WILDLIFE AND FISH

Introduction

The Lewis and Clark National Forest Plan Forest-wide Objectives place emphasis on recovery of federally listed Threatened and Endangered species and on maintenance of forest Sensitive Species. The National Forest Management Act specifies categories for the selection of Management Indicator Species (MIS) to be considered in all project planning: threatened and endangered species, species with special habitat needs that may be influenced significantly by planned management programs, species commonly hunted, fished or trapped, non-game species of special interest, and additional species for which population changes are believed to indicate the effects of management activities on other species of selected major biological communities or on water quality.

Table III-84 displays the Threatened, Endangered, Sensitive, and Management Indicator species present on the LCNF with information on the extent to which each species is included in the analysis of impacts, and the rationale for the level of analysis. In this table the following abbreviations are used: T= Threatened, E=Endangered, C=Candidate, PT=Proposed Threatened, S=Sensitive, MIS=Management Indicator Species, O=Other.

Wildlife Analysis Documentation Summary

Table III-84. Wildlife Analysis Table

Species Name	Habitat Preference and Occurrence in Project Area	Location of Documentation	Rationale and Other Information
Threatened, Endangered, and Proposed Species			
Grizzly Bear (T)	Ranges widely through variety of habitats; prefers low-elevation riparian zones, avalanche chutes in spring/early summer; high elevation steep slopes for denning. Habitat throughout project area; entire RMRD is within NCDE Recovery Zone	Analysis in DEIS and Biological Assessment*	Present throughout project area. Primary concerns are effects of motorized travel on grizzly bear habitat use, and habitat connectivity. Will serve as surrogate for black bear due to similarities in habitat requirements and other protection needs.
Gray Wolf (E)	Ranges widely through variety of habitats; prey availability is key to denning and rendezvous sites. No den sites in analysis area, recent denning in adjoining wilderness. Entire RMRD is within the Northwest MT Recovery Area.	Biological Assessment* only	Likely use of project area and potential for expansion in area. Primary concerns are maintenance of prey base and potential for direct mortality. Access restrictions and habitat guidelines and requirements for grizzly bear and elk meet needs for gray wolf; therefore analysis for elk and grizzly bear are surrogate for gray wolf.
Bald Eagle (T)	Preferred nesting areas adjoin large bodies of water; nest and perch in large diameter snags or trees. Project area is primarily migration habitat; no known nests.	Biological Assessment* only	Little or no nesting habitat and no known nests within project area.

Species Name	Habitat Preference and Occurrence in Project Area	Location of Documentation	Rationale and Other Information
Lynx (T)	Ranges widely through variety of habitats. Multi-story conifer habitat key to foraging; prefers woody debris for denning. Habitat and species present.	Analysis in DEIS and Biological Assessment*	Primary concern is potential effects of compacted over-snow routes and areas on lynx.
Sage Grouse (S,C)	Sagebrush benches and irrigated cropland. No habitat or population exists in or adjacent to the project area.	No further analysis will be completed	Not in project area.
Mountain Plover (PT)	Grazed shortgrass prairie; prairie dog towns. Habitat does not exist in the project area.	No further analysis will be completed	Not in project area.
Forest Sensitive Species			
Peregrine Falcon (S)	Nests on cliffs adjacent to grassland, riparian openings or bodies of water. Nesting habitat exists but no known nests within the project area	No further analysis will be completed	**One known nest along NF boundary in Blackleaf area**; no new access to nesting habitat proposed in any alternative.
Northern Goshawk (S)	Nests in mature/over-mature forest; forages in variety of successional stages. Nest sites and habitat within the project area.	No further analysis will be completed.	No new access or changes to existing nesting habitat proposed in any alternative.
Flammulated Owl (S)	Semi-arid cool sites of mid-elevation pine communities. Nests in existing cavities. Little or no habitat exists in the project area. Species is not known to occupy the project area.	No further analysis will be completed.	Not in project area.
Blackbacked Woodpecker (S)	Mature/over-mature forest and recently burned areas. Habitat exists within the project area.	No further analysis will be completed.	No new access or changes to existing habitat proposed in any alternative.
Townsend's Big-eared Bat (S)	Generally inhabits caves or buildings. Little known habitat in project area; species not known to occupy project area.	No further analysis will be completed	No new access or changes to habitat proposed in any alternative.
Wolverine (S)	Wide ranging use of variety of habitats. Natal denning in high-elevation cirques. Habitat and species present	Analysis in DEIS	Likely present in much of project area. Primary concerns are potential for snowmobiling impacts to alpine denning areas, and overall habitat connectivity.
Harlequin Duck (S)	Low-gradient, fast-flowing streams with cobble to boulder substrate. Habitat and species present.	No further analysis will be completed	Majority of suitable habitat in designated wilderness. No new access or changes to existing habitat proposed in any alternative.
Fisher (S)	Prefer forested areas of continuous cover; closely associated with riparian areas. Habitat occurs in project area, species may be present.	No further analysis will be completed.	Access restrictions and habitat guidelines and requirements for grizzly bear, lynx, elk, and wolverine meet needs for fisher. Therefore analysis for those species serves as surrogate for fisher.
N.Bog Lemming (S)	Thick mats of sphagnum moss in bogs, fens, or other wet areas. Habitat and population exist in project area	No further analysis will be completed	Existing known habitat limited to small portion of one drainage with no changes proposed in any alternative.

Species Name	Habitat Preference and Occurrence in Project Area	Location of Documentation	Rationale and Other Information
Ferruginous Hawk (S)	Nest in open, high-relief areas; forage in non-forested, non-mountainous areas. Habitat does not occur in the project area.	No further analysis will be completed.	Not in project area.
Westslope Cutthroat Trout (S)	Cold streams with few competing fish species and low to moderate productivity. Spawn in gravel riffles with low sediment levels. Pure strain and hybridized populations occur in project area.	Analysis in DEIS	Present in several streams within project area; additional streams are potential candidates for population expansions. Primary concern is potential for sedimentation to impact existing / potential habitat.
Boreal Toad (S)	Breeds in shallow, silt-bottomed ponds with little flow. Breeding sites documented in several locations throughout project area..	No further analysis will be completed.	Existing known breeding habitat limited to specific sites; no changes to any habitat proposed in any alternative.
Northern Leopard Frog (S)	Low elevation ponds and slow-moving streams and rivers. Habitat is not known to exist in the project area. No leopard frogs were found during survey work or reported from historical references.	No further analysis will be completed.	Not in project area.
Common Loon (S)	Low elevation lakes with significant emergent vegetation. Nesting habitat does not exist in project area. Occasional presence during migration.	No further analysis will be completed.	Does not nest in project area.
Management Indicator Species			
Elk (MIS)	Wide ranging through variety of habitats.Habitat and population exists	Analysis in DEIS	Subject to regulated and permit harvest. Primary concerns are potential for displacement due to recreational travel, and potential for increased hunting pressure. Will be used as a surrogate for mule and white-tailed deer, bobcat, black bear, gray wolf and mountain lion. Of these wide-ranging species, elk are the most sensitive to displacement caused by recreation, and they serve as important prey for gray wolf and mountain lion.
Mule Deer (MIS)	Wide-ranging through variety of habitats. Habitat and population exists	No further analysis will be completed.	Subject to regulated harvest. Access restrictions and habitat guidelines and requirements for elk meet needs for mule deer; therefore analysis for elk is surrogate for mule deer.
White-tailed Deer (MIS)	Deciduous riparian and low-elevation grass and cropland. Primary habitat at lower elevation and private land, limited habitat and seasonal presence within project area.	No further analysis will be completed.	Subject to regulated harvest. Access restrictions and habitat guidelines and requirements for grizzly bear and elk meet summer needs for white-tailed deer; therefore analysis for grizzly bear and elk serve as surrogate for whitetail deer. Winter habitat outside of project area.

Species Name	Habitat Preference and Occurrence in Project Area	Location of Documentation	Rationale and Other Information
Black Bear (MIS)	Wide ranging through variety of habitats. Habitat and population exists	No further analysis will be completed.	Subject to regulated permit harvest. Access restrictions and habitat guidelines and requirements for elk and grizzly bear meet needs for black bear; therefore analysis for elk and grizzly bear serve as surrogate for black bear.
Bighorn Sheep (MIS)	Open grassland and savannah in proximity to cliff habitats. Habitat and population exist	Analysis in DEIS	Critical sheep habitat exists in project area. Primary concerns are potential impact of snowmobiles and winter travel on winter range, and other travel on lambing range.
Mountain Goat (MIS)	High elevation meadows in proximity to cliff habitats. Habitat and population exist	Analysis in DEIS	Critical mountain goat habitat exists in project area. Primary concern is potential impact of snowmobiles and winter travel on winter range, and other travel on kidding range.
Mountain Lion (MIS)	Wide ranging through variety of habitats. Habitat and population exist.	No further analysis will be completed.	Highly adaptable to environment, subject to regulated permit harvest. Management of prey base (wild ungulates) aids in management of lion. Access restrictions and habitat guidelines and requirements for elk meet needs for lion; therefore analysis for elk is surrogate for mountain lion.
Blue Grouse (MIS)	High-elevation timber/grassland mosaics. Winter in high elevation conifer stands. Habitat and population exist.	No further analysis will be completed.	No new access or changes to existing habitat proposed in any alternative.
Brook, Rainbow Trout (MIS)	Cool streams and rivers with sand or gravel substrate. Habitat and populations exist.	Limited further analysis in the form of generalized inferences about effects on fish habitat will be completed, particularly where westslope cutthroat trout are absent.	Habitat management efforts and mitigations for westslope cutthroat trout meet the requirements for these species; therefore analysis for westslope cutthroat is often surrogate for brook and rainbow trout.
Beaver (MIS)	Variety of riparian habitats. Habitat and population exists.	No further analysis will be completed.	No new access or changes to existing habitat proposed in any alternative.
Bobcat (MIS)	Prefers rough broken terrain, open or semi-open overstory canopy; use of riparian corridors to link habitat segments. Habitat and population exist.	No further analysis will be completed.	Access restrictions and habitat guidelines and requirements for elk meet needs for bobcat; therefore analysis for elk is surrogate for bobcat.
Golden Eagle (MIS)	Nests on cliffs or open, high-relief areas. Nest sites within the project area.	No further analysis will be completed.	No new access or changes to existing nesting habitat proposed in any alternative.

Species Name	Habitat Preference and Occurrence in Project Area	Location of Documentation	Rationale and Other Information
Prairie Falcon (MIS)	Nests on cliffs adjacent to grasslands and large openings. Nest sites within the project area.	No further analysis will be completed.	No new access or changes to existing nesting habitat proposed in any alternative.
N. 3-Toed Woodpecker (MIS)	Mature and old-growth forest. Habitat and species exist.	No further analysis will be completed	No new access or changes to existing nesting habitat proposed in any alternative.
Other Species of Concern			
Boreal Owl (formerly S)	High elevation spruce-fir forest with multilayered canopy. Habitat and species exist.	No further analysis will be completed.	No new access or changes to existing nesting habitat proposed in any alternative.
Neotrop Birds (O)	General forest species are present, habitat does not exist for species that are restricted to special habitats (ie, shortgrass prairie, sagebrush, marshlands, post fire, older forests of the cedar-hemlock type) or have demonstrated downward trends.	No further analysis will be completed.	No new access or changes to existing mix of vegetative types or to specific habitats proposed in any alternative.
Amphibians (O)	Habitat for amphibians exists; Columbia spotted frogs and long-toed salamanders have been found in the project area.	No further analysis will be completed.	No new access or changes to specific habitats proposed in any alternative.

* Biological Assessment will be prepared for Preferred Alternative once it is chosen (prior to the FEIS and Record of Decision) and will become part of the project file.

As indicated in the above table, potential impacts of the alternatives on the following species or their habitats will be analyzed in detail: grizzly bear, Canada lynx, elk, bighorn sheep, mountain goat, wolverine, and westslope cutthroat trout. Elk appear to be more sensitive than many other species to displacement caused by recreation, they migrate over long distances between critical seasonal ranges, and they serve as important prey for some carnivore species. They will therefore be used as an analysis surrogate for several other species, as noted in the table. The habitat requirements and concerns regarding the impacts of recreation on grizzly bears are similar to but more critical than those for black bears, so grizzly bears will serve as an additional analysis surrogate for black bears.

The list of Threatened and Endangered species found on US Fish & Wildlife Service website (http://montanafieldoffice.fws.gov/Endangered_Species/Listed_Species/Forests/L&Csplist.pdf) was confirmed by e-mail from the U.S. Fish and Wildlife Service (April 25, 2005). The list was checked on the website in January 2006 prior to preparation of the Biological Assessment, and again in March 2007 prior to release of the FEIS and ROD. The Region One Sensitive Species list was updated in October 2004, and two species (northern goshawk and black-backed woodpecker) were added to the list by order of the Regional Forester in April 2005.

Issues

During the scoping period, six significant issues were identified as requiring detailed analysis. These issues are:

1. The effects of recreational travel on seasonally important wildlife habitats.
2. The potential for recreational travel to displace wildlife.

3. The potential effects of snow compaction on wildlife (specifically on Canada lynx).
4. The effects of recreational travel on wildlife habitat connectivity.
5. The potential for sedimentation of fish habitat from roads and trails.
6. The effects of recreational travel on westslope cutthroat trout.

Because some of these issues are of concern for all wildlife species on the RMRD, while others are of concern in the context of only one or a few species, the analysis presented below is organized around these issues, with sections for particular species within each issue discussion as appropriate.

Scope of Analysis

The entire Rocky Mountain Ranger District will be considered for direct and indirect effects for most species considered. Cumulative effects analysis will be considered at the scale of the entire Rocky Mountain Division, or the Northern Continental Divide Ecosystem, whichever is most appropriate for the species under consideration. Grizzly bear habitat and population information will be discussed for the entire RMRD, while effects analysis will primarily be at the Bear Management Unit (BMU) Subunit level. Canada lynx will be analyzed by Lynx Analysis Unit (LAU) and at the scale of the entire RMRD. Most wildlife species analyzed will also be considered at the scale of specific seasonal habitats.

Wildlife Affected Environment

Because of the nature of analysis required for this project, the format for the Wildlife and Fish section of Chapter 3 varies slightly from that used for other resource areas. Existing condition is described in one section for all wildlife populations and habitats to be analyzed in detail. Environmental Consequences of the alternatives are discussed for both 'impacts to seasonal habitats' and 'potential for displacement of wildlife' under the heading "Potential Impacts of Recreational Travel on Seasonal Wildlife Habitats – Disturbance and Displacement". The other issues are discussed separately under appropriate headings. The cumulative effects considered for wildlife are the same or similar for all wildlife issues, so they will be discussed in a single section at the end of the analysis. Issues and analysis for fish, including cumulative effects, are considered under a separate heading.

1. EXISTING CONDITION

a. Natural Characteristics

The Rocky Mountain Ranger District is home to nearly all wildlife species that were present prior to European settlement. A full array of fish, amphibians, birds, and mammals are present, with diverse habitats ranging from high elevation peaks along the Continental Divide through mid-elevation conifer forests to limber pine savannah, transitioning into mid-grass prairie immediately east of the National Forest boundary.

Table III-84A displays the total acreage of key seasonal habitats on the RMRD and adjacent lands for the species discussed below. Acreages of those habitats are also displayed for the Badger-Two Medicine and Birch-South areas separately to facilitate comparison with the effects displayed in subsequent sections.

Table III-84A.
Total Acreage of Key Wildlife Habitats, and Acreage and Percent of each Habitat within National Forest Boundary and within Badger-Two Medicine and Birch-South Areas

Habitat	Total Acreage	Acreage Within NF Boundary*	% of Total Habitat Within NF Boundary*	Acreage of Habitat in Badger-Two Medicine	% of NF Habitat in Badger-Two Medicine**	Acreage of Habitat in Birch-South	% of NF Habitat in Birch-South**
Grizzly Bear Denning	340,840	333,200	98%	45,270	14%	287,930	86%
Grizzly Bear Spring	632,870	205,410	32%	46,720	23%	158,680	77%
Lynx Habitat	268,010	268,010	100%	37,630	14%	230,380	86%
Wolverine Denning	12,660	12,620	>99%	1,290	10%	11,330	90%
Elk Winter Range	254,240	83,930	33%	24,450	29%	59,480	71%
Elk Calving Range	162,800	65,250	40%	9,580	15%	55,670	85%
Bighorn Sheep Winter Range	90,980	66,720	73%	480	<1%	66,240	>99%
Bighorn Sheep Lambing Habitat	43,640	35,490	81%	0	0	35,490	100%
Mountain Goat Yearlong (Winter) Habitat	259,070	251,080	97%	39,740	16%	211,340	84%
Mountain Goat Kidding Habitat	131,950	127,110	96%	23,560	19%	103,550	81%

***Acreage and percent within NF boundary may include some private inholdings for some habitats. Private inholdings represent ≤ 1% of the total acreage and ≤ 2% of the acreage within the NF boundary for any wildlife habitats in which they occur.**
****Percent of Habitats in Badger-Two Medicine and Birch-South areas are portion of habitat with NF boundary that is in each area, to facilitate comparison with effects analysis**

Threatened and Endangered Species

Grizzly Bear

The entire RMRD serves as habitat for the Threatened Grizzly Bear. The RMRD is part of the eastern portion of the Northern Continental Divide Ecosystem (NCDE) Recovery Area (USDI Fish and Wildlife Service 1993). Grizzly bears range east of the National Forest boundary onto private and other agency lands along the foothills and prairie adjacent to the RMRD. Occupied grizzly bear range extends eastward to at least Highway 89. [Map 24]. The shortgrass prairie and its riparian corridors east of the RMRD represent the last remaining plains habitat occupied by grizzly bears. Most bears that use the prairie also spend at least part of the year in the foothills and mountains of the RMRD. Typical denning habitat on the RMRD is generally above 6200 ft. (1900 m), on slopes greater than 30%. Denning typically occurs between December 1 and April 15 (USDI Bureau of Land Management 1987).

Many grizzly bears move to low-elevation foothill habitat along the eastern boundary and non-National Forest lands to the east in spring to forage on greening vegetation and winter-killed carcasses on ungulate winter ranges. Other grizzly bears remain in the central and western portions of the district, taking advantage of greening vegetation in broad meadows along major river valleys, in avalanche chutes, and in other areas that green up early. Spring habitats are generally used between April 1 and June 30 (USDI Bureau of Land Management 1987).

Summer grizzly bear habitat generally comprises higher elevation forests and meadows as grizzlies roam widely in search of various foods. Many grizzly bears return to lower elevations in late summer and fall to take advantage of ripening buffaloberry, chokecherry, and other foods. Some shift to areas with concentrations of hunters throughout the district and lands to the east to capitalize on gut piles and carcasses left by big-game hunters. Summer habitats are generally used between July 1 and August 31, while fall habitats are used between September 1 and November 30 (USDI Bureau of Land Management 1987).

Potential grizzly bear spring and denning habitats have been mapped for the Rocky Mountain Division based on general habitat and landscape characteristics and information derived from studies of radio-collared bears (Map 24 - grizzly habitat). Of approximately 633,000 acres of mapped potential spring habitat, roughly **32% (205,000 acres)** occurs on National Forest, with roughly **67% (427,000 acres)** outside the National Forest to the east. The remaining 1% (5,000 acres) occurs on private land within the National Forest boundary; **for the purposes of analysis it will be included with the National Forest habitat acres.** Of approximately 341,000 acres of mapped potential denning habitat, roughly 98% (333,000 acres) occurs on land within the RMRD boundary and only 2% (8,000 acres) occurs on other lands outside the RMRD boundary. **Please refer to Table III-84A for acreage of grizzly bear habitats by area.**

Population estimates of grizzly bears on the RMRD portion of the NCDE range from 80 to 115 bears, although these estimates are several years old and based on limited mark-recapture data (USDI Bureau of Land Management 1992). An effort is currently underway to estimate the entire population of the NCDE using DNA samples collected systematically across the ecosystem. When that study is complete (estimated in **2007**) a more precise estimate of the grizzly bear population on the RMRD should be available.

Canada Lynx

Lynx generally occur in cool, moist coniferous forest types that support populations of their primary prey, snowshoe hare (Reudiger et al. 2000). Sufficient presence of large, woody debris appears to be important for natal den sites (Reudiger et al. 2000). Lynx have been documented throughout the RMRD, with concentrations of observations in the Two-Medicine, Teton, and Sun River drainages.

Potential lynx habitat has been mapped for the RMRD, using vegetation type and using models developed by the Kootenai National Forest, that were modified to fit conditions on the Lewis and Clark National Forest. Mapped potential lynx habitat is entirely on the RMRD, and is classified as foraging, denning, or travel habitat (habitat that does not meet the requirements for denning or foraging habitat but that may serve to connect blocks of those habitat types). About 268,010 total acres of lynx habitat has been mapped on the RMRD. (Map 10 – lynx habitat). **Please refer to Table III-84A for acreage of lynx habitat by area.**

As part of the requirements of the Lynx Conservation Assessment and Strategy (LCAS; Reudiger et al. 2000), Lynx Analysis Units (LAUs) were mapped for the RMRD. LAUs are a conceptual framework meant to approximate the home range of a female lynx. They contain blocks of denning and foraging habitat in sufficient quantity to maintain a female lynx throughout the year. The LAU is generally the unit at which project analysis of impacts to lynx habitat is conducted. The RMRD contains 27 LAUs, encompassing all mapped potential lynx habitat as described above.

Gray Wolf, Bald Eagle

As noted in Table III-84, access restrictions and habitat guidelines and requirements for grizzly bear and elk essentially cover the needs for gray wolf. Therefore those analyses will serve as a surrogate for analysis of impacts to wolves in the EIS. Little or no bald eagle nesting habitat and no nests occur on the RMRD. Therefore analysis of impacts to bald eagles has not been included in the EIS. Detailed analysis of the impacts on wolves and eagles of both the Existing Situation and the alternative chosen for implementation can be found in the Biological Assessment in the project file, with summary information provided in the Record of Decision.

Sensitive Species

Wolverine

Wolverines range widely, from subalpine talus slopes to ungulate winter ranges (Hornocker and Hash 1981). A distinct seasonal elevational pattern was documented in Montana, with the wolverines occupying higher ranges during snow-free season than in winter. Banci (1987) reported that no single habitat type can be identified as important for the species, but large, isolated areas supporting a diverse prey base and diversity of habitats are believed to be required. Wolverines may be sensitive to disturbance at natal den sites, which appear to be chosen to provide kits with maximum security from predation or other disturbance (Banci 1994). Den sites have been found in a variety of situations. Dens may be made under tree roots, under fallen logs, under boulders, in caves, in burrows under overhanging banks, or in deep snow (Pulliainen 1968, Rue 1981, Hash 1987, as cited in Banci 1994). The proximity to rocks, boulders, or talus fields appears to be a common feature of natal dens in many areas (Banci 1994). Models developed for mapping wolverine natal denning habitat generally focus on high elevation cirque basins with a significant talus component, oriented such that they receive significant snow accumulation during the winter. Females with young may spend

much of their time in natal dens or at nearby rendezvous sites between January and April (Magoun 1985, Pulliainen 1968, Banci and Harestad 1988, as cited in Banci 1994).

Wolverines and their sign have been observed throughout the RMRD. Potential wolverine natal denning habitat has been mapped for the Rocky Mountain Division, using a model similar to that used on other National Forests in Montana. Natal denning habitat was identified based on vegetation, landtype, elevation, slope, aspect, and landform. No data on actual den sites on the RMRD is currently available with which to validate this model. About 12,600 acres of potential natal denning habitat occur, all on National Forest within the RMRD boundary. (Map 4). **Please refer to Table III-84A for acreage of wolverine habitat by area.**

Currently Montana Fish, Wildlife and Parks (MFWP) authorizes a quota-based trapping season on wolverines in Montana. The Northern Unit, comprising all of MFWP Region 1, a portion of Region 2, and the Rocky Mountain Division, has an annual quota of 5 wolverines.

Westslope Cutthroat Trout

Westslope cutthroat trout (WCT) are the only trout native to the upper Missouri River basin and historically occupied nearly all streams accessible to fish in the project area. However, due to habitat loss, competition from introduced species, and fishing pressure, WCT have declined to mostly remnant or hybridized (90-99% pure) populations in 6 drainage basins in the project area: upper SF Two Medicine River, upper Badger Creek, upper Birch Creek, upper Dupuyer Creek, upper Teton River, and upper Sun River (southern basin). Within these drainages, there are 10 known genetically pure (100%) populations. These reside in Sidney, Whiterock, N Badger, Lee, Badger Cabin, Red Poacher, SF Birch, MF Dupuyer, SF Dupuyer creeks and Green Gulch. **In addition, two recently introduced pure WCT populations reside in NF Ford and Petty creeks. All of these pure populations are protected from hybridization by fish barriers (waterfall or dam) except the Whiterock and Green Gulch populations.** Because of their limited distribution and vulnerability to further habitat loss, displacement by non-native trout species, or hybridization, WCT are a sensitive species with protection of their habitat provided by the Forest Plan. **Map 28 displays the current distribution of 90-100% pure WCT in the project area; this represents about 12% of their estimated historic range in these river drainages (Moser et. al 2005).**

Roads and trails along cutthroat trout streams can facilitate excessive fishing pressure, but regulations now require release of all cutthroat trout, thereby reducing the threat of overharvest. **Road and trail access to backcountry streams may also increase the risk of humans inadvertently introducing fish diseases and invasive exotic species (e.g., whirling disease, New Zealand mudsnails) or intentionally stocking non-native trout. These risks are from anglers using contaminated fishing gear and from people illegally moving live fish. Both motorized and non-motorized users can be carriers of unwanted organisms.**

There is direct evidence that **erosion from Trails 102 and 102A** is causing significant adverse effects on WCT habitat in Whiterock Creek. **Streambed sedimentation is pervasive and the fish population is depressed downstream from the uppermost crossing of Trail 102, which has a long history of severe erosion problems (USDA Forest Service 2002). Elsewhere in the project area**, the effects of roads and trails on WCT and other fish habitats appear to be minor or localized in nature. Factors such as seasonally-limited flows, severe winter conditions, flood-related disturbances, and low productivity have a much greater effect on these fish populations than travel management. Nevertheless, some inferences can be

made regarding potential effects of the travel plan alternatives on fish habitat, based on proximity of roads and trails to streams and the frequency of stream crossings.

Other Sensitive Species
Please refer to Table III-84 for information on the status of and potential impacts to other Sensitive Species on the RMRD.

Big Game Species

Elk

The entire RMRD serves as elk habitat. Elk summer in the higher elevation portions of the district, and migrate to lower elevation winter ranges both on and off-Forest. Many elk that summer in the adjoining Flathead and Helena National Forests travel to and through the RMRD to reach important winter range along the eastern boundary of the district. The nearly 200,000 acre Sun River Game Preserve, established in 1913 to provide secure elk habitat, is located in the Bob Marshall Wilderness portion of the RMRD in the Sun River drainage. Hunting is not allowed within the Preserve. Three Wildlife Management Areas (WMAs) have been established by the State of Montana east of the NF boundary primarily to protect winter range for elk: the Sun River WMA south of the Sun River, the Ear Mountain WMA along the South Fork of the Teton River, and the Blackleaf WMA in the lower Blackleaf and Muddy Creek area. All three WMAs directly adjoin National Forest on all or part of their western boundary.

Elk winter range has been mapped (Map 23) based on data collected from studies of radio-collared elk as well as on historic observations by MFWP and FS biologists. Of approximately 254,000 acres of mapped elk winter range, only about 32% (roughly 82,000 acres) is on the RMRD, with 67% (over 170,000 acres) outside National Forest east of the boundary. The remaining 1% (approximately 1500 acres) is on private lands within the National Forest boundary. **That acreage is included with the RMRD acreage and referred to as habitat within the National Forest boundary for most of the analyses in this document.**

Elk calving range has been mapped in a similar fashion as elk winter range (Map 23). Elk generally calve on or near winter ranges, depending largely on snow conditions during the calving season. Of approximately 163,000 acres mapped as elk calving range, about 40% (roughly 65,000 acres) is on the RMRD, with the remaining 60% (roughly 98,000 acres) outside National Forest east of the boundary. Very little (about 400 acres) mapped elk calving range occurs on private lands within the RMRD boundary. **Please refer to Table III-84A for acreage of elk habitats by area.**

The elk population in the Rocky Mountain Division is counted during the winter months, when herds are concentrated in defined wintering areas. The total wintering elk population has varied between roughly 2500 to 4200 elk over the past 20 years (MFWP unpubl. data). The elk population on the Division comprises several herd units, generally defined by their wintering areas. The following herd size information is from the Draft Statewide Elk Management Plan for Montana (MFWP 2004) and from MFWP unpublished data (G. Olson and Q. Kujala, pers. comm.). These numbers represent only rough estimates of herd size.

Table III-85. Wintering Elk Herd Size Estimates

Wintering Area	Hunting District (HD)*	Estimated Number of Elk
Hyde-Mettler-Lubec (Badger-Two Medicine)	415	100-200
Birch Creek – Dupuyer Creek	441	500
Blackleaf WMA– Teton River	441/450	100-150
Sun River	424/425/442	2000-2500
Sunrise/Sunset-Skunk Creek- Cunniff-Harrison – Haystack (Elk Creek south)	422	500-1000

* Hunting Districts shown on Map 12.

Elk are hunted both on and off National Forest along the front, according to regulations that vary among hunting districts. Specific hunting regulations are developed by MFWP with consideration given to public access, elk herd size, elk herd demographics, recreational opportunity, private land conflicts, and other issues.

Bighorn Sheep

Bighorn sheep habitat occurs largely on the non-wilderness portion of the RMRD, generally associated with the cliff bands, plateaus, open valleys, and foothills of the eastern portion of the district. Some sheep summer in the central and western portion of the district where suitable habitat occurs. During all parts of the year sheep choose habitats in proximity to cliffs and rocky terrain (Andryk 1984), which they rely on for escape from predators. This requirement limits the total amount of habitat available to sheep. Shirokauer (1996) cites information that steep and rugged terrain appears to be an important factor in lambing habitat. Winter range generally consists of open grassland and old burn areas with characteristics that inhibit snow accumulation, as well as steep windward slopes blown free of snow (Andryk 1984). Visibility appears to be a key component of year-round bighorn sheep habitat (Shirokauer 1996).

Bighorn sheep winter range and lambing habitat has been mapped for the Rocky Mountain Division based on historic observations, surveys, and studies of marked animals (Map 25). Of approximately 91,000 acres of mapped bighorn sheep winter range, roughly 72% (66,000 acres) occurs on National Forest and roughly 27% (24,000 acres) occurs outside National Forest east of the boundary. The remaining 1% (800 acres) is on private lands within the National Forest boundary. Of roughly 43,000 acres of mapped bighorn sheep lambing habitat, approximately 81% (35,000 acres) occurs on National Forest, 19% (8,000) acres occurs outside National Forest east of the boundary, and the remaining 1% (200 acres) occurs on private lands within the National Forest boundary. **The acreage of habitat on private lands inside the Forest boundary is included with the RMRD acreage and referred to as habitat within the National Forest boundary for most of the analyses in this document.Please refer to Table III-84A for acreage of bighorn sheep habitats by area.**

The bighorn sheep population in the Division is made up of several herds that occupy relatively distinct areas, although movement of some animals among herds may occur The following herd count information is from MFWP unpublished data (G. Olson and Q. Kujala, MFWP Area Biologists, pers. comm.). These numbers represent actual counts, which likely underestimate the total number of animals present. The range of numbers represents the

minimum and maximum counts over the past 10 years. All of the herd units are currently at or near the maximum counts shown in Table III-86.

Table III-86. Early Winter Sheep Herd Counts

Wintering Area	Hunting District (HD)	Number of Sheep Counted (minimum –maximum)
Birch Creek – Teton River	441	37 -141
Teton River – Deep Creek	421	15 – 50
Mortimer Gulch – Arsenic Crk	423	91 – 265
Castle Reef – Sun River	422	179 – 262
Sun River – Ford Crk – South	424	85 – 236

Sheep are hunted both on and off National Forest lands along the front by special permit only. The bighorn sheep population along the southern portion of the Division is likely the healthiest and most productive sheep population in Montana. This population has been the source of sheep used to augment or re-establish populations further north along the Division, elsewhere in Montana, and in other states.

Mountain Goat

Mountain goats are distributed along the entire Rocky Mountain Division. Mountain goats prefer steep rocky slopes above 6000 feet in elevation, although they may use lower elevation areas periodically during winter (Joslin 1986). This type of habitat is abundant on the RMRD, particularly in the central and eastern portions of the district, with extensive and continuous goat habitat north of the Sun River to the Badger-Two Medicine area (Joslin 1986).

Mountain goat habitat has been mapped on the Division based on historic observation, research on marked animals, and on specific habitat characteristics (Map 26). Goats demonstrate little definable difference between summer and winter habitat selection (Joslin 1986), so areas identified as yearlong habitat include wintering areas. Distinct kidding and nursery areas have been identified only for areas north of the Sun River, although they are known to occur to the south as well (Map 26). Of approximately 260,000 acres of mapped yearlong habitat, roughly 97% (251,000 acres) occurs on National Forest within the RMRD boundary. Roughly 3% (8,000 acres) occurs on other lands outside the administrative boundary of the RMRD. Approximately 132,000 acres of habitat north of the Sun River has been mapped that may include kidding habitat, although it is likely that kidding occurs only in portions of that area. Of that total, about 96% (127,000 acres) occurs on National Forest lands, and roughly 4% (4800 acres) occurs outside the Forest boundary. **Please refer to Table III-84A for acreage of mountain goat habitats by area.**

The goat population may be segmented into somewhat discrete herds defined by natural breaks in habitat. Goat herds south of the Teton River are small and scattered and are not specifically counted in MFWP censuses. North of the Teton River (Hunting Districts 414 and 441), goat counts have varied from 41to 91 animals over the past 10 years, down from a range of 78 to122 in the previous 10 years. Goat counts have varied from 14 to 69 over the past 10 years in the southern two-thirds of the RMRD, including in the Bob Marshall and Scapegoat

Wildernesses. These numbers represent actual counts, which likely underestimate the total number of animals present. Goats are hunted in the northern portion of the RMRD by special permit only.

b. Forest Plan Direction

General

Forestwide Management Standards for wildlife include a number of general statements about management of wildlife and habitats, including compliance with the Endangered Species Act and other laws, regulations, and policies. Standards with specific relevance to travel management include:

- C-1(6): Manage motorized use through the Forest Travel Plan, in cooperation with the public, state of MT, and other federal agencies to reduce effects on wildlife during periods of high stress (hunting seasons and wintering periods).
- C-1(11): Use the Interagency Wildlife Monitoring/Evaluation Program Guidelines to manage land-use activities occurring within habitat of grizzly bear, elk, mountain goat, mule deer, bighorn sheep, and raptors on the Rocky Mountain Division.

The Forest Plan also provides specific direction for Management Areas (MAs) on the Forest. Two Management Areas are specific to wildlife: MA-E includes important big game winter range, and MA-I includes important wildlife habitat for big game and other species, generally occurring near the Forest boundary and adjacent to state Wildlife Management Areas (refer to Map 13 for location of Forest Plan Management Areas). Direction for road and trail management in both MA-E and MA-I states:

- Achieve low (defined as 0.5-1.5 miles open road/square mile area) public access through permitting motorized use on all arterial and most collector roads. Although local roads could remain open, collectively the access provided would be restricted. Closures or restrictions may be used to: (1) resolve user conflict, (2) promote user safety, or (3) protect resources. Important identified wildlife habitat will be protected.
- Open all areas and trails to ORVs except where use is restricted by season, type of vehicle, or type of activity. Closures or restrictions may be used to : (1) resolve user conflict, (2) promote user safety, or (3) protect resources. Important identified wildlife habitat will be protected.

Threatened and Endangered Species

The LCNF Forest Plan states that “Standards have been established to further the recovery efforts on behalf of T&E (threatened and endangered) species. These standards are a continuation of present methods, policies, and direction” (Forest-wide Management Standard C-2). The LCNF Forest Plan also requires compliance with the Endangered Species Act and other laws, policies, and regulations with respect to management of T&E species and their habitats (Forest-wide Management Standard C-2(1)).

Grizzly Bear

The LCNF Forest Plan adopted general grizzly bear management recommendations provided by the Interagency Grizzly Bear Committee as described in the Interagency Grizzly Bear Guidelines (1986; Forest-wide Management Standards C-2(5) and C-2(7)). Most of the RMRD is designated Management Situation (MS) 1 habitat for grizzly bears, defined in the Interagency Grizzly Bear Guidelines as areas in which:

> Grizzly habitat maintenance and improvement…and grizzly-human conflict minimization will receive the highest management priority. Management decisions will favor the needs of the grizzly bear when grizzly habitat and other land use values compete. Land uses which can affect grizzlies and/or their habitat will be made compatible with grizzly needs or such uses will be disallowed or eliminated. Grizzly-human conflicts will be resolved in favor of grizzlies unless the bear involved is determined to be a nuisance.

Small portions of the RMRD containing concentrations of human activity such as recreation residences, developed campgrounds, private land inholdings, developed recreational facilities, and the Highway 2 corridor are designated MS-3 habitat. In MS-3 habitat:

> Grizzly habitat maintenance and improvement are not management considerations. Grizzly-human conflict minimization is a high priority management consideration. Grizzly bear presence and factors contributing to their presence will be actively discouraged. Any grizzly involved in a grizzly-human conflict will be controlled. Any grizzly frequenting an area will be controlled.

The RMF Guidelines referred to above were used in developing the seasonal restrictions on travel in the 1988 RMRD Travel Plan.

Canada Lynx

The USDA Forest Service Region 1 is a signatory to the Lynx Conservation Agreement (USFS #00-MU-11015600-013), applicable through December 31, 2005 **and renewed through December 2006.** Signatories have agreed to take actions to reduce or eliminate adverse effects or risks to the species and its habitat and to maintain the ecosystems on which lynx depend. **The agreement was amended in May 2006 to define "occupied lynx habitat", which includes the RMRD.** This agreement will eventually be superceded by the Northern Rockies Lynx Amendment, which will add specific management direction to Forest Plans, including the LCNF Forest Plan. **The Northern Rockies Lynx Amendment is expected to take effect in late May 2007.** Specific recommendations and guidelines to be followed under the current agreement are contained in the Lynx Conservation and Assessment Strategy (LCAS; Reudiger et al. 2000).

The LCAS objectives call for using specific criteria to map lynx habitat on federal lands, and for establishing LAUs as the analysis area for project planning purposes. LAUs are to be the approximate size of a female lynx home range and contain a sufficient quantity of denning and foraging habitat, as well as connections between those habitats, to sustain a female lynx throughout the year (Reudiger et al. 2000, pp. 7-2 – 7-4).

The LCAS acknowledges that lynx can "adapt to the presence of regular and concentrated recreational use", but that to do so "it is essential that an interconnected network of foraging habitat be maintained that is not subjected to widespread human intervention or competition from other predator species" (Reudiger et al. 2000, p. 7-8).

Concern regarding potential competition from other predator species provides the basis for the LCAS standard for programmatic planning in recreation management This standard is to "allow no net increase in groomed or designated over-the-snow routes and snowmobile play areas by LAU unless the designation serves to consolidate unregulated use and improves lynx habitat" (Modifications of Lynx Conservation Assessment and Strategy, August 2000 Edition – Clarifying Language; Memo from Deputy Regional Forester, August 28, 2003).

Designated over-the-snow routes are defined as "over-the-snow routes (such as trails) and snowmobile play areas (usually large, open areas) that are 'designated', that is specifically marked on a map, described in the resource or forest plan, described in the travel plan, or signed. This definition does not apply to ski areas" (Modifications of Lynx Conservation Assessment and Strategy, August 2000 Edition – Clarifying Language; Memo from Deputy Regional Forester, August 28, 2003).

LCAS guidelines for recreation and travel management planning efforts include:

> Provide a landscape with interconnected blocks of foraging habitat where snowmobile, cross-country skiing, snowshoeing, or other snow compacting activities are minimized or discouraged.
>
> Determine where high road densities (>2 miles per square mile) coincide with lynx habitat, and prioritize roads for seasonal restrictions or reclamation in those areas (Reudiger et al. 2000, p. 7-9).

Sensitive Species

Sensitive species, as defined in the Forest Service Manual (FSM) are those identified by the Regional Forester, Northern Region, USDA Forest Service, for which population viability is a concern as evidenced by "significant current or predicted downward trend" in population numbers or density and/or in habitat capability that would reduce a species' existing distribution (FSM 2670.5).

Sensitive species must receive special management emphasis to ensure their viability and to preclude trends toward endangerment that would result in the need for Federal listing (FSM 2672.1).

Big Game Species

The primary Forest Plan direction for big game species is stated above (Forest-wide Management Standards C-1(6) and C-1(11)) and directs the Forest to manage motorized travel to reduce impacts to wildlife during seasons or periods of stress, and utilize information in the Interagency Rocky Mountain Front Wildlife Monitoring/Evaluation Program Management Guidelines (hereafter referred to as the RMF Guidelines) to guide such management.

Specific recommendations for restrictions on potentially disturbance-causing activities are contained in the RMF Guidelines, included as Appendix I in the LCNF Forest Plan. These guidelines were developed primarily in response to concerns over potential oil and gas exploration and development, but are intended to serve as guidelines for other human activities as well. General management guidelines include recommendations to:

> Avoid human activities or combinations of activities on seasonally important wildlife habitats which may adversely impact the species or reduce the habitat effectiveness. Impose seasonal closures and/or vehicle restrictions based on wildlife or other resource needs on roads which remain open.

Species-specific guidelines are provided that include dates during which each species included may be particularly vulnerable to disturbance and during which potentially disturbance-causing human activity should be minimized or avoided.

The LCNF Forest Plan also states that the Montana Fish and Game Commission Road Management Policy (1982) will guide Forest road management planning (LCNF Forest Plan Forest-wide Management Guideline L-2; LCNF Forest Plan Appendix G). The objective of the MT Fish and Game Commission policy is to "maintain current hunting opportunities associated with elk in forested areas of Montana as other resources are developed". The policy recommends limits on open road densities during hunting season. It also recommends that:

> Calving grounds and nursery areas having concentrated elk use should be closed to motorized public use during periods of peak use by elk. These should be identified with land managers.
>
> All winter range should be closed to motorized public use between December 1 and May 15. Exceptions may be established through consultation with land managers.

Wildlife Environmental Consequences

As described under the heading "Wildlife Affected Environment" above, potential impacts of the alternatives on wildlife were analyzed and will be discussed by issue. Potential impacts to individual species are discussed within each issue as appropriate.

Analysis Considerations

There are three basic differences among the travel management alternatives under consideration:

- the total mileage of routes (particularly trails) open to wheeled motorized travel
- the total acreage of area open to snowmobile travel
- the pattern in which those uses would occur

Therefore our analysis will be based on comparisons of the different mileage, acreage, and pattern of motorized use among alternatives with respect to wildlife habitats.

Roads vs. Motorized Trails

The majority of travel routes open to motorized use on the RMRD are trails, most of which are single track motorcycle trails (refer to Table III-17 in the Recreation section), particularly in the Birch-South area. Studies looking at impacts of recreation on ungulates have looked at roads, hiking, skiing, snowmobiling, hunting, and other activities (Canfield et al. 1999), but few if any address the specific impacts of motorized trails (Gaines et al. 2003). Existing models that address access concerns with respect to grizzly bears (IGBC 1998a, IGBC 1998b, IGBC 2004) **and elk (Lyon 1983, Rowland et al. 2005) are based largely on studies evaluating the impacts of roads. Very little research, however, has specifically examined the impacts of motorized trails on wildlife, or differentiated impacts of trail-based motorized travel from that occurring on roads. The models that include consideration of motorized trails generally** assign the same or similar degree of impacts to both roads and motorized trails (IGBC 1998a, IGBC 2004). At least one study that looked at grizzly bear response to both motorized and non-motorized trails (Graves 2002) appears to support the idea that they **may have impacts similar to those of roads.**

Other studies have indicated greater response to primary or secondary roads than to primitive roads or jeep trails (Lyon 1984 as cited in Frederick 1981, Gruell and Roby 1976, Rowland et al. 2000), while many suggest that the volume of traffic affects likelihood of wildlife response (e.g. Papouchis et al. 2001, Mace et al. 1996). It appears, therefore, that impacts of motorized trails likely varies, as does the impact of roads, according to the type and level of use, habitat, topography, and other factors.

Motorized Route Density vs. Secure Areas (or Distance-to-Route)

Two methods have commonly been used to evaluate impacts of motorized travel on wildlife: road density and distance-to-route or secure areas. Lyon (1983) assessed road density models with respect to elk habitat availability where a network of roads was being used for logging and related traffic. Road density values were recommended as one component, along with habitat values such as cover and forage availability, of a model to predict or measure elk Habitat Effectiveness (HE). Road density alone was not intended as a predictor of elk use of an area. Also, road density thresholds were not measured as such, but were extrapolated from information on the distance at which elk appeared to avoid areas near roads. Mace et al. (1996) identified road density thresholds at which grizzly bears appeared to avoid use of nearby habitat. Their study included both open and closed roads, although some of the closed roads experienced motorized administrative travel. Road density thresholds at which impacts were identified were tied to motorized use levels. Mladenoff (1995) and others looked at road densities in the Midwest as an indicator of wolf occurrence. Unimproved Forest Roads and trails were excluded from that study, and road density was understood to be simply an index of the probability of detrimental contact with humans. These and other studies vary in the species addressed, the type and use levels of roads that were included, the type of response of wildlife that was measured, and the scale at which both road density and response were measured. Not surprisingly, various studies provide differing recommendations for appropriate road densities in wildlife habitat, depending on such things as habitat quality, topography, and type and level of road use. Variation in the scale or method by which density is calculated, alone, can have a great impact on conclusions and management recommendations (Predator Conservation Alliance 2002).

Roughly 90 miles out of a total 118 miles of road currently open to motorized travel on the RMRD is main access road, oriented as relatively straight linear features accessing end-of-line trailheads and campgrounds. These roads would remain open under all alternatives. The limited mileage of road that would vary in management across alternatives is nearly all short spurs immediately adjacent to main access roads. The road system on the RMRD does not resemble areas in which most road density studies have been carried out; i.e. areas where extensive road networks are being used for logging or experience other heavy use. Applying impacts of road densities measured in areas with entirely different types and levels of use could lead to erroneous conclusions about potential impacts to wildlife.

Most if not all of the literature on road density is exactly as it says: road density. As discussed above, differences among alternatives in the FEIS are almost exclusively in the amount and pattern of trails that would be open to motorized travel. While it may be appropriate at some level of analysis to assume similar impacts to wildlife of roads and motorized trails, it may not be appropriate to apply road density impacts or

recommendations to motorized trails. As noted above, traffic volume appears to play an important role in the response of wildlife to motorized travel. Many of the road density studies included only roads receiving a considerable volume of traffic, and those that differentiated based on use levels generally recommended different density thresholds based on those levels (e.g. Mace et al. 1996). The technical group working to establish access management standards for the Northern Continental Divide Ecosystem for grizzly bears determined that a motorized trail should be included in open motorized access density calculations only if it "… receives sufficient motorized use to affect bears. … Sufficient motorized use is defined as low intensity use, use of 1 vehicle count/day, for at least 25% of a season" (IGBC 2002). Most of the motorized trails on the RMRD, particularly the single-track motorcycle trails that make up the large majority of motorized trails in the Birch-South area, receive well below that level of use. It would be inappropriate to apply road density impacts as discussed above to analysis of the relatively lightly used motorized trails on the RMRD, and could lead to erroneous conclusions regarding potential impacts of the alternatives on wildlife.

Travel planning on the RMRD is occurring at a large scale, with the analysis intended to display the general potential for impacts to wildlife and other resources over an entire landscape. Most analyses of and recommendations for road densities have been at a smaller scale, usually at the watershed or other moderately-sized unit. Implications of a particular density category are difficult to determine outside of the general context in which it was originally reported in the literature. Analysis of open road or open motorized route (including trail) density could provide an additional tool to differentiate among alternatives, but it would not likely provide much meaningful insight into the true potential impacts to wildlife of each alternative.

Rowland et al. (2000) suggest that it may be more biologically meaningful to evaluate road effects based on distances from roads and spatial pattern of roads than on traditional road density models. **Using an extensive data set of elk locations mapped in relation to open roads, they tested a commonly used road density model for elk. They found that the elk model did not do well in predicting observed elk use of an area, because it failed to measure the spatial pattern of roads. This study suggests that** the overall pattern of open motorized routes and the availability of areas outside the influence zone of motorized routes may be a more important metric than density of motorized routes in determining impacts to elk and other wildlife. **Many studies have measured the distance at which wildlife respond to a road, trail, aircraft flight line, or other human activity (e.g. Canfield et al. 1999). Some provide general or specific recommendations for recreation management in particular wildlife habitats (e.g. Gaines et al. 2003). These studies provide a general format for predicting potential wildlife response to the various amounts and patterns of motorized travel allowed under each alternative.** Additionally, Wisdom et al. (2004) suggest that linear distance of open motorized routes relative to the size of the watershed or other appropriate analysis area may be a key to determining the degree of impact of motorized travel on elk and other wildlife.

The literature is replete with specific distances at which wildlife have been observed to respond to both motorized and non-motorized travel. For example, the Montana Cooperative Elk-Logging Study (USDA Forest Service 1982) is a widely used reference on the impacts of logging roads on elk. This study found that elk select for areas greater than one-half mile (805 meters) from open roads associated with active logging operations. The study also found that this distance may be less when roads are more lightly used or pass through habitats less important to elk, or during less-intensive logging operations. The one-

half mile buffer has been adopted by most national forests, including the LCNF, as a standard for analysis of roads associated with timber harvest. The elk-logging study and related guidelines, however, do not address the potential impacts to elk of generalized recreational travel on roads or on motorized trails. Research at the Starkey Experimental Forest in Oregon has looked at the potential for off-road recreational travel to impact elk and deer. Recent studies there found that elk may be influenced by ATV travel on an off-road transect more than 1500 meters away from the transect (Wisdom et al. 2004). The study measured elk probability of flight response to ATV and other forms of recreational travel on routes that included primarily cross-country (off-road and off-trail) travel in addition to some travel on closed roads. It is not clear to what degree the results of this study may be applicable to travel on established motorized trails. Models used to evaluate impacts of travel routes on grizzly bears (IGBC access guidelines – IGBC 1998a; Cumulative Effects Models – IGBC 2004) generally use 500 meters as an estimate of the distance a grizzly bear may be displaced from a motorized road or trail. This distance is based on studies of grizzly bear response to roads in Yellowstone National Park, the Rocky Mountain Front, and the Cabinet Mountains. These studies documented that grizzly bears used areas ranging from 100 meters to 900 meters away from open roads less than expected based on availability (IGBC 1998a&b). Graves (2002) measured responses of grizzly bears to the recreational trail system in the Badger-Two Medicine area of the RMRD. That study documented that bears selected against areas within 250 to 500 meters of open ATV trails and within 450 to 600 meters of single-track trails open to motorcycles. Avoidance was not tied to type of use on trails, which included ATV travel, motorcycle travel, horseback riding, hiking, and bicycling. Most travel of all types occurred on trails open to ATVs.

These studies and others show that distances at which individual species respond vary according to type and use level of travel, habituation of individuals or populations, habitat, topography, season, etc. There is considerable overlap among species in reported distance of response. There is also considerable variation in the type of response or impact that is reported. Some studies, for example, have measured the distance at which wildlife avoid an area, while some measure the distance at which an alert response has been exhibited, and still others measure the distance at which animals flee from disturbance. Much of this variety can be traced to the differing intent of each study, with some attempting to simply define a disturbance distance or measure an effect, and others attempting to establish a distance or make a recommendation about when habitat becomes ineffective, or at which a population-level response due to stress or flight might occur. Recommendations for specific distances at which to measure impacts of specific recreational activity are common, but generally vary according to the specifics of the study, area, or population.

Motorized vs. Non-motorized travel

The grizzly bear models referred to above assume that impacts from high-use non-motorized trails are similar to those from certain types of motorized trails. Graves (2002) observed that grizzly bear avoidance of single track trails that were seldom if ever used by motorized vehicles was as great as, and in some cases greater than, their avoidance of trails more frequently used by OHVs. **Some studies have found that under certain circumstances non-motorized travel may cause as great or greater disturbance to ungulates as motorized travel (Canfield et al. 1999).** Other studies, conversely, have demonstrated that **some species, such as elk,** are more likely to be displaced away from off-road routes

receiving mechanized and motorized use than those receiving foot and horse travel (Wisdom et al. 2004).Vaske et al. (1995) note that behavioral responses of wildlife to recreation are influenced by specific characteristics of that recreation as well as by individual circumstances. Canfield et al. (1999) cite studies that have found that the most detrimental disturbances to wildlife are those that are unanticipated, regardless of type. **Response of wildlife to travel routes or the activities occurring on them may vary according to the individual, availability of visual cover, and habitat quality (e.g. Mace et al. 1996, Graves 2002, Aune and Kasworm 1989), as well as on** specific patterns of travel and past experience of the animals being studied. **The many variables influencing both recreation and wildlife make** it difficult to arrive at a universal means for understanding wildlife response to different modes of travel.

General Analysis Methods and Rationale

Type of Routes Included for Analysis

The primary differences among the alternatives are the miles of travel route (wheeled travel) and acres of land (snowmobile travel) available for motorized travel on the RMRD. This analysis will compare, by alternative, the potential impacts to wildlife of motorized travel as a means to differentiate potential consequences among the alternatives. **The impacts of non-motorized travel are not known but are assumed to fall somewhere in the range reported for various species in the literature. These impacts are understood to be cumulative to any impacts resulting from motorized travel, and are assumed to be the same under all alternatives. Therefore non-motorized routes will not be specifically included in the analysis.**

Most of the analysis focuses on potential impacts to wildlife of motorized trails open during key seasons in key seasonal habitats. The IGBC taskforce on access and grizzly bears recognized that "motorized trails receiving the level occurring in the mid 1980s did not alter bear use patterns", and that trails should only be included in motorized access calculations when use reaches 1 vehicle per day for more than 25% of a season (IGBC 1998b; IGBC 2002). This definition is used in the grizzly bear Cumulative Effects Model for the NCDE, as well (IGBC 2004). Given the relatively low levels of use on most motorized trails in the analysis area, and considering that much of the literature on other species acknowledges that impacts of motorized travel are greatly reduced at low use levels, it is appropriate to apply this "25% rule" for analysis of all wildlife species at this scale.Therefore, a route was considered open and included in the **non-winter** analysis calculations below if it was open to motorized use for ≥ 25% of the season of concern. The dates during which roads or trails must be open within each species' seasonal habitat to be included in the calculation was defined according to the RMF Wildlife Guidelines. **All main access roads were included as open in all calculations by applying this rule, because they are open year-round or nearly so. Other roads are almost entirely short, two-track type roads that access dispersed campsites or occasionally remote trailheads, so applying the 25% rule is appropriate. All roads that access recreation residences or private land were included in all calculations, assuming that they could be open to any amount of traffic at any time of year.** Roads or trails eliminated from calculation based on this rule were all open either at the very beginning or the very end of the seasonal period of concern, or for very brief periods at both times. These times are likely to be less critical for wildlife than the main portion of a season. **Calculations for winter impacts included areas open for ≥25% of the**

winter season for each species, but due to the structure of the database it was not possible to apply this rule to the analysis of the mileage of routes open to snowmobile travel. Therefore all routes open to snowmobile travel were included in that part of the snowmobile analysis.

Assumptions Regarding Impacts of Motorized Routes

On the RMRD formal data on use levels of roads and motorized trails do not exist, although it is generally accepted that the single-track motorcycle trails that make up the majority of motorized trails on the District receive significantly less use than most roads. Nevertheless, while acknowledging this likely difference and the uncertainty regarding potential differences in impacts of roads vs. motorized trails, we have chosen for portions of this analysis to assume that the same or similar impacts may result from both roads and trails open to motorized travel. Thus the same buffer distance or other measures will be applied to both. This assumption will facilitate comparison of the relative potential of each alternative to impact wildlife, **and will allow a relatively large-scale analysis of impacts appropriate to the scope of the decision being made.**

Methods Used to Determine Potential Impacts

To arrive at a relative assessment of the potential impacts to wildlife of motorized use, the analysis considers the number of miles of roads and trails open to wheeled motorized use in key seasonal wildlife habitats in order to compare the **basic** potential of each alternative to disturb or displace wildlife in those habitats. The analysis also **uses a distance-to-route or buffer method to approximate the potential zone of influence of motorized routes. This method accounts for both the amount and spatial pattern of motorized routes, and allows comparison of** the potential for each alternative to provide secure habitat for wildlife. **As applied in this analysis, the distance-to-route method allows the analysis to be scaled appropriate to the level of the decision being made; i.e. at the scale of the RMRD or of individual species' seasonal habitats. This method is also used to assess the potential of each alternative to maintain habitat connectivity at the both the seasonal habitat and landscape scale.**

As discussed above, there is considerable variation in the literature regarding the distance at which certain recreational activities may impact wildlife. This variation occurs even within a particular species. Consideration of different impact distances is recommended for different types and use levels of routes (Wisdom et al. 2005, IGBC 2004, Thomas et al. 1979), different species (Gaines et al. 2003), and different habitat and terrain types (Mace et al. 1996, Graves 2002). Attempting to incorporate these many factors into the relatively large-scale analysis required for this decision would result in analysis that, due to its extreme complexity, would be prone to error and could falsely imply a level of predictive ability that does not exist. The goal of this analysis is not to identify the precise distance at which each species present on the RMRD might avoid certain types of travel or to identify a precise distance at which a particular recreational activity would have no effect on wildlife. The goal is to use a transparent method by which to estimate the potential effect of each alternative's amount and pattern of motorized travel on wildlife. A common theme in most of the published literature is that

most of the species studied will experience some level of disturbance or displacement by motorized travel within some distance from where the travel is occurring. Therefore, we have chosen to apply a single buffer distance to all motorized routes for all species being analyzed. This method approximates a biologically reasonable zone of influence that can be compared among alternatives at an appropriate scale. No assumptions will be made regarding the specific impacts to wildlife that may occur within or outside this zone of influence. Using a single buffer distance simply provides a method by which to estimate the potential impacts of motorized travel on wildlife habitat security across all alternatives. A distance of 500m was chosen because it falls roughly in the midst of the range of response distances reported for most species, and has been used in the widely accepted models for analysis of access impacts to grizzly bears (IGBC 1998a, IGBC 2004), a wide-ranging species whose habitat use encompasses that of many other species.

POTENTIAL IMPACTS OF RECREATIONAL TRAVEL ON SEASONAL WILDLIFE HABITATS –DISTURBANCE AND DISPLACEMENT.

This section is a combination of two issues that were identified through internal scoping and through public comment:

1) Effects of recreational travel on seasonally important wildlife habitats

2) Potential for recreational travel to displace wildlife.

These issues were expressed primarily as a concern that motorized travel, in particular, might reduce the value of important seasonal ranges (winter range, lambing/calving/kidding habitat, denning habitat) by disturbing wildlife and/or displacing them from those habitats.

WHEELED TRAVEL

A critical feature of existing travel management on the RMRD that would be retained under any alternative is the use of seasonal restrictions on motorized use in key seasonal wildlife habitats, as recommended in the RMF Guidelines. Therefore, this analysis focuses on the amount of road or trail that would be open to motorized travel in those habitats during the seasons of concern. The potential for impacts is expressed in terms of both miles of open motorized routes in specific habitats, and acres within the potential influence zone of open motorized routes.

MILES OF OPEN MOTORIZED ROUTES WITHIN WILDLIFE SEASONAL HABITATS

Analysis Methods

Miles of road and trail open to motorized use during key seasons within specific seasonal habitats was calculated for each alternative. **For discussion of which routes were included in the analysis, see the previous section titled "General Analysis Methods and Rationale".**

a. Alternative 1 - No Action Alternative

1. Direct and Indirect Effects

Adherence to the RMF Wildlife Guidelines by the 1988 Travel Plan resulted in very little motorized travel currently being allowed in most wildlife spring habitats and winter ranges.

There are more miles of open motorized routes in grizzly bear spring habitat than in any other seasonal wildlife habitats. This appears to be largely a function of the location of this habitat in low-elevation riparian areas (refer to Map 24 showing grizzly bear spring habitat), where most of the major access roads are located on the district. Likewise elk winter range, which overlaps grizzly bear spring range in many areas (see Map 23 showing elk winter range) occurs largely at lower elevations in proximity to some of the main access routes. See the following section, however, for information on the acreage of grizzly bear spring habitat potentially influenced by these routes.

The table below displays the miles of motorized routes open during identified seasons in key seasonal wildlife habitats. Mileage figures are rounded to the nearest mile.

Table III-87. Miles of Open Motorized Roads and Trails in Wildlife Seasonal Habitats by Alternative

Seasonal Habitat	Area	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Grizzly Bear Spring	Badger Two	44	21	5	9	1
	Birch South	184	128	85	106	106
	Totals	228	149	90	115	107
Grizzly Bear Denning	Badger Two	5	7	0	2	0
	Birch South	7	2	0	1	1
	Totals	12	9	0	3	1
Elk Calving	Badger Two	3	0	0	0	0
	Birch South	27	7	5	5	5
	Totals	30	7	5	5	5
Elk Winter	Badger Two	24	23	1	4	<1
	Birch South	89	68	25	56	56
	Totals	113	91	26	61	56
Bighorn Sheep Lambing	Badger Two	0	0	0	0	0
	Birch South	19	12	0	11	11
	Totals	19	12	0	11	11
Bighorn Sheep Winter	Badger Two	0	0	0	0	0
	Birch South	71	57	32	46	46
	Totals	71	57	32	46	46
Mountain Goat Kidding	Badger Two	0	0	0	0	0
	Birch South	12	2	1	1	1
	Totals	12	2	1	1	1
Mountain Goat Winter (Yearlong)	Badger Two	1	1	0	<1	0
	Birch South	31	20	3	9	9
	Totals	32	21	3	9	9

b. Action Alternatives 2-5

1. Direct and Indirect Effects

Table III-87 above displays the miles of motorized routes open during identified seasons in key seasonal wildlife habitats for Alternatives 2 through 5. Mileage figures are rounded to the nearest mile.

It is important to note that some trails, while technically open to motorized travel under the existing plan, receive little to no wheeled motorized travel, particularly during winter and spring. Although studies of visitor use patterns have not been conducted, RMRD Recreation Specialists and other staff indicate that visitor use on the RMRD is typically very low prior to the July 4 holiday, and is at its peak from then until mid-late August. Spring human use is often confined to main access roads and developed campgrounds, because access to more remote areas is often made difficult by remaining snowpack and/or high water due to runoff. During winter many roads and trails are unavailable for wheeled travel due to snow accumulation. Therefore the numbers in the table above **likely overestimate the mileage of trail truly available to or being used by motorized travel in winter and spring.** Potential impacts from snowmobile travel are discussed in a separate section below.

All of the Action Alternatives would reduce the total miles of roads and trails open to motorized use during key spring seasons as compared to the No Action - Alternative 1. Alternative 3, in which motorized travel would not be allowed on any trails and would be

confined to main access roads and short spurs off those roads, represents the minimum miles of motorized travel that can be achieved in these habitats while still allowing motorized access to trailheads and other recreation sites. The relatively higher miles for grizzly bear spring range as compared to other species under Alternative 3, as for Alternative 1, is a function of the location of spring habitat in low-elevation riparian zones where most of the major access roads are located on the RMRD. Likewise, elk and bighorn sheep winter ranges tend to be located in low elevation areas that include some of the main access routes.

Whether the reduction in miles of open motorized routes in the Action Alternatives as compared to the Existing Condition (No Action Alternative) or in any of the Action Alternatives relative to the others would result in any measurable impacts to wildlife populations in terms of survival or reproduction is not possible to determine. Types and levels of recreational use can only be predicted for the RMRD in the most general terms. That information is not sufficient to accurately predict the impacts of different types of recreational travel on wildlife. Therefore, the differences displayed above represent only the potential for each alternative to impact wildlife if the amount and type of motorized travel on the RMRD has effects that differ from those of non-motorized travel. Wildlife populations on the RMF are influenced by a variety of other factors, including climate, hunting, and land use and management both on and off the National Forest.

c. Effects Common To All Alternatives

None known.

d. Effects Common To All Action Alternatives

All Action Alternatives decrease the total miles of open motorized routes in key seasonal wildlife habitats during seasons of concern. The alternatives differ in degree to which each would do so.

WILDLIFE SECURITY WITHIN SEASONAL HABITATS - SPRING HABITATS

Analysis Methods

A key feature of wildlife habitat management with respect to recreational travel on the RMRD is seasonal restriction on motorized use. **Potential impacts to key seasonal wildlife habitats were analyzed using a distance-to-route, or buffer method.** This method focuses more specifically on the spatial aspect of motorized travel than traditional road and trail density models. It addresses where motorized travel occurs relative to important habitats, and how much of those habitats it may influence. **Rationale for this method and discussion of routes included and buffer distances used in the analysis are in the sections titled "Analysis Considerations" and "General Analysis Methods and Rationale".**

Open motorized routes were buffered by 500 meters. The amount of area outside the buffers (i.e. the number of acres beyond 500 meters of an open motorized road or trail) was then calculated. This represents the amount of area potentially secure from disturbance or displacement by motorized travel.

Secure area was calculated for wildlife spring habitats. For grizzly bear spring range and ungulate lambing/calving/kidding habitats, the total number of acres outside the buffer was calculated, as well as the percent of the total seasonal habitat that fell outside the buffer. These figures provide a comparison among alternatives of the amount of spring habitat secure from potential influence of recreational motorized travel.

a. Alternative 1 - No Action Alternative

1. Direct and Indirect Effects

Table III-88 shows the acreage beyond 500m of open motorized routes **for both the Birch-South and Badger-Two Medicine areas, and displays those acreages as percent of the seasonal habitat within each of those areas (e.g. there are 44,320 acres of grizzly bear spring habitat in the Badger-Two Medicine area in Alt. 3 that are outside the buffers, and that acreage is 95% of the total grizzly bear spring habitat in the Badger-Two Medicine area). The table also shows the total acreage outside the 500m buffer and the percent of total seasonal habitat on NF lands that represents (e.g. there are 186,200 acres of grizzly bear spring habitat on the entire RMRD in Alt. 3 that are outside the buffers, and that acreage is 91% of the total grizzly bear spring habitat in entire district).** Potential impacts of motorized travel on the non-Forest portions of seasonal habitats are addressed under Cumulative Effects. Acreages are rounded to the nearest 10 acres; percentages are rounded to the nearest whole number.

Table III-88. Total Acreage and % Beyond 500m of Open Motorized Routes in key Spring Wildlife Habitats on NF Lands*– by Alternative

Spring Wildlife Habitat	Map Zone	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Grizzly Bear Spring	Badger Two	36,730 (79%)	40,490 (87%)	44,320 (95%)	43,330 (93%)	45,290 (97%)
	Birch South	125,310 (79%)	134,208 (85%)	141,880 (89%)	138,740 (87%)	138,740 (87%)
	TOTALS	162,040 (79%)	174,700 (85%)	186,200 (91%)	182,070 (89%)	184,033 (90%)
Elk Calving	Badger Two	8,660 (90%)	9,540 (>99%)	9,580 (100%)	9,540 (>99%)	9,580 (100%)
	Birch South	47,440 (85%)	52,640 (95%)	53,400 (96%)	53,400 (96%)	53,400 (96%)
	TOTALS	56,100 (86%)	62,190 (95%)	62,980 (97%)	62,950 (96%)	62,980 (97%)
Bighorn Sheep Lambing	Badger Two	na**	na	na	na	na
	Birch South	28,970 (82%)	30,630 (86%)	35,140 (99%)	31,560 (89%)	31,560 (89%)
	TOTALS	28,970 (82%)	30,630 (86%)	35,140 (99%)	31,560 (89%)	31,560 (89%)
Mountain Goat Kidding	Badger Two	23,560 (100%)	23,560 (100%)	23,560 (100%)	23,560 (100%)	23,560 (100%)
	Birch South	99,010 (96%)	101,850 (98%)	102,870 (99%)	102,810 (99%)	102,810 (99%)
	TOTALS	122,570 (96%)	125,410 (99%)	126,430 (99%)	126,370 (99%)	126,370 (99%)

*** This table has been changed from Table III-88 in the DEIS. The table originally calculated percentages based on the entire seasonal habitat both on and off Forest without having considered motorized routes off-Forest. This table in the DEIS therefore incorrectly portrayed larger percentages of secure habitat than probably exist. Because the analysis included only on-Forest routes, it is more appropriate to carry out the analysis only for the on-Forest habitat through which they pass. Impacts of motorized travel on the off-Forest portion of seasonal habitats is addressed under "Cumulative Effects".**

** No bighorn sheep lambing habitat has been identified within the Badger-Two Medicine area

Adherence to the RMF Wildlife Guidelines under the 1988 Travel Plan has resulted in very little motorized travel currently being allowed in most wildlife spring habitats. Thus **nearly 80% of** grizzly bear spring habitat, and over 80% of elk calving, mountain goat kidding, and bighorn sheep lambing habitat **on National Forest lands** is secure from potential influence of motorized travel during the spring season. Much of the potential influence on bighorn sheep lambing range results from a combination of main access roads in the Sun Canyon area and motorized trails (largely open to motorcycles only) to the near south. Traffic on the main Sun Canyon Road likely represents a predictable, localized disturbance to which bighorn sheep have habituated. The amount of motorized travel on trails in the area during spring is not known.

Mountain goat kidding areas have only been mapped north of the Sun River. Therefore the acreages in the tables above and below represent that area only.

b. Action Alternatives 2-5

1. Direct and Indirect Effects

Table III-88 above shows the total acreage beyond 500m of open motorized routes, as well as the percent of each total seasonal habitat that is outside the 500m buffer for Alternatives 2 through 5. Potential impacts of motorized travel on the non-Forest portions of seasonal habitats are addressed under Cumulative Effects. Acreages are rounded to the nearest 10 acres; percentages are rounded to the nearest whole number.

It is important to note that the **inverse of the percentages** in the tables above represent the total **percentage of habitat** within possible influence of motorized routes, but not the **percentage** that might actually be experiencing influence at any one point in time. Much of the acreage **within the 500m buffers** may be un-influenced by motorized travel during all or most of the season of concern. Furthermore, a single OHV traveling on a trail exerts an influence and potential for displacement only within its immediate area, which is constantly changing, and for a specific period of time in that area after it has departed. Behavioral responses of wildlife may be of short duration, or may vary based on the frequency and duration of the disturbance.

It is also important to note that although a 500m buffer was used to approximate the potential zone of influence, it does not mean that wildlife within that zone will necessarily be disturbed or displaced, or that wildlife beyond 500m will not be influenced by motorized travel. The more traffic a road or trail receives, the more of the buffer zone remains or is repeatedly influenced by that traffic, and the greater potential that zone has to displace wildlife. There may be a level and timing of motorized travel that becomes predictable enough for wildlife to become habituated and therefore less likely to be displaced from the area, but there is also likely an upper threshold at which disturbance becomes too frequent and the area influenced by the route no longer functions as effective wildlife habitat (Knight and Cole 1995). Neither of these points is possible to determine, however, in the context of this analysis.

Alternative 3 represents the maximum secure acreage or conversely, the minimum acreage within potential influence of motorized travel that can be achieved while allowing motorized travel on main access roads and roads to recreational facilities, while restricting all motorized travel on trails. Therefore it can serve as a benchmark for comparison with other alternatives.

The greater percentage of bighorn sheep habitat secure from potential influence of motorized routes in Alternative 3 as compared to the other Alternatives appears to be heavily influenced by restricting motorized use on trails in the Home Gulch, Cutreef Creek, Lime Gulch, and

Ford Creek/Ford Plateau areas. Differences between the No Action Alternative and Alternatives 4 and 5 are less easily traced, but appear to be influenced by motorized travel restrictions in several areas, including Crown Mtn., Ford Creek/Ford Plateau, Blacktail Gulch, and lower Castle Reef.

The greater percentage of elk calving range secure from potential influence of motorized routes in the Action Alternatives as compared to the No Action Alternative results from restrictions on motorized travel on trails in the Volcano Reef, Walling Reef, and Petty Crown areas as well as from portions of two trails in the Two Medicine Ridge area.

The causes for differences among Alternatives with respect to the portion of grizzly bear spring habitat secure from potential influence of motorized travel are less easy to assign due to the fact that grizzly bear spring habitat is widespread throughout the RMRD. Some areas that contribute to higher percentages in the Action Alternatives as compared to the No Action include restrictions on motorized use on all or portions of trails in the north end of the Badger-Two Medicine area, in the North Fork Dupuyer and Volcano Reef area, Petty-Ford and Ford Plateau area, and the Falls Creek area. It is important to note that restrictions on motorized travel in Falls Creek may appear more meaningful on paper than on the ground, as the area has been **effectively** closed to motorized travel under the Existing Condition due to restrictions placed on access across private land at the main entry points into the area. **The trails in this area were included in access calculations, however, because motorized access could occur in the area if the landowner's preferences change or if motorcycles enter via other points on private land.** Although Alternative 3 represents the greatest amount of grizzly bear spring habitat secure from potential motorized influence **in the Birch-South area** of any of the Alternatives, including the No Action Alternative, it is interesting to note that there is almost no difference in the percent under that Alternative as compared to the other Action Alternatives. In other words, there appears to be little difference between Action Alternatives with respect to security of spring grizzly bear habitat.

Differences between the No Action Alternative and the Action Alternatives with respect to mountain goat habitat are influenced by restrictions on motorized travel in the South Fork Dupuyer, upper South Fork Teton, Deep Creek, and portions of Clary Coulee/Choteau Mountain areas.

The numbers in the tables above provide an index of the relative potential of each alternative to **provide security for wildlife in** key spring habitats. Canfield et al. (1999) suggest that "the importance of spring range in assuring recovery from winter weight loss has not been appropriately emphasized in the literature". They review evidence, in fact, that spring green-up may be the most important forage resource for pregnant elk in determining the outcome of pregnancy. Canfield et al. (1999) cite other studies suggesting that harassment by recreationists may be debilitating, or even fatal, to winter-stressed bighorn sheep despite the absence of overt stress behavior. They provide information, however, that non-motorized recreation can result in greater disturbance to winter-stressed wildlife than motorized recreation, depending on characteristics of the disturbance.

Because motorized travel on trails on the RMRD is likely sporadic and largely unpredictable, Alternatives that concentrate motorized use in specific areas, leaving large blocks outside the influence of that travel are likely to provide lower potential for disturbance of wildlife. Alternative 3, of course, would provide the most concentrated and predictable pattern of spring motorized use by confining it entirely to access roads. Alternatives 4 and 5 would provide the next most concentrated pattern by confining spring motorized use to access roads and a limited number of selected trails. Alternative 5 differs from Alternative 4 only in restricting all motorized travel throughout the entire Badger-Two Medicine area. Alternative 2

would restrict and concentrate spring motorized travel more than Alternative 1, but Alternatives 1 and 2 would be similar in allowing motorized travel to be more dispersed across the landscape as compared to the other Alternatives.

WILDLIFE SECURITY WITHIN SEASONAL HABITATS – SUMMER AND FALL GRIZZLY BEAR AND OTHER WILDLIFE HABITAT

Following guidance from the Interagency Grizzly Bear Committee (IGBC), the RMRD has been divided into several Bear Management Units (BMUs), which have been further divided into a total of 13 Subunits. Each Subunit is intended to approximate the size of a female grizzly bear's home range, and is the unit at which most grizzly bear impacts analysis is recommended to take place. Table III-89 shows the acreage and percent of each grizzly bear BMU Subunit that falls inside the National Forest boundary (including private in-holdings within the Forest boundary), as well as the acreage and % of each Subunit within Congressionally designated Wilderness.

Note that the Lick Rock and Roule Biggs Subunits are completely within Wilderness, whereas the Badger, Deep Creek, Falls Creek, and Pine Butte Subunits do not contain any Wilderness. Only the 2 Wilderness Subunits are entirely within the National Forest boundary; the remainder extend to varying degrees east of the National Forest boundary. Because the Lick Rock and Roule Biggs Subunits are entirely within Wilderness and analysis showed no areas within 500m of an open motorized route, they will not be considered further.

Table III-89. Total Acreage of BMU Subunits, and Acreage and Percent of each BMU within National Forest Boundary and within Designated Wilderness

Subunit	Total Acreage in Subunit	Acreage Within NF Boundary	% of Subunit Within NF Boundary	Acreage in Wilderness	% of Subunit Within NF Boundary in Wilderness	% of Subunit in Wilderness
Badger Two Medicine Area:						
Two Medicine	62,780	47,520	76%	44,770	94%	71%
Badger	82,430	56,660	69%	0	--	--
Heart Butte	71,020	33,380	47%	5,620	17%	8%
Birch South Area:						
Birch	94,640	47,050	50%	40,240	86%	43%
Teton	113,200	58,250	51%	14,800	25%	13%
Roule Biggs	64,120	64,120	100%	64,120	100%	100%
Lick Rock	101,060	101,060	100%	101,060	100%	100%
Pine Butte	87,170	25,960	30%	0	--	--
Deep Creek	104,700	40,850	39%	0	--	--
W Fk Beaver	142,420	120,830	85%	78,920	65%	55%
S Fk Willow	120,730	97,380	81%	50,620	52%	42%
Scapegoat	100,900	58,030	58%	30,350	52%	30%
Falls Creek	84,950	30,540	36%	0	--	--

Analysis Methods

Summer and fall are likely the periods of most widespread motorized use on the RMRD. **These are also seasons for which specific wildlife habitats are not generally mapped, because most species considered in this analysis range widely during these seasons and** have seasonal habitat needs encompassing all of the RMRD and portions of adjoining lands. **BMU Subunits provide an appropriate scale at which to focus analysis of potential impacts to grizzly bears and other wildlife during summer.** In order to look at the potential influence of summer and fall recreational motorized travel on grizzly bears **and other wildlife**, the total number of acres outside the potential zone of influence of motorized routes during summer and fall by Bear Management Unit (BMU) Subunit were calculated, using the buffer method described above under the "Spring Habitats" section. These figures complement the spring range analysis by providing a measure of the relative level of grizzly bear **and other wildlife habitat** security that would occur under each alternative during the periods of greater and potentially more dispersed motorized travel on the RMRD. For this analysis, the percent of each unit outside the buffered area was calculated for the portion of the unit inside the National Forest boundary only, since this is the portion of the unit directly influenced by FS travel management decisions. While not as detailed and complex an analysis as the IGBC access models, the results of this analysis parallel the results of the IGBC models. This issue is discussed in more detail below. **Analysis specific to grizzly bears, using the IGBC model and the Cumulative Effects Model, has been completed for the Existing Situation and the alternative chosen for implementation. This analysis can be found in the Biological Assessment in the Project File, and results are summarized in the Record of Decision.**

a. Alternative 1 - No Action Alternative

1. Direct and Indirect Effects

The table below shows the total acreage beyond 500m of open motorized routes, as well as the % of each BMU Subunit within the National Forest boundary that is outside the 500m buffer, by season and by grizzly bear BMU Subunit for the all Alternatives. Figures are rounded to the nearest 10 acres. Percentages are rounded to the nearest whole number. For the No Action Alternative, motorized routes open during the summer (July 1 – August 31) are the same as those open during the fall (1 September – 30 November). This is because the RMF Guidelines assign September 1 as the biological start of fall for bears, and most fall closures are related to general big-game hunting season, which begins on or about October 15. Therefore summer and fall for Alternative 1 are combined in the Table III-90.

At least one-half of each Subunit except the Two Medicine Subunit is outside the potential influence zone of motorized travel during summer and fall. The Two Medicine Subunit is in the northern portion of the Badger-Two Medicine area, and includes the primary area used by OHVs on the RMRD.

Table III-90. Total Acreage and % Beyond 500m of Open Motorized Routes by BMU Subunit – Fall and Summer- by Alternative

Subunit	Alt. 1	Alt. 2	Alt. 3	Alt. 4		Alt. 5	
				Fall only	Summer only	Fall only	Summer only
Badger Two Medicine Area:							
Badger	32,890 58%	35,640 63%	56,370 100%	51,870 92%	51,870 92%	56,340 99%	56,340 99%
Heart Butte	28,120 84%	31,100 93%	33,380 100%	31,830 95%	31,830 95%	33,380 100%	33,380 100%
Two Medicine	19,790 42%	25,540 54%	45,550 96%	31,300 66%	31,300 66%	46,490 98%	46,490 98%
Birch South Area:							
Birch	43,020 91%	44,030 94%	47,050 100%	44,030 94%	44,030 94%	44,030 94%	44,030 94%
Deep Creek	25,800 63%	26,960 66%	38,990 95%	36,300 89%	38,950 95%	36,300 89%	38,950 95%
Falls Creek	22,010 72%	30,540 100%	30,540 100%	30,540 100%	30,540 100%	30,540 100%	30,540 100%
Pine Butte	15,320 59%	16,960 65%	23,700 91%	23,150 89%	23,700 91%	23,150 89%	23,700 91%
Scapegoat	53,520 92%	55,310 95%	56,350 97%	55,310 95%	55,310 95%	55,310 95%	55,310 95%
South Fork Willow	78,690 81%	80,890 83%	88,630 91%	81,760 84%	81,760 84%	81,760 84%	81,760 84%
Teton	44,450 76%	44,590 77%	52,850 91%	50,060 86%	50,060 86%	50,060 86%	50,060 86%
West Fork Beaver	108,320 90%	108,140 89%	115,540 96%	109,550 91%	109,550 91%	109,540 91%	109,550 91%

Percents are the portion of each BMU Subunit within the National Forest boundary that is beyond the 500m buffer. Under Alternatives 1, 2, and 3, motorized routes open during the summer (July 1 – August 31) are the same as those open during the fall (September 1 – November 30), therefore figures are combined. Under Alternatives 4 and 5, some additional routes would be open for handicapped hunting accessibility during the fall that would not be open to motorized use during the summer. Therefore, those figures are shown separately.

b. Action Alternatives 2-5

1. Direct and Indirect Effects

For Alternatives 4 and 5 some additional routes would be open for handicapped hunting accessibility during the fall that would not be open to motorized use during the summer. Because of these additional open fall routes, summer and fall are calculated separately for Alternatives 4 and 5 as shown in Table III-90 above.

All of the Action Alternatives would increase the amount of area outside the 500m buffer for all Subunits. The differences between Alternatives 1 and 2 are not as great as between Alternative 1 and Alternatives 3, 4, and 5. The increase in secure area in the Falls Creek Subunit would not be meaningful on the ground. Although some trails in the Falls Creek

Subunit are open to motorized travel according to the existing Travel Plan, the only access to those trails is across private land where travel by motorized means is prohibited. **The trails in this area were included in access calculations, however, because motorized access could occur in the area if the landowner's preferences change or if motorcycles enter via other points on private land.**

Alternative 3 represents the maximum amount of area secure from influence by motorized travel that can be achieved while allowing motorized travel on main access roads and roads to recreation sites.

The IGBC developed interim direction for access management on public lands in occupied grizzly bear habitats in 1995 and updated them in 1998 (Interagency Grizzly Bear Committee 1998a). The access guidelines included specific methods for calculating density of access routes and for calculating secure or "Core" areas outside the influence of access routes. High-use non-motorized routes are to be included in density and core calculations. The guidelines also recommended maximum densities of total and open motorized routes, as well as the minimum percent of a Subunit to achieve or maintain in Core.

In 1998, modifications were proposed to the Interim Access guidelines to address problems in application of density objectives and in the biological validity of the core area calculations (IGBC 1998b). The Proposed Rule Set would change objectives for route densities as well the methods used to calculate core areas, in order to better capture specific seasonal habitats used by grizzly bears in those areas. It would also recognize several important differences in grizzly bear ecology and land management on the east side of the Continental Divide as compared to the west side (IGBC 1998b, IGBC 2002).

Neither of these sets of guidelines have been formally adopted by the LCNF. The LCNF has continued application of seasonal restrictions based on the RMF Guidelines to provide secure habitat for grizzly bears, in keeping with the recommendations in the Proposed Rule Set. **Motorized route densities and Core areas were calculated for the Existing Condition and the alternative chosen for implementation, using the Interim Guidelines as applied by the Flathead National Forest with some modifications for database differences on the LCNF. The results of that analysis are included in the Biological Assessment (BA) in the project file, and are summarized in the Record of Decision. The calculations for route density and Core are complex and require manipulation of a very large and detailed database at the scale of this analysis. It was therefore not practical to carry out that level of analysis for all Alternatives. Doing so would have required an enormous amount of data manipulation, which carries a significant risk of error.**

In an attempt to see whether the calculations made for Table III-90 could approximate Core, and therefore whether the results could be compared to the target values set by the Interim Guidelines, the percent of each BMU Subunit in Core was compared for the Existing Situation with the percent of each BMU Subunit outside the 500m buffer (simple buffer method) as calculated for Table III-90. For all Subunits, the Core calculation predicted less secure habitat than that predicted by the simple buffer method, by an average of about 9%. This is because: 1) The Interim Guidelines method excludes high-use non-motorized trails in addition to motorized routes from Core, whereas the simple buffer method excluded only motorized routes from secure areas, 2) the Interim Guidelines method excludes all open motorized routes from Core, whereas the simple buffer method excluded only routes open ≥25% of the season from secure areas (note that the proposed changes to the Guidelines would apply the 25% rule; IGBC 1998b), and 3) the Interim Guidelines method includes only patches >2500 acres in Core, whereas the simple buffer method includes all habitat outside the buffered

routes as potentially secure habitat, regardless of size. Therefore the simple buffer method used in this analysis does not approximate Core, as defined in the Interim Guidelines, well enough to compare the results with the target values of the Interim Guidelines. The Proposed Guidelines, however, move away from specific Core percentage goals east of the Continental Divide, and recommend that important seasonal habitats be identified and avoided during their season of importance (IGBC 2002). Continued application of the RMF Guidelines under all Alternatives will help achieve that goal. All Action Alternatives would also increase the amount of secure habitat, calculated by any method, as compared with the Existing Situation. This also is in keeping with the direction in the Proposed Guidelines.

c. Effects Common To All Alternatives

None known.

d. Effects Common To All Action Alternatives

Under all Action Alternatives the Falls Creek Subunit would become entirely non-motorized. This result is not meaningful on the ground, however, as the entire Subunit is effectively non-motorized under the Existing Condition due to prohibitions on motorized access by private landowners who control access into this area. Changes in all Action Alternatives to make the area non-motorized were made in part to reflect this management reality.

SNOWOBILE TRAVEL

The miles of trail available for wheeled motorized travel in winter ranges is relatively low for most species, and most motorized trails are likely unavailable for wheeled travel during the majority of the winter season. The potential for disturbance or displacement from wheeled motorized travel on the portion of winter ranges on the National Forest is therefore likely to be very small. The potential for displacement of wildlife during winter due to snowmobile travel is a more valid analysis.

Although snowmobile use in some areas is likely to occur on trails, mileages were not calculated for winter travel except to compare the mileage of designated system snowmobile trails under each alternative. This is because in all Action Alternatives travel management for snowmobiles was not assigned to any trails except a very few identified as system snowmobile trails. Rather, areas where snowmobiling would be permitted were identified in development of each alternative, and it was assumed that in many of those areas snowmobile travel could occur either on or off trail, depending on terrain, snow conditions, and other factors. Under the current Travel Plan, furthermore, there are some areas in which trails closed to snowmobiles occur within areas open to snowmobiles, resulting in a situation in which it is apparently legal to travel by snowmobile adjacent to but not on the trail. Acreage, therefore, appears to be a more appropriate measure of the potential impact of snowmobile travel on wildlife seasonal ranges.

The concern regarding the potential of designated snowmobile routes to create compacted snow in lynx habitat is a separate issue and will be addressed in a more detailed fashion in a separate section.

WILDLIFE SECURITY WITHIN SEASONAL HABITATS – WINTER SNOWMOBILE TRAIL MILES

Analysis Methods

The analysis in this section addresses grizzly bear, elk, bighorn sheep, and mountain goats and is intended to be a part of the overall analysis of potential impacts to key seasonal habitats for these species.

a. Alternative 1 - No Action Alternative

1. Direct and Indirect Effects

Table III-92 displays the mileage of designated system snowmobile routes open during identified seasons in key seasonal wildlife habitats under the No Action Alternative (Alternative 1; Existing Condition). Due to the structure of the database, it was not possible to select routes based on whether they would be open for ≥ 25% of the season of concern. Therefore the mileages below reflect the miles of snowmobile route within identified habitats regardless of use dates. Because elk calving and mountain goat kidding restriction dates begin May 1, however, it was assumed that little if any snowmobiling would influence those habitats. Bighorn sheep winter and lambing ranges are not displayed or discussed because there would be no mileage of designated snowmobile trails in those habitats. Figures are rounded to the nearest mile.

Table III-92. Mileage of Designated Snowmobile Trail Open to Snowmobiles in Wildlife Seasonal Habitats – by Alternative

Wildlife Seasonal Habitats	Area	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Grizzly Bear Denning	Badger Two	2	2	<1	2	0
	Birch South	<1	0	0	0	0
	Totals	2	2	<1	2	0
Grizzly Bear Spring	Badger Two	24	24	3	24	0
	Birch South	1	1	0	1	1
	Totals	25	25	3	25	1
Elk Winter	Badger Two	2	2	0	2	0
	Birch South	0	0	0	0	0
	Totals	2	2	0	2	0
Mountain Goat Yearlong	Badger Two	3	3	0	3	0
	Birch South	0	0	0	0	0
	Totals	3	3	0	3	0

The greater mileage associated with grizzly bear spring range as compared with the other habitats reflects, as in the analysis of wheeled motorized use, that grizzly bear spring habitat tends to occur in valley bottoms and riparian areas. Most of the miles of open trail in grizzly bear spring habitat is the snowmobile trail along the Two-Medicine River and North Badger Creek in the Badger-Two Medicine area. In most years, however, this route is not available to snowmobiles after April 1 due to breakup of the numerous ice and snow bridges crossing the Two-Medicine River.

b. Action Alternatives 2-5

1. Direct and Indirect Effects

Table III-92 above displays the mileage of designated routes open to snowmobiles during identified seasons in key seasonal wildlife habitats under the Action Alternatives 2-5.

The most notable changes would occur with respect to grizzly bear spring habitat in Alternatives 3 and 5. These reflect closure of the Two-Medicine/Puzzle Creek route discussed under Alternative 1, as both alternatives would restrict the entire Badger-Two Medicine area to snowmobiles. The lower mileage in grizzly bear spring range in Alternative 5 as compared to Alternative 3 is because in Alternative 5 no snowmobiling would be allowed anywhere in the Badger-Two Medicine area, whereas in Alternative 3 a short section of the Pike Creek Road would remain open to snowmobiles, allowing access to connecting trails on the Flathead National Forest. It is important to note, however, that the differences between both Alternatives 3 and 5 and the other Alternatives (including the No Action) may not be meaningful. By the time grizzly bears emerge from their dens, generally in early April, the Two-Medicine/Puzzle Creek route is rarely available for snowmobile travel.

With respect to grizzly bear denning, elk, and mountain habitat there is very little difference among any of the Alternatives, including the No Action Alternative, in the amount of designated snowmobile trail open to snowmobiling in key habitats.

c. Effects Common To All Alternatives

Under all Alternatives some roads would be open to snowmobile travel. These roads are not specifically designated snowmobile routes, and are available intermittently to snowmobile travel depending on snow conditions. All are within areas open to snowmobiles, and are thus accounted for in the analysis of acreage open to snowmobiles within seasonal habitats. The mileage of road available to snowmobiles would not differ under any alternative. Mileage within seasonal habitats is approximately as follows: grizzly bear spring habitat – 25 miles, yearlong goat habitat – 1 mile, elk winter range – 12 miles, and sheep winter range – 7 miles.

d. Effects Common To All Action Alternatives

None.

WILDLIFE SECURITY WITHIN SEASONAL HABITATS – WINTER SNOWMOBILE ACREAGES

Analysis Methods

For impacts during winter, the acres of habitat open to snowmobiling during the identified winter range season for each species was calculated. As with the analysis for wheeled travel, an area must be open to snowmobiling for ≥25% of the critical seasonal period for each species in order to be considered in the ‘open’ acreage calculations.

The numbers in the tables below represent the maximum potential acreage available to snowmobiles without consideration of terrain, vegetation, access, etc. Therefore the numbers represent an estimate of the maximum possible acreage open to snowmobile use. Steep slopes, rocks and cliffs, dense vegetation, windblown areas, and other factors combine to restrict the

area actually available to snowmobilers below that indicated by the acreages presented. As noted for wheeled travel, the amount of area experiencing influence from snowmobile activity at any one time will be small, localized, and changing as the snowmobiles travel through the landscape. The numbers in the tables below, then, show the total area that is available within key habitats in which localized, temporary disturbances may occur.

a. Alternative 1 - No Action Alternative

1. Direct and Indirect Effects

Table III-93 displays the acreage open to snowmobile use on the RMRD during identified seasons in key seasonal wildlife habitats under the No Action Alternative (Alternative 1; Existing Condition), and the percent of **on-Forest** seasonal habitat that this represents. **Only the portion of seasonal habitats on NF lands was included because that is the only portion influenced by this travel management decision, and to facilitate splitting the analysis into separate decision areas.**

Only those areas open to snowmobile use for ≥25% of the dates identified in the RMF Wildlife Guidelines were included. Mountain goat kidding and elk calving ranges are not included because the dates of importance for those habitats begin May 1, when snowmobiling activity is likely minimal or nonexistant. Acreages are rounded to the nearest 10 acres.

Table III-93. Acreage and Percent of Total Seasonal Habitat Open to Snowmobiles in Wildlife Seasonal Habitats – by Alternative

Seasonal Habitat	Area	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Grizzly Bear Spring	**Badger Two**	**27,470 (59%)**	**25,120 (54%)**	**0**	**18,350 (39%)**	**0**
	Birch South	**68,550 (43%)**	**38,070 (24%)**	**0**	**26,310 (17%)**	**26,310 (17%)**
	TOTALS	96,020 **(47%)**	63,190 **(31%)**	**0**	44,660 **(22%)**	26,310 **(13%)**
Grizzly Bear Denning	**Badger Two**	**11,150 (25%)**	**6,920 (15%)**	**0**	**4,380 (10%)**	**0**
	Birch South	**82,710 (29%)**	**51,300 (18%)**	**65 (<<1%)**	**27,340 (9%)**	**27,340 (9%)**
	TOTALS	93,860 (28%)	58,220 (17%)	**65 (<<1%)**	31,720 **(10%)**	27,340 (8%)
Elk Winter	**Badger Two**	**12,690 (52%)**	**10,180 (42%)**	**0**	**8,080 (33%)**	**0**
	Birch South	**42,240 (71%)**	**33,730 (57%)**	**0**	**28,000 (47%)**	**28,000 (47%)**
	TOTALS	54,940 **(66%)**	43,920 **(53%)**	0	36,080 **(43%)**	**28,000 (33%)**
Bighorn Sheep Lambing	**Badger Two**	**na***	**na**	**na**	**na**	**na**
	Birch South	**28,750 (81%)**	**18,140 (51%)**	**0**	**15,200 (43%)**	**15,200 (43%)**
	TOTALS	28,750 **(81%)**	18,140 **(51%)**	0	15,200 **(43%)**	15,200 **(43%)**
Bighorn Sheep Winter	**Badger Two**	**220 (46%)**	**220 (46%)**	**0**	**0**	**0**
	Birch South	**48,340 (73%)**	**37,210 (56%)**	**0**	**31,000 (47%)**	**31,000 (47%)**
	TOTALS	48,560 **(73%)**	37,430 **(56%)**	0	31,000 **(46%)**	31,000 **(46%)**
Mountain Goat	**Badger Two**	**8,690 (22%)**	**4,030 (10%)**	**0**	**1,080 (3%)**	**0**

Seasonal Habitat	Area	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Yearlong	**Birch South**	**84,180 (40%)**	**48,730 (23%)**	**170 (<<1%)**	**26,710 (13%)**	**26,710 (13%)**
	TOTALS	92,870 **(37%)**	52,760 **(21%)**	170 <<1%	27,790 (11%)	26,710 **(11%)**
Wolverine Natal Denning	**Badger Two**	**330 (26%)**	**250 (20%)**	**0**	**40 (3%)**	**0**
	Birch South	**2,580 (23%)**	**1,290 (11%)**	**0**	**640 (6%)**	**640 (6%)**
	TOTALS	2,917 (23%)	1,540 (12%)	0	680 (5%)	640 (5%)

* No bighorn sheep lambing habitat has been mapped in the Badger-Two Medicine area

Actual spring use areas may be even more constricted than those used during winter, because access into many areas may be made difficult due to melting snowpack at lower elevations, open stream crossings, muddy roads, etc.

b. Action Alternatives 2-5

1. Direct and Indirect Effects

Table III-93 above displays the acreage open to snowmobiles on the RMRD during identified seasons in key seasonal wildlife habitats under Action Alternatives 2-5. Comparison of the five Alternative maps for winter travel with those depicting seasonal wildlife habitats (Maps 4, 23-26) will help further illustrate the size and location of areas open to snowmobiles on the RMRD relative to total wildlife seasonal ranges.

All of the Action Alternatives would reduce the acreage open to snowmobiles during winter and spring seasons as compared to the No Action Alternative. It is possible that the acreage used by snowmobiles could be more similar among the Action Alternatives (except Alternative 3) than represented by the figures above, because we do not have figures for the actual acreage useable by snowmobiles based on terrain, snow conditions, vegetation, etc.. The location and size of these areas may actually be the same or similar under all alternatives. Spring use may be even more constricted than use during winter, because access into many areas may be made difficult due to melting snowpack at lower elevations, open stream crossings, muddy roads, etc.

In Alternative 3, the only snowmobiling allowed would be continuing permitted use associated with operation of the Teton Pass Ski Area, which overlaps mapped grizzly bear denning habitat as well as mapped mountain goat winter range. **Because the ski area has been in operation for many years, it is likely that grizzly bears, mountain goats and other wildlife have long since adjusted to any disturbance associated with snowmobile travel there.**

The reduction in acreage in Alternative 5 as compared to Alternative 4 for some species reflects the prohibition on snowmobiling throughout the Badger-Two Medicine area in Alternative 5. The degree of change between these alternatives differs for different species, depending both on the quantity of habitat within that area as well as the degree of restriction within those habitats under Alternative 4.

Whether the reduction in acreage open to snowmobiles in the Action Alternatives as compared to the Existing Condition or in any of the Action Alternatives relative to the others

would result in any measurable impacts to wildlife populations in terms of survival or reproduction is not possible to determine. Elk generally move to portions of winter range that have minimum snow depth, for ease of access to forage. Most of those areas are either off-Forest or are unlikely to have use by snowmobiles due to the lack of snow. Likewise, sheep select for areas of little snow accumulation in their winter range, as well as for steep areas near cliffs. Although there is conflicting evidence regarding the potential for denning grizzly bears to be disturbed by snowmobile activity, all of the Action Alternatives would greatly reduce that potential.

c. Effects Common To All Alternatives

None.

d. Effects Common To All Action Alternatives

All of the Action Alternatives would reduce the percentage of wildlife seasonal habitats potentially influenced by snowmobile travel.

POTENTIAL EFFECTS OF SNOW COMPACTION ON CANADA LYNX.

Concern about over-snow travel in Canada lynx habitat centers around the amount of compacted snow in lynx habitat. Reudiger et al. (2000) cite information that suggests plowed roads and groomed over-the-snow routes may allow competing carnivores to access lynx habitat in winter, increasing competition for prey. Although some recent research indicates that this may be less a concern in some areas than originally thought **(USDI FWS 2003)**, the LCAS currently sets a standard of "no net increase in groomed or designated over-the-snow routes and snowmobile play areas by LAU" (Reudiger et al. 2000). Designated over-the-snow routes and play areas refers to "over-the-snow routes (such as trails) and snowmobile play areas (usually large, open areas) that are 'designated', that is, specifically marked on a map, described in the resource or forest plan, or signed. This definition does not apply to ski areas" (Lynx Wolverine Steering Committee memo dated October 23-24, 2001).

Analysis Methods

There are no designated snowmobile play areas on the RMRD. Nevertheless, to address the potential for snowmobile use in lynx habitat, we calculated the total acreage open to potential snowmobile use in lynx habitat by alternative. We also calculated the mileage of over-the-snow route by including only those routes specifically identified in the 1988 Travel Plan or in each alternative as a designated snow trail or cross-country ski trail. This is consistent with the analysis completed for consultation with the USDI Fish and Wildlife Service on the LCNF ongoing actions completed in 2000 subsequent to listing of the Canada lynx as a threatened species . The mileage of road that would be plowed or open to snowmobiles was not considered in the 2000 analysis and would remain the same under each Alternative. Therefore it will not be considered here. Roads represent existing and ongoing compacted or plowed routes that would continue to exist, providing limited and localized potential access for competing carnivores.

For reference purposes, Table III-94 shows the total acreage of each LAU, the acreage of **mapped lynx foraging and denning** habitat within each LAU, and the percent of each LAU that is **mapped** lynx habitat. **Numbers in this table and in Tables III-95 and III-96 below differ from those shown in the DEIS due to a more conservative estimate of lynx habitat. In the DEIS, areas that were mapped as potential lynx "travel" habitat (habitat that may connect patches of lynx foraging or denning habitat but that does not likely function as foraging habitat for lynx) were included in the lynx habitat totals. These areas, however, should not be included in total calculations of lynx habitat because they do not likely contain populations of snowshoe hare, the primary prey of lynx. Including mapped travel habitat incorrectly overestimates functional lynx habitat. The analyses discussed below, therefore, are based only on habitat mapped as suitable for lynx foraging and/or denning.**

Table III-94. Acres of Lynx Habitat

LAU Name	Total Acres in LAU	Acres Lynx Habitat	% LAU in Lynx Habitat
Badger Two Medicine Area:			
RM1	23,210	**7,850**	**34%**
RM2	22,910	**12,220**	**53%**
RM3	38,360	**11,410**	**30%**
RM4	30,400	**4,170**	**14%**
RM5	23,240	**1,980**	**9%**
SUBTOTAL	**138,120**	**37,630**	**27% of Total Badger-Two LAU acreage in Lynx Habitat**

LAU Name	Total Acres in LAU	Acres Lynx Habitat	% LAU in Lynx Habitat
Birch South Area:			
RM6	27,360	**9,510**	**35%**
RM7	22,780	**9,750**	**43%**
RM8	37,350	**19,360**	**52%**
RM9	20,310	**8,770**	**43%**
RM10	27,830	**14,540**	**52%**
RM11	34,650	**8,440**	**24%**
RM12	22,710	**7,880**	**35%**
RM13	21,440	**9,580**	**45%**
RM14	27,160	**10,230**	**38%**
RM15	19,310	**7,040**	**36%**
RM16	27,650	**12,120**	**44%**
RM17	37,900	**17,210**	**45%**
RM18	15,650	**8,440**	**54%**
RM19	29,200	**15,910**	**54%**
RM20	20,520	**13,460**	**66%**
RM21	30,320	**19,440**	**64%**
RM22	24,770	**10,010**	**40%**
RM23	19,470	**10,330**	**53%**
RM24	23,900	**7,390**	**31%**
RM25	19,900	**2,720**	**14%**
RM26	15,750	**4,710**	**30%**
RM27	25,350	**3,560**	**14%**
SUBTOTAL	**551,280**	**230,400**	**42% of Total Birch-South LAUacreage in Lynx Habitat**
TOTAL	**689,400**	**268,010**	**39% of Total LAU acreage in Lynx Habitat**

a. Alternative 1 - No Action Alternative

1. Direct and Indirect Effects

Table III-95 shows the acreage of lynx habitat open to snowmobile use under the No Action Alternative (Alternative 1), as well as the percent of total lynx habitat open to snowmobile use. Acreages are rounded to the nearest 10 acres. **Percentages for the Badger-Two Medicine and Birch-South areas are the percent of lynx habitat *in that area only* that would be open to snowmobiling. The percent listed in the "Total" row is the percent of total lynx habitat on the RMRD that would be open to snowmobiling.**

Table III-95. Snowmobile Acres in Lynx Habitat and Percent of Total Lynx Habitat

Area	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Badger-Two Medicine Area	**20,704 (55%)**	**13,870 (37%)**	**0**	**13,130 (35%)**	**0**
Birch-South Area	**67,450 (29%)**	**28,771 (12%)**	**125 (<1%)**	**23,587 (10%)**	**23,587 (10%)**
Total	**88,150 (33%)**	**42,640 (16%)**	**125 (<1%)**	**36,720 (14%)**	**23,587 (9%)**

Table III-96 shows the mileage of designated over-snow routes (trails designated on maps or other official documentation as snowmobile trails or cross-country ski trails) open to snowmobiling by LAU in lynx habitat for the No Action Alternative. Only those LAUs with designated over-the-snow routes open to snowmobiling are displayed in the table. Mileages are rounded to the nearest mile. The entry '<1' is used to note where less than one mile of route is open in an LAU, to avoid discounting the LAU as a potential, albeit minor, contributor to snow compaction.

Table III-96. Miles of Designated Over-the-Snow Routes Open to Snowmobile Travel in Lynx Habitat by LAU

Area	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Badger Two Medicine Area:					
RM1	**<1**	**<1**	**<<1**	**<1**	**0**
RM2	**6**	**6**	**<1**	**6**	**0**
RM3	**3**	**3**	**0**	**3**	**0**
SUBTOTAL	**10**	**10**	**1**	**10**	**0**
Birch South Area:					
RM9	**2**	**2**	**1**	**2**	**2**
SUBTOTAL	**2**	**2**	**2**	**2**	**2**
TOTAL	**12**	**12**	**3**	**12**	**2**

The RM1, RM2, and RM3 LAUs are in the Badger-Two Medicine area. The miles of snowmobile trail in those units are due to the presence of the Two Medicine/Puzzle Creek trail.

b. Action Alternatives 2-5

1. Direct and Indirect Effects

Table III-95 above shows the acreage of lynx habitat open to snowmobile use under the Action Alternatives 2-5, as well as the percent of total lynx habitat open to snowmobile use. Acreages are rounded to the nearest 10 acres.

These figures should be interpreted only as a relative index of potential snowmobile activity. The RMRD has no designated snowmobile play areas and very few areas used as play areas, due to the lack of expanses of open ground with sufficiently predictable snow to cover vegetation and rock.

Although both the total acreage and the percent of lynx habitat potentially open to snowmobiling is less in the Action Alternatives than in the No Action Alternative, it is likely that the differences among alternatives are smaller than represented in the above tables. It is possible that the actual area used by snowmobilers may be similar under Alternatives 1, 2, and 4. Smaller areas in Alternatives 3 and 5 reflect restriction of off-road snowmobile use throughout the RMRD in Alternative 3, and restriction of all snowmobile use in the Badger-Two Medicine area in Alternative 5. Therefore these alternatives represent a genuine decrease in the amount of lynx habitat potentially affected by snowmobile use. The small amount of

area open to snowmobiles in Alternative 3 is associated with operation of Teton Pass Ski Area.

Alternatives 2 and 4 retain the same mileage of designated over-the snow route as Alternative 1. The reduction in over-the-snow routes in Alternative 3 can be attributed to restriction of snowmobiles on all routes except a portion of the Pike Creek Road in RM1 and RM2 that connect to snowmobile trails on the Flathead National Forest. The remaining mile of over-the-snow route in Alternative 3 in RM9 is the North Fork Waldron Creek cross-country ski trail, which would be open to skiing under all alternatives. Overall, the miles of designated over-the-snow route are small for all alternatives, and very little lynx habitat would experience snow compaction and potential introduction of competing predators into lynx habitat under any alternative.

c. Effects Common To All Alternatives

None.

d. Effects Common To All Action Alternatives

None.

POTENTIAL IMPACT OF RECREATIONAL TRAVEL ON WILDLIFE HABITAT CONNECTIVITY.

This issue was identified through internal scoping and through public comment. It was expressed primarily as a concern that motorized travel, in particular, might potentially disrupt seasonal migration routes or other connections between wildlife habitats.

Wildlife Habitat Connectivity

Connectivity is a concept that is receiving increasing attention in the realm of wildlife and conservation biology. It generally refers to the combined quantity and pattern of wildlife habitat in a particular area at a specified scale. More specific definitions of connectivity vary widely. Many conceptual models have been built to project connectivity across landscapes. These models vary widely in terms of the scale of connectivity addressed and the means by which it is expected to be achieved. Empirical data supporting or validating these models has generally been lacking, contributing to controversy surrounding both the concept of connectivity and the methods used to address it. Nevertheless, there is general agreement among wildlife scientists that connectivity should be addressed in land use planning and habitat management, particularly with respect to road management.

Two terms have been widely used to discuss connectivity. Corridors have been defined as strips of land that differ from the surrounding land type (Forman and Godron 1986). Corridors may be thought of as providing movement or access among habitat patches that collectively make up the components of an individual's or population's entire home range or annual habitat. Corridors may be necessary components of year-round habitat for certain species and populations, connecting seasonal habitats dispersed across a landscape (migration corridors). Corridors may also provide opportunities for dispersal of individuals to other areas within occupied habitat or to suitable but previously unoccupied habitat (dispersal corridors). Breaks in habitat may impact movement both along and across corridors (Forman and Godron 1986).

Another term, 'linkage zones', has been used to describe connectivity among habitats at a larger scale. Linkage zones have been defined as areas "between larger blocks of habitat where animals can live at certain seasons and where they can find the security they need to successfully move between these larger habitat blocks" (Servheen et. al 2003). Linkage zones may be thought of at a larger scale than corridors, providing habitat for low density wildlife populations often as seasonal residents (Servheen et al. 2003). Linkage zones connect larger and potentially more discrete blocks of habitat and populations, generally through a matrix of unsuitable or inhospitable habitat. Linkage zones may provide connection within a population across areas of generally unsuitable habitat, they may connect metapopulations across a landscape, or they may provide dispersal opportunities between suitable habitats. Both corridors and linkage zones may be necessary for maintaining healthy and diverse wildlife populations.

The RMRD is unique among National Forest lands in the region, in that it encompasses a rapid transition between high-elevation alpine and subalpine habitats along the Continental Divide to mid-grass prairie immediately east of the district boundary. Flora and fauna change dramatically from west to east, within the space of anywhere from roughly 6 to 22 miles, as landform, moisture, and habitat change across that gradient. Because of this geography, connectivity on the RMRD can be thought of in two distinctly different ways.

East-west connectivity on the RMRD refers primarily to the ability of a variety of species to move between seasonal ranges across all or a portion of the alpine-to-prairie gradient. East-west connectivity is probably best thought of in terms of seasonal migration corridors, and to

probably a lesser extent in terms of dispersal corridors. An example is elk habitat; elk use the higher elevation mountains of the western portion of the district and adjoining Flathead, Lolo, and Helena National Forest lands during the summer, and travel to winter ranges at and beyond the eastern RMRD boundary. East-west connectivity on the RMRD may also be important in maintaining a diverse array of wildlife species for which the transitional habitats along the east-west gradient are key to survival and persistence.

North-south connectivity refers to the ability of the RMRD to serve as a link between wildlife habitats and populations to the north in Glacier National Park and Canada, and those in the mountain ranges of central and southern Montana. Ultimately, the RMRD is considered by some to be a link between the ecosystems to the north and the Greater Yellowstone Ecosystem to the south. This link is considered important by some for the maintenance of healthy carnivore populations in the northern Rocky Mountains. The major interruptions or potential fractures in the connectivity of north-south habitats occur at the north boundary of the RMRD (U.S. Highway 2) and beyond the south boundary (MT Highway 200), while the RMRD remains a relatively contiguous piece of habitat including and bounded on the west by substantial areas of protected Wilderness. Thus the RMRD cannot be thought of as a linkage zone in the sense that it is not a constricted area of low-density wildlife occupation occurring between larger blocks of more suitable habitat. Nevertheless, attention should be paid to the potential for land management decisions to impact north-south connectivity within the RMRD.

Most discussions of connectivity focus on the influence of roads, developed sites, and conversion of vegetation either by timber harvest or agricultural practices. Few if any analyses of connectivity have considered the potential effects of motorized trails. This is likely due in part to a lack of information regarding actual impacts of these routes. Although many motorized routes on the RMRD receive very little motorized use under the Existing Condition and fewer would under the Action Alternatives, each alternative will assess the relative potential to contribute to overall landscape connectivity.

Analysis Methods

To arrive at an overall measure of the potential of each alternative to maintain connectivity across the entire RMRD, a basic patch size analysis was conducted. Roads and trails that would be open for $\geq$ 25% of the summer (defined as from July 1 to October 15) were selected, because that is the season when the greatest total mileage and widest distribution of motorized routes would be open across the RMRD under any Alternative. Therefore summer represents the most conservative picture of habitat connectivity of all seasons. Although winter motorized use could occur throughout portions of the RMRD under some alternatives, the pattern of that use would generally be dispersed and not as predictable.

All open motorized routes were buffered by 500 meters as in other analyses. The polygons remaining outside the buffered were sorted area by size, and assigned to one of 4 categories: < 100 acres, 100-500 acres, 500-1000 acres, and >1000 acres. This allowed comparison among alternatives of the number of patches within a particular size range. Please refer to Maps 5-9 for a visual depiction of this analysis. There are few if any recommendations regarding the mix of patch number and size required to maintain habitat connectivity or linkages for various species. In general, however, a smaller number of larger patches is considered to represent greater connectivity than a larger number of smaller patches.

We have chosen not to display the connectivity analysis by the separate decision areas (Badger-Two Medicine and Birch-South) as we did for the other wildlife analyses. The connectivity analysis is a very broad-scale one, suited best to display over an entire landscape. In particular, the patch analysis presented in Table III-97 below is a general representation that would not benefit from separating into specific areas. Maps 5-9 allow visual interpretation of the potential connectivity in each decision area for each alternative.

a. Alternative 1 - No Action Alternative

1. Direct and Indirect Effects

Table III-97 displays the number of patches by size class for the No Action Alternative.

Table III-97. Total Number of Patches ≥10 acres and Number of Patches ≥10 acres by Size Class

Patch Size	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
Patch Size <100 Acres	18	5	0	0	1
Patch Size 100-500 Acres	20	12	0	8	5
Patch Size 500-1000 Acres	12	8	0	4	4
Patch Size >1000 Acres	21	17	2	6	2
Total Number of Patches	71	42	2	18	12

b. Action Alternatives 2-5

1. Direct and Indirect Effects

All of the Action Alternatives would reduce the total number of separate patches as compared to the No Action Alternative. Alternative 3 represents the minimum amount of buffered area, and therefore the minimum number of separate patches of all alternatives since motorized use in that alternative would be confined strictly to existing roads.

As shown in Maps 5-9, for all alternatives except Alternative 3 the smaller patches are located along the eastern and (also excepting Alternative 5) northern edges of the RMRD. Large areas outside the potential influence zones of motorized travel exist in and near the Wilderness throughout the western and central portions of the RMRD. Alternative 1 represents the most widely dispersed pattern of relatively smaller patches, and thus has the greatest potential to fragment habitat or disrupt connectivity. Alternative 2 reduces the number and constricts the distribution of smaller patches in comparison to Alternative 1. Alternative 4 would limit the smaller patches to a few localized areas thereby confining the potentially disruptive influence of motorized travel to a few specific areas, while large areas would continue to provide both east-west and north-south connectivity. Alternative 5 represents a similar situation, with the exception that the entire Badger-Two Medicine area would be non-motorized.

Currently, many of the trails open to motorized use during summer receive little or no actual use. This is likely to be the case under any alternative that allows motorized use on trails, as well. It is important to keep in mind that the analysis presented here represents the relative potential of each alternative to impact wildlife habitat connectivity, rather than an actual measure of true connectivity as experienced by various wildlife species.

c. Effects Common To All Alternatives

None.

d. Effects Common To All Action Alternatives

All Action Alternatives would reduce the total number of patches outside the potential influence of motorized travel, and would reduce the ratio of small patches to large patches.

CUMULATIVE EFFECTS

Of the activities listed in Appendix M for consideration of Cumulative Effects, the proposed oil and gas drilling, Northwest Energy pipeline expansion, timber harvest, and the 2001 3-state OHV decision have the potential to add to the effects described for wildlife species above. In addition to these, motorized travel on land east of the RMRD boundary is considered as a potential cumulative effect on wildlife seasonal habitats. Please refer to Appendix M for a description of the activities analyzed for Cumulative Effects.

Motorized Travel on non-National Forest Lands

As described in the Existing Condition section, some key seasonal wildlife habitats extend to the east of the National Forest boundary. Approximately 32% of mapped grizzly bear spring habitat, 67% of elk winter range, 60% of elk calving range, 27% of bighorn sheep winter range, and 19% of bighorn sheep lambing habitat occur east of the National Forest boundary off National Forest. In contrast, only 3-4% of mountain goat yearlong and kidding habitats occurs off-Forest, less than 2% of grizzly bear denning habitat, and no mapped wolverine denning habitat occurs off-Forest. For the species whose habitats occur both on and off the RMRD, activity occurring off-Forest may influence wildlife in addition to influences brought about by activity on National Forest.

Based on information used in developing the Eastside Cumulative Effects Model for grizzly bears (Eastside CEM), we estimated the mileage of motorized road or trail on both public and private lands within key wildlife seasonal ranges. Because of differences in datasets, mileages were calculated differently from the way there were calculated for the analysis of potential impacts on the RMRD and are therefore not directly comparable, nor can they be combined to arrive at a total sum. They may, however, provide a rough idea of the potential for additional impacts due to motorized travel.

Some key differences in use of motorized routes off-Forest as compared to on-Forest must be considered when interpreting this information. The patterns of use on off-Forest roads and trails are likely to be very different from the recreational use patterns on Forest roads and trails. Some roads are main access routes to homes or ranch facilities, or connecting routes between such main access roads. Many other roads and trails are not open to the general

public, but are roads and trails on private lands, used for specific purposes often associated with ranching operations. Seasonality of use is likely, but may differ markedly from the seasonal restrictions and use patterns of recreational travel on Forest roads and trails.

The mileages presented in Table III-98 are rough estimates and may either over or underestimate the actual mileage of open motorized routes off National Forest.

Table III-98. Mileage of Open Motorized Routes (Roads and Trails) in Wildlife Seasonal Habitats off National Forest east of the RMRD boundary

Grizzly Bear Spring	Grizzly Bear Denning	Elk Calving	Elk Winter	Bighorn Sheep Lambing	Bighorn Sheep Winter	Mountain Goat Kidding	Mountain Goat Yearlong
1000	0	250	300	3	30	2	2

Once again, the mileage of motorized routes in grizzly bear spring habitat is a reflection of its occurrence in low-elevation riparian areas, where many main access roads occur. Additionally, the mileage of motorized routes in grizzly bear spring habitat and elk calving and winter range as compared to that for other species' habitats reflect the relatively large proportion of grizzly bear and elk habitats that occur off-Forest.

Private lands east of the National Forest boundary have homes, ranch buildings and other centers of human activity that have the potential to cause disturbance or displacement to wildlife in addition to that caused by motorized travel. Complex relationships may also exist between these potential disturbances and the various attractants, such as irrigated fields, hay stacks, or cattle carcasses, that may exist on private land. These considerations, together with the previously mentioned differences in type and seasonality of use, preclude a meaningful estimation or comparison of the potential for displacement that could occur on non- National Forest lands. Processes to carry out this analysis consistently across both National Forest and non- National Forest lands have been developed for grizzly bears (Cumulative Effects Model) and will be applied to a Preferred Alternative when it is chosen and included in the Biological Assessment to be prepared on that alternative.

Oil and Gas Exploration and Development

If any of the 3 recent proposals for natural gas well exploration and development on or adjacent to National Forest (refer to Appendix M for information on these proposals) were to occur, a total of anywhere from 10 to 25 miles of new road could be constructed on National Forest with an additional unknown mileage of new or reconstructed road on private or other non- National Forest lands. The roads to all 3 sites would travel through grizzly bear spring habitat and elk winter range, and the road to the FINA/Longwell site could pass through elk calving habitat, depending on the route chosen. Although any roads constructed or re-constructed for gas well development would be open only to the permittee and would likely be re-claimed if no gas is found or if production ceases, these roads would represent additional potential for disturbance to wildlife during the period in which they would be in use. **Recent legislation has made it very unlikely that any oil or gas exploration or development will occur on the RMRD in the foreseeable future.**

Northwest Energy Pipeline

The expansion of the Northwest Energy pipeline in 2004 **and again in 2006** created a temporary disturbance during the summer months in and adjacent to the existing pipeline right-of-way. Although construction occurred in grizzly bear spring habitat and adjacent to elk calving habitat, it was not allowed to begin until after July 1 to avoid potential impacts to those species. Motorized travel along the right-of-way is allowed only to the permittee for monitoring purposes, and represents an additional limited potential for wildlife disturbance. Clearing and widening of the pipeline right-of-way, in addition to any routes cleared or constructed to access the right-of-way however, **could** increase the potential illegal OHV travel along the right-of-way due in part to access at road and trail crossings. Pipeline expansion therefore represents a potential for increased disturbance and displacement due to illegal motorized travel.

Timber Harvest

Past timber harvest on the RMRD since 1988 has totaled 107 acres. Treatment areas have ranged from 1-20 acres, with treatments ranging from thinning to salvage harvest to clearcutting. Few if any of these activities have occurred on key wildlife seasonal ranges. Therefore it is unlikely that timber harvest activity has resulted in habitat alterations that would incur impacts cumulative to those of travel management. Planned future timber harvest activities are associated entirely with specific fuels-reduction projects. These projects are likely to be small in size and associated with areas near private inholdings or recreation residences. Some may occur in wildlife seasonal habitats but changes in habitats from these projects are unlikely to influence wildlife populations cumulative to travel management decisions.

Management of roads associated with past timber harvest was considered in developing the Action Alternatives and has therefore been included in analysis of the Existing Condition and the Alternatives. No roads are expected to be constructed in association with planned fuels reduction projects. Although no timber harvest activities are currently planned, any road building and management associated with future harvest activity would comply with the standards and guidelines in the Forest Plan, including seasonal restrictions on construction and use, and likely closure of roads after harvest is completed. Therefore there are no anticipated cumulative effects associated with past or future timber harvest.

2001 Three-State OHV Decision

This decision restricted off-trail motorized travel on the entire RMRD. It reduced the total area within any wildlife habitats that might be influenced by motorized travel, and therefore reduced the potential for disturbance and displacement to the zone associated with existing motorized routes. This impact, however, has been included in the Existing Condition and has therefore been analyzed implicitly in Alternative 1 for each issue. No additional Cumulative Effects are anticipated as a result of this decision.

Management of Wildlife Habitat on adjoining Lands

The area to the west of the project area is the heart of the Bob Marshall Wilderness Complex. Wildlife habitats there are subject almost exclusively to natural forces, such as climate and fire, and receive only minimal influence from human activity. Lands east of the NF boundary, however, are largely privately-owned ranch lands, where livestock husbandry is the primary activity. Although there are 3 state-owned Wildlife Management Areas (WMAs) that provide key ungulate winter range, large numbers of

elk and deer also winter on private lands, as do lesser numbers of bighorn sheep. Elk, deer, and sheep are subject to regulated harvest on these lands in addition to NF lands, but harvest-related mortality on private lands is heavily influenced by limits on access, which in turn may influence ungulate distribution. Agricultural management practices also have the potential to influence ungulate numbers and distribution both on private and NF lands. Currently those influences appear to be either neutral or positive with respect to ungulate numbers, based on recent counts. Grizzly bears are known to frequent lands east of the NF boundary, particularly in spring and in late summer/fall. The large majority of grizzly bear-human conflicts occurring in the area known as the Rocky Mountain Front for the past 10+ years have been on private land. All but one permanent management-related removal (via relocation or killing) from the area have been from private lands. Although significant efforts have been made by agencies and private groups and landowners, private lands east of the NF boundary will likely continue to be a source of grizzly bear mortality. Whether this mortality source affects bear numbers or distribution on NF lands is not entirely clear, although it has the potential to do so. Occasionally wolves are found on private lands east of the NF boundary. It is unlikely that wolves would exist there for long without eventually coming into conflict with livestock operations. The history of the Sawtooth Pack, which established a territory in 1993 on private land in the Smith Creek area and eventually had to be removed (in 1996-97) after a series of livestock depredations, lends weight to this assumption. Mortality of wolves on private lands could serve as a population 'sink', primarily for wolves dispersing from other areas.

Most private lands east of the boundary remain as large ranches, with very little subdivision and with centers of human activity spread relatively sparsely across landscape and habitat. Although there are a number of two-track ranch roads, these are relatively lightly used and likely exert very little influence on wildlife distribution. Future landownership patterns and levels are not possible to predict. Increases in human numbers and density, should they occur, would at some level influence distribution and mortality of wildlife cumulative to any impacts occurring on NF lands.

POTENTIAL FOR SEDIMENTATION OF FISH HABITAT.

a. Alternative 1 - No Action Alternative

1. Direct and Indirect Effects

As discussed in the "WATER QUALITY" section, continuation of existing travel management would result in levels of erosion and sediment delivery similar to current conditions. Although these impacts are generally small in comparison to natural disturbances, there are localized effects on fish habitats from trails that closely parallel streams and repeatedly cross them. For example, there are about 26 miles of trails within 100 feet of streams and 70 stream crossings in the South Fork Two Medicine River watershed, within the project area **(Table III-6)**. Existing types and levels of use are causing chronic sediment delivery to this system and impairment of fish habitat. **Drainage structures and maintenance efforts help to reduce but can not prevent the routing of sediment to these stream channels, especially when trails are used by wheeled vehicles during wet periods, which are common in this area throughout the recreation season.** Additionally, frequent stream fording by horses or vehicles has the potential to impact trout reproduction by destroying embryos incubating in streambed gravels during spring and summer. Data are not available to determine the actual effect on fish numbers, and large population fluctuations due to natural factors are common. However, it is reasonable to estimate that these fisheries may be as much as 25% below their potential.

The Badger watershed has over 30 miles of trails within 100 feet of streams ("riparian" trails) and 75 stream crossings **(Table III-6)**, but for the most part, trail erosion and sedimentation do not appear to be causing significant harm to fish habitats. Riparian trail/road mileage and total stream crossings are relatively high for the Beaver/Blacktail and upper Teton watersheds **(Table III-6)**, which likely reduce the quality of fish habitats in affected stream reaches, especially those that are still recovering from the 1964 and 1975 flood events. Although riparian trail/road miles are substantial and stream crossings numerous in the Wood Creek and Falls Creek watersheds, erosion problems are minor and fish populations appear to be healthy. Deep Creek also has many riparian trail miles and stream crossings, but no major sedimentation problems and essentially no fisheries on National Forest, **due to waterfall barriers**. Transportation routes in the remaining watersheds are not known to cause significant effects overall on fish habitats.

2. Cumulative Effects

Certain natural and human-caused disturbances in the project area may act cumulatively with the existing road and trail system to cause sedimentation of fish habitats. These include natural fires, livestock grazing, off-road/off-trail travel, and oil and gas development. Activities that are unlikely to have significant or lasting cumulative effects on fish habitats include prescribed fire, the Wood Lake recreation site developments, the Northwest Energy pipeline project, and past or future timber management activities (see "WATER QUALITY" section).

Wildfires are an inevitable natural disturbance whose effects on streams can be exacerbated by roads and trails. However, available evidence from the 1988 Canyon Creek and Gates Park Fires, **and the 2000 McDonald Creek Fire** does not indicate that the transportation system caused significantly more impacts to fish habitat or retarded the natural recovery process. **Specifically, surveys of Falls Creek in the Canyon fire area and NF Sun River**

downstream from the Gates and McDonald fires did not indicate precipitous declines in the fisheries due to erosion from trails . It is likely that the effects of roads and trails in the project area are undetectable in the context of such major natural events.

Livestock often follow roads and trails, causing increased compaction/erosion problems and widening stream crossings used as watering sites. Effects in the project area are generally limited to high livestock use areas. Problem spots where grazing and trails may act cumulatively to affect local fish habitats include lower Whiterock, upper Little Willow, and middle Petty creeks. Improved grazing management is expected to reduce but not eliminate these impacts. Although fish habitats are compromised, the cumulative effects from livestock grazing do not threaten fish population viability in any stream **except Whiterock Creek (see next section)** because enough habitat exists outside the affected areas to sustain the fisheries.

Cross country travel (off-road/trail) and stream fording by horses and vehicles compounds effects of the transportation system on fish habitats. Education and enforcement efforts have been increased recently to address these concerns, but problems persist in some areas. With increasing use, there is potential for these effects to worsen, but there is no evidence to suggest that cumulative effects of on- and off-route travel impacts will cross the threshold where fish no longer have enough suitable habitat to maintain their populations.

The Fina/Longwell oil and gas drilling proposal would require additional road development and stream crossings in portions of the lower SF Two Medicine River watershed. However, due to site characteristics, sediment delivery to fish habitat would be avoided or mitigated to minor and temporary levels by required stipulations and best management practices. Therefore, the Fina proposal and the current travel plan would not be expected to have significant cumulative effects in this area. The Chevron/Devon Energy proposal, on the other hand, would require additional stream crossings and a substantial increase in road miles in portions of the upper SF Two Medicine River watershed. Because sediment from existing road and trail use is already affecting fish habitats in this area, there is a greater likelihood of a significant cumulative effect from the Chevron proposal even if mitigation measures were fully implemented.

b. Alternatives 2-5

1. Direct and Indirect Effects

Based on the anticipated effects on water quality from changing travel management, inferences can be drawn concerning the potential to reduce effects on fish habitats. **Decreases in motorized travel could reasonably be expected to reduce stream sedimentation from some "riparian" trails. As indicated in the "WATER QUALITY" section, the potential for improving water resources, and therefore fish habitats, is greatest for Alternative 3 (100%/100%), followed by Alternative 5 (100%/64%) and then Alternative 4 (48%/58%). Alternative 2 (24%/58%) offers the least potential for improving fish habitat. (The numbers in parentheses refer to the reduction of riparian trail mileage open to ATVs and motorcycles in the Badger Two Medicine/Birch Creek South portions of the analysis area, as shown in Table III-8.)** Potential increases in fish populations based on reduced stream sedimentation levels are much more difficult to predict but would be most likely to occur in the SF Two Medicine River drainage.

All of the action alternatives would reduce total miles of riparian trails and roads in the Badger Two Medicine portion by about 7% after effective decommissioning, which is

expected to eventually reduce localized impacts to fish habitats (Table III-8). However, no significant reductions in total miles of riparian trails or roads would be made in the Birch Creek South portion under any alternative. Decommissioning of certain road or trail segments would also reduce the number of stream crossings, resulting in a beneficial effect on fish spawning sites and other habitat components. Stream crossings in the Badger Two Medicine portion would be reduced by 12-14% with Alternatives 2, 3 and 5, but only by 4% with Alternative 4 (Table III-9). Thus, impacts to fish habitats would be lessened by the fewer crossings retained under Alternatives 2, 3 and 5, while Alternative 4 would not differ significantly from the current situation. The Birch Creek South portion would see 2-5% fewer stream crossings under the action alternatives, not enough to significantly change overall effect on fish habitats.

2. Cumulative Effects

Natural events and other actions having potential cumulative effects on fish habitats with road and trail use are the same for Alternatives 2-5 as they are for Alternative 1. None of these cumulative effects are considered to be significant enough to threaten fish population viability except **grazing in Whiterock Creek and possibly the Chevron proposal in the upper SF Two Medicine drainage.** However, the potential for cumulative effects is lessened under Alternatives 2-5 to the same extent that each of these alternatives would reduce sedimentation from roads and trails in the project area. That is, Alternatives 3, 5, 4, and 2, in that order, provide decreasing opportunities to improve fish habitats despite any cumulative effects from other actions.

EFFECTS OF TRAVEL ON WESTSLOPE CUTTHROAT TROUT.

a. Alternative 1 - No Action Alternative

1. Direct and Indirect Effects

Continuation of existing travel management would result in additional sedimentation of westslope cutthroat trout (WCT) habitat in the project area, particularly from Trail #102 and 102A in the Whiterock Creek drainage. Plans are currently being developed to treat erosion problems on the upper portion of Trail 102 but stream recovery will not be immediate. Other reaches of the SF Two Medicine River would also continue to receive excess sediment from the trail system. Mitigation in the form of improved drainage features and better maintenance could reduce but not eliminate these effects. However, funding levels are unlikely to cover all needed work. Because WCT embryos remain in stream gravels through mid summer, they would continue to be crushed by vehicle, **horse, and foot** traffic at those crossing sites where spawning occurs. WCT populations in these drainages would remain below potential and viability could be threatened. Elsewhere in the project area, adverse effects on WCT populations from roads and trails would continue but are unlikely to threaten viability or act as limiting factors. Affected streams include EF Woods Creek, SF Teton River, Green Gulch, Rierdon Gulch and Little Willow Creek.

The current travel plan allows motorized access to North Badger Creek, which supports the most extensive genetically pure WCT population in the analysis area. Easier access facilitates more fishing pressure than would occur if the stream could be reached only by foot or horse. Although anglers are required to release WCT, ignorance of special fishing regulations and public uncertainty about fish identification lead to illegal harvest. Fishing pressure also causes incidental injury and hooking mortality. In total, these factors could suppress a WCT population that is already limited by low productivity and harsh environmental conditions.

2. Cumulative Effects

The natural and human-caused disturbances in the project area that may act cumulatively with the existing road and trail system to affect WCT habitats include natural fires, livestock grazing, and oil and gas development; **none of the other activities in the project area have potential for significant cumulative effects on the limited number of streams supporting WCT populations. Intense wildfire in a drainage basin that supports an isolated WCT population could, by itself, cause extinction of that population, independent of any effects from roads and trails. However, effects of the current travel plan act cumulatively with grazing in the Whiterock Creek drainage to exacerbate sedimentation problems which threaten WCT population viability. Fish habitats in the lower reach are compromised by livestock trampling on streambanks while habitat in the upper reach is compromised by trail erosion. Additional cumulative effects could come from the Chevron drilling proposal which creates a potential threat to WCT population viability in portions of the SF Two Medicine River watershed.** This risk would be due to the location and extent of additional road mileage, and number of new stream crossings needed for drilling operations.

b. Alternatives 2-5

1. Direct and Indirect Effects

Alternatives which reduce motorized travel in WCT drainages would reduce some associated impacts to WCT habitat such as sedimentation and physical damage to potential trout spawning sites. This is true because motorized use increases maintenance needs for drainage features, delivers sediment directly to streams at fording sites, and disrupts spawning gravels. However, benefits to fish habitat would not be realized if other types of travel **such as horseback** increased, or trail maintenance programs fell behind.

Alternatives 3 and 5 offer the best opportunity to reduce adverse effects of trails on WCT habitats in Whiterock Creek and elsewhere in the SF Two Medicine River watershed. Over time, viability of WCT in Whiterock Creek would be expected to increase as the population recovered with improved habitat conditions. WCT habitat in the headwaters of Badger Creek and the upper Teton River watershed would likely receive less impact from the trail system **and less human use (especially upper Badger), but actual increases in fish populations may not be observable unless fishing pressure and related mortality also declines with reduced accessibility.**

Alternative 4 offers some reductions in motorized travel and associated effects on WCT-occupied streams in the SF Two Medicine, Badger and Teton drainages but does not fully address trail impacts on Whiterock Creek. Alternative 2 does not significantly reduce motorized trail use in WCT watersheds.

2. Cumulative Effects

Natural fire, livestock grazing, and oil and gas development may act cumulatively with the road and trail system alternatives to influence the condition of WCT habitats in the project area. However, these events and activities are, for the most part, unlikely to change the significance level of **predicted effects for trails and roads under the action alternatives.** Alternatives 3 and 5 would reduce adverse effects from motorized use and therefore further lessen the likelihood of cumulative effects with other actions. The potential for cumulative effects on WCT habitat would remain essentially unchanged from the No Action alternative with implementation of Alternatives 2 or 4. Thus, cumulative effects **from livestock grazing and** the Chevron drilling proposal, **and either** Alternatives 2 or 4 could create a potential threat to WCT population viability in the SF Two Medicine River watershed.

ENVIRONMENTAL JUSTICE

Examination of community composition, as required under Executive Order 12898, found no minority or low income communities or groups to be disproportionately affected under any of the alternatives.

The effects on members of the Blackfeet Tribe to use the Badger-Two Medicine area were discussed in the analysis. Members of the Blackfeet Tribe and members of other tribes in the area would have the same opportunities as others to access and engage in traditional cultural activities in the Rocky Mountain Division.

Low income people would have no benefits or detriments as a result of implementing any of the alternatives. There may be more employment opportunities in the area due to road, trail, and trailhead construction/maintenance projects, but such opportunities would be sporadic and of short duration. Low income people would be equally able to enjoy the hiking opportunities provided by Alternatives 3 and 5. Higher income people would have some additional opportunities to use the area under Alternatives 3, 4 and 5, because they could afford the expense of saddle horses, pack animals, and/or backpacking equipment needed to enjoy the remote portions of the mountains.

The effects on disabled people as well as effects on an aging population were addressed in the analysis. There is no indication that older Americans or disabled people would be disproportionately impacted by any of the alternatives.