" of 1994 rendered the Hand Creek drainage unusable to fishers until forests recover. Sections on "Snags and Downed Woody Material Wildlife Habitat," "Old Growth Habitat and Old Growth Associated Wildlife Species," and "Riparian and Wetland Wildlife Habitat" further discuss the potential of the area to provide habitat components. For more information about this species and its habitat at various scales, including that of the Flathead National Forest, see Exhibits Rg-1, Rg-3, and Rs-25.

Environmental Consequences—Fisher

Direct and Indirect Effects

Alternative A – No Action

No additional salvage, harvest, or other rehabilitation actions are proposed with this alternative. The availability of denning and hiding sites would generally increase, as would habitat used by numerous species preyed on by the fisher. The high fuel loading in some stands would increase the chance of large hot fires in adjacent areas, increasing the potential for destruction or isolation of fisher habitat. Such wildfires would be less acceptable than if the area had experienced little or no timber harvesting in the past. No additional road closures are planned with this alternative, leaving many snags and downed logs near streams vulnerable to firewood cutting across the analysis area (Exhibits Rd-1 and Rg-8).

Alternatives B, C, D, E, and F

These alternatives would harvest and burn in potential preferred fisher habitat as shown in Table 3-86. From 283 acres (Alternative C) to 671 acres (Alternative B) of potential fisher habitat would be lost until the stands are pole-sized. Up to 271 acres would also be harvested or burned, but in such a way that fisher habitat value would be retained at a reduced quality because these areas have sufficient living forested canopy to retain short-term habitat value after harvest. In most units, all or numerous windfirm live trees and snags would be left standing thus helping to maintain the potential for future fisher habitat. Tree planting and site preparation such as the removal of dead and downed wood would accelerate regeneration of green canopy cover. It would also reduce the probability of fire spreading to fisher habitat of higher quality. Connectivity along riparian habitat corridors would be narrowed to less than 300 feet wide in up to three places (Exhibit Rg-9), but it would still enable the area to function as fisher habitat. No forested riparian corridors would be severed.

Table 3-86. Potential Fisher Habitat and Vegetation Management Effects by Alternative (Exhibit Rs-8).

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Total Potential Habitat	13,256 ac	12,585 ac	12,904 ac	12,934 ac	12,645 ac	12,897 ac
Change from Mid- to Early-seral/structural	n.a.	110 ac	76 ac	41 ac	103 ac	67 ac
Change from Late- to Early-seral/structural	n.a.	561 ac	276 ac	281 ac	508 ac	292 ac
Habitat loss as % of current potential habitat	n.a.	5.1%	2.7%	2.4%	4.6%	2.7%

Most of the temporary road construction would pass through potential fisher habitat areas. This would negate fisher habitat value throughout the width of the road corridor until well after the roads were reclaimed. Very little of the specified road construction would pass through potential fisher habitat areas.

Road closures would reduce the summertime Open Road Density (ORD) to 1.26 or 1.27 miles per square mile, with a fall-through-spring ORD of 0.91 (Exhibit Rg-8). This would further protect dead wood habitat and somewhat reduce the vulnerability of this species to trapping. Other actions proposed in this project would not affect fishers. Due to the extent of other potential habitat for fisher across the analysis area, the viability of the current potential and future home ranges are not likely to be reduced further by any alternative.

Cumulative Effects

The fisher's status in the Western United States is thought to be "precarious and declining" (Witmer et al. 1998), apparently due to habitat alteration and overexploitation.

There is concern that fire suppression and timber harvest in the analysis area may have altered the availability of denning habitat, forested connectivity, and prey habitat for fisher. Fires and past timber harvest in the analysis area resulted in a complex matrix of edge, ecotones, microhabitat sites, and openings in various stages of regeneration. Some suitable denning, feeding, and travel habitat has been harvested across national forest, corporate, and private lands. Logging will likely continue on private land. No vegetation management activities are planned on national forest lands in the analysis area in addition to those proposed in the action alternatives. Timber harvest and road construction in the adjacent Good Creek drainage is expected to continue under the 2000 Good Creek Resource Management Project Record of Decision. The extent of the effects of the Good Creek Project on fisher will in part depend on which alternative is selected in the Logan Creek Ecosystem Restoration Project. A reasonably foreseeable action would be measures to control tansy ragwort and other weed species, which would not impact this species.

Across the analysis area, open roads facilitate access for trappers and firewood cutters, potentially decreasing fisher populations and the downed logs important for fisher and their prey species (Exhibit Rd-1). Current open road density averages 1.34 miles per square mile in summer and 0.99 from fall to spring. Snowmobile use on roads in this area is not restricted. The analysis area is part of MDFWP's Region 1, which has an annual quota of one fisher harvested through trapping.

This species' affected environment described above has been shaped by past and present cumulative effects to this species. These effects would be cumulative to those discussed above for each alternative. For an assessment of this species' viability at the Forest level, see the Final Environmental Impact Statement for the Flathead's LRMP Amendment 21 (USDA 1999) and Exhibit Rg-1. Exhibit Rs-25 is an assessment of the fisher and its habitat at level of USFS Region One.

Introduction—Flammulated Owl

Flammulated owls (*Otus flammeolus*) are a USFS Region One sensitive species. In western Montana and Idaho, the tiny flammulated owl often nests in older, open, and relatively dry mixed-species forests. These stands nearly always support ponderosa pine, but sometimes have large Douglas-fir instead. Flammulated owls prey on small birds, moths, and/or

grasshoppers for at least part of their life cycle. These prey species use more open stands or are more vulnerable to flammulated owls in such stands. Special habitat features used by flammulated owls include large-diameter trees with cavities at least as large as those made by northern flickers, as well as small openings used for foraging. For more information, see Exhibit Rs-29.

Timber harvest, fire, and fire suppression can affect this species in both positive and negative ways. Timber harvest and stand-replacing fire can destroy nest structures and prey supplies. Flammulated owls disappear from stands after the large tree component is removed (Hayward and Verner 1994). On the other hand, frequent low-intensity fire in ponderosa pine/Douglas-fir stands can maintain open conditions required by flammulated owls (McCallum 1994). Flammulated owls have been located in selectively logged stands where the logging was relatively light and where numerous large trees and pockets of smaller trees remained (Wright, Hejl, and Hutto, 1997).

Effects on flammulated owls tie to Issue #2: "Effects on existing old growth habitat and on late-seral/structural stage forests," as discussed in Chapter 1. Vegetation manipulation in action alternatives could remove nesting structures in some stands, while recreating potential habitat for this species in others. Potential flammulated owl habitat was identified as late-seral/structural stage forests that have warm dry habitat types and Douglas-fir or ponderosa pine overstories (Exhibit Rs-2). This was electronically and visually overlain with proposed units.

Affected Environment—Flammulated Owl

Flammulated owls have not been definitively detected anywhere on the Flathead National Forest, and it is unknown whether flammulated owls inhabit the analysis area. Call-back surveys for this species were done in June 2002 in the most likely habitat areas in the Logan Creek area, including the location where calls of this species were reported by a resident in the Taylor Creek drainage in 2003 (Exhibit Rs-2). We plan to resurvey this area in late spring 2004. In June 1992, one flammulated owl was heard calling in the Wolf Creek drainage, about seven miles west of the analysis area on the Kootenai National Forest. The next closest observations were of three or four owls about 20 miles to the southwest. These owls were located in mixed conifer stands dominated by Douglas-fir, western larch, and lodgepole pine.

Approximately 4800 acres across the analysis area meet the description of areas where owls were found nearby (Exhibit Rs-2). This potential habitat is well distributed, with a concentration along the eastern shore of Tally Lake. It totals nearly ten percent of the analysis area, but it is likely most of this now has mid-story and understory vegetation that reduces or negates habitat value for the flammulated owl. Fire suppression in the Logan Creek area has resulted in a high percentage of older forests becoming filled in with thick understories and mid-stories. This increases the risk of extensive tree mortality due to stand-replacing fire or pathogens. The analysis area has no stands dominated by mature or old growth ponderosa pine. For more information about this species and its habitat at various scales, including that of the Flathead National Forest, see Exhibits Rg-1, Rg-3, and Rs-26.

Environmental Consequences—Flammulated Owl

Direct and Indirect Effects

Alternative A – No Action

This alternative would have no direct effects on potential habitat for flammulated owls. However, continued accumulation of plant growth in the understory and mid-story would further reduce habitat value while increasing the chances potential nest structures would be consumed by stand-replacing fire. Large Douglas-fir trees are likely to continue to succumb to Douglas-fir beetles at a rate that could reduce the quality of flammulated owl habitats.

Alternatives B, C, D, E, and F

The action alternatives would apply stand-replacement harvest in up to 1750 acres (Alternative B) of potential habitat for flammulated owls (Table 3-87). None of this would occur in stands that have high potential for current use by flammulated owls. The 2003 report of possible flammulated owls occurred in or close to Unit 31A (Alternatives B, C, and E only) (Exhibit Rs-2). Negative effects on potential flammulated owl habitat would be reduced somewhat because silvicultural prescriptions have been designed to retain many or all of the larger, wind-firm trees wherever they exist. In units totaling 786 acres (Alternative B) to 882 acres (Alternative D), understory burning, piling, or commercial thinning treatments would probably have a direct short- and long-term benefit to flammulated owls. In general, vegetative manipulation that would open up stands and remove understory vegetation would benefit flammulated owls in the long term, although harvesting itself has the potential of removing nest trees. If active flammulated owl nesting is discovered in any proposed harvest or burn unit, activities would be modified, if needed, to protect nest stand conditions and maintain reproduction efforts. In all action alternatives, construction of about 2000 feet of new trail past the Tally Lake Overlook would occur in potential habitat for this species. The effect of this action would likely be limited to the felling of hazard trees, which are often potential nest trees, in and along the trail corridor.

Table 3-87. Harvest and Burning Prescriptions in Potential Habitat for Flammulated Owls, in acres (Exhibit Rs-2).

Prescription	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Hand-piling and pile-burning	0 ac	180 ac	180 ac	180 ac	180 ac	180 ac
Underburn without Harvest	0 ac	282 ac	282 ac	282 ac	282 ac	282 ac
Commercial Thin	0 ac	254 ac	294 ac	350 ac	295 ac	387 ac
Sanitation Salvage	0 ac	70 ac	70 ac	70 ac	70 ac	82 ac
Understory Treatment Total*	**0 ac**	**786 ac**	**826 ac**	**882 ac**	**827 ac**	**849 ac**
Burning (regeneration)	0 ac	114 ac	114 ac	114 ac	114 ac	114 ac
Seed Tree with Reserves	0 ac	51 ac	51 ac	27 ac	51 ac	18 ac
Shelterwood with Reserves	0 ac	1211 ac	787 ac	868 ac	1095 ac	878 ac
Stand Replacement Total	**0 ac**	**1376 ac**	**952 ac**	**1009 ac**	**1224 ac**	**1093 ac**

* Potentially beneficial to flammulated owls.

Cumulative Effects

There is concern fire suppression and timber harvest have altered the availability of habitat with large trees and open understories in the Logan Creek area. The absence of large fires during the past 75 or more years has resulted in denser, more closed canopies with more patches of Douglas-fir regeneration in the understory than typically occurred. Parts of the analysis area in the mixed-severity fire regime were likely dominated by open-understory large tree habitat. Fire suppression efforts may have contributed to increased understory growth and denser mid-canopy trees, making foraging more difficult for flammulated owls. Across national forest, corporate, and private lands, past timber harvest of old growth Douglas-fir stands removed suitable nesting habitat (Exhibit Q-8). Firewood cutters have eliminated important snag habitat components. Timber harvest and road construction in the adjacent Good Creek drainage is expected to continue under the 2000 Good Creek Resource Management Project Record of Decision. The extent of the effects of the Good Creek Project on flammulated owls will in part depend on which alternative is selected in the Logan Creek Ecosystem Restoration Project. No vegetation management activities are planned on national forest lands in the analysis area in addition to those proposed in the action alternatives. This species' affected environment described above has been shaped by past and present cumulative effects to this species. These effects would be cumulative to those discussed above for each alternative. For an assessment of this species' viability at the Forest level, see the Final Environmental Impact Statement for the Flathead's LRMP Amendment 21 (USDA 1999) and Exhibit Rg-1. Exhibit Rs-25 is an assessment of the flammulated owl and its habitat at level of USFS Region One.

Introduction—Gray Wolf and Grizzly Bear

The gray wolf (*Canis lupus*) and the grizzly bear (*Ursus arctos horribilis*) are federally listed as threatened species on the Flathead National Forest. They are considered together because they are both wide-ranging species that could occur in any part of the Logan Creek analysis area, and they could be affected in similar ways by proposed activities.

For wolves, adequate prey base and security from risk of mortality are the two major components that provide survival and recovery value (USFWS 1987, Witmer et al. 1998). Wolves in the central Rocky Mountains appear to select landscapes with relatively lower elevation, flatter terrain, and closer to water and roads. Habitat preferences appear to relate more to prey than to cover. The predominant prey of wolves in the northern Rockies is white-tailed deer, with lesser amounts of moose, elk, beaver, and smaller animals. Ungulate winter ranges, usually located in valley bottoms, are a critical factor for wolf survival. Within their home ranges in and near Glacier National Park, wolves concentrated their hunting in wintering areas of white-tailed deer (Kunkel and Pletscher 2001). Wolves commonly den in undisturbed sites, usually within 400 yards of water. A wolf pack will usually move up to six miles to a number of rendezvous sites, typically meadows, until the pups can travel with adults. Another important habitat component appears to be corridors for travel and dispersal, typically with vegetative cover and shallow snow. The effect of timber salvage and harvest and insect epidemics on wolves is best defined by effects on its prey, much of which depend on early seral/structural stage stages interspersed with cover, shelter, and water. Although lesser-used roads and trails can facilitate wolf travel, frequently used roads can reduce wolf habitat

security and increase the potential for accidental or illegal mortality (Thiel 1985). See Exhibit Rt-23 for more information.

When grizzly bears are away from denning habitat or other areas that provide sufficient foods and security, effects of actions like timber harvest and salvage, fires, and insect epidemics are mostly limited to displacement and changes in the availability of cover. Roads have facilitated easy human access into grizzly bear habitat. The grizzly bear study in the Swan Mountains of Montana (Mace and Waller 1997, Mace et al. 1999) demonstrated relationships between roads and grizzly bear habitat use patterns. Bears tended to avoid roads, especially those open to motorized traffic. However, the study showed a preference for habitat use away from roads, not "no use" by grizzlies of habitat adjacent to roads. Bears are most vulnerable in areas with many roads and limited cover and escape habitat (Claar 1999). Fire and vegetation management can eliminate cover for security and thermal regulation and short-term changes in food availability (Witmer et al. 1998). See Exhibit Rt-13 for more background information.

Effects on wolves and grizzlies tie most strongly to two issues discussed in Chapter 1. These are Issues #1: "Wildlife Security," and #3: "Landscape Dynamics--Connectivity." In the short term, timber harvest, salvage, and burning would reduce available cover and connectivity in some stands. These activities would enhance hiding cover quality in these stands over the long term. The effects of the alternatives on these species were largely evaluated through the analysis for their major prey species, due to similarities of needs for security and cover. See the "Management Indicator Species--Commonly Hunted Big Game" section of this chapter, as well as the portions on connectivity in the "Old Growth Habitat and Old Growth Associated Wildlife Species" section.

Affected Environment—Gray Wolf and Grizzly Bear

The Northwest Montana Wolf Recovery Area (USFWS 1987) includes the Logan Creek drainage. Aside from the human element, wolf habitat quality has remained high throughout northwest Montana. Wolf population trend is upward, as the recolonizing population in northwestern Montana continues to expand. There are now several wolf packs in Montana, with some travel between Canada and the United States. No wolf dens have been documented on any part of the Tally Lake Ranger District. The Logan Creek drainage and most of its tributaries are not expected to provide wolf denning habitat due mostly to the scarcity of winter prey. The exception is the actual (not Forest Plan-designated) winter range that lies near and beyond the eastern edge of the analysis area (Exhibit Rb-3), although no wolf dens have been recorded there. Possible denning or other pack activity was located in the upper Griffin drainage in 2003, less than 5 miles southwest of the Logan Creek area, and a rendezvous site was detected in upper Sheppard drainage in 1998, about 15 miles to the west. This and other wolf observations in and near the analysis area are in Exhibit Rt-12.

Potential wolf prey is plentiful and well distributed in the Logan Creek area in spring, summer, and fall. These are ungulates (white-tailed deer, mule deer, moose, and elk), and beaver. Ungulate populations, especially white-tailed deer, appear to be at healthy numbers throughout the area in spring, summer, and fall. No specific ungulate calving or fawning sites have been identified in the analysis area, as these appear to be dispersed. A relatively high

number of moose are yearlong residents, as are beaver and several smaller potential prey species. Several beaver ponds are scattered throughout the Logan Creek drainage. For more information about potential wolf prey species, see sections in this chapter on "Management Indicator Species--Commonly Hunted Big Game" and "Riparian and Wetland Wildlife Habitat."

The Logan drainage is outside the Grizzly Bear Recovery Zone identified in the Grizzly Bear Recovery Plan (USFWS 1993, p. 59). Federal lands within the proposed project area are designated in the LRMP as unoccupied grizzly bear habitat (II-24). However, grizzly bears are reasonably expected to occur within the Logan Creek area (Exhibit Rt-13). In the contiguous 48 states, only five areas in mountainous regions of Washington, Idaho, Montana, and Wyoming currently contain populations of grizzly bears.

Few grizzlies linger west of Highway 93 in scattered summer and fall habitat throughout the Tally Lake Ranger District (Exhibit Rt-11). Most of the grizzly bear reports across the Salish Mountains portion of the District are in the Good and Martin Creek drainages to the north of the analysis area. Even these areas have only a fraction of the sightings as reported on Whitefish Divide to the east. In 2002 and 2003, a sow with cubs has frequented the northeast portion of the Logan Creek area and adjacent lands (Tim Manley, pers. comm. 2003). Most likely, the rest of the Logan Creek observations (mostly in Griffin, etc., Exhibit Rt-11) were single bears that denned in the Whitefish Range and wandered westward in search of food. The analysis area does not provide denning habitat, and grizzly bears have not been reported there in winter or early spring. Potential foraging habitat for grizzly bears is well distributed across the analysis area, but is of limited quality due to habitat types and to human disturbance levels. For example, the area does not seem to contain enough bear foods, such as found in huckleberry fields or avalanche chutes, to sustain grizzlies. Overall, the forage values for grizzly bear are moderate to low, the availability of travel corridors between forage areas is fair to good, and cover patches are abundant and well dispersed.

Environmental Consequences—Gray Wolf and Grizzly Bear

Direct and Indirect Effects

Alternative A – No Action

No additional actions such as timber salvage, harvest, or rehabilitation are proposed in Alternative A. In areas of extensive windfall and beetle-caused mortality, accumulations of downfall could impede travel for large mammals. The lack of new openings and prescribed underburns mean less forage available for prey eaten by wolves and grizzlies. If no further timber harvest, prescribed burning, or wildland fire occurs over the next 15 years, over 95 percent of the area would function as hiding cover. Indirectly, taking no action to reduce fuels would increase the potential for stand-replacing fires to occur, which could result in large areas of decreased suitability or unsuitable habitat, and possibly mortality associated with heat intensity. The level of effects would be dependent on the size and intensity of such

a wildland fire. No additional road closures are planned with implementation of this alternative, leaving 126 miles open across the analysis area in summer for an Open Road Density (ORD) of 1.27 miles per square mile. About 93 miles would remain open from fall to spring, with an ORD of 0.99 (Exhibit Rg-8). The densities of open roads, by LRMP Geographic Area, are shown in Table 3-88. Any road that is open seasonally or yearlong is considered as open, as these roads would be open during all or part of grizzly bears' non-denning season (April 1 to November 20). This definition is equivalent to "unrestricted road", as used in the Flathead LRMP.

Table 3-88. Open Road Densities by Geographic Units to Compare with Forest Plan Direction.

Open Road Density (ORD)	Star Meadow-Logan Creek	Tally Lake-Round Meadow	Mountain Meadow-Rhodes Draw
Maximum Flathead N.F. LRMP Open Road Density by Geographic Unit	2.20	2.20	2.20
Alternative A (Existing)	1.70	1.75	1.78
Alternative B	1.59	1.73	1.78
Alternative C	1.59	1.73	1.78
Alternative D	1.59	1.73	1.78
Alternative E	1.58	1.73	1.78
Alternative F	1.58	1.73	1.78

Alternatives B, C, D, E, and F

These alternatives would alter a substantial amount of cover used by large mammals such as wolves or grizzlies, as discussed in the section in this chapter on "Management Indicator Species--Commonly Hunted Big Game." The short-term loss of hiding cover would occur on from 3236 (Alternative C) to 5824 acres (Alternative B) (Table 3-78 and Exhibit Rb-8), and includes several units that would sever major forested connections (Table 3-73 and Exhibit Rg-9). There would be an eventual increase in the quality of hiding cover in all harvest units. The prescriptions for retaining many large live trees, as well as snag and downed wood retention, would both help provide some cover in the units.

Reclamation and yearlong-gated closure of 6.9 to 7.5 miles of roads would benefit wolves and grizzly bears by increasing habitat security, as discussed in the section in this chapter on "Management Indicator Species--Commonly Hunted Big Game." This is shown in Table 3-88, above. Alternative C would seasonally close 0.7 miles of one road, along with 17.5 miles of trails that would become closed to motorized use during hunting season. Alternative F would close 12.7 miles of trails to motorized use during hunting season. This would dramatically increase hunting season security habitat usable by wolves, grizzlies, and several of their prey species. However, several commercial harvest units remove hiding cover, leading to a net decrease in Alternatives B and E of up to 1090 acres of security area, despite the access changes (Table 3-76).

As a result of the proposed project, human use in these areas would be elevated during seasons of grizzly bear activity from the year 2004 to 2012, with more sporadic administrative visits after that. The construction of about 2000 feet of new trail past the Tally Lake Overlook could lead to displacement of wolves or grizzlies using this area during construction and

use. There would be no direct or indirect effects on wolves or grizzlies from disturbance to key habitat areas such as den sites, rendezvous sites, or whelping sites in or beyond the area where this project is proposed. Temporary displacement of individual animals might occur during preparation or implementation of activities.

The action alternatives are not expected to have any direct, indirect, or cumulative effects to grizzly bear denning habitat or high quality food sources. In all action alternatives, fish (an important grizzly bear food source) may be benefited by large wood placement in up to 3.7 miles of streams in the analysis area and by construction of fish pools in Logan Creek near Round Meadow. As a result of the action alternatives, there should be an increase in the quality of forage for ungulates. Seeding and shrub planting would not be expected to attract bears into areas where there would be an increase in mortality risk. Due to disturbance and displacement, there could be a minor effect on prey species' habitat use patterns, but not their population levels or availability as prey. Other prey items such as beavers would not be affected.

Based on the nature and duration of the proposed project, the mortality risk for wolves would remain low and that for grizzly bears would remain low-to-moderate. This would be further reduced through improvements in habitat security. If gray wolf denning or rendezvous sites are identified in the project area in the future, existing Flathead LRMP standards and guidelines would be implemented to ameliorate potential adverse effects. The same would be true of grizzly bear dens, although this is extremely unlikely.

Cumulative Effects

The Logan Creek area contains established human activities and developments including roads, extensive timber harvest, and numerous recreational opportunities. See the "Management Indicator Species--Commonly Hunted Big Game" section of this chapter for information about hiding cover for large mammals, secure habitat, and roads.

Cover within and adjacent to the project area is fragmented because much of the land base has been harvested in some manner and is within various stages of regeneration. There are no active timber harvesting operations on national forest lands in the analysis area. Timber harvest and road construction in the adjacent Good Creek drainage is expected to continue under the 2000 Good Creek Resource Management Project Record of Decision. The extent of the effects of the Good Creek Project on gray wolves and grizzly bears will in part depend on which alternative is selected in the Logan Creek Ecosystem Restoration Project. Logging will likely continue on private land. No vegetation management activities are planned on national forest lands in the analysis area in addition to those proposed in the action alternatives.

Administrative uses of closed roads for reforestation or road-related work may also affect grizzly bear use of the area. These and other activities such as routine road maintenance, watershed improvements, trail reconstruction, and measures to control weeds are foreseeable and scheduled to occur. Across the analysis area, open and closed roads facilitate human access, contributing to the risk of mortality or displacement. Current open road density averages 1.34 miles per square mile in summer and 0.99 from fall to spring.

Human access, available cover, and public attitudes largely determine mortality risk to wolves and grizzly bears (Witmer et al. 1998). A Forest Service livestock allotment occurs in and around Round Meadows in the analysis area, and grazing occurs on private land. There has been no indication of wolves or grizzlies preying on stock in this area, and no predator control efforts are ongoing or anticipated. However, an inexperienced black bear hunter killed a grizzly in the analysis area, and spring black bear hunting is expected to continue. Montana FWP killed a grizzly in the analysis area via control action after eating duck feed. The Food Storage Order is not required in the Salish Mountains portion of the Tally Lake Ranger District, but its conditions are applied to permitees anyway. Tally Lake Campground has bear-proof garbage containers. Human settlement occurs on many of the private lands, but no grizzly bear attractants were identified in the analysis area (Exhibit Rt-3). In consideration of habitat conditions, human use, roaded access, and the number of reported observations, the mortality risk to wolves and grizzlies is considered low and low-to-moderate, respectively.

No geographic or man-made barriers exist within the analysis area that would preclude wolf or grizzly bear movements to adjacent populations or Recovery Areas. For more information about these species and their habitats at various scales, including that of the Flathead National Forest, see Exhibit Rg-1.

No alternatives of the proposed project are expected to have any direct, indirect, or cumulative effects to grizzly bear or wolf denning habitat or high quality food sources. This species' affected environment described above has been shaped by past and present cumulative effects to this species. These effects would be cumulative to those discussed above for each alternative. For an assessment of this species' viability at the Forest level, see the Final Environmental Impact Statement for the Flathead's LRMP Amendment 21 (USDA 1999) and Exhibit Rg-1.

Introduction—Harlequin Duck

The harlequin duck (*Histrionicus histrionicus*) is a USFS Region One sensitive species. Across North America, the range of the harlequin duck has decreased dramatically from historical levels (Genter 1993). Local populations appear to be stable, although there is virtually no information from before 1988 (Reichel per. comm. 1995). Low population size, restricted distribution, narrow habitat requirements, and small numbers of breeding ducks have led to the listing of this species as sensitive.

Female harlequin ducks and their young typically live on oxbows and ponds adjacent to mountain streams until the ducklings are old enough to feed and travel in fast stream currents. Nests are located in woody debris in streams, overhangs in stream banks, or in adjacent tree cavities. In Northern Idaho, old growth and mature forest was adjacent to 90 percent of observation sites, and woody debris was present at 77 percent of sites (Cassirer and Groves 1989). Clear, clean water and an abundant aquatic food source appear essential for successful reproduction (Cassirer, et al. 1993).

Timber harvest and salvage, insect epidemics, and wildland fire can affect this species through destruction of nest structures and changes in availability of large woody material.

They can also decrease aquatic food sources through changes in water quality, quantity, and temperature.

Effects on harlequin ducks tie to Issue #5: "Water quantity and fine sediment deposition," as discussed in Chapter 1. For more information about analysis methods and cumulative effects, see the "Water Resources" section of this chapter.

Affected Environment—Harlequin Duck

The harlequin duck is an uncommon and localized breeder throughout the Rocky Mountains of the Forest Service Northern Region, wintering along the North Pacific Coast (Reel, et al. 1989). At least 159 pairs nest in Montana (Reichel, et al. 1997). Breeding has been confirmed on approximately 32 streams in northwestern Montana (Reichel and Genter 1995).

Montana Natural Heritage Program personnel began surveys for harlequin ducks on the Flathead National Forest in 1989. Logan and Good Creeks on the Tally Lake Ranger District were characterized as having suitable habitat, but no harlequins were located (Carlson 1990, Exhibit Rs-15). No other streams in the Logan Creek area have been surveyed for harlequin ducks, as they appear to be too small and low gradient. One incidental observation was just east of the analysis area along Good Creek. Two adults were reported on Upper Stillwater Lake in May 1985, two miles northeast, and a pair was reported two miles to the east of the analysis area on the Stillwater River. The closest known reproduction is on Swift Creek, about ten miles north of the analysis area.

Reaches of Logan Creek appear to match physical characteristics of known harlequin habitat in northwestern Montana (Exhibit Rs-15). This was based on a comparison of flow, temperature, and gradient data, along with general familiarity with the habitat. Overall, potential habitat is of good quality, in terms of water quality and bank vegetation. In general, the water quality in the Logan Creek area is good, with monitoring suggesting healthy conditions for fish and other aquatic life. Sediment and turbidity is normally low with the exception of some extreme springtime high flow periods, although natural turbidity is often relatively high. Refer to sections in this chapter on "Water Resources," "Riparian and Wetland Wildlife Habitat," and "Fisheries" for more information on the existing condition. For more information about this species and its habitat at various scales, including that of the Flathead National Forest, see Exhibit Rg-1.

Environmental Consequences—Harlequin Duck

Direct and Indirect Effects

Alternative A – No Action

No additional actions such as timber harvest, salvage, or rehabilitation are proposed in this alternative. Trees killed by fire or insect outbreaks, but not cut for firewood, would fall to the ground over the next 100 years. Downed logs, shading from snags, and lack of seed sources

may delay the regeneration of new trees. The lack of reclamation for aquatic habitat could mean that water quality conditions for harlequin ducks and their potential prey species would not improve. Indirectly, taking no action to reduce fuels would increase the potential for stand-replacing fires to occur, which could result in a short-term increase in nutrients, and depending on the size and intensity of the fire, a short-term increase in water yield. The risk of increased sediment to the stream would depend on the intensity and location of the fires. Where large fuel buildups have occurred and the duff is removed, there is an increased chance that intense rainstorms and accelerated snowmelt could cause sedimentation.

Alternatives B, C, D, E, and F

These alternatives would harvest and/or burn in up to 7190 acres, all of which is upstream of potential harlequin duck habitat. Predicted changes in water yield associated with the action alternatives are within recommended limits for most drainages. However, in some drainages, channel erosion is likely to continue, particularly if the road reclamation included with Alternative E is not selected. This could decrease the prey base and the ability of harlequin ducks to capture whatever prey are present. Harvest operations in uplands and within one unit inside an RHCA (Unit 138A) are not expected to generate erosion, and thus water quality changes are not expected downstream, due to protective design criteria. Downstream nesting structures, such as downed logs, are also not expected to be affected. Implementation of rehabilitation actions in this proposal is expected to improve habitat conditions over time. In all action alternatives, harlequin duck food sources may be benefited by large wood placement in up to 3.7 miles of streams in the analysis area and by construction of fish pools in Logan Creek near Round Meadow. See the "Water Resources" and "Fisheries" sections of this chapter for more information.

Cumulative Effects

Habitat along Logan Creek and the Stillwater River was degraded by splash dam log drives in the 1920s and 1930s, but may have healed sufficiently to reach former habitat quality. The Stillwater River naturally has a very silty substrate and moderate levels of livestock grazing. Stream habitat quality in the analysis area fluctuated with the effects of fires, insects, and disease. See the Water Resources and Fisheries sections of this chapter. This species' affected environment described above has been shaped by past and present cumulative effects to this species. These effects would be cumulative to those discussed above for each alternative. For an assessment of this species' viability at the Forest level, see the Final Environmental Impact Statement for the Flathead's LRMP Amendment 21 (USDA 1999) and Exhibit Rg-1.

Introduction—Northern Goshawk

Northern goshawks (*Accipiter gentilis*) are a USFS Region One sensitive species. They are a mid-sized raptor most closely associated with mature and older conifer or conifer/aspen forests. Goshawks prey on a variety of medium-sized forest birds and mammals, and their foraging habitat is typically forests with relatively open understories (Beier and Drennan 1997, Squires and Ruggiero 1996). Hayward and Escano (1989) found nest sites in northwest

Montana were often located in even-aged, single-storied, mature forest stands with a high canopy closure of widely spaced large trees. The density of small trees is also relatively low in nest stands, and the forest floor is relatively clear of woody debris (Squires and Ruggiero 1996). Minimum patch size for nest stands is 25 acres with 125 acres being optimum (Warren 1990). Estimates of the goshawk's home range vary from 500 to over 6000 acres. See Exhibit Rs-17 for more information.

Regeneration harvest can have an impact on goshawks by removing suitable nesting habitat and decrease the size of nesting stands, although it can also create forest edges and in some cases smaller openings that goshawks could still use. Generally speaking, intermediate harvest and/or underburning can have a positive effect on goshawk habitat, as long as a landscape-based approach is used (Squires and Ruggiero 1996; Graham, et al. 1997, Finn et al. 2002). Intermediate harvest can maintain or create more favorable conditions over time for goshawks as the second-growth stands develop structural diversity. This is particularly true if stands are managed for canopy closure values above 40 percent canopy levels (Beier and Drennan 1997) and if patches are left unharvested (Finn et al. 2002). Stand-replacement fire or insect epidemics can eliminate or create the various elements of goshawk habitat, depending on the size and severity of the disturbance.

Effects on northern goshawks tie to two issues discussed in Chapter 1. These are Issue #2: "Effects on existing old growth habitat and on late-seral/structural stage forests;" and Issue #4: "Landscape dynamics--Seral/structural stage patch size and shapes." Potential goshawk habitat was identified as northerly facing and relatively flat late-seral/structural stands (Exhibit Rs-16). Land with these attributes was electronically overlain with proposed units. For more information about effects analysis methods, conclusions, and cumulative effects, see the "Old Growth Habitat and Old Growth Associated Wildlife Species" section of this chapter.

Affected Environment—Northern Goshawk

The 1998 U.S. Fish and Wildlife Service (USFWS) review of goshawk in the western United States found that although forest management has changed the vegetation characteristics throughout most of the west, the goshawk continues to be well-distributed throughout its historical range and there was no evidence of substantial population declines (Clark 1998). An assessment of potential goshawk habitat across USFS Region One (Exhibit Rs-17) done in 2003 found at least 68 percent of the Region's sixth-code Hydrologic Units have sufficient habitat for goshawks. Call playback surveys done in the Logan Creek area specifically for this species in 2002 did not detect any goshawks (Exhibit Rs-20). Nevertheless, goshawks are year-round residents of the analysis area, and there have been sightings of goshawks in a variety of sites (Exhibit Rs-20). Over the past decade on the Tally Lake Ranger District, goshawk observations were common enough that most were not recorded.

Across the analysis area, about 10,860 acres may provide goshawk nesting and foraging habitat (Exhibit Rs-16). Additional foraging habitat is available in openings. The largest continuous patches of forested potential goshawk habitat are 1075 and 910 acres; 12 patches are less than 10 acres. If a pair's territory is assumed to be about 5000 acres across a fragmented landscape, then Forest Service land in the analysis area could theoretically support

at least two pairs (Exhibit Rs-16). These theoretical territories are based on available habitat only. Both nesting and foraging habitat are well distributed throughout the drainage.

Fire suppression in the Logan Creek area has resulted in a high percentage of older forests becoming filled in with thick under-stories and mid-stories. This increases the risk of extensive tree mortality due to stand-replacing fire or pathogens. It also makes some stands less desirable for species such as the goshawk. See the "Fire and Fuels" section of this chapter for more information about trends regarding stands containing larger trees and open understories. For more information about this species and its habitat at various scales, including that of the Flathead National Forest, see Exhibits Rg-1, Rg-3, and Rs-27.

Environmental Consequences—Northern Goshawk

Direct and Indirect Effects

Alternative A – No Action

Because no additional harvest, prescribed burning, or roading would occur, this alternative would have no direct effect on existing goshawk habitat. Vegetative conditions would continue to respond to normal growth conditions, providing a mosaic of forested habitats. Indirectly, as time goes on, understory growth would decrease habitat suitability for foraging opportunities. This is particularly true in the lower- to mid-elevation ranges. In addition, taking no action to reduce fuels would increase the potential for stand-replacing fires to occur, which could indirectly result in large areas of unsuitable habitat.

Alternatives B, C, D, E, and F

Regeneration harvest (Table 3-89) would remove suitable nesting habitat, although in some cases it may create forest edges and smaller openings that goshawks could still use for foraging. In Alternatives B, D, and E, the largest continuous patch of potential forested goshawk habitat would be reduced from 1075 acres to two blocks of 515 acres and either 180 or 465 acres (Exhibit Rs-16). This area would stay intact under Alternatives A, C, and F. As these affected acres are spread out over the analysis area, most resident goshawks are likely to experience some habitat loss at a small or site-specific scale. Generally speaking, intermediate harvest and/or underburning should have a positive effect on goshawk habitat. While harvest was ongoing, activity near an active nest site could cause temporary avoidance or abandonment, depending on the length and intensity of activity. Road closures would reduce the summertime Open Road Density (ORD) to 0.91 miles per square mile, with a fall-through-spring ORD of 1.26 or 1.27 (Exhibit Rg-8). This would further protect dead wood habitat used by goshawks and their prey.

Table 3-89. Harvest and Burning Prescriptions in Potential Habitat for Northern Goshawk (Exhibit Rs-16).

Prescription	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
Hand-piling and pile-burning	0 ac	5 ac	5 ac	5 ac	5 ac	5 ac
Underburn without Harvest	0 ac	14 ac	14 ac	14 ac	14 ac	14 ac
Commercial Thin	0 ac	508 ac	620 ac	633 ac	660 ac	765 ac
Sanitation Salvage	0 ac	8 ac	8 ac	8 ac	8 ac	19 ac
Total Understory Treatment	**0 ac**	**535 ac**	**647 ac**	**660 ac**	**687 ac**	**792 ac**
Seed Tree with Reserves	0 ac	277 ac	92 ac	151 ac	253 ac	146 ac
Shelterwood with Reserves	0 ac	1473 ac	891 ac	1134 ac	1346 ac	980 ac
Total Stand Replacement	**0 ac**	**1750 ac**	**983 ac**	**1285 ac**	**1599 ac**	**1126 ac**

Following implementation, the analysis area would be still be expected to support at least two pairs of goshawks in all alternatives (Exhibit Rs-16). Indirect effects on goshawks in the adjacent Good Creek drainage from construction of System Roads 18 and 22 are expected to be minimal (Exhibit Rt-16). Other actions included in these alternatives, including the trail construction north of Tally Lake, would not be expected to affect goshawks.

Cumulative Effects

Cumulative effects on northern goshawks are very similar to those of flammulated owls, as described earlier in this chapter. This species' affected environment described above has been shaped by past and present cumulative effects to this species. These effects would be cumulative to those discussed above for each alternative. For an assessment of this species' viability at the Forest level, see the Final Environmental Impact Statement for the Flathead's LRMP Amendment 21 (USDA 1999) and Exhibit Rg-1. Exhibit Rs-27 is an assessment of the northern goshawk and its habitat across USFS Region One.

Introduction—Northern Leopard Frog, Boreal Toad, Northern Bog Lemming, and Western Big-eared Bat

The northern leopard frog (*Rana pipiens*), boreal toad (*Bufo boreas boreas*), northern bog lemming (*Synaptomys borealis*), and Western (Townsend's) big-eared bat (*Plecotus townsendii)* are USFS Region One sensitive species. They are discussed together because of similarities of most aspects of their habitat needs and many potential effects.

The bog lemming, a rare, short-tailed rodent, is found in wet meadows containing standing water and extensive coverage of sedges and species such as sphagnum moss. Special habitat features seem to include fallen logs and other woody debris used for burrowing (Exhibit Rs-11). Northern leopard frogs reproduce in slow-moving or standing water, typically supporting dense sedges or cattails, and feed in damp meadows and wet forests nearby (Exhibit Rs-12). This species was nearly extirpated from western Montana in the 1980s (Maxell et al. 2003). Leopard frogs and bog lemmings do not use drier upland habitat. Boreal (western) toads breed in lakes, ponds, road ditches, and slow streams, with a preference for shallow areas and mud bottoms. Adult toads are largely terrestrial in a wide variety of habitats, including

forests, up to at least four miles from water (Werner and Reichel 1994; Exhibit Rs-13). This species is widespread across western Montana but may be experiencing population declines (Maxwell et al. 2003). Western big-eared bats (Exhibit Rs-18) forage on insects high in living forest canopy near wet meadows (Dobkin, et al. 1995). Caves, tree cavities, rock outcrops, buildings, or mines may provide sites for roosting, communal nurseries, or winter hibernation (Reel, et al. 1989; Tuttle and Taylor 1994).

Timber harvest and salvage, insect epidemics, fires, and road construction and maintenance can affect all four of these species through soil compaction, changes in vegetative cover, or by altering the quantity and quality of water flowing into wet meadows. In addition, timing of recruitment of large woody material into wetland edges can be altered. For bats, snags used as roosting structures can be removed. For boreal toads, regeneration harvest with underburning removes overstory trees and ground cover, resulting in warmer and drier exposed soils. Intermediate harvest and burning would retain most of the larger overstory trees, leaving ground-level habitat more protected, with better daytime refugia sites for toads. Individual toads or tadpoles can be killed by vegetation management or road construction/maintenance activities, or by wildland fire.

Effects on these four species tie to Issue #5: "Water quantity and fine sediment deposition," as discussed in Chapter 1. Harvest in action alternatives could alter adjacent upland habitats and could cause hydrologic changes, as well as remove snags used by bats for roosting. Boreal toads are vulnerable to mortality caused by motor vehicles or by fires. Potential year-round habitat for the bog lemming and northern leopard frog, potential breeding habitat for the boreal toad, and potential foraging sites for Western big-eared bats were identified as Riparian Landtypes NL1A and NL1E (Exhibits Rr-1 and Rr-3). These are nearly level riparian habitats in flat valley bottoms and with relatively fine substrates. With the exception of some roadside ditches, all of the past bog lemming, toad, and leopard frog reproductive sightings on the Tally Lake Ranger District match these riparian landtypes. This riparian type was electronically and visually overlain with proposed units. Terrestrial habitat for the boreal toad was considered to be all of the analysis area. For more information about effects analysis methods, conclusions and cumulative effects, see the "Water Resources," "Riparian and Wetland Wildlife Habitat," and "Snags and Downed Woody Material Wildlife habitat" sections of this chapter.

Affected Environment—Northern Leopard Frog, Boreal Toad, Northern Bog Lemming, and Western Big-eared Bat

In the Logan Creek area, about 2818 acres may provide year-round habitat for bog lemmings and northern leopard frogs, as well as breeding habitat for boreal toads and feeding sites for western big-eared bats (Exhibit Rr-1). This potential habitat is defined as nearly level areas with substrate of medium sand or finer material. It is well distributed throughout the analysis area, with the exception only of the Tally Mountain area. There are over 100 wet meadow sites ranging from 0.2 to 1119 acres (Exhibit Rr-1).

The northern bog lemming has few populations in the lower 48 states, with only 13 sites in Montana (Reichel and Beckstrom 1993). Since about 10,000 years ago, this species has become a glacial relict with localized primary habitat. A bog lemming was trapped in 1992 at the head of Bowen Creek, ten miles northwest of the Logan Creek area (Exhibit Rs-4). This is the only known occurrence of this species on the Flathead National Forest. Other known bog lemming sites occur just to the north, on the Kootenai National Forest. Other potential habitat in the analysis area has not been surveyed for bog lemmings, but it appears to contain suitable habitat scattered throughout (Exhibit Rr-1).

Historically, the northern leopard frog was widespread in Montana, but it now appears to have disappeared throughout much of the western part of the state. The only known locations of leopard frogs anywhere in western Montana are a set of small ponds about 30 miles to the northwest, a lake complex near Kalispell, and a location near Nine Pipe Wildlife Refuge. It is unknown if northern leopard frogs inhabit the Logan Creek area, but potential habitat does occur and surveys are ongoing. None have been documented on the Flathead National Forest since a record in the Swan Valley about 1950.

Historical data on the western toad indicates it was widely distributed and very common in Montana and other western states, but surveys in the late 1990s indicate that they are absent from many historic locations and that they now occupy less than ten percent of suitable habitat (Maxell 2000). There have been four records of boreal toads in the Logan Creek area (Exhibit Rs-5), two of which were of egg masses, tadpoles, or adults in reproductive (wetland) habitats seen during amphibian and reptile searches. The Griffin Creek drainage, adjacent to the west, appears to be a hotbed of toad reproductive activity. This species is likely to be much more common than these observations suggest; it is a recent addition to the Sensitive Species list and has not been generally recorded. All of Forest Service land in the analysis area is close enough to potential breeding ponds to be potential upland habitat for boreal toads.

The western big-eared bat has a widespread distribution, but is uncommon to rare; a notable decline has been reported in the western United States (Dobkin, et al. 1995). Western big-eared bats are distributed throughout western North America in a wide variety of forest types, with isolated populations further east. It has not been recorded in the Logan Creek area, and potential roosting habitat has not been surveyed for bat occupancy. No western big-eared bats were found in bat surveys on the adjacent Kootenai National Forest in 1993. Nevertheless, the species may be present. Roosting habitat may be provided by abandoned mines or by abandoned buildings on private land. There appears to be sufficient snag roosting habitat near numerous wet meadow feeding areas. Across the analysis area, numerous wet meadow sites have adjacent potential feeding habitat for the bat, with insect numbers apparently at endemic levels. See Exhibit Rs-1. For more information about these species and their habitat at various scales, including that of the Flathead National Forest, see Exhibit Rg-1.

Environmental Consequences—Northern Leopard Frog, Boreal Toad, Northern Bog Lemming, and Western Big-eared Bat

Direct and Indirect Effects

Alternative A – No Action

This alternative would have no direct effect on boreal toads, northern leopard frogs, or northern bog lemmings. Indirectly, taking no action to reduce fuels would increase the potential for stand-replacing fires, which could result in areas of less suitable or unsuitable habitat, and possible fatalities. The level of effects would be dependent on the size and intensity of such a wildland fire. See the "Water Resources" and "Riparian and Wetland Wildlife Habitat" sections of this chapter for more information.

Alternatives B, C, D, E, and F

No vegetation manipulation or road construction would occur in potential habitat for these four wildlife species (Exhibit Rr-1). In addition, no harvest or burning is planned close enough to these areas to alter the availability of downed wood recruitment.

In-channel erosion would most likely increase with the implementation of Alternative B because it includes the most ground-disturbing activities. Elevated channel erosion is more likely to occur if road reclamation associated with the action alternatives did not occur, especially those roads proposed for reclamation in Alternatives E and F. The sediment generated by in-channel erosion, undersized culverts, and existing road locations would be deposited in the broad flood plain and willow complex in Star Meadow.

All action alternatives would include Riparian Habitat Conservation Areas (RHCAs; Flathead National Forest 1995) as a design feature to meet INFISH guidelines for managing riparian habitat. This includes riparian buffers on all streams, ponds, or springs/seeps suitable for breeding sites. None of these breeding sites would be adversely affected by proposed alternative activities.

None of the watershed or fisheries enhancement measures included in these alternatives are expected to have negative impacts on riparian habitat areas or the species using them. Roadside ditches that hold water long enough into the summer to provide breeding sites would not be protected by RHCAs unless they were associated with streams or other protected sites. These toad breeding sites would be vulnerable to seasonal dry-up and site-specific road reconstruction. Individuals or site populations could be affected by either of these if they occurred while tadpoles were still dependent on water availability.

Proposed harvest and underburning activities are likely to alter existing non-breeding habitat for boreal toads for the short-term (Exhibit Rs-22). The amounts are shown below in Table 3-90. As vegetation recovered within a few years, habitat would become increasingly suitable and use would be expected to increase. If adult boreal toads were present, individual

mortality could occur during harvest or underburning from heat or consumed woody material, or by vehicles or machinery used for logging or roadwork. Based on this species' ability to occupy a wide variety of habitats, boreal toad population levels would be very slightly reduced for a short time or would remain unchanged.

Table 3-90. Acres of Timber Harvest or Burning Activities in Potential Terrestrial Habitat of Boreal Toads, in acres and miles (Exhibit Rs-22).

Alternative	Acres Treated	Miles of Road Construction	Miles of Road Reclamation	Miles of Road Rehabilitation
B	7190	9.8	16.2	141
C	4801	6.3	16.2	99
D	5290	7.0	16.2	124
E	6881	9.6	16.6	138
F	6290	8.3	16.6	133

The other actions in these alternatives, including watershed and fisheries enhancement measures, are not expected to have negative impacts on riparian habitat areas or the species using them. See the "Fisheries," "Water Resources," "Riparian and Wetland Wildlife Habitat," and "Snags and Downed Woody Material Wildlife Habitat" sections for more information.

Cumulative Effects

Past timber harvest, road construction and maintenance, fires, and fire fighting have likely affected northern bog lemming, northern leopard frog, boreal toad, and western big-eared bat habitat in this area as well as across the Flathead National Forest. No vegetation management activities are planned on national forest lands in the analysis area in addition to those proposed in the action alternatives. Timber harvest and road construction in the adjacent Good Creek drainage is expected to continue under the 2000 Good Creek Resource Management Project Record of Decision. Livestock grazing is likely to continue in the USFS allotment and on private lands, and may have had past effects. Fires probably rarely burn in these species' habitats, although water quality and quantity varies after large fires upstream. Beaver dams also provide a flux of habitat availability; past beaver trapping may have affected habitat availability where beavers may not have recolonized. A reasonably foreseeable action would be measures to control weed species, but this is unlikely to affect these wildlife species. Bat roosts provided by mines and bridges are relatively new developments. For all of these species, Management Area designations, INFISH regulation, SMZ management, etc., would ameliorate any past downward trend caused by timber harvest or roading. Cumulative effects have been greatest to the boreal toad. This is due to its use of upland habitats and vulnerability to individual mortality in an area that has had extensive past timber harvest and road construction. Logging and roading will likely continue on private land in and near the analysis area. See the "Water Resources," "Riparian and Wetland Wildlife Habitat," and "Snags and Downed Woody Material Wildlife Habitat" sections for more information about cumulative effects on these and similar habitats.

These species' affected environment described above has been shaped by past and present cumulative effects to this species. These effects would be cumulative to those discussed above for each alternative. For an assessment of these species' viability at the Forest level, see the Final Environmental Impact Statement for the Flathead's LRMP Amendment 21 (USDA 1999) and Exhibit Rg-1.

Introduction—Wolverine

Wolverines (*Gulo gulo*) are a USFS Region One sensitive species. Remoteness and isolation from human impacts and a diverse prey base seem to be the most important habitat components (Witmer et al. 1998). Adults are mostly solitary and range widely over a variety of habitats, with home ranges in Montana averaging 150 square miles (Exhibit Rs-19). The literature suggests wolverines readily avoid human activity (Ruggiero, et al. 1994). With few exceptions, wolverine dens described to date have been located in alpine, subalpine, taiga, or tundra habitat. Reports of dens in low elevation, densely forested habitats are rare (Magoun and Copeland 1998). Wolverines feed primarily on rodents and carrion, although they eat berries, insects, fish, birds, and eggs when available. Movements to lower elevations during winter may be to take advantage of ungulate mortalities on winter ranges (Butts 1992).

Effects on wolverines tie to four issues discussed in Chapter 1. These are Issue #1: "Wildlife Security;" Issue #2: "Effects on existing old growth habitat and on late-seral/structural stage forests;" Issue #3: "Landscape dynamics—connectivity;" and Issue #4: "Landscape dynamics--Seral/structural stage patch size and shapes." Potential wolverine dispersal habitat was identified as the entire analysis area. The ArcView geographic information system was used for quantification of potential disturbance of wolverines and changes in cover. See the "Management Indicator Species--Commonly Hunted Big Game" section of this chapter, as well as the portions on connectivity in the "Old Growth Habitat and Old Growth Associated Wildlife Species" section.

Affected Environment—Wolverine

There is very limited suitable wolverine habitat (large, isolated tracts of land supporting a diverse prey base) in the Logan Creek area, and no observations have been reported there (Exhibit Rs-30). Possible wolverines were seen along Brush Creek divide in August 1996 (about 10 miles to the west) and in lower Squaw Meadows drainage (about 10 miles to the southwest). This may have been a young, dispersing individual. The location of one harvested in 1990 was given as "Good Creek." Another in 1978 was reported as harvested at "Tally Lake," which could be anywhere on the Tally Lake Ranger District. There have been confirmed sightings over the past five years in Whitefish Divide and in the drainages of the North and Middle Forks of the Flathead River in Glacier National Park, upper Grave Creek, and Ten Lakes area. These are the closest suspected denning habitats, all of which have a considerable amount of ungulate winter range nearby. For information about the distribution of vegetative cover and wolverine foraging opportunity, see the "Vegetation," "Old Growth and Old Growth Associated Wildlife Species," and "Management Indicator Species—Commonly Hunted Big Game" sections in this chapter. For more information about this

species and its habitat at various scales, including that of the Flathead National Forest, see Exhibits Rg-1, Rg-3, and Rs-28.

Environmental Consequences—Wolverine

Direct and Indirect Effects

Alternative A – No Action

No additional management that would directly or indirectly affect the wolverine is planned with this alternative. Overall, availability of carrion and other food sources would not be measurably affected. The availability of hiding sites used during dispersal would gradually increase. The high fuel loading in many stands would increase the chance of large hot fires in adjacent areas, which could have mixed results for wolverines. Stand-replacement disturbances are more likely to occur under this alternative, which would have the greatest and most-enduring effect on potential denning habitat. No additional road closures are planned with this alternative, allowing current levels of potential displacement of dispersing wolverines.

Alternatives B, C, D, E, and F

These alternatives would harvest and/or burn in up to 7190 acres. Some of this would remove hiding cover and some may create forest edges and smaller openings. Considering the large scale of wolverine dispersal, these effects would not be measurable, nor would availability of carrion and other food sources be measurably affected. Harvest activities would not be conducted in or near any wolverine denning habitats and would therefore not have any impacts on this habitat component. The probability of large stand-replacing wildland fires would be reduced. Additional road closures are planned with these alternatives, reducing current levels of potential displacement of dispersing wolverines as described above for grizzly bears and wolves. For more information on effects relevant to the wolverine, see the sections of this chapter on "Management Indicator Species--Commonly Hunted Big Game", "Old Growth Habitat and Old Growth Associated Wildlife Species," "Snag and Downed Woody Material Wildlife Habitat," and "Fire and Fuels" sections of this chapter.

Cumulative Effects

The wolverine is vulnerable where it occurs across the Columbia River Basin, due to its low population densities and dependence on remote habitat (Witmer et al. 1998). Past timber harvests altered habitat characteristics by reducing the amount of small mammal habitat (down logs/snags) and construction of roads, which allowed relatively easy access for trapping opportunities. These past management activities have also provided early succession/foraging habitats for big game and easier access for hunters during hunting seasons. Prior to fire suppression and timber management, elk and deer populations were dependent upon natural disturbances to create openings that provided the early successional growth favored by foraging ungulates. On the other hand, the use of roads by snow machines and other motorized vehicles reduced the remoteness of the pre-managed landscape. Human developments such as the Tally Lake Campground, hiking trails, and road development within

the drainage probably had more far- reaching effects by increasing human access into once remote areas. Roads that accessed high-elevation basins probably reduced habitat quality the most. Snowmobile use may also have had effects on winter prey species by providing pathways for other predators to access a limited winter wolverine prey base. No vegetation management activities are planned on national forest lands in the analysis area in addition to those proposed in the action alternatives. The 2000 Good Creek Resource Management Project Record of Decision was determined to have "no impact" on the wolverine.

This species' affected environment described above has been shaped by past and present cumulative effects to this species. These effects would be cumulative to those discussed above for each alternative. For an assessment of this species' viability at the Forest level, see the Final Environmental Impact Statement for the Flathead's LRMP Amendment 21 (USDA 1999) and Exhibit Rg-1. Exhibit Rs-25 is an assessment of the wolverine across USFS Region One.

REGULATORY FRAMEWORK AND CONSISTENCY

Threatened Wildlife Species

Threatened or endangered status affords a species and its habitat special protection from adverse effects resulting from federally authorized or funded projects. It is the responsibility of the Forest Service to design activities that contribute to the recovery of listed species in accordance with recovery plans developed as directed by the Endangered Species Act (ESA) (50 CFR part 402). The Flathead National Forest's Amendment 21 to the LRMP has a goal to "provide sufficient habitat to promote the recovery of threatened and endangered species and conserve the ecosystems upon which they depend." Section 9 of the Endangered Species Act of 1973, as amended, requires threatened and endangered species be protected from "harm" and "harassment" wherever they occur, regardless of recovery boundaries.

The Proposed Action and its alternatives comply with Section 9, ESA of 1973 as amended, Flathead National Forest LRMP as amended, and all finalized recovery documents and recommendations listed below. A Biological Assessment for Threatened and Endangered Wildlife Species will be prepared for the Preferred Alternative (Exhibit Rt-17). U.S. Fish and Wildlife Service consultation is in Exhibit Rt-2; concurrence or Biological Opinion will be in Exhibit RT-21. If any active nesting, denning, or rendezvous sites for threatened or endangered wildlife species are discovered in any proposed harvest or burning unit, area of road construction or similar activity, activities would be modified, if needed, to protect habitat conditions and maintain reproductive efforts.

All alternatives would comply with NFMA direction that wildlife habitat be managed to maintain viable populations of existing native and desired non-native species well distributed across the planning area. See the analysis of forest-level viability of threatened and endangered wildlife species for Flathead National Forest's Forest Plan Amendment 21 and Exhibit Rg-1.

Gray Wolf – The Gray Wolf in Montana is classified as threatened and is protected under the Endangered Species Act. Strategies to protect and recover populations in Montana are

outlined in the Northern Rocky Mountain Wolf Recovery Plan (USFWS 1987; adopted as Forest Plan Appendix PP). The Logan Creek area is in the Northwestern Montana Wolf Recovery Area identified in the Northern Rocky Mountain Wolf Recovery Plan (USFWS 1987). Management direction applicable to the project area from the U.S. Fish and Wildlife Service includes maintaining an adequate prey base for wolves and minimizing mortality risk for wolves without unnecessary land use restrictions. Gray wolves are also legally protected under the Lacey Act (1901). Forest Plan direction includes II 34-38; Amendments 8, 11, and 12; and Appendix PP. Amendment 21 includes new standards that are listed below:

a. Wolf habitat needed to meet recovery goals includes available prey (especially elk, deer, and moose) and security.
b. In general, logging activities should not be conducted in or near known or highly suspected dens and rendezvous sites, ungulate calving/fawning areas, or important ungulate winter ranges at certain times of the year.

Grizzly Bear – The grizzly bear is currently classified as Threatened in Montana and is protected under the Endangered Species Act. The analysis area is outside the recovery zone known as the Northern Continental Divide Grizzly Bear Ecosystem (USFWS Grizzly Bear Recovery Plan 1993). It is listed as "unoccupied grizzly bear habitat," based on habitat suitability combined with lack of consistent grizzly observations. However, grizzly bears are reasonably expected to occur within the Logan Creek area (Exhibit Rt-13). Forest Plan direction includes pages II-24 through II-33 and Amendments 8, 9, and 11. Interagency Grizzly Bear Guidelines (1986) were adopted as Forest Plan Appendix OO.

Bald Eagle – The bald eagle is currently classified as Threatened in Montana and is protected under the Endangered Species Act. The U. S. Fish and Wildlife Service proposed to delist this species in July 1999. Strategies to protect and recover bald eagle populations in Montana are outlined in the Pacific Bald Eagle Recovery Plan (USFWS 1986; adopted as Forest Plan Appendix RR), the Montana Bald Eagle Management Plan (MBEMP, Montana Bald Eagle Working Group 1986; adopted as Forest Plan Appendix QQ, and MTBEWG 1994) and the Habitat Management Guide for Bald Eagles in Northwestern Montana (MBEWG 1991). Bald eagles are also legally protected under the Migratory Bird Treaty Act (1918), the Bald Eagle Protection Act (1940), and the Lacey Act (1901). Forest Plan direction includes pages II-23 #5; III-53 #2, 3; and III-83 #6, Amendments 8, 11 and 13. The analysis area is in Management Zone 7 (Upper Columbia Basin) of the Pacific Bald Eagle Recovery Area identified in the Pacific Bald Eagle Recovery Plan. Management direction for Zone 7 involves identifying and protecting nesting, feeding, perching, roosting, and winter/migration areas. Direction also includes stabilizing water fluctuations, maintaining and enhancing prey populations, and monitoring or regulating human disturbance. Site-specific guidelines for the Tally Lake territory were not completed; the report is in Exhibit Rt-14. See Exhibit Rt-4 for more information.

Lynx –A Canada Lynx Conservation Assessment and Strategy has been finalized (Lynx Biology Team 2000; Exhibit Rt-15). In February 2000, the Forest Service and the Fish and Wildlife Service entered into the Canada Lynx Conservation Agreement. The contiguous United States population segment of the lynx, including Montana, became a threatened species on March 24, 2000. In October 2000, the U.S. Fish and Wildlife Service issued a biological opinion on the effects of National Forest Land and Resource Management Plans

and Bureau of Land Management Land Use Plans on Canada lynx in the contiguous United States. The Forest Service and Bureau of Land Management are proposing to amend land management plans for 18 national forests and four BLM units in the northern Rocky Mountains to include measures to conserve Canada lynx. This includes the Flathead National Forest. The management direction proposed for the Northern Rockies Lynx Amendment for National Forests in the Northern Rockies is based on the Lynx Conservation Assessment and Strategy. For more information about these documents, see Exhibit Rt-15.

Threatened Wildlife Species Determination Statements:

A. *Bald Eagle* – Based upon the location and nature of the proposed project and the analysis of potential impacts and cumulative effects, a determination of "May affect -- not likely to adversely affect" has been determined for bald eagle for all alternatives.

B. *Gray Wolf* – Based upon the location and nature of the proposed project, and the analysis of potential impacts and cumulative effects, a determination of "May affect -- not likely to adversely affect" has been determined for gray wolf for all alternatives.

C. *Grizzly Bear* – Based upon the location and nature of the proposed project, and the analysis of potential impacts and cumulative effects, a determination of "May affect -- not likely to adversely affect" has been made for grizzly bear for all alternatives.

D. *Canada Lynx* – Based upon the location and nature of the proposed project and the analysis of potential impacts and cumulative effects, a determination of "May affect -- not likely to adversely affect" has been made for the Canada lynx for Alternatives A and D. A determination of "May affect -- likely to adversely affect" has been made for lynx for Alternatives B, C, and E. In addition, Alternatives A, D and F are consistent with all of the recommended standards and guidelines found in the Canada Lynx Conservation Assessment and Strategy (Lynx Biology Team 2000); Alternatives B, C, and E are not. See Exhibit Rt-15.

Sensitive Wildlife Species

Federal laws and direction applicable to sensitive species include the National Forest Management Act (NFMA 1976) and Forest Service Manual 2670. Amendment 21 to the Flathead's LRMP has standards to conduct analyses to review programs and activities to determine their potential effect on sensitive species and to prepare a biological evaluation. It also states "adverse impacts to sensitive species or their habitats should be avoided. If impacts cannot be avoided, the significance of potential adverse effects on the population or its habitat within the area of concern and on the species as a whole will be analyzed. Project decisions will not result in loss of species viability or create significant trends towards federal listing." The USDA Forest Service is bound by federal statutes (Endangered Species Act, National Forest Management Act), regulation (USDA 9500-4), and agency policy (FSM 2670) to conserve biological diversity on National Forest System lands. A goal in LRMP Amendment 21 is to "ensure that Forest Service actions do not contribute to the loss of viability of native species."

All alternatives would comply with NFMA direction that wildlife habitat be managed to maintain viable populations of existing native and desired non-native species well distributed across the planning area. See the analysis of forest-level viability of sensitive wildlife species for Flathead National Forest's Forest Plan Amendment 21 and Exhibit Rg-1. If any active

breeding, nesting, or denning sites for sensitive wildlife species are discovered in any proposed harvest or burning unit, area of road construction or similar activity, activities would be modified, if needed, to protect habitat conditions and maintain reproductive efforts.

Sensitive Wildlife Species Determination Statements. In accordance with FSM 2673.42, determinations have been made as to the degree of impact the proposed activities may have on sensitive species (Table 3-91 and Exhibit Rs-3). Along with Chapter 1, Chapter 2, and the sub-section above on each species, these determination statements meet the requirements of the Biological Evaluation for Sensitive Wildlife Species. These determination statements are for the segment of the population using the analysis area. Exhibit Rg-1 provides viability determinations for this project when evaluated at larger spatial scales including that of the Flathead National Forest. These statements are based on available information on the distribution, presence/absence from the project area, habitat requirements, and management strategies for these species, as well as the project design and location.

Table 3-91. Biological Evaluation Determinations for Sensitive Wildlife Species (Exhibit Rs-3).

	Alternative				
Sensitive Wildlife Species	**A**	**B**	**C**	**D**	**E**
Black-backed woodpecker	BI	MIIH	MIIH	MIIH	MIIH
Boreal toad	MIIH	MIIH	MIIH	MIIH	MIIH
Common loon	MIIH	MIIH	MIIH	MIIH	MIIH
Fisher	MIIH	MIIH	MIIH	MIIH	MIIH
Flammulated owl	MIIH	MIIH	MIIH	MIIH	MIIH
Harlequin duck	MIIH	MIIH	MIIH	MIIH	MIIH
Northern bog lemming	MIIH	MIIH	MIIH	MIIH	MIIH
Northern goshawk	MIIH	MIIH	MIIH	MIIH	MIIH
Northern leopard frog	MIIH	MIIH	MIIH	MIIH	MIIH
Peregrine falcon*	NI	NI	NI	NI	NI
Western big-eared bat	MIIH	MIIH	MIIH	MIIH	MIIH
Wolverine	MIIH	MIIH	MIIH	MIIH	MIIH

The peregrine falcon used to be listed as a threatened species, but was recently delisted. However, it has not yet been added to the sensitive species list.

NI = "No Impact"; MIIH = "May Impact Individuals or Habitat but will not likely result in a trend toward federal listing or reduced viability for the population or species"; BI = "Beneficial Impact."