

Biological Assessment The Effects of Snowmobile Use on Grizzly Bears Gallatin, Beaverhead-Deerlodge, Custer, Bridger-Teton and Shoshone National Forests Greater Yellowstone Area 2002

Introduction

Consultation pursuant to Section 7 of the Endangered Species Act (ESA) between the US Fish and Wildlife Service (USFWS) and another federal agency normally occurs when a federal action is proposed. The proposal's impacts to threatened and endangered species are analyzed in what is called a Biological Assessment. In some cases, consultation may be done on an existing activity in accordance with the regulations at 50 CFR s 402.16. The action agency makes determination of effect on individuals of the species. If the action agency determines there is "no effect" on a listed species, no further consultation occurs. If the action agency determines that the project "may affect" a listed species, then the agency makes a further finding depending on the degree of effect. If the determination is "may affect, likely to adversely affect" the agencies enter formal consultation and the USFWS writes a Biological Opinion. The USFWS makes a determination of jeopardy or non-jeopardy in the Biological Opinion based on the impacts to the species or population, rather than to an individual

Action Consulted Upon

The federal action being consulted upon is snowmobile use on the national forests as allowed under the Forest Plans and travel management for the Gallatin, Beaverhead-Deerlodge (B-D), Custer, Bridger-Teton (B-T), and Shoshone National Forests. The issue being addressed is how snowmobile use on the Forests (except the Targhee) affects in the GYA (see map Appendix 1) grizzly bears.

History of Consultation

In the early 1990's research was being conducted that indicated and quantified a negative impact of motorized access routes on grizzly bears in the Northern Continental Divide Ecosystem (Mace and Waller 1997). Discussions occurred amongst biologists working on grizzly bears and bear habitat in the Yellowstone area as to how to apply the findings of this work in the Yellowstone. The Interagency Grizzly Bear Committee prepared a taskforce report in 1994 on Grizzly Bear/Motorized Access Management. This report was revised somewhat in 1998 (IGBC 1998). This became the basis for limiting motorized route access in the Yellowstone Grizzly Bear Recovery Zone. Winter use was not addressed in this report. The Forests in the Yellowstone Area have worked extensively with the USFWS and other agencies on Interagency Grizzly Bear Technical Team projects that frequently address motorized access, among other issues.

In 1994, the Sierra Club Legal Defense Fund sued the Gallatin National Forest and the USFWS regarding motorized access routes on the Forest. A settlement was reached in which the Forest

received an amended Biological Opinion on its Forest Plan (USFWS 1995) from the USFWS and did a Forest Plan amendment (#19; Gallatin National Forest 1995). The Forest has abided by this Opinion and Forest Plan amendment since that time. The terms and conditions were (in the Grizzly Bear Recovery Zone):

- 1) The Forest will administer its lands in a manner that will not increase open motorized access route density,
- 2) The Forest will not increase total motorized access route density, and
- 3) The Forest will not decrease the amount of 'secure' areas from that, which currently exists (previously called 'core').

In the 1995 Amended Biological Opinion (BO), the USFWS issued an incidental take statement made for the Forest, which was based on road densities existing in the environmental baseline. A finding of no jeopardy was made. The basis of the no jeopardy finding was an increasing grizzly bear population in the Yellowstone area, as well as the meeting of occupancy requirements (for the Recovery Plan) by all Bear Management Units (BMU's) on the Gallatin National Forest (USFWS 1995 p. 8.).

The 1995 BO required the Gallatin National Forest to produce semi-annual reports to the USFWS on motorized access route changes or changes in secure habitat on the Forest in the Recovery Zone. The Gallatin National Forest and USFWS have been in consultation, either formal or informal, on motorized access management, since late 1994.

Yellowstone National Park, Grand Teton National Park and the John D. Rockefeller, Jr. Memorial Parkway proposed to prohibit snowmobile use from the parks beginning in 2002-2003 (Winter Use EIS 2000). The accompanying Winter Use BA (USDI 2000) stated, "whether or not snowmobiles may disturb denning bears is unknown." They believed that potential for human-bear conflict was more likely to occur immediately before and after denning in the Park; therefore concluding that the preferred alternative "may affect, but is not likely to adversely affect" grizzly bears. This BA was consulted upon with the USFWS office in Wyoming and received concurrence. The Park Service believed that a presumed increase in snowmobile use outside of the Parks, based on the projected closure, was highly speculative and they did not address cumulative effects of the potential increased snowmobiling on the National Forests surrounding the Parks. They suggested that winter use outside of the Park be monitored.

Recently, the administration asked Yellowstone National Park to reevaluate the information in the EIS and produce a Supplemental EIS (SEIS) which could lead to a different decision for snowmobile use in the Park.

The Greater Yellowstone Coordinating Committee (GYCC), which includes land management agency leaders in the area, designed and funded a snowmobile monitoring study that began the winter of 2000-2001.

In December 2000, the Gallatin National Forest submitted a Biological Assessment to the USFWS on the Effects of Snowmobile Use on Grizzly Bears on the Gallatin National Forest. In early 2001, the other Forests in the Greater Yellowstone area decided to join this consultation, with the exception of the Targhee National Forest which had recently consulted on their revised Forest Plan. This combined Biological Assessment, which covers most of the GYA national forest lands, should provide a better and more inclusive picture of the effects of snowmobiling in this area on the Yellowstone grizzly bears.

Description of the Action

The Forest Plans and current travel management are the actions being consulted upon, specifically snowmobile use in Forest areas in the Recovery Zone where grizzly bears are currently distributed (Schwartz et al. in review). Snowmobile use has existed for many years and changes in use have been gradual. Technology of snow machines has evolved (primarily providing more power), yet no sudden or major changes have occurred at any one time.

The following table provides a brief summary of snowmobile use on the Forests under consideration (see Table 1). Most Forests are experiencing an increase in snowmobiling although most have relatively poor use data available. Few, if any, of the Forests have a legal opening and closing dates for their snowmobile seasons. Most Forests have some groomed and ungroomed routes.

Table 1. Snowmobile seasons, miles signed, groomed and ungroomed, and other information.

Forest	Snowmobile season dates	Trail miles in area considered and status	Other notes
Gallatin	Generally 12/1-4/15 but sometimes possible into May or June	112 mi marked only 259 mi groomed and marked*	Increased use, poor data
Custer	Season generally 11/15-4/30	Beartooth RD No grooming 83 mi marked	Increased use, poor data
B-D	Generally 12/2-5/15	Madison RD has 73 mi marked, 18 groomed, and 7 sometimes groomed	Increased use
Shoshone	Generally 12/1-4/15	Dubois RD has 93 mi groomed, 43 ungroomed outside Rec. Zone Beartooth has 31 mi groomed and 34 ungroomed in Rec. Zone, 2 groomed mi at east entrance of YNP	Increased use, little data available
B-T	Gen. 12/1-4/1 except later at Togwotee Pass area; season legally restricted to 12/1-4/30	800 mi marked 700 some grooming 109 frequent grooming	Increased use, poor data

*includes the areas south of Interstate-90

The Greater Yellowstone Coordinating Committee has developed a coordinated Winter Use Monitoring Plan. Winter use data, including snowmobile use information, is of poor quality or lacking on many Forests, and a coordinated effort should improve the quality and quantity of information available. These efforts began during the winter of 2000-2001 on some GYA forests.

Gallatin National Forest

Although good, quantitative data is somewhat lacking, information indicates that snowmobile use is increasing on the Gallatin National Forest. The Forest has numerous restrictions in place regarding off-road, off-trail and snowmobile use, and is currently doing travel management planning. A planning team is creating a new travel plan proposal, during which time they are

reviewing old travel management decisions, working with new travel management concerns, etc. in order to generate a travel plan which will emphasize travel route management and reduce the amount of off-road and off-trail use on the Forest. Travel management tools that will be used include increased signing, loops and connections to keep travelers on designated routes. There will be an overall decrease in linear motorized access routes on the Forest and an increase in area (off-road) closures (J. Devitt, pers. comm.).

The snowmobile season in the Hebgen Lake area begins about December 1. Although the majority of snowmobile use ends by March 30, there is some snowmobiling that occurs into April in the higher elevations on the district. In some heavy snow years, snowmobiling may extend into May or June. These dates are approximately the same for the area around Cooke City. For the remainder of the Forest, the snowmobiling starting date is typically between December 1-15 and ends about April 15.

Data collected by the various snowmobile clubs was obtained from the Montana Department of Fish, Wildlife and Parks. This information consists of visitation/use in a winter on a particular trail. The actual sampling effort (number of days and dates counter was operational) is not given. The location of the vehicle counter other than in a particular drainage is not known. There are some obvious anomalies such as a count of 145,577 visits on a trail in one year vs. a range of around 2,000 to 33,000 over the last 10 years. This type of error or counter problem occurs on several trails in several years. Other trails show the exact same number of visits for several years in a row. That would be very unlikely and is probably an estimate based on the most recent data and not counter data for that year. Some locations were only counted in one year. Counters could have been moved to different locations in the same drainage which might affect the counts.

The counts on the same trails, even assuming a methodology in which the numbers can be compared (the counter works properly and was working for the same dates in all years), are somewhat indicative of an overall trend. Buck Creek and Cooke City appear to show an overall increasing trend, but other areas appear to be stable (Brackett Creek, Rock Creek), highly variable (Moose Creek, Taylor Fork), or even decreasing (Doe Creek).

Data collected from trail counters combined with estimates on the Hebgen Lake Ranger District shows an increase in snowmobile use from 69,800 snowmobiles in 1990-91 to 117,000 in 1999-2000 (Naber pers. comm.). The Cooke City area snowmobile use has increased from an estimated 10,000 snowmobiles in 1989-90 to 55,000 in 1997-98 (GYCC 1999 p. 82). These numbers are more indicative of an increasing trend in snowmobile use. Numbers from the Upper Yellowstone Snowmobile Club for the Cooke City area are highly variable due to having counters out for different dates in different years and having counters located in different locations. From 1995-96 to 1999-00, the counts were approximately 32,000, 10,100, no count in 97-98, 34,000, and 44-46,000, respectively (Gardner, pers. comm.).

The Gallatin National Forest also has some groomed and marked snowmobile routes, and some that are marked and not groomed. South of Interstate-90, the Forest has approximately 112 miles of marked only routes, and 259 miles of marked and groomed routes. The Big Sky snowmobile trail alone accounts for 79 marked miles and 58 marked and groomed miles.

Custer National Forest

The Beartooth Ranger District, the only district on the Custer in the Greater Yellowstone, has operated under a travel management plan since 1987. A revised travel management plan is scheduled to occur in 2002. The current travel plan addresses all motorized use including snowmobiles. The District does not have any groomed snowmobile trails but has approximately 83 miles of designated snowmobile routes that are all associated with existing roads. Seven miles of designated snowmobile route have a seasonal closure from December 1 to April 15. This closure addresses big game winter range and public safety issues. See Appendix 2 for a description of the snowmobile routes and predicted snowmobile use. Snowmobiling begins as early as mid November and usually ends by April. Most of the Beartooth District would not be considered a destination snowmobile area due to the lack of “loop” routes and steep topography, dense vegetation, and low snow conditions that limits off trail use. However, the Upper Stillwater Basin/Cooke City area is a destination area for snowmobilers. Current snowmobile use on the Custer National Forest in this area is estimated at <30,000 round trips per season. Snowmobile use on and off designated routes occurs throughout the area. Snowmobile use is predicted to increase in this area.

Beaverhead-Deerlodge National Forest

The Madison Ranger District of the B-D has had area travel restrictions in place for more than 20 years. This has limited the impact of off designated route vehicle and ATV travel. Snowmobiles have been restricted from Wilderness and Area 1 on the Interagency Visitor/Travel Map during this time.

Personal observation (Wiseman) and data from counters indicate that the number of snowmobiles using the District has increased rapidly in the past 10 years (Appendix 15). In Antelope Basin where there were few to no snowmobile tracks observed in winter of 1988, there were no areas of untracked snow in 2001 (personal observation, Wiseman).

The Madison Ranger District also has some groomed and marked snowmobile routes and some that are marked and not groomed. There are 73.2 miles of marked only routes, 18.0 miles of marked and groomed routes and 7.1 miles of marked and intermittently groomed routes on the District. In addition, there are 19.5 miles of marked only routes and 28.9 miles of marked and groomed routes off Forest that are associated with the District routes.

The Forest has 4 snowmobile outfitters that guide trips in the Gravelly Mountains.

Shoshone National Forest

Similar to other Forests in the GYA, the Shoshone National Forest has several areas outside Wilderness where snowmobile use is restricted (Appendix 3).

Cooperative efforts with the State and local snowmobile clubs allow installation of trail markers, wilderness boundary signing, grooming, maintenance and monitoring of all marked trails during the winter months. Forest personnel also monitor use and facility condition through periodic inspection and feedback from users. The Continental Divide Snowmobile Trail is monitored annually through the CDST Monitoring Plan which was developed in partnership with several environmental groups who were concerned about future impacts of the trail on other resource values. The plan includes monitoring of use, and impacts to vegetation, soil, water, air and wildlife. Snowmobiling, cross country skiing and backcountry skiing continue to be the fastest

growing segment of recreation on the Forest. Wilderness trespass has decreased over the last few years as a result of patrols and increased signing.

There are approximately 220 miles of groomed and ungroomed snowmobile trails in the evaluation area, primarily in two major areas. One of the areas is in the Beartooth Mountains on the Clarks Fork District and the other near Dubois on the Wind River District. Both trail systems are associated with large off trail areas. Snowmobile season on the Shoshone National Forest typically begins around December 1-15 and ends about April 15. There are no restrictions on dates of use, but rather is dictated by snow conditions.

The Dubois area contains 93 miles of groomed and 43 miles of ungroomed trail, all outside the grizzly bear recovery area. Most of these trails tie into the Continental Divide Snowmobile Trail and other trails on the adjacent Bridger-Teton National Forest, many of which are inside the recovery area. These trails are described in a brochure and map of The Continental Divide Trail System distributed by the Wyoming Department of Commerce. The trail system on the Beartooth Mountains is described in a similar brochure of Northern Wyoming Snowmobile Trails. There are about 31 miles of groomed trail and 34 miles of ungroomed trail in the Beartooths, most of which are inside the grizzly bear recovery area. An additional 2 miles of groomed trail accesses the East Gate of Yellowstone National Park from the Pahaska Teepee Resort on the North Fork Shoshone River. Both brochures provide information to the user about observing wildlife from a distance and avoiding winter range areas.

Two trail counters have been placed on the Beartooth trail system for the last several years by the State of Wyoming. There were no counters on the trail system during the 2000-2001 winter. The State has not released the data due to the unreliability of the counters. The Missoula Technology Development Center is working on improvements.

However, it is estimated that this area receives about 4000 snowmobile visits per year. This last winter (2000-2001) use at the Pilot Creek Trailhead, one of two major parking areas for the trails system, was somewhat below normal due to lack of snow. As of Jan 25, 2001 the maximum count of vehicles at the trailhead was about 150 over the New Year's weekend.

A formal use/trail condition monitoring system was initiated on the south zone of the Shoshone in 1999. Data from 5 infrared counters on the south zone was compiled by the State of Wyoming's Department of Commerce. During the 1999-2000 winter there were approximately 55,155 snowmobile counts with slightly lower use in the winter of 2000-2001 (52,083). There are problems with the accuracy of these data as well. Weather, speed of the machine, rerouting around counters and other factors influence the reliability of the data.

Bridger-Teton National Forest

The Bridger-Teton National Forest Land and Resource Management Plan includes broad standards and guidelines that apply to public recreation in grizzly bear habitat. Forest-wide, the plan directs that management will minimize the potential for human-grizzly conflicts and resolve conflicts that occur. In specific land allocations within the Recovery Zone (Desired Future Conditions 7a and 7b), forest plan standards direct that recreation uses will be "restricted as needed to meet grizzly bear habitat objectives" and "limited to favor grizzly bear security." Trail use in backcountry areas is not encouraged and trails are to be managed to be "compatible with meeting grizzly bear objectives" (Bridger-Teton Forest Land and Resource Management Plan, Chapter 4).

The Forest Plan is largely silent on the subject of winter use in grizzly bear habitat; since 1990, when the plan was signed, snowmobile use has increased a great deal and the system of groomed, marked snowmobile trails has expanded, both in and out of the Recovery Zone. Trail counters and use reports received from snowmobile guides verify the general observation of forest managers that snowmobile use is on the rise.

Trail counters have been in place for several years on heavy-use snowmobile trails, offering some information that helps establish use trends. A summary of snowmobile use counts between 1993 and 2000 follows. Some of the more reliable traffic counts have been in parts of the Forest outside grizzly bear occupied habitat, but they serve to indicate use trends that are fairly consistent Forest-wide (Appendix 4).

The B-T has received requests annually for additional service days (beyond authorization), and most of the time these have been granted. These figures (Appendix 4) show that the vast majority of guided snowmobiling takes place within the Recovery Zone on the Buffalo Ranger District. Guided tours generally follow the groomed trail system with few side trips into the more remote backcountry; they also tend to be well supervised and are less likely than private parties to explore untracked powder or be out after dark.

Snowmobile use on the Bridger-Teton Forest is regulated by travel management plans between December 1 and April 30. Outside of classified wilderness, where no snowmobiling is allowed, snowmobiles may use most of the national forest, both on and off trails. Restricted areas include big game winter ranges where all human uses are prohibited (between December 1 and April 30), elk feed grounds administered by the Wyoming Game and Fish Department, and some big game winter ranges where regulatory closures are not in effect but snowmobilers are asked to stay on designated trails as they pass through. Two small areas managed for cross-country skiing are closed to snowmobiles (Teton and Salt River Passes), as are the alpine ski areas. All other areas of the Forest are legally open to snowmobiles, and when there is adequate snowpack, nearly all of the Forest gets at least some occasional use.

Although the majority of snowmobile use ends by early April, some snowmobiling occurs late into the spring in the higher elevations, especially in the Togwotee Pass area.

There are approximately 800 miles of snowmobile trails on the forest, about 700 miles of which are groomed at least occasionally. Of these, 109 miles of frequently groomed trail occur within the Recovery Zone. Cooperative efforts with the State Trails program and Cowboy Village at Togwotee provide trail markers and counters, Wilderness boundary and winter range signing, trail grooming, patrols, and monitoring.

The highest concentration of groomed trails and recreation use occurs in the Togwotee Pass – Moran area, especially since the Continental Divide Snowmobile Trail (CDST) was completed and Cowboy Village at Togwotee (an on-Forest resort) expanded to accommodate nearly 500 people at a time, making it a major hub of winter sports activity. More visitor services, guided trips, trail signing and frequent grooming characterize the highest-use snowmobile trails in the Togwotee Pass area. Close behind in terms of use and frequency of trail grooming are the Gros Ventre, Greys, and Green River trails. There is also considerable use along the Continental Divide Snowmobile Trail between Togwotee Pass and the upper Green River, including Union Pass.

The trails surrounding Cowboy Village at Togwotee, the Gros Ventre River trail, and Granite Creek (in the Hoback Canyon, beyond the current extent of occupied habitat but likely to be occasionally used by grizzly bears) are heavily used on both weekdays and weekends. Most of the other trails on the Forest serve the local and regional visitor and are therefore used primarily on weekends. The use of rental machines by non-guided visitors has increased significantly in recent years, especially in the Jackson Hole area.

Several areas that are currently outside of the Recovery Zone but likely to be inhabited by bears (in the near future, if not already) are seeing rapidly increasing growth in winter use. These include the Hoback Basin, with major trailheads in Granite Creek, Cliff Creek, Clark Draw and the North Fork of Fisherman Creek, and the Wyoming Range, especially the North Horse Creek trailhead, which has been expanded in the past few years. The North Horse Trail gives access to Blind Bull summit from the east, where there is a warming hut; this trail links to the Greys River road on the west, a primary snowmobile trail in the southern part of the forest.

The Forest has been expanding its system of backcountry winter shelters in recent years. We currently rent five Forest Service guard stations to the general public in winter (all of them outside the Recovery Zone) and are considering adding others to the system. In addition to the warming hut at Blind Bull Summit, which is a restored miner's cabin, shelters maintained by snowmobile clubs exist at Monument Ridge (an old fire lookout in the Hoback Basin), Elk Mountain (a fire lookout south of the Snake River Canyon), and Poison Meadows (a temporary shelter in the upper Greys River). The guard stations are available for overnight use; the warming huts have no heat and are primarily used for brief stops during the day, although there is no prohibition on overnight use.

On the Bridger-Teton Forest, resorts that cater to snowmobilers have expanded their operations in recent years and have become quite active in grooming, marking and helping to patrol winter trails. Dude ranches that years ago operated only from June through October now offer guided snowmobile tours and lodging all winter. The following table (Table 2) display on-Forest resorts that offer snowmobiling within the Recovery Zone.

Table 2. Bridger-Teton on-Forest resorts offering snowmobiling.

Resort name	Location	Capacity (People at one time)
Cowboy Village at Togwotee	45 miles from Jackson on US 26, less than one 1 mile to Teton Wilderness	481 PAOT
Heart Six	40 miles from Jackson on the Buffalo Valley Road, less than on mile from Teton Wilderness	45 PAOT (draft MDP would allow up to 70)
Turpin Meadows	40 miles from Jackson on the Buffalo Valley Road, less than a mile from the Teton Wilderness	50 PAOT (MDP allows 70)

Description of the Action Area

The following table (Table 3) presents acres of National Forest in the Recovery Zone and the ‘area where grizzly bears are distributed or may occur’ (Schwartz et al. in review; see map Appendix 5) and acres of designated Wilderness and other acres where snowmobiling is restricted. The current distribution of grizzly bears, also termed the area where grizzly bears may occur was determined using the distribution of initial, unduplicated sightings of sows with COY, mortalities, and human/bear conflicts from 1990-2000 (Schwartz et al. in review). The analysis area is bounded by this current distribution map (Appendix 5), but data are also presented for the Recovery Zone. Because the distribution map outside the Recovery Zone does not coincide with existing Bear Management Units (BMUs) the data are presented by Forest rather than on a BMU or subunit basis. Because Forest boundaries often follow topographic boundaries except for where they adjoin the Parks, many of the BMUs follow Forest boundaries and only occur in one or two jurisdictions (see map Appendix 6).

Table 3. Acres (in millions) by Forest of Recovery Zone, acres where grizzly bears may occur, acres of Wilderness and snowmobile restrictions.

Forest (may not have entire forest in some cases, like B-D and Targhee)	Total acres (excluding private and state lands) (excluding lakes)	Acres of designated Wilderness (excluding private/state lands and lakes)	Acres outside Wilderness closed to snowmobiling (excluding private/state lands and lakes)
Gallatin	0.83 acres Recovery Zone 1.16 acres where grizzly bears may occur 1.63 acres of entire forest*	0.41 acres Wilderness in RZ 0.59 acres Wilderness where grizzlies may occur 0.72 acres Wilderness entire Forest	0.08 acres outside Wilderness closed to snowmobiling in RZ 0.09 acres outside Wilderness closed to snowmobiling where griz may occur 0.13 acres outside Wilderness Closed to snowmobiling on the entire Forest
Custer	0.11 acres Recovery Zone 0.31 acres where grizzly bears may occur 0.51 acres of entire forest*	0.11 acres Wilderness in RZ 0.29 acres Wilderness where grizzlies may occur 0.33 acres Wilderness entire Forest	0 acres outside Wilderness closed to snowmobiling in RZ 0 acres outside Wilderness closed to snowmobiling where griz may occur 0 acres outside Wilderness Closed to snowmobiling on the entire Forest
B-D	0.06 acres Recovery Zone 0.28 acres where	0.06 acres Wilderness in RZ 0.09 acres	0 acres outside Wilderness closed to snowmobiling in RZ

	griz may occur 0.59 acres of entire Forest*	Wilderness where griz may occur 0.10 acres Wilderness entire Forest	0 acres outside Wilderness closed to snowmobiling where griz may occur 0.3 acres outside Wilderness Closed to snowmobiling on the entire Forest
Shoshone	1.22 acres Recovery Zone 1.95 acres where grizzlies may occur 2.44 acres of entire Forest *	0.89 acres Wilderness in RZ 1.06 acres Wilderness where griz may occur 1.36 acres Wilderness entire Forest	0.06 acres outside Wilderness closed to snowmobiling in RZ 0.10 acres outside W closed to snowmobiling where griz may occur 0.10 acres outside Wilderness Closed to snowmobiling on the entire Forest
B-T	0.72 acres Recovery Zone 1.39 acres where griz may occur 2.43 acres of entire Forest *	0.58 acres Wilderness in RZ 0.79 acres Wilderness where griz may occur 1.29 acres W entire Forest	0.03 acres outside Wilderness closed to snowmobiling in RZ 0.09 acres outside Wilderness closed to snowmobiling where griz may occur 0.12 acres outside Wilderness Closed to snowmobiling on the entire Forest
Targhee ** discrepancy is probably due to definition of TGNF boundary. The 0.39 may not include the part of Caribou that is administered by Targhee and yet is included in TGNF Boundary.	0.47 acres Recovery Zone ** 0.45 acres where griz may occur 1.44 acres of entire Forest *	0.06 acres Wilderness in RZ 0.10 acres Wilderness where griz may occur 0.13 acres W entire Forest	0 acres outside Wilderness closed to snowmobiling in RZ 0 acres outside Wilderness closed to snowmobiling where griz may occur 0.10 acres outside Wilderness Closed to snowmobiling on the entire Forest

*in the analysis area, which may not be the entire Forest in some cases

Most national forest acreage is primarily designated Wilderness in the Recovery Zone (>80%) with the exception of the Targhee, which is not part of this consultation. Over 50% of the acres

‘where bears may occur’ are designated Wilderness on the Forests. Approximately another 10% of the area where bears may occur is legally closed to snowmobiling.

Gallatin National Forest

The Gallatin National Forest is comprised of approximately 1.7 million acres and is located in southwestern Montana, bordering both the state of Idaho and the state of Wyoming (Table 3). The Forest is the northern and western boundary of Yellowstone National Park. There are approximately 716,000 acres of designated Wilderness on the Forest located in the Lee Metcalf and Absaroka-Beartooth Wilderness areas.

Snowmobile use on and off designated routes occurs on the Forest, yet it is restricted from Wilderness areas as well as some other parts of the Forest (Codes A and E on the Forest Travel Map; Appendix 7). Furthermore, it is not feasible, due to topography and vegetation, in some other parts of the Forest (Appendix 7). (In portions of the Travel Map coded B, snowmobiling ceases near the end of May. In C it is not restricted. D and F are restricted in the fall. For G, the snowmobile season is Oct. 15- Mar 1.) The map shows that approximately 41% of the Recovery Zone on the Gallatin National Forest is in designated Wilderness. Approximately another 10% of the Recovery Zone has snowmobile use prohibited. Thus, snowmobiling is only legal in about 49% of the Recovery Zone on the Forest. In addition, only 15% of the Recovery Zone can actually be considered desirable for snowmobiling due to terrain and vegetation (Appendix 7). A large block of this is the lodgepole flats near West Yellowstone, which is poor quality grizzly bear habitat and does not provide resources that meet the characteristics of denning habitat for grizzly bears (Judd et al. 1983).

Custer National Forest

The Custer National Forest is comprised of three Districts. Only the Beartooth Ranger District is within the Greater Yellowstone Area. The Beartooth District is located in south-central Montana and encompasses approximately 586,000 acres (Table 2). Approximately 346,000 acres are within the Absaroka-Beartooth Wilderness Area. The District borders the state of Wyoming. The Beartooth District includes the Beartooth Unit and the Pryors Unit. Only the Beartooth Unit falls within occupied grizzly bear habitat.

The Beartooth Unit supports approximately 110,500 acres of occupied grizzly bear habitat where 5,500 acres fall within MS-I and 105,000 in MS-II. All 5,500 acres of MS-I habitat and 1,280 acres of MS-II habitat occur outside of the Absaroka-Beartooth Wilderness Area. The 6,780 acres of grizzly bear habitat outside Wilderness occurs in the Upper Stillwater Basin where snowmobile use is high. On the Custer National Forest, the potential for disturbance of denning grizzly bears by snowmobile recreationists is highest in the Upper Stillwater Basin.

The Beartooth Unit of the Beartooth District is approximately 524,000 acres where 346,000 acres (66%) are within the Absaroka-Beartooth Wilderness Area. The 178,000 acres of the Beartooth Unit that are not within the Wilderness area support limited opportunities for snowmobilers. Only 83 miles of designated routes are available and off trail riding is limited due to steep topography, dense vegetation, or low snow conditions (see map, Appendix 7). The Upper Stillwater Basin and Line Creek Plateau generally support the most off trail snowmobiling

opportunities. The Line Creek Plateau is generally limited by low snow conditions. The Beartooth District Travel Plan describes roads/trails open to snowmobiling.

Beaverhead-Deerlodge National Forest

The Madison Ranger District, Beaverhead-Deerlodge National Forest is comprised of over 750,000 acres (Table 3) and is located in Southwestern Montana, bordering the Gallatin National Forest on the east and the state of Idaho on the south. There are approximately 110,00 acres of designated Wilderness on the District located in the Lee Metcalf Wilderness Area. In addition the Mount Jefferson area of approximately 4,500 acres has been recommended for Wilderness in a 1991 BLM Environmental Impact Statement.

The area under consideration is the Madison Ranger District where grizzly denning may occur. Grizzly bears may occur outside of the Recovery Zone and, for the purposes of this analysis, are considered to be using the Madison and Gravelly Mountain Ranges. In general, the farther one moves north and west in the Gravelly Range, the less likely it is that grizzly bears occur.

Snowmobile use on and off designated routes occurs on the District, yet it is restricted from the Wilderness and other parts of the District (Area 1 on the Interagency Visitor/Travel Map). Furthermore, it is not feasible, due to topography and vegetation, in other parts of the District. Areas of high use for snowmobiling would be in the McAtee Basin adjacent to the Lee Metcalf Wilderness, Antelope Basin and West Fork Madison/Freezeout areas of the Gravelly range. The general season for snowmobiles is from December 1 through May 15 (noted on Interagency Visitor/Travel Map), but may extend into June in high elevation areas such as Mount Jefferson in heavy snow years.

Shoshone National Forest

The Shoshone National Forest is approximately 2.5 million acres (Table 3) and is located in northwest corner of Wyoming. The Forest extends south from the Montana State line to South Pass. Yellowstone National Park and the Bridger-Teton National Forest form the western boundary. The Wind River Indian Reservation divides the northern and southern portions of Washakie District. There are approximately 1.4 million acres of designated wilderness on the Forest (Washakie, Fitzpatrick, Popo Agie, North Absaroka and Absaroka-Beartooth).

The area being evaluated where grizzly bear denning may occur is the entire Shoshone National Forest roughly north of East Torrey Creek in the Fitzpatrick Wilderness, approximately 2.1 million acres. About 60 % is within the grizzly bear Recovery Area. Wilderness comprises 53 % of the evaluation area and 72 % of the recovery area (Table 2). This area includes all the Wilderness areas on the Forest except the Popo Agie and the southern portion of the Fitzpatrick.

Snowmobile use on the Shoshone is restricted both on and off trails in all Wilderness areas. Use is limited to open roads and trails in winter range areas near Bald Ridge, Sunlight Basin, the South Fork of the Shoshone River, Spring Mountain and Alkali Creek (Code B on Forest Travel Map; Appendix 3). All other areas of the Forest are legally open to snowmobile use on and off trail (Table 3). There are no restrictions on dates of use for snowmobiles, but the average season is from Dec. 1-15 through Apr. 15. Although actual acres are not available, much of the area legally open is unavailable to snowmobiles due to steep terrain, dense vegetation or low snow.

Bridger-Teton National Forest

The Bridger-Teton National Forest covers approximately 3.5 million acres (Table 3) in western Wyoming, from the southern boundary of Yellowstone National Park to the mountains north of Kemmerer in southwestern Wyoming. There are approximately 1.4 million acres of designated wilderness on the Forest (Bridger, Gros Ventre, and Teton). Approximately 22% of the forest, or 764,000 acres, is within the Recovery Zone; of this, 585,000 acres (80%) are within the Teton Wilderness.

Grizzly bear denning may occur in much of the northern part of the Forest, including all of the Teton Wilderness, Buffalo Valley, Moran, and Blackrock Creek, the Togwotee-Union Pass area, the Mt. Leidy highlands, and parts of the upper Gros Ventre and Green River drainages. Since bears are expanding their range to the south, it is likely that dens may be found in the Gros Ventre Wilderness and adjacent areas.

Nearly 38 percent of the Forest is within designated Wilderness or in one of two Congressionally designated Wilderness Study Areas (Shoal Creek and Palisades); another 40 percent is included in roadless backcountry that is managed primarily for non-motorized uses, except in winter when snowmobiling is allowed. The remainder of the forest includes major recreation corridors, most of them arterial forest roads that are groomed as winter trails.

Of the National Forest currently open to snowmobiles, virtually all of it gets used when snow conditions allow. For the 1997 GYA Winter Visitor Use Assessment (USDI 2000) we assumed that slopes in excess of 30 degrees were essentially unused, but such slopes are of relatively small extent and are surrounded by usable terrain. The power of snow machines has increased every year since that assessment was completed, so in effect the entire area, where not restricted by regulations, is used or influenced by sights and sounds of nearby snowmobile use.

Grizzly Bears in the Greater Yellowstone Area

The following information is taken from the scientific literature and various government publications such as the Grizzly Bear Recovery Plan (USFWS 1993 pp. 7-20, 28-30) and the Grizzly Bear Compendium (IGBC 1987 pp.111-115, 119-121).

Introduction

The Greater Yellowstone Area (GYA) is a large, high elevation basin surrounded by mountain ranges. The elevations range from 1620 to 4197 meters (IGBC 1987 p. 119). Natural fire is a major influence on vegetation in the Greater Yellowstone area. Most the GYA is contained in the subalpine zone and the primary conifer species is lodgepole pine (*Pinus contorta*). Englemann spruce (*Picea engelmannii*) is the climax species in the subalpine zone with Douglas fir (*Pseudotsuga menziesii*) the climax species at lower elevations. Large meadows vegetated by sagebrush and grasses occur below 2125 meters, while rock and tundra dominate the higher elevations. Large populations of ungulates such as elk, bison, mule deer and moose abound in this area.

Status

In the contiguous United States, grizzly bears were reduced to approximately 2% of their historic range from 1850-1950 through human caused mortality. In 1975, the grizzly bear was listed as a threatened species under the Endangered Species Act (ESA). Recovery Zones were established. Efforts to reduce mortality, especially that of adult females, have led to an increase in grizzly bear numbers in the GYA.

The Greater Yellowstone Area is one of the six Recovery Zones for the grizzly bear in the coterminous United States. Recovery Zones are large enough and contain sufficient habitat to support a recovered bear population. The Grizzly Bear Recovery Plan discusses each area in detail. It was estimated that there were 800 to 1000 grizzly bears in the coterminous United States as of 1993 (USFWS 1993 p. 2).

The Grizzly Bear population in the Yellowstone area appears to be recovering and has met some of the recovery criteria in recent years, far exceeding the number of females with cub-of-the-year (COY), sometimes meeting the distribution criterion, but having difficulty meeting the mortality criteria. As the bear population increases, there is a greater chance of bears and humans encountering one another, and a greater chance of mortality of bears. This seems to be what is happening in the Yellowstone. A Draft Conservation Strategy (ICST 2000) has been written which is the guidance for how the grizzly bear would be managed after delisting. As the states in the Yellowstone area finish their state grizzly bear management plans, and the bears meet recovery criteria, it is likely that they will be delisted in the relatively near future. After delisting, monitoring would continue of both the bear population and its habitat to assure that the bear population continues to do well enough to remain delisted.

Yellowstone Recovery Zone

The Greater Yellowstone Recovery Zone includes 9,209 square miles and is divided into Management Situations. Management Situation 1 (MS1) contains grizzly bear population centers and habitat components necessary for the survival and recovery of the grizzly bear population. Management Situation 2 (MS2) is comprised of areas lacking distinct grizzly bear population centers or highly suitable habitat, although some habitat exists and grizzly bears may be present on occasion. Management Situation 3 (MS3) consists of areas of high human use where grizzly bear use is likely to lead to conflict (Gallatin National Forest Plan p. G-3). Of the entire grizzly bear Recovery Zone in the Greater Yellowstone, 36% is comprised of US Forest Service Wilderness, while Yellowstone and Grand Teton National Parks are an additional 40% of the Recovery Zone. Only 1.7% of the Recovery Zone is privately owned, and about 23% is Forest service non-Wilderness (ICST 2000 p. 20). The Parks contain roughly 89% of the bears in the Greater Yellowstone.

The Recovery Zone is divided into 18 Bear Management Units (BMUs), and these are divided into subunits Appendix 6). The subunits are the approximate size of a female home range. From 1975-87, female home ranges (sows with COY) home range size averaged 231 sq km while all females averaged 281 sq km. In 1999, female home ranges averaged 156 sq km. Male home ranges are larger averaging 874 sq km from 1975-87 (USGS 2000). Adult males have the largest average home ranges. Daily movements vary somewhat by season and cohort, but average from 0.7 to 1.9 km/day (USGS 2000 pp. 23-24).

Life History

Grizzly bears are large terrestrial mammals that can weight from 250 to 600 pounds, with females weighing less than males on average. Grizzly bears may live 25 years or more in the wild. They are omnivorous and opportunistic feeders. Grizzly bears eat food rich in protein and carbohydrates when they have the option due to caloric needs and storing fat for hibernation. Grizzly bears hibernate during the winter (ranging from November to April depending on the bear's sex, age and reproductive status) when there is little food available and temperatures are low (Craighead and Craighead 1972b; Pearson 1975).

Habitat Use and Food Habits

Blanchard (1978) found 90% of radio relocations of bears were in very dense cover. Open areas close to cover accounted for almost all of the other locations. Over 90% of grizzly bear day beds are in forest cover (*Ibid.*). Grizzlies use nonforested habitats primarily during the summer. Lower Douglas fir and nonforested sites mixed with Doug fir were used in the spring. Whitebark pine and higher elevations and nonforested sites at these elevations were used primarily during the fall. Use of lodgepole pine was ambiguous, and use of spring-fir was neutral to preferred (IGBC p. 120). Use in Douglas fir and Whitebark pine habitats was weighted toward mature and late successional forests. In general, late successional or climax states of forest were more critical to bears than early successional states (*Ibid.*). Spring habitat is characterized by the interspersed cover to ungulate winter range.

Grizzly bears are omnivores and opportunistic making them very flexible in their food habits. In some areas, grizzly bears may be almost entirely herbivorous while in other areas they are largely carnivorous. Bears must seek foods rich in protein, fat or carbohydrates in order to obtain enough calories to survive denning and post-denning periods. Grizzlies spend much of their time searching for energy-rich foods and the search for food strongly influences bear movements. Diverse structural stages of vegetation that support many plant species and animals are needed to meet the energy demands of the grizzly. Bears consume animal matter, roots, bulbs, tubers, fungi and tree cambium, berries, seeds, and fish (Craighead et al. 1995 pp. 391-410).

Upon emergence from their dens in the spring, grizzly bears typically move to lower elevations such as ungulate winter ranges where their dietary needs may be met. Grizzly bears prey on elk calves in the spring in some locations. In the later spring and summer, they follow plant phenology as plant green up moves up in elevation. Bears with home ranges adjacent to Yellowstone Lake feed on fish extensively during the cutthroat spawning season (spring) (Reinhart and Mattson 1990). In the later summer, they often switch to fruit, army cutworm moths and seeds (whitebark pine) if available, and other herbaceous material. Plant material appears to provide more than half of the grizzly bear diet from 1968 to 1987, with decrease in proportion in the later part of that time. There is much more ungulate food available to grizzly bears now, but this food is used primarily during elk calving and by feeding on carrion that is most abundant in the spring. Overall, army cutworm moths, elk, bison, cutthroat trout, and whitebark pine are the highest sources of digestible energy available to grizzly bears in the Yellowstone areas (Craighead et al. 1995 pp. 391-410).

Hibernation/Denning

In general, bears enter dens in the fall and emerge in the spring. This is a means of avoiding food shortages and severe weather conditions (Pelton 1982 p. 508). Most bears enter dormancy, at which time their body temperature drops about 5 degrees C and heart rate declines from normal rates. Bears are not 'true hibernators' that awaken to deal with bodily functions. Bears do not generally feed, urinate or defecate during dormancy. In mild climates or some areas with abundant food year around, bears may not den at all. Craighead and Mitchell (1982 p. 521) state that bears need about two weeks to enter deep "winter sleep" and, unless disturbed, do not normally awaken until spring. Dens may be excavated in soil, in hollow trees, in caves, or occasionally on the ground or in a brush pile. Winter severity and denning opportunities influence the type of den used. Most dens are probably only used for one winter. Female bears give birth to cubs in the den in mid-winter. Cubs are altricial and nurse and grow while in the den until spring. In grizzly and black bears, females with cubs-of-the-year emerge from the den later than other sex and age classes of bears.

Based on 14 years of den data for the Yellowstone area, 90% of grizzly bears denned by the end of November (USDI 2000 BA p. 14). Bears may spend some time in the den vicinity prior to actual denning (Judd et al. 1986). Adult males typically emerge between mid-February and late March; subadults and single females in late March or early April, and females with new cubs emerge last, between early and mid-April (*Ibid.*). Females with COY may remain near the den for a period of time post-emergence (Craighead and Craighead 1972c; Vroom et al. 1977; Haroldson, pers. comm.); however, other research has not consistently documented this behavior which may be due to the bear monitoring method and frequency (Haroldson, pers. comm.). At emergence, ungulate carrion is usually the most important grizzly bear food (Mattson et al. 1991), but Whitebark pine seeds can be important after a year of high production (Mattson et al. 1992).

Home Range

Adult grizzlies are typically solitary except for females with cubs or during breeding. Siblings may associate with one another for several years after weaning. Home ranges vary from 50 square miles for females to several hundred for males. Home ranges often overlap. Grizzlies have one of the lowest reproductive rates among terrestrial mammals due to age at first reproduction (female at 5.5 yrs), litter size (1-4), and a long interval between litters (3 yrs). Mating occurs in early summer.

Recovery Criteria

Rather than use a specific size of a bear population as criterion for delisting, the following criteria were developed:

- Fifteen females with cubs-of-the-year (COY) over a six-year running average inside the Recovery Zone and within 10 miles of the Recovery Zone.
- Females with young must occupy 16 of 18 Bear Management Units on a six-year sum of verified sightings and evidence and no 2 adjacent BMUs can be unoccupied
- Known human-caused mortality cannot exceed 4% of the population estimate based on the most recent three-year sum of females with COY
- No more than 30% of the mortality can consist of females. Mortality limits cannot be exceeded during any 2 consecutive years.

These recovery parameters were met in 1995, 1998, and 1999 (ICST 2000 pp. 11,14,21).

The number of females with cubs-of-the-year (COY) has exceeded the recovery criterion for a number of years (ICST 2000 p. 11). Distribution has varied with occasionally having 2 adjacent BMUs where sows with young were not counted. Mortality levels have been higher than allowed by the recovery criterion in most recent years.

Population Size and Distribution

The exact size of the grizzly bear population in the Yellowstone area is not known, and several interpretations exist for the status of the population. Recent population estimates (USGS 1999; Eberhardt and Knight 1996) made population estimates of a minimum of 344 bears and a range of 245 to 390, respectively. Some believe the grizzly population is growing at about 3-4% per year (Eberhardt et al. 1996, Boyce 1995) but Pease and Mattson (1999) disagree. The best information suggests that the Yellowstone population is stable and may be increasing.

Numbers of sows with COY are well above the recovery criterion, and bears are appearing in locations where they have not been seen for many years. The numbers of sows with COY has been well in excess of the recovery criterion. The six year running average of sows with COY has gradually increased since 1984 from 13 to 28 in 1999 (USGS 2000 p. 11). The highest annual count of sows with COY was 35 in 1998. Litter size has also shown a slight increase (*Ibid.*).

The distribution of grizzly sows with young is tracked each year. In the last few years, the number of BMUs occupied by sows with young has ranged from 12 to 17 (ICST 2000; see Table 4).

Bear Management Units with occupancy every year from 1994-99 include Gallatin, Lamar, Shoshone, South Absaroka, Two Ocean/Lake, Thorofare, and Buffalo/Spread Creek. Other BMUs were occupied for varying years during this time period with Hellroaring/Bear and Plateau having the least number of years occupied by sows with COY.

Table 4. BMUs and Subunits by Forest, 1999 confrontations and conflicts, and 1994-99 occupancy by sows with COY, and subunits in need of access reduction.

BMUs all or partially on National Forests	Subunits	Forest	in need of improvement (reduced mot. access route density)	# bear/human confrontations in 1999 by BMU ¹	# bear/human conflicts in 1999 by BMU ²	Years ('94-'99) occupancy by sows w/ coy by BMU
Hilgard	1 2	GNF/B-D GNF		7	0	94,95,97,99
Gallatin	3	GNF	Y	21 ³	18 ⁴	all
Hellroaring/ Bear	1 2	GNF GNF		4	3	97,99
Boulder/ Slough	1 2	GNF GNF		3	0	95,96,97,99
Crandall/ Sunlight	1 2 3	GNF/SNF SNF SNF		0	0	95,97,98,99
Lamar	1	GNF/SNF		5	2	all
Shoshone	1 2 3 4	SNF SNF SNF SNF		1	0	all
South Absaroka	1 2 3	SNF SNF SNF		0	1	all
Two Ocean/Lake	1 2	B-T B-T		13 ⁵	0	all
Thorofare	1 2	B-T B-T		0	0	all
Buffalo/Spread Creek	1 2	B-T B-T		1	0	all
Bechler/Teton	1	B-T/T-C		0	11 ⁶	96-99
Plateau	1 2 3	T-C T-C T-C/GNF	Y Y	0	0	94,99
Henry's Lake	1 2	T-C T-C/GNF	Y Y	0	2	95,97,98
Madison	1 2	GNF GNF	Y	11 ⁷	4	94,97,98,99

Grizzly Bear Conflicts, Confrontations and Mortality

Gunther (USGS 2000 p. 68) reported 96 grizzly bear/human confrontations (aggressive encounters) in the Yellowstone area in 1999 (Table 4). Almost half of these (46) were bears

¹ Bear/human confrontations include aggressive encounters, bear approaching humans, bear in camp, bear in development and other.

² Bear/human conflicts include human injuries, property damage, anthropogenic foods, gardens/orchards, beehives, and livestock depredation.

³ Comprised of 5 aggressive encounters, 1 bear approach, 3 bear in camp, 12 bear in development.

⁴ Comprised of 2 human injuries, 5 property damage, 4 anthropogenic foods, 3 gardens/orchards, and 4 livestock depredation.

⁵ Comprised of 2 bear in camp and 11 bear in development.

⁶ Comprised of 11 livestock depredations.

⁷ Comprised of 3 aggressive encounters, 1 bear in camp, and 7 bears in development.

entering developed areas, 29 were bears acting aggressively but not injuring people, 13 in which bears entered occupied backcountry camps, 5 where bears approached or followed people, 2 in which bears were frequenting private ranch lands, and 1 in which a bear claimed a hunter killed animal. Most (89%) of these confrontations occurred on public land with 11% on private land. Only 14% occurred outside the Recovery Zone.

The Gallatin BMU accounted for 25% of the confrontations. Two Ocean/Lake and Madison BMUs were the next highest in number of confrontations. A majority of these incidents were in developments such as campgrounds. (Confrontations in the state of Wyoming outside of Yellowstone National Park are not recorded.)

Grizzly bear/human conflict situations (includes human injury, property damage, livestock depredation, damaged beehives, anthropogenic foods being obtained or damaged, or orchard fruits and vegetables being obtained) were recorded 113 times in 1999 (USGS 2000 p. 68; see Table 4). The Gallatin BMU had the most conflicts and Bechler/Teton had the second most. The conflicts were mixed in the Gallatin BMU but were all livestock depredations in the Bechler/Teton. The number of bear/human conflicts in Montana appears to be increasing with approximately 60% occurring on public land and 40% on private land. Due to an increasing number of human numbers and activities, and an expanding grizzly bear population, bear/human confrontations are likely to increase rather than decrease (USGS 2000 pp. 92-93).

Mortality can occur from intra-specific predation. Sometimes, but rarely, mortality occurs from disease and parasites or starvation. Mortality can be due to humans, when bears frequent areas where they may have found human related foods, or during encounters with armed humans. Natural mortality is extremely difficult to quantify. Human-caused mortality is more readily documented, and can be due to mistaken identity by black bear hunters, management control actions, poaching, defense of life or property, etc. A white paper produced in 2000 (IGBST pp. 1-2) reported on known human caused mortalities of grizzly bears in the Yellowstone area from 1992 to 1998. Of the 58 man-caused bear mortalities, 43% were hunting related, 10% were poaching, 28% were food conditioned bears, 7% were related to livestock, and 12 % were accidental deaths. Mortality has more than doubled in recent years with most of the bear deaths being self-defense in fall by big game hunters. The conflicts with humans often occur in poor natural food years for bears. Livestock conflicts were independent of natural food availability. Human conflicts peak in September, while livestock conflicts peak in August. Mortalities associated with human garbage and property damage have not changed from 1985-92 to 1992-98. The location of a bear mortality may not indicate where the bear first came into conflict with humans in the case of bears that have been translocated.

A summary of the known and probable grizzly bear mortalities throughout the GYA from 1975-2000 is presented in Table 5. This table summarizes mortalities in five categories: poached/malicious, hunting related, habituation/aggression, livestock related, and accidental. Poached/malicious mortalities accounted for 22 % of the bear mortalities, hunting related for 26%, habituation/aggression for 27%, livestock related for 12% and accidental for 13%. Most of the poaching, malicious killings, hunting related and livestock related mortalities occur, as expected, on the national forests surrounding the Parks. Livestock related bear mortalities are also fairly high on private land in Montana. Most of the habituated and aggression mortalities occur in Yellowstone National Park and private land in Montana. Most of the accidental mortalities occur in Yellowstone National Park. Twenty percent of the bear mortalities occur on private land, 63% on national forests, 16% in national parks, and less than 1% on state land.

Table 5. Known and probable grizzly bear mortalities by reason and land ownership from 1975-2000 (excluding natural causes, unknown causes and humane removals). (The Custer National Forest has no mortalities at this time.)

Jurisdiction	poached/malicious	hunting related	habituation/aggression	livestock related	accidental	total
Gallatin	10	12	7		4	33
B-D				1		1
Shoshone	11	13	5	3	3	35
B-T	15	22	3	1		41
Targhee	3	1		10	1	15
YNP	1		16		12	29
GTNP/RMP		1	1	1		3
State MT					1	1
State WY						0
State ID						0
Private MT	2	3	15	8	2	30
Private WY			5		2	7
Private ID	1		2			3
Total	43	52	54	24	25	198

Cumulative Effects

Cumulative impacts are past, present and future (reasonable and foreseeable actions of federal, state and private entities). Under the Endangered Species Act, in a Biological Assessment, future federal actions do not have to be considered because they will go through their own analysis, Biological Assessment, and consultation process as needed.

The current condition of the GYA is known as the environmental baseline. This includes past management activities such as land adjustments, timber harvest, mining, road and trail development, etc. The issue being addressed in the analysis is the effects of snowmachine use on grizzly bears. Therefore, the cumulative effects analysis can be limited in time and space to other activities that occur in or near grizzly bear denning habitat and occur at the same time of year that snowmobiling and denning occur. Because not all bears enter and emerge from dens at the same time, the analysis is extended slightly into the fall season just prior to denning and the spring season during early den emergence.

To set the context for the environmental baseline for grizzly bears in the Greater Yellowstone area, there are a number of naturally or semi-naturally occurring factors that may influence

grizzly bear habitat. Whitebark pine provides an important food source for grizzly bears, and this species is beginning to experience blister rust. The long-term effects of this are uncertain, but blister rust has had severe consequences on whitebark pine in the Northern Continental Divide area. Yellowstone cutthroat trout have been an important food source in the spring for grizzly bears using Yellowstone Lake as part of their home range. This species is being impacted by the introduction of lake trout. Bears could lose an important spring food in this part of the Park. Ungulate populations also vary widely and are largely influenced by weather. Winter killed ungulates are an important food source for grizzlies in many areas in most years (Bison EIS p. 563). The reintroduction of wolves to the Yellowstone area has brought back a competitor for the grizzly bear. This may be most important in the spring when both predators are seeking carrion and elk calves. Army cutworm moths have been found to be an important food source for some bears in some areas, most notably in the eastern part of the Yellowstone area (especially the Shoshone National Forest). Pesticide use in agricultural areas may affect this species. Wildfires are common in the Yellowstone areas in some years, and lodgepole pine is a fire dependent species. The 1988 fires burned almost 1 million acres in the Yellowstone area. Canopy was removed in some areas, whitebark pine was impacted in some locations, and there were undoubtedly influences on other foods. Bears whose home ranges were affected by fire may have enlarged their home ranges (Craighead et al. 1995 p. 386). Blanchard and Knight (1990) did not report serious effects of the fires on the grizzly bear population. It is expected that fires will continue to occur, but effects on the bears should be minimal with the primary effect being digression of vegetation back to an earlier successional stage, thus reducing cover in some areas and sometimes increasing preferred forage species.

Recent federal actions on a broad scale include the decision of the Park Service Winter Use EIS (2000) that will phase out snowmobiling in the Parks. At least some of this use will be displaced to the National Forests adjacent to the Parks. The Park Service Biological Assessment (2000) determined that this decision “may affect, but is not likely to adversely affect” the grizzly bear. However, it should be noted that the Park Service has been requested to reevaluate the information collected for the EIS and prepare a Supplemental EIS on this subject which could have a different decision on snowmobiling in the Park..

Another broad decision will be that of the OHV EIS (2000 pp. 2.11-2.14) covering Montana, North Dakota and part of South Dakota federal lands. The preferred alternative is to disallow off-road/trail wheeled, motorized use unless an area is designated as open. The ROD has been signed for this document.

The Bison EIS (2000) has been completed, and the ROD has been signed. The Biological Assessment determination is “may affect, but not likely to adversely affect grizzly bears” for the selected alternative and received concurrence from the USFWS..

Past and present activities on the National Forests in the Yellowstone areas include land adjustments, timber sales, mineral exploration and extraction, livestock grazing, permitted outfitting and recreation. The following is not intended to be an exhaustive review of all the existing conditions (environmental baseline) and current actions occurring on each Forest included in this analysis, but it covers what each Forest representative believed to be worth discussing in a cumulative effects discussion. If the discussion was in great detail or was outside of the general winter season, it was all or partially moved to an Appendix (Appendix 8). Some of these discussions were reduced if activities appeared to be outside of grizzly bear denning season and could have no known effect on denning grizzly bears.

Cumulative effects are those that have the potential to affect grizzly bears in the same time and place as snowmobiling. Those activities that are worth looking at most closely are those that involve activity in bear denning habitat during the winter season (from sometime in November or December to sometime in April in most places). There are some areas and years in which snow conditions may allow for snowmobiling to continued into May or even June

Land Adjustments

Land adjustments (acquisitions, trades, easements, etc.) can have the effect of allowing the National Forest system to control access to an area and thus affect travel management, including snowmobiling, in that area. In many cases, with ongoing adjustments that are not completed or that have a Forest Plan amendment, travel management issues have not been decided and will be taken through a travel management planning process or Forest Plan amendment process for the new lands. In most cases, land adjustments result in better road management and fewer miles of road.

Timber Harvest

Timber harvest removes forest cover in an area and could make it more available to snowmobile activity. If roads are built to access timber, they may later be used as snowmobile routes. Although timber sales could potentially operate in the winter, when bears are denning, this is quite unlikely in the Yellowstone area due to the severity of winters and snow depths. Past timber harvest and other vegetation manipulation is part of the environmental baseline. Harvest has been occurring for many years on the national forests in the GYA. In general, the amount of timber harvested in the area has declined in recent years.

Recreation-Winter

On the Forests in the GYA, expanding winter recreation of various forms, including alpine and Nordic skiing, snowshoeing, snowboarding, hiking, dogsledding, and other potential activities may affect denning grizzly bears when they are denning or just prior to entering the den or, more likely, after emergence. Early spring recreational activities that occur when bears have just exited the den, and fall activities that occur just prior to bears entering their dens may have cumulative effects on wintering bears. Fall activities might include hunting, especially late season hunts that occur in November or later (Swenson et al. 1997). Early spring activities other than snowmobiling might include skiing or snowshoeing. Further information on winter use in the GYA can be found in the Winter Visitor Use Management: A Multi-agency Assessment document (GYCC 1999).

Most Forests have issued special use permits for various winter activities such as ski resorts, outfitting for snowmobiling, ice climbing, dogsledding, cross-country ski races, etc. These activities have the potential to affect denning grizzly bears if they occur in denning habitat.

The Gallatin National Forest has 14 snowmobile outfitters, 3 dog sled outfitters, and 3 cross-country ski outfitters, primarily operating out of West Yellowstone and Cooke City. The Forest is also the location of one snowmobile race and one cross-country ski race.

Presently the primary activity within the Custer National Forest boundary that has long-term impacts on wildlife habitat and habitat use is the Red Lodge Mountain Ski Area. The Red Lodge Mountain Ski Area encompasses 2,088 acres that includes 1,288 acres of National Forest System Lands. Expansion of this area is presently not proposed. There are other ski resorts in the GYA in areas where grizzly bear may occur such as Big Sky, which is on private land.

In 2001 a temporary special use permit was issued for ice climbing in the Beartooth Mountains of the Custer National Forest for less than 30 service days. A permanent special use permit is being examined that may be issued for 2002/2003 that would include ski touring in addition to the ice climbing. Also under consideration is a second special use permit to a separate vendor for the same activities that may be issued for 2002/2003. The total number of service days under both permits could be up to 500 days. Due to the location of the permitted activities, primarily outside occupied grizzly bear habitat, these proposed activities would not be expected to add measurable cumulative effects to potential impacts from snowmobile use on denning or emerging grizzly bears on the Custer National Forest

The Sleeping Giant Ski Area on the Shoshone National Forest encompasses 1,147 acres and managed entirely under a special use permit on National Forest System Lands. It is located on the Wapiti Ranger District within the North Fork Shoshone River Corridor near Yellowstone Park. The ski area can accommodate about 1,000 skiers per day. Use is well below capacity, with an average of about 4,200 total user days per year from December through early April. Most use is in January and February. The only other downhill ski area on the Shoshone is located in the Beartooth Mountains on the north end of the Forest, just outside the grizzly bear recovery area. It is used only as a race training camp from early June through early July.

There are eight areas with marked cross-country ski trails on the Shoshone National Forest, totaling about 40 miles of trail. Four areas are near Dubois (12 miles), one near the East Gate of Yellowstone Park (7.5 miles), one on the Wood River east of Meeteetse (15.5 miles), one at Sinks Canyon (2 miles) and one at South Pass (3 miles). All except the Sinks Canyon and South Pass trails are in areas potentially used by grizzly bears. Only the trails near the East Gate of Yellowstone are within the grizzly bear recovery area. Trails near the East Gate, Wood River, Sinks Canyon and South Pass are groomed.. The potential to impact denning grizzly bears from these cross-country ski trails is likely very low, as most trails are in relatively flat open areas.

Backcountry skiing occurs in several areas of the Forest at elevations and in terrain potentially used by denning grizzly bears. Use levels have not been documented. Some of the lodges on the North Fork of the Shoshone and the Brooks Lake Lodge on the south end of the Forest promote backcountry skiing opportunities.

The National Outdoor Leadership School is located in Lander, Wyoming and conducts backcountry skiing trips in Wilderness on the Shoshone National Forest throughout the winter. Activity generally consists of one group at a time of about 12 people in the Wind River Mountains on the south end of the Forest.

The only other winter outfitting on the Shoshone consists of two commercial dog sledding operations out of Dubois. Use is almost exclusively on groomed snowmobile trails in the area. The International Rocky Mountain Sled Dog Race occurs every year along the Continental Divide Snowmobile trail on the south end of the Shoshone National Forest. About 25-30 dogs

teams compete in late January and early February running from Jackson to Lander. Teams are on the Shoshone Forest for a total of about 4 days.

The South Fork of the Shoshone River is a very popular area for ice climbing and use is increasing. No permits for commercial ice climbing operations have been issued, although the Forest has had inquiries regarding the possibility.

There are several ski resorts that lie either all or partially on the B-T National Forest. These include White Pine, near Pinedale, Jackson Hole Mountain Resort, and Snow King near Jackson. White Pine is a small resort that is open from December through early April. Jackson Hole Mountain Resort is large and is open late November through early April. Snow King is partly open in November and runs through early April. They are all under USFS special use permits. The Forest offers both groomed and ungroomed cross-country ski routes. Snowshoeing and ice climbing also occur on the Forest.

Recreation-Hunting

There are some late season big game hunts in the GYA. By the time the late hunts begin, most bears are already in their dens. However, there is potential for hunting activity to disturb denning bears or bears prior to entering their dens in the fall (Swenson et al. 1997).

The general elk hunting season in Montana is from late October through late November. The general season hunt dates are such that bears entering their dens could be disturbed by hunters prior to or after entering their dens. The Gallatin National Forest has a number of late season elk hunts by permit. These are usually for antlerless, either sex or brow-tined elk depending on the area and the purpose of the hunt. Hunting District (HD) 310 has a January hunt of about 100 permits, HD 313 has a hunt from early Jan to early Feb for almost 2500 permits, HD 314 has 5 permits in Jan-Feb and 755 that last until early December, HD 360 has 400 permits in January and December, HD 311 has about 600 December and January permits, and HD 362 has about 200 permits for January. Most of these later season hunts are depredation hunts and occur at lower elevations where bears are unlikely to be denning according to the denning model.

Most of the hunt areas north of Dubois on the Shoshone National Forest have late season elk hunts that last until the end of December. Antlerless elk hunting in two hunt units in the Crandall/Sunlight area continues until the middle of January and through the end of January on Carter Mountain and Greybull River areas.

There are two late season hunts in potential grizzly bear habitat on the B-D. They are limited permit hunts and one runs from the end of the regular season until the end of January and the other is a January hunt. Most hunting occurs in the lower elevations, but in low snow years, may move into higher elevations. Approximately 75 and 50 hunters are permitted at a time for these two late season hunts.

Developed sites such as houses and lodges on private land and campgrounds and cabins on the national forests that are used in the winter likely increase winter use in the vicinity of the site where people snowmobile, ski, snowshoe or participate in some other winter recreation.

Livestock

Because livestock grazing on the national forests occurs in the summer, well outside of bear denning season, there is no cumulative effect of livestock grazing and snowmobiles on grizzly bears.

Development

Human development continues in and around the Yellowstone. Residential development typically increases human use of the land and leads to an increase in human/bear encounters. Human recreation continues to increase in areas near developments with humans moving into bear habitat. Winter use activity of various kinds is likely to be greater near developments. The Big Sky area in Montana is an example of a large amount of rapidly developing private land with people recreating on it and around it on the National Forest. Snowmobile use, cross country skiing, snowshoeing, and other recreational activities are likely to be greater in this area than in undeveloped areas. There are a number of such rapidly developing areas in the GYA within areas where grizzly bears may occur. Most of the actual development is located at lower elevations than where bears typically den, however, the winter recreational activity associated with these developments may occur near bear dens.

Mining

Mines that operate year around in grizzly bear denning habitat could have cumulative impacts on denning grizzly bears. To operate in the winter, mine operations could include plowing roads which might increase snowmobiles or other winter recreational access into an area. Mining activity itself may produce some noise and could disturb bears denning nearby. The Stillwater and East Boulder mines are located on the Custer and Gallatin National Forests, respectively, operate year around and may cause effects if they are in denning habitat. These mines do not appear to be in denning habitat. The talc mines on the B-D are not located in grizzly bear denning habitat.

In early spring 2001 exploratory mineral drilling took place in the Stillwater drainage of the Custer National Forest under an existing lease. The drilling occurred “on the snow” but the drill sites were located outside of MS1 and MS2. These drilling activities could disturb bears denning nearby. To date, no additional exploratory drilling is proposed on the District in winter 2001/2002.

No other Forests reported winter minerals activity.

Motorized Road or Trail Access

Access into the Forest may allow for more winter use, especially snowmobile use following roads and trails and in some areas, reaching snowmobile play areas. Most Forests in the GYA have been and are decreasing motorized access route density and have Forest Plan direction or amendments to do so where densities are high. It should be mentioned that much of the Recovery Zone and area where bears may occur lies within designated Wilderness where snowmobiling is not allowed.

Appendix 9 provides a map of secure habitat in the grizzly bear recovery zone on the National Forests in the GYA. This map was created following the general procedure and definitions outlined in the Interagency Grizzly Bear Committee Taskforce Report (IGBC 1998). Secure habitat was originally referred to as “core habitat”, but has been officially changed to avoid confusion with other biological uses of the term. Two seasons were identified in the GYA for analysis of motorized access route density and secure habitat (ICST 2000, Barber and Ouren 1999). Season 1 was defined as 1 March – 15 July and Season 2 as 16 July – 30 November. Only Season 1 was used in this analysis, as snowmobile use rarely occurs during Season 2.

Secure habitat is defined as that area greater than 500 meters from an open or gated motorized access route or high use non-motorized trail and areas where open motorized access route density (OMARD) is 1 mile per square mile or less. OMARD is calculated using a moving windows analysis process with the Arc/Info Geographic Information System software. Polygons identified using this process had to be greater than 10 acres in size to be classified as secure (Barber and Ouren 1999).

Inside the grizzly bear recovery area and within 1 mile outside, databases created for the development of the Draft Conservation Strategy (ICST 2000) were used in the secure area analysis. High use non-motorized trails were included in the analysis as defined above. A more complete description of the development of the databases and analysis process is contained in the 1998 Annual Report of the Interagency Grizzly Bear Study Team (Barber and Ouren 1999). However, databases in other areas on the National Forests did not have high use trails identified. In addition, databases in these areas did not receive the years of review that occurred within and adjacent to the recovery area. All linear features depicted on each Forest’s roads coverage in areas greater than 1 mile from the recovery area boundary were considered to be open motorized access routes for this analysis.

Effects of Snowmobiles on Grizzly Bears

The literature was surveyed for articles related to the effects of different types of disturbance on bears in the winter. Due to the paucity of information in this area, literature was collected for all species of bears for which it could be found, and all types of disturbances during the winter and pre-and post-denning periods. The following is the result of that literature search.

Behavioral Response to Disturbance

The potential responses that a bear may have to disturbance while in the den range along a continuum (Linnell et al. 2000). Minor responses could include waking from deep sleep, slight increase in temperature and increased heart rate, and may range all the way to den abandonment. The cost to the bear increases as one moves along the behavioral continuum (*Ibid.*). As the cost of abandoning a den and relocating to another rises, females with cubs should be expected to tolerate greater levels of activity without abandonment (Linnell et al. 2000). In some studies, dens that were approached directly were more often abandoned than those approached tangentially (*Ibid.*).

With repeated exposures, animals habituate or adapt both physiologically and behaviorally (Knight and Gutzweiler 1995 p. 114). Unfamiliar noise is more likely to arouse an animal than a harmless, familiar noise. A startle response is a response to a sudden event or sound and is characterized by a physiological response. Lower decibel (dBs) trigger more normal responses,

and sudden noises at higher dBs trigger startle responses. At lower frequencies (below 100 Hz), responses are reduced. Increases in heart rate after noise is not evidence that an animal has been startled. Mild heart rate increases may indicate that a sound has merely been detected. Minor noises previously accompanied by pain or some other related negative event may cause a stronger heart rate response than louder noises (*Ibid.* p. 123). Many species show a minor response to noise such as flights, traffic, etc., but in mammals, there has not been strong evidence that animals are affected to the point that they deplete energy reserves (*Ibid.* p. 124). Animals may have one of three responses to noise: attraction, tolerance or aversion. If something positive, like food, is associated with noise, the noise can become an attractant. Tolerance occurs when noise is not accompanied by anything else, either positive or negative for the animal. Aversion would occur when noise is accompanied by something negative for the animal (e.g. loud barking preceding being chased by a dog) (*Ibid.* p. 127). Mild responses may be difficult to detect. If mammals are repeatedly exposed to the same noise stimulus without negative associations, responses decline rapidly (*Ibid.* p. 133). Vertebrates can track the direction of movement and typically respond more strongly to direct approaches than to tangential passes (*Ibid.* p. 133). Most of the effects of noise are mild enough that they are probably not detectable at a population level (*Ibid.*, p. 135).

The response to noise at an individual level may vary with age, sex, experience, reproductive state (with COY or young and without), terrain, temperament, time into the denning season, den characteristics, distance from noise, approach of noise (direct or tangential), weather conditions, and other factors.

Effects of Disturbance On Denning and Emerging Bears

Grizzly/Brown Bears (*Ursus arctos*)

Sterling Miller (pers. comm. to Dolan, Lolo National Forest) reported that Alaskan brown bears moved within the den when located by fixed wing aircraft. Some moved when the aircraft approached, and others only after the aircraft had circled over them a few times.

On Admiralty and Chichagof Islands, Schoen (Schoen et al. 1987, p 302.) stated "Frequently, (brown) bears instrumented with motion sensor transmitters became active as we flew over their dens at an altitude of about 150 m." These flights were in small, fixed-wing aircraft, which are much quieter than helicopters. This study included flights about every 6 weeks throughout the winter.

Reynolds et al. (1986) monitored heart rates of 4 bears (both male and female) during seismic activity in March and April (seismic shots and fixed-wing flights) in Alaska. Heart rates of 2 bears (sows with young) whose dens were flown over by fixed-wing aircraft did not change.

Reynolds et al. (1986) found that none of the 4 bears monitored left their dens as a result of seismic exploration activities. Although heart rates seem to fluctuate naturally during denning, the researchers believed that seismic activity caused an increase in heart rate in one bear indicating that it was moving within the den after a seismic shot detonated about 1.4 km from its den. Another bear apparently responded after a seismic shot detonated about 1.6 km from its den. Bear heart rates appeared to be elevated when seismic crews worked near (< 1 km) den sites. The authors state (p.174) that the limited number of observations and the fact that bears show increased heart rates during undisturbed conditions limit the conclusion that can be drawn,

especially because heart rate can vary independent of physical activity. “Even if animals responded to noise associated with seismic exploration activities effects on the bears were probably minimal. None of the radio-collared bears deserted their dens in response to seismic activities and all emerged in the spring with no observed deaths of accompanying offspring.”

Harding and Nagy (1977) found that grizzly bears denned successfully 1.6 to 6.4 km from active mining camps. Although bears did not avoid general areas of industrial activity, they appeared to avoid drilling and staging camps by at least 1 km.

Swenson et al. (1997) believed that fall hunting, which occurs early in the denning period in Sweden, may contribute to fall disturbance and early den abandonment by brown bears. They suggest that bears may be more tolerant of industrial activity located some kilometers from the den, but not of humans or human related activity near or at the den site. A number of the human activities at or near the den site were not motorized (i.e. hunting, survey work, shooting, and fishing at or near the den, and a dog at the den site, etc.).

Black Bears (*Ursus americanus*)

In a relatively mild climate in California, Goodrich and Berger (1994) found den abandonment in response to investigator disturbance, and that all but one disturbed bear remained active after abandonment. This was in a relatively mild climate with primarily nonexcavated dens and time of year of disturbance was not given.

Teitje and Ruff (1980) found that black bears that abandoned their dens lost 25% of their body weight compared to 16% to bears that did not. Nursing bears or den abandonment may account for another 9% overwinter weight decrease.

Pelton (1982; p. 508) states that as one moves southward, black bears appear to be more easily aroused from their dens. This may be due to den selection and climate rather than true differences in physiology and denning behavior.

Polar Bears (*Ursus maritimus*)

In polar bears, only pregnant females den. Ampstrup (1993) found that most polar bears in their study area showed substantial tolerance for human activities. Recruitment of cubs was not affected by capture, marking and overhead monitoring flights. Ramsay and Stirling (1986) also found this. Two bear dens were approached by snow machines. In one case the bear left the den 6 days after the snow machine approached within 10 m of the den. In the other case, the bear seemed to emerge normally later in the spring. Two maternity dens were found within 2.8 km of an oil production plant where traffic, human activity and noise were constant throughout the denning period. Polar bears may be more willing to abandon dens in the fall than later in the denning period.

Blix and Lentfer (1992) measured noise and vibration from seismic testing, drilling and vehicular traffic in polar bear habitat in Alaska. They found that dry arctic snow is an extremely good sound and vibration insulator, and they believed that denning bears would not be disturbed if activities occur more than 100 m from the den. Only helicopter and seismic testing within 100 m of the den were louder than background noise.

Abandonment of Dens

Abandonment Related to Disturbance

Grizzly/Brown Bears

In the Brooks Range in northeastern Alaska, (brown) bears abandoned five den sites after they were tracked to them by helicopter (Reynolds et al. 1976).

Harding and Nagy (1977) found that one grizzly bear abandoned its den after having the den driven over by a seismic vehicle. Another bear abandoned a den during gravel mining operations. Other bears denned successfully 1.6 to 6.4 km from active mining camps. Although bears did not avoid general areas of industrial activity, they appeared to avoid drilling and staging camps by at least 1 km.

Swenson et al. (1997) found that there was no significant difference in den abandonment in a 'protected area' versus areas where there was military activity and timber harvest. Swenson et al. (1997) found that when there was some type of human activity at or within 100 m of den sites, 12 of 18 dens were abandoned.

Craighead and Craighead (1972) apparently caused den abandonment by a female grizzly bear in the fall that they tracked to within 200 ft of its den.

Reynolds et al. (1986) found none of the 4 grizzly bears they monitored left their dens as a result of seismic exploration activities. Noise from nearby vehicles (tractors and tracked vehicles) 100 m from a den did not cause the bear to leave its den in mid-March. It is possible that another bear left its den that was 200 m from a seismic line. None of the radio-collared bears deserted their dens in response to seismic activities and all emerged in the spring with no observed deaths of accompanying offspring."

In the Swan Range of Montana, Mace and Waller (1997) reported no abandonment of dens by grizzly bear although snowmobiles were often seen within 2 km of den sites.

Black Bears

Kolenosky and Strathearn (1986) found that rates of black bear den abandonment in Ontario were inversely related to duration of denning. In other words, den abandonment is much more likely early in the fall than any other time.

Smith (1983) found that black bears (6 of 9) abandoned their dens less than 2 weeks after den entry, but bears within the dens more than 4 weeks ($n = 12$) did not abandon their dens. This study was in a mild climate where many bears use tree dens and even den in the open (on the ground), and there is no snow. Beecham et al. (1983) also found that den abandonment was inversely related to the length of time that the bear had been denned. Reynolds et al. (1976) and Tietje and Ruff (1980) also found this for black bears and brown bears.

Tietje and Ruff (1980) indicated that "oil drilling activities may cause den abandonment", while Manville (1983) noted that "two (black) bears moved to new dens when their original dens were 0.15 km from an active oil well and 0.09 km from a snowmobile trail".

Goodrich and Berger (1994) studied the effects of winter disturbance on denning black bears in the Sierra and Sweetwater Mountains in Nevada and California. They noted no difference in the rate of abandonment (by black bears) in response to disturbance (a person at the den site) in an area with high recreation (Sierras) versus an undisturbed area in the Sweetwater Mountains, which they believed indicated that these bears did not habituate to regular disturbance. "We did not document den abandonment due to recreational disturbance, but indirect evidence of the problem exists. Bears were sighted on ski runs bordering the Sierra study area on at least two occasions in early February 1989 and two bears were reported at another ski area in late December 1999. Because these activities occurred several weeks before any radio-collared bears had emerged from their dens, it seems likely that the uncollared bears had abandoned their dens, possibly as the result of human recreational disturbance." They cite 3 cases of cub abandonment (out of 12 cases of den abandonment)- one after researchers entered the den to radio-collar the female and two as researchers approached the den. They conclude, "Since the quiet approach of investigators sometimes causes abandonment of dens and cubs (this and other studies; Manville 1983, Kolenosky and Strathearn 1987), skiing and other recreational activities could have the same or a heightened effect." Den site abandonment in response to investigator disturbance occurred at both study areas and all but one disturbed bear remained active after abandonment. Applications of the findings of this study to grizzly bears should be made with caution because these black bears were most commonly denning in trees, either at the base or in elevated tree dens, rock dens, and in some cases in logs, brush piles or on the ground, which can occur when winters are relatively mild. The time of year for den abandonment was generally not provided.

Polar Bears

Ampstrup (1993) found that most polar bears in their study area showed substantial tolerance for human activities. Two bear dens were approached by snow machines. In one case the bear left the den 6 days after the snow machine approached within 10 meters of the den. In the other case, the bear seemed to emerge normally later in the spring. Two maternity dens were found within 2.8 km of an oil production plant where traffic, human activity and noise were constant throughout the denning period. Polar bears may be more willing to abandon dens in the fall than later in the denning period.

Other Reasons for Den Abandonment

Shoen et al. (1987) believed that in 1986, after a period of mild temperatures and heavy rainfall, almost 1/3 of the brown bears in their study area abandoned their dens and moved into new dens, probably due to wet conditions in the dens caused by thawing and rain. Snow consistency became denser and contained more moisture in the spring than in January. They hypothesize that snow cover as insulation for the den is more important in colder, interior areas such as the Rocky Mountains than in Southeast Alaska.

Craighead and Craighead (1972) state that water trickling into a den would be undesirable and this may be why grizzly bears tend to select north slopes for denning, as snow is less likely to melt during warm periods. They found that dens were located in timbered areas relatively far from developed areas or human activity. All dens they located were excavated by grizzlies.

Phil Farnes (pers. comm. to M.Cherry) believes that spring grizzly bear emergence dates in the Yellowstone area can be predicted by changing snow characteristics that lead to moisture in the den.

Displacement from Suitable Denning Habitat

Craighead and Craighead (1972) indicated that grizzly bears in Yellowstone constructed dens "in timbered areas isolated from human habitation and activities."

Shoen et al. (1987) believed that brown bears may be seeking isolated den sites away from development and human activity. Female bears denning in an area with intensive helicopter traffic moved their den sites significantly farther from this area the next year (3.4 km 1st year to 11.7 km the next year). Their findings suggest that intensive development, including aircraft traffic, may reduce an area's suitability as brown bear denning habitat.

Judd et al. (1983) believed that bear dens are consistently located in remote areas less traveled by people.

Effects on Reproduction

Goodrich and Berger (1994) studied the effects of winter disturbance on denning black bears in the Sierra and Sweetwater Mountains in Nevada and California. They cite 3 cases of cub abandonment (out of 12 cases of den abandonment)- one after researchers entered the den to radio-collar the female and two as researchers approached the den.

Although they had a small sample size, Swenson et al. (1997) showed that den abandonment resulted in a higher loss of young during the denning period and emergence in the group of pregnant females that moved prior to parturition.

Reynolds et al. (1986) found that all bears they monitored emerged in the spring with no observed deaths of accompanying offspring.

McLellan and Shackleton (1989) noted that following seismic exploration in "berry" season, a previously successful female grizzly bear emerged with one cub. Traces of a second were found in her scat near the den (suggesting that she had either killed the cub or consumed its dead body), and the living cub was lost within 3 weeks. The authors think it is unlikely that the loss of these cubs was related to the seismic activity months before. The same female had 2 cubs after the 1984 seismic activity that survived through 1985 seismic activity.

Ampstrup (1993) found that most polar bears in their study area showed substantial tolerance for human activities. Recruitment of cubs was not affected by capture and marking and overhead monitoring flights. Ramsay and Stirling (1986) also found this.

Post-emergence

Reinhart and Tyers (1999) suggested that conflicts between grizzly bears and snowmobiles could occur after bears emerge (after Mar. 15) on big game winter ranges, and in years where there was a carryover of whitebark pine seeds in caches (about one year out of every five years) there could

be a conflict at higher elevations after emergence in whitebark pine habitats. Since sows with cubs-of-the-year may stay near the den site for a short period of time post-emergence, on average (Craighead and Craighead 1972c, Vroom et al. 1997, Haroldson, pers. comm.) they may be more likely to be disturbed by snowmobiling. It should be noted that grizzly bear sows with cubs-of-the-year (this year's cubs or COY) emerge later from their dens than other bears, usually in April (Judd et al. 1986).

At the time of emergence (March-April), snow conditions are changing rapidly, with the same conditions that help lead to bear emergence (water infiltrating the den) (Shoen et al. 1986; Craighead and Craighead 1972a; P.Farnes, pers. comm. 2000) leading to poor quality snow for snowmobiling. Snow is melting at lower elevations, making access to higher elevations more difficult for snowmobilers. Snow starts to lose its insulating qualities as it warms and becomes isothermal in the spring (P. Farnes, pers. comm. 2000).

Conclusion from the Literature

Swenson et al. (1997) recommended that humans avoid areas around known active bear dens. They suggested that dens be avoided by 100 meters to 1 km, and that disturbance be minimized in areas with dense concentrations of dens.

Linnell et al. (2000) reviewed the literature on disturbance to denning bears. They concluded that bears tend to select dens 1 to 2 km away from human activity such as roads and dwellings, and bears seemed tolerant of activities that occurred more than 1 km from the den. Activity closer than 1 km, especially that within 200 meters of the den, led to variable responses from bears. Bears may abandon dens if activity occurs within this zone, particularly early in the denning season. Bears often den at some distance from where they denned the previous year, indicating that loss of a single denning area due to human disturbance does not always lead to deleterious effects if alternate denning habitat is available within the bear's home range.

Linnell et al. (2000) recommended:

- 1) locate den concentrations,
- 2) minimize winter activity in denning areas,
- 3) if winter activity is unavoidable, it is better to commence activity about the time bears are entering dens so they can choose to avoid certain areas,
- 4) confine winter activity to regular routes and valley-bottoms,
- 5) avoid known den sites by 1 km, and
- 6) off-route use, which is not predictable, may have more serious impacts than predictable activity and should be minimized.

Direct Impacts of Snowmobiling on Grizzly Bear Denning Habitat in the Greater Yellowstone Area

The USFS, Region 2, did an analysis of snowmobile use as compared with known den sites (Appendix 10) in the Greater Yellowstone (USDI BA 2000). Preferred denning habitats of grizzly bears are generally remote and thus are removed from most winter recreation in the parks (Gunther, pers. comm. to Barber). Snowmobiles are more likely to have access to remote sites on adjacent National Forest Lands in the GYA.

The Interagency Grizzly Bear Study Team (IGBST) has documented 380 grizzly bear den sites of radio-collared bears from 1975-99 in the GYA. These data represent the last known den site for an individual bear in a given year and only one site per bear per denning year. Den site data are only a small sample of den locations in the GYA and are not representative of all potential denning habitats in the GYA. Radio-telemetry efforts during most of this period (1975-99) were focused within the recovery area. Consequently, inferences beyond this area are subject to minimal sample size and interpretation. In addition, den site locations are only accurate to + or – 100 meters.

An Interagency assessment, completed in March 1999 (GYCC 1999), identified areas closed to snowmobile use, areas open to snowmobile use and areas and routes currently used by snowmobiles in the GYA. These data have limitations in accuracy and resolution. The large mapped polygons (1:250,000 scale) identifying areas open to and used by snowmobiles on National Forest lands in the GYA likely include small inclusions of steep or forested terrain inaccessible to snowmobiles.

In spite of the identified limitations, these data do provide for a general evaluation of where bears have denned as it relates to snowmobile use in the GYA. Approximately 88% of all den sites were in areas currently closed to dispersed snowmobile use and about 96% of all den sites were inside the grizzly bear recovery area (Table 6). This high percentage within the recovery area likely reflects sampling effort and historic bear distribution. In recent years, bears have reoccupied areas outside the recovery area in greater numbers. However, the telemetry sample from this group of bears is limited. Although 12% of the den sites were in areas open to snowmobiles and other recreation use (Table 6) only about 5% of the den sites were within mapped areas known to be used by snowmobiles (Table 7). Most of the area open to and not currently used by snowmobiles either does not reliably accumulate enough snow to sustain over-the-snow recreation or is better suited to non-motorized winter uses (Table 6).

The distance from den sites to existing snowmobile routes and play areas was also evaluated in 500-meter intervals (Table 7). Almost 83% of all den sites were greater than 2000 meters from snowmobiles use areas or routes.

Table 6. Number of grizzly bear den sites (1975-99) in areas open to and areas closed to snowmobiles in the Greater Yellowstone Area.¹

Area	Outside GB Recovery Area	Inside GB Recovery Area	Total
Closed to Snowmobiles	1	332	333 (87.6)%
Open to snowmobiles	14 ²	33	47 (12.4%)
Total	15 (3.9%)	365 (96.1%)	380

¹ Areas open to and areas closed to snowmobiles as identified in Winter Visitor Use Management: A Multi-Agency Assessment, (GYCC 1999).

² Four of these den sites were in areas defined as low or unpredictable snow depths (GYCC 1999).

Table 7. Number of grizzly bear den sites (1975-99) within and adjacent to routes and areas used by snowmobiles in the Greater Yellowstone Area.¹

Area	Outside GB Recovery Area	Inside GB Recovery Area	Total
Within snowmobile use areas	8	13	21 (5.5%)
Within 500 meters of snowmobile use areas or routes	0	4	4 (1.1%)
Between 501 and 1000 meters from snowmobile use areas or routes	0	12	12 (3.2%)
Between 1001 and 2000 meters from snowmobile use areas or routes	2	27	29 (7.6%)
> 2000 meters from Snowmobile use areas or routes	5	309	314 (82.6%)
Total	15	365	380

¹ Snowmobile use areas and routes as identified in Winter Visitor Use Management: A Multi-Agency Assessment (GYCC 1999).

Only about 7% of the den sites documented from 1975-99 in the GYA were inside dispersed snowmobile areas or within 500 meters of these areas or snowmobile routes. Data are not available to evaluate the level or timing of snowmobile use associated with each den site during the year it was documented. It is unknown if den sites within snowmobile areas were located in inaccessible micro sites (steep terrain or dense forest) or were potentially available for snowmobile access.

The following table (Table 8) gives the number of known dens by Forest and Park and the location relative to snowmobile use areas. Yellowstone National Park is where 55% of the known dens are located. The Shoshone, B-T, and Gallatin National Forests have 25, 10, and 7% of known den sites, respectively. Of the 13 known dens that are within snowmobile use areas, 7 are on the Gallatin, 2 on the Shoshone and 4 on the Bridger-Teton National Forests. Of these three Forests with a substantial percentage of known dens, the majority are found more than 2000 m from snowmobile use areas or routes.

Table 8. Number of grizzly bear den sites (1975-99) within and adjacent to routes and areas used by snowmobiles in the Greater Yellowstone Area.¹

Area	Forest	Outside GB Recovery Area	Forest	Inside GB Recovery Area	Total
Within snowmobile use areas	GNF	1	GNF	7	21 (5.5%)
	B-D	1	B-D	0	
	Custer	0	Custer	0	
	SNF	4	SNF	2	
	B-T	2	B-T	4	
	T-C	0	T-C	0	
	YNP	0	YNP	0	
	Total	8	Total	13	
Within 500 meters of snowmobile use areas or routes	GNF	0	GNF	2	4 (1.1%)
	B-D	0	B-D	0	
	Custer	0	Custer	0	
	SNF	0	SNF	1	
	B-T	0	B-T	0	
	T-C	0	T-C	0	
	YNP	0	YNP	1	
	Total	0	Total	4	
Between 501 and 1000 meters from snowmobile use areas or routes	GNF	0	GNF	2	12 (3.2%)
	B-D	0	B-D	2	
	Custer	0	Custer	0	
	SNF	0	SNF	3	
	B-T	0	B-T	0	
	T-C	0	T-C	1	
	YNP	0	YNP	4	
	Total	0	Total	12	
Between 1001 and 2000 meters from snowmobile use areas or routes	GNF	0	GNF	0	29 (7.6%)
	B-D	0	B-D	0	
	Custer	0	Custer	0	
	SNF	2	SNF	1	
	B-T	0	B-T	1	
	T-C	0	T-C	2	
	YNP	0	YNP	23	
	Total	2	Total	27	
> 2000 meters from Snowmobile use areas or routes	GNF	0	GNF	16	314 (82.6%)
	B-D	1	B-D	0	
	Custer	0	Custer	1	
	SNF	3	SNF	86	
	B-T	1	B-T	32	
	T-C	0	T-C	0	
	YNP	0	YNP	174	
	Total	5	Total	309	
Total		15		365	380

The USFS, Region 1, developed a process to analyze the effects of snowmobiles on carnivores. This is presented in Appendix 11.

¹ Snowmobile use areas and routes as identified in Winter Visitor Use Management: A Multi-Agency Assessment (GYCC 1999).

The Interagency Grizzly Bear Study Team (IGBST) devised a Mahalanobis Distance model based on known sites in the Yellowstone (Podruzny et al. in review; see map Appendix 10). Clark et al. (1993) describe the Mahalanobis Distance method of modeling wildlife habitat requirements and Clark et al. (1998) used the method to model female black bear (*Ursus americanus*) denning habitat in Arkansas. The objective was to develop a predictive GIS model to identify potential grizzly bear denning habitat in the Yellowstone area. Clark et al. (1998) describe the Mahalanobis distance as a dissimilarity measure. It is a standardized squared distance between some “ideal” habitat and a set of sample variants. The habitat characteristics included in the model were an index of solar radiation, elevation, slope, and percent forest cover. These habitat characteristics were chosen based on previous work and on preliminary results of attempts to build resource selection function models of denning habitat. Values of these 4 variables at 344 known grizzly bear den sites identified between 1975 and 1999 were used to characterize the ideal habitat. Den sites that were identified prior to 1988 that were burned over in 1988 were not included in the sample. Large values of the Mahalanobis distance indicate a location that is dissimilar from those chosen as denning habitat by bears whereas small Mahalanobis distance values indicate a location that is similar to habitat chosen as denning habitat by bears.

We used the 80th percentile (80% model) of the Mahalanobis distance values from the actual den locations to identify areas of high potential for denning. Thus, any location in the study area with a Mahalanobis distance less than this cutoff is assumed to be a location similar enough to actual den sites to be labeled denning habitat. We also looked at using the maximum Mahalanobis distance value (100% model) from actual den locations as a cutoff. However, it is known that bears do choose substandard habitat to den in on occasion. In fact the use of the maximum resulted in locations being labeled as potential good denning habitat that are in fact known to be poor denning habitat. In particular the importance of elevation results in virtually any high elevation locale being labeled as good denning habitat when the maximum Mahalanobis distance from den sites is used. The results of other modeling exercises and biological evidence clearly indicate that the highest elevations are, in fact, not preferred by bears. Discussions with IGBST biologists and the statistician who assisted in the calculation of the Mahalanobis distance values led to the selection of the 80th percentile as a reasonable compromise. However, we do present maps from both approaches, which are presented in Appendix 10. The development of denning habitat models is an area of ongoing research by IGBST members, and future results will be incorporated into management activities.

A number of assumptions were made in calculating the statistics for geographic areas of suitable denning habitat, snowmobile activity and travel restrictions. These are described in Appendix 13. These assumptions include the geographic extent of the analysis area where it extended beyond the Recovery Zone boundary. The current distribution of grizzly bears, also termed ‘where grizzly bears may occur’, was determined by Schwartz et al. (in review) (Appendix 5). The boundary of grizzly bear distribution was a composite of initial observations of females with COY, mortalities, and human/bear conflicts from 1900-2000.

The following tables present statistics appearing in Appendix 13 and derived from GIS analysis for Forests in the GYA. Table 9 presents the percent of suitable grizzly bear denning habitat based on the 80% Mahalanobis distance model (Appendix 10). One can conclude from these percentages that suitable denning habitat is available and well distributed throughout the Greater Yellowstone area. The Custer National Forest, shown here with the lowest percentage of

suitable denning habitat, includes high elevation, unforested habitat that did not fit the denning habitat model. GYA-wide, over 60% of federal lands are suitable for grizzly bear denning.

Table 9. Results of the 80% Mahalanobis denning suitability model where grizzly bears are distributed and within the Recovery Zone by Forest (Appendix 13).

Forest	Percent Suitable Denning Habitat in the Recovery Zone	Percent Suitable Denning Habitat Where Grizzlies are Distributed
Gallatin	74	68
Custer	30	23
B-D	73	58
Shoshone	60	58
B-T	78	73
Targhee	~~44~~ 46	~~46~~ 44
All federal lands including YNP and GTNP	68	63

Table 10 shows the percent of federal lands that meeting the 80% denning habitat model that are legally open to snowmachine use (Appendices 10 and 13). Within the Recovery Zone in the GYA, only 20% of suitable denning habitat occurs on federal lands that legally allow snowmobile use. When one expands to where grizzlies are distributed, this increases to 73%.

Table 10. Percent suitable denning habitat (80% model) not in Wilderness or areas administratively closed to snow machines in the Recovery Zone and where grizzly bears are distributed (Appendices 10 and 13).

Forest	Recovery Zone	Where Grizzlies may occur
Gallatin	40	~~59~~ 41
Custer	84	~~87~~ 13
B-D	4	~~44~~ 56
Shoshone	22	~~59~~ 41
B-T	17	39
Targhee	78	~~35~~ 65
All federal lands including YNP and GTNP	20	~~73~~ 31

Table 11 presents data derived from the Winter Visitor Use Assessment (USDI, National Park Service, 2000). From this table it can be seen that a relatively small percentage (16%) of land, GYA-wide, can potentially be used by snowmachines in the Recovery Zone (Appendices 3 and 13). This increases as one includes all the areas where grizzly bears are distributed. An in-depth look at the use on the Gallatin National Forest, for example, revealed that a fairly small percentage of the Forest was actually desirable for snowmobiling due to factors such as steep slopes, forest cover, etc. (Appendix 7, see discussion p.12)

Table 11. Percent suitable denning habitat (80% model) in areas potentially used by snow machines in the Recovery Zone and where grizzly bears are distributed (Appendices 3 and 13).

Forest	Recovery Zone	Where Grizzlies are Distributed
Gallatin	32	~~69~~ 31
Custer	14	9
B-D	4	42
Shoshone	6	24
B-T	17	36
Targhee	72	58
All federal lands including YNP and GTNP	16	~~69~~ 19

Table 12 shows the potential snowmobile use of the areas where snowmobiling is not legally restricted (Appendix 3 and 13). As expected, these percentages are almost uniformly high. This is the percentage of suitable denning habitat outside Wilderness and other restricted areas which is potentially used by snowmachines.

Table 12. Percent suitable denning habitat (80% model) potentially used by snowmachines and not in Wilderness or areas administratively closed to snow machines (Appendices 3 and 13).

Forest	Recovery Zone	Where Grizzlies may occur
Gallatin	77	72
Custer	86	58
B-D	76	73
Shoshone	25	57
B-T	98	89
Targhee	92	86
All federal lands including YNP and GTNP	75	~~92~~ 75

Table 13 shows that there is a fairly high percentage suitable denning habitat where snowmobile use is not legally restricted that is in 'secure' habitat both in the Recovery Zone and in the area where grizzly may occur (Appendices 9 and 13). This is not surprising because the mapping criteria for 'secure' habitat did not take winter uses into account.

Table 13. Percent suitable denning habitat (80% model) not in Wilderness or areas administratively closed to snowmachines that is in 'secure' habitat (Appendices 9 and 13). (See assumptions Appendix 12 for explanation of 'secure' habitat in Recovery Zone and where grizzlies may occur.)

Forest	Recovery Zone	Where Grizzlies may occur
Gallatin	50	50
Custer	77	79
B-D	90	65
Shoshone	78	62
B-T	58	61

Targhee	-	-
All federal lands including YNP and GTNP	57	58

Table 14 shows, as expected, the figures are somewhat lower than the figures in the previous table because the area of 'potential' snowmachine use was added to the figures (Appendices 9 and 13).

Table 14. Percent suitable denning habitat (80% model) not in Wilderness or areas administratively closed to snowmachines that is potentially used by snowmachines that is in 'secure' habitat (Appendix 9 and 13). (See assumptions, Appendix 12, for explanation of 'secure' habitat in Recovery Zone and where grizzly bears may occur.)

Forest	Recovery Zone	Where Grizzlies may occur
Gallatin	45	41
Custer	79	67
B-D	87	58
Shoshone	54	46
B-T	58	61
Targhee	-	-
All federal lands including YNP and GTNP	48	50

Table 15 shows that in the Recovery Zone, a relative small percentage of secure habitat that is suitable denning habitat potentially receives snowmobile use (Appendices 13 and 14). This percentage increases when the area is expanded to include the area where grizzly bears may occur.

Table 15. Percent secure habitat that is suitable denning habitat (80% model) is potentially used by snowmachines (Appendices 13 and 14). (See assumptions, Appendix 12, for explanation of 'secure' habitat in Recovery Zone and where grizzly bears may occur).

Forest	Recovery Zone	Where Grizzlies may occur
Gallatin	19	17
Custer	12	6
B-D	4	31
Shoshone	3	13
B-T	11	27
Targhee	-	-

Table 16 shows the percentage of secure areas that are potentially used by snowmachines (Appendices 9 and 13). This does not take suitable denning habitat into account. These percentages are also fairly low both in the Recovery Zone and the area where grizzly bears may occur.

Table 16. Secure areas used by snowmobiles. See assumptions (Appendix 9 and 13) for explanation of 'secure' habitat in Recovery Zone and where grizzlies may occur.

Forest	Recovery Zone	Where Grizzlies may occur
Gallatin	18	14
Custer	4	2
B-D	3	36
Shoshone	4	13
B-T	9	24
Targhee	-	-

Conclusion and Determination

Monitoring data indicates that grizzly bears in the Yellowstone are nearing recovery. Grizzlies are surpassing the recovery criterion for number of sows with COY (ICST 2000). There is no indication that any human activity is seriously affecting grizzly bear reproduction. Grizzly bears are doing well meeting the distribution criterion in 16 of 18 BMUs with no 2 adjacent BMUs unoccupied on a six-year running average (ICST 2000). The recovery criterion that is proving most problematic is the mortality criterion. This is due, in part, to the fact that the population is growing, and bears are appearing in areas they have not been for many years. The more bears there are, the more likely they are to run into a human conflict situation leading to mortality (USGS 2000). This mortality seems to be more related to hunting than other activities. For instance, as of November 2000, there were 19 grizzly bear mortalities in the Yellowstone area, 12 of which were related to hunting.

Anthropogenic factors that can affect the grizzly bear include: human development in and around grizzly bear habitat, human tolerance for grizzly bears, and proper sanitation to prevent bears from habituation to human foods and human development. Access is only one of the anthropogenic factors affecting grizzly bears, and it is not the most important. Human tolerance may be the most critical factor influencing the recovery of the grizzly bear as the bear population expands into areas where they have not been in recent years.

Humans can access some grizzly bear denning habitat in a number of different ways including cross-country skiing, snowshoeing, driving, snowmobiling, hiking and snowboarding. Any of these winter activities has the *potential* to affect denning grizzly bears.

Snowmobiling has occurred for many years, with gradual increases in use and improvements in technology (J. Kempff pers. comm.). This means the grizzly bears have likely habituated to snowmobile use (Knight and Gutzweiler 1995 p. 114,133) or bears may have moved their den site to another location the next year (Shoen et al. 1987). Grizzly bears are noted to den primarily in remote locations (Judd et al. 1983). Grizzly bears are unlikely to abandon their dens very late into the winter due to the high costs (both energetic and fitness) of doing so (Linnell et al. 2000). It is likely that hibernating bears exposed to meaningless noise (no negative consequences to the bear) habituate to this type of noise (Knight and Gutzweiler 1995 p. 133). A few researchers have found that some bears do, at least on occasion, appear to respond to noise or disturbance near the den site by waking up and moving around in the den (Reynolds et al. 1986; Miller pers. comm. to Dolan). On rare occasions, bears may abandon a den due to some disturbance (Reynolds et al. 1976, Swenson et al. 1997).

The insulating quality of snow (Blix and Lentfer 1992; P. Farnes pers. comm.), and the locations bears chose to den in the Yellowstone area (forested, steep, north aspects with deep snow) (Judd et al. 1986) are such that the degree of disturbance by snowmobiles activity is questionable. The information on impacts to denning bears is largely anecdotal and collected in the course of other research, with few, if any, studies actually designed to look at this phenomenon. The March 2000 Draft of the Grizzly Bear Conservation Strategy for the Yellowstone area concluded that there was insufficient information to call for specific management direction for either snowmobile or OHV use (ICST 2000).

A large proportion of the Yellowstone grizzly bear Recovery Zone is protected from snowmobiling. Of the 380 known den locations in the Yellowstone area, approximately 88% were in areas currently closed to dispersed snowmobile use (USDI 2000). Most of the known den locations (333) were in the Recovery Zone because that is where trapping and radio collaring efforts have been emphasized. Even if not officially protected by being in the National Parks away from designated snowmobile routes or designated Wilderness Areas, many areas are undesirable for snowmobile use due to being forested, too steep, or inaccessible due to terrain. For instance, only about 15% of the Gallatin National Forest in the Recovery Zone is considered desirable for this type of use although 44% of this area is technically open to snowmobiling.

The IGBST analysis using the Mahalanobis distance model for suitable denning habitat showed that a large proportion of the Forest, and the Yellowstone area, is comprised of suitable denning habitat. Approximately 25% of the suitable denning habitat is in areas where snowmobile use occurs. Approximately two-thirds of the Gallatin National Forest south of I-90 (approximately 1 million out of 1.5 million acres) meets the definition of “secure” according to the IGBC (1998). About 9% of this “secure” habitat is used by snowmobiles.

From a practical standpoint, it should be noted that grizzly bears rarely reuse a den. Therefore, protecting actual den locations is infeasible. Even protecting denning concentrations is infeasible because we only know where 26 dens were located on the Gallatin National Forest during the last 25 years because most trapping and radio collaring efforts occurred in Yellowstone National Park. Protecting potential denning areas means letting the public know why a certain area is closed, and perhaps focusing unwanted attention on grizzly bear denning habitat. This, in and of itself, may pose a risk to the grizzly bear.

It is somewhat more likely that there could be a potential negative impact from snowmobiles to sows with COY upon emergence from their dens than to denning bears. About 60% of sows emerge between the first and fourth weeks of April (USDI 2000). Most emerging bears move immediately to a known, reliable spring food source, such as a big game winter range (Reinhart and Tyers 1999). However, sows with COY may remain near the den for a period of time. It is possible that snowmobiles could disturb females with cubs at this time of year, although there is no known incidence of this in the Yellowstone area. Depending on where one is on the Gallatin National Forest, snowmobile season ends from March 30 to late May or June in some years at the higher elevations. The conditions that usually force den emergence (melting snow and moisture in the den) are the same conditions that cause poor snowmobiling conditions (Farnes pers. comm.). In many cases the access to snowmobiling on the National Forest has become limited before the emergence dates due to the exposure of mud and rock at lower elevations. A disturbance would have to be severe for a sow to abandon her cubs (Linnell et al. 2000). Although probably quite rare, the potential seriousness of a sow with COY being displaced post-

emergence, and perhaps abandoning her cubs, means this type of disturbance should be considered. The IGBST is conducting research on spring emergence habitat for sows in the GYA that will be utilized once it becomes available.

We do not know where all grizzly bear dens are located, and we do not always know exactly where a snowmobile will go, thus we cannot assure that a snowmobile does not go near a den. Because snowmobile activity may disturb or displace an individual grizzly bear, the determination for the effect of snowmobiling on grizzly bears must be “may affect-likely to adversely affect.” This determination is believed to be more appropriate in the case of sow with COY upon emergence from the den than for grizzly bears in their dens during the winter.

There are a number of key points involved in making this determination, its meaning and interpretation. The major points are:

- 1) The grizzly bear population in the Yellowstone area is nearing recovery.
- 2) Snowmobiles are only one of several means by which humans can access denning habitat in the winter, on or off of trails.
- 3) Snowmobile use has been around for many years, and has increased over a long period of time.
- 4) Bears have had a chance to either habituate or move to a new den site if disturbed.
- 5) Bears tend to den in remote areas with characteristics that are not entirely conducive to snowmobiling (steep, forested habitats).
- 6) Snow is an excellent sound insulator.
- 7) A large proportion of the Recovery Zone and area where bears may occur (68 and 63 percent, respectively) provides suitable denning habitat (Table 9).
- 8) A large proportion of known dens in the Yellowstone area (88%) are located in areas where snowmobile use does not occur (Tables 6,7 and 8) and suitable denning habitat is well distributed on the Forests.
- 9) Within the Recovery Zone a relatively small percentage (16%) of suitable denning habitat is in areas potentially used by snowmachines (Table 11). In the areas where grizzlies may occur, this increases to 69%.
- 10) On the five National Forests in this consultation only 3-19 percent of the secure area within the Recovery Zone that is suitable for denning is potentially used by snowmobiles (Table 15). In the area where bears may occur, 6-31 percent falls into this category. The percentages are very similar for secure areas used by snowmobiles without considering whether or not it is suitable denning habitat (Table 16). In the National Parks, less than 5 percent of the total area is open to snowmobiling. This provides a large acreage of suitable denning habitat where no snowmobiling occurs.
- 11) Information on effects of snowmobiling on bears is largely anecdotal, although there is sufficient information to indicate that some individual bears have the potential to be disturbed.
- 12) Potential effects of snowmobiling on reproduction and survival in Yellowstone grizzly bears are not evident in the population statistics.

Section 7(d) of the ESA prohibits the irreversible and irretrievable commitment of resources that foreclose the formulation of reasonable and prudent alternatives to avoid jeopardy after the initiation of consultation. Allowing snowmobiling to continue in the GYA does not irreversibly or irretrievably commit resources that has the effect of foreclosing the formulation or implementation of any reasonable and prudent alternative measure. The action of continuing snowmobiling is not likely to jeopardize the continued existence of the grizzly bear or adversely

modify or destroy its habitat. Although the determination of this Biological Assessment on the grizzly bear was 'may affect-likely to adversely affect,' for snowmobiling, this is extremely conservative and based more upon the potential impact of snowmobiling on sows with COY upon den emergence, rather than the effects on denning bears in the Yellowstone area. The grizzly bear population has continued to increase at the same time that snowmobile use has increased within the GYA, indicating little, if any, effect of snowmobiling on the population. The purpose of section 7(d) of the ESA was to "prevent Federal agencies from 'steamrolling' activity in order to secure completion of the projects regardless of their impact on endangered species. . . . [C]ongress enacted section 7(d) to preclude the investments of large sums of money in any endeavor if (1) at the time of the investment there was a reasonable likelihood that the project, at any stage of development, would violate section 7(a)(2) and (2) that investment was not salvageable (i.e. it could not be applied to either an alternative approach to the original endeavor or to another project." North slope borough v. Andrus, 486 F.Supp 332, 356 (D. D.C. 1979) *aff'd in part and reversed in part on other grounds*, 642 F.2d 589 (D.C. cir. 1980)

Continued snowmobiling on the Forests in the GYA will not foreclose the consideration or adoption of any reasonable and prudent alternative. Some GYA Forests have a small investment in snowmobiling in cooperation with State programs. Snowmobiling is not a new use or impact but is merely the continuation of an existing use that has been ongoing for many years with few, if any, impacts on either individuals or the population. Although snowmobiling may occasionally affect an individual bear, it is very unlikely to affect the population as a whole, especially a population such as the Yellowstone grizzly bear, which is nearing recovery. The continuation of snowmobiling does not foreclose any alternatives that may be considered to address any potential impacts in the future.

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s/ *Marion Cherry*

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Grizzly Bear/Snowmobile BA Appendices

Appendix 2

Beartooth Ranger District, Custer National Forest, Snowmobile routes, Areas, and predicted use.

Area #	NF Rd #s	Drainage or Landmark	Grizzly Bear MS	Predicted Snowmobile Use ¹	Miles
1	2140	Picket Pin Mtn	No	<50 trips	10.2
2	2414 2415	Benbow Area	No	<100 trips	18.6
3	2072	WF Rosebud Creek	No	<100 trips	6.9
4	2177	EF Rosebud Creek	No	<150 trips	5.9
5	2141	WF Red Lodge Creek	No	<200 trips	4.5
6	2071 2478	WF Rock Creek/Silver Run	No	<1200 trips	13.1
7	2004 2346 2421	Rock Creek/Beartooth Hwy	No	<500 trips	19.3
8	2212 3230 6943	Upper Stillwater Basin/Cooke City	MS 1	<30,000 trips	4.4

¹ Predicted use is based on personal observation and is described as the upper level of estimated round trips per season (Jeff Gildehaus, Beartooth RD, 2000).

Appendix 4
Bridger-Teton National Forest snowmobile use data.

Location	93/94	94/95	95/96	96/97	97/98	98/99	99/00
Greys River At Alpine TH	6,559	8,200	9,282*	7,956	9,025	8,897	1,145*
Smiths Fork At Salt River Pass	2,683	2,700	6,437*	2,632	3,281	5,131	4,070
CDST near Togwotee Pass	10,945	11,668	--	10,161	10,425	8,273	--
CDST Upper Green River TH		--	6,500	16,298	--	--	--
North Horse Creek, Wyoming Range		900	--	--	--	--	--

-- Indicates one of the following: no monitoring was done that year; there were problems with electronic trail counters and data collected was incomplete or suspect; or (for 1999-2000) we have not yet received trail counter information from the state.

* Indicates a figure that doesn't match trends; the 1995 federal shut-down that closed Yellowstone Park during the holidays; a trail counter that quit working mid-season.

Commercial snowmobile use in the Recovery Zone and nearby areas also gives some insight on use trends, especially in the Buffalo Ranger District where much of the total use is guided. Though the Greys River lies beyond grizzly bear occupied habitat, its main snowmobile trail leads into the Wyoming Range, likely to be used by grizzly bears in the future.

Greys River Ranger District, outside occupied habitat:

1994-95: 795 service days

1995-96: 1706 (up due to Yellowstone closure during govt. shut-down)

1996-97: 1125

1997-98: 785

(no reports available after this year)

Jackson Ranger District: total service days authorized = 6,600, most of which is outside the Recovery Zone but within occupied habitat.

1994-95: 4777 service days

1997-98: 6137

1999-99: 6136

1999-00: 6741

Buffalo Ranger District: total service days authorized = 15,000, mostly within the Recovery Zone, all within occupied habitat.

1996-97: 8773 service days (CDST only)

1997-98: 7703
1999-00: 10,165

Pinedale Ranger District: total service days authorized = 1,000, outside of Recovery Zone but within occupied habitat (upper Green River to Union Pass)

1994-95: 222 service days
1995-96: 553
1996-97: 568
1997-98: 298 (not sure why this is so low)
1998-99: 320
1999-00: 366

Appendix 8 Cumulative Effects

Land Adjustments

The Gallatin National Forest is completing a large land exchange that is blocking up federal ownership on what was previously “checkerboard” ownership with federal and timber company lands mixed. This includes the acquisition of over 11,200 acres within the Taylor Fork and approximately 5,000 acres in the south Gallatin Range Grizzly Bear Recovery Zone. Another approximately 62,000 acres of land that grizzly bears may potentially use is being or has been acquired and is located on the Forest, south of Interstate-90. Another land exchange/acquisition may occur on the Royal Teton Ranch (RTR) lands north of the Park near Gardiner. Some RTR lands will also enter into conservation easements.

The lands within the Bridger-Teton National Forest boundary are largely federally controlled, with no checkerboard patterns and relatively few non-federal inholdings. The forest completed a land adjustment plan in April 2000, which identified the following objectives and criteria (among others) for considering land adjustments:

- The Forest is interested in acquiring lands valuable for recreation, wildlife habitat, wilderness, riparian areas, historical or cultural resources, visual character, and other natural resource management purposes.
- The Forest is interested in land adjustments that result in the protection of lands containing essential habitat for Threatened, Endangered, or Sensitive species. This is a priority of the BTNF in land adjustment procedures.

Recent and ongoing land adjustments are focused on the Buffalo Valley (within the Recovery Zone), the Gros Ventre River valley (occupied by grizzly bears), and lands surrounding Jackson Hole.

On the Shoshone National Forest, in 1992, Amex Incorporated donated about 3,850 acres of private in holdings on the Greybull District to the Shoshone National Forest. All of these lands are outside the grizzly bear recovery area, but are in areas currently used extensively by grizzly bears. Land exchanges with private landowners in the South Fork of the Shoshone River Valley since 1996 have resulted in a net increase of 325 acres to the Forest. These lands are outside, but adjacent to the Recovery Area, and provide important spring habitats. Snowmobiles are not allowed on public lands in the South Fork. No major land exchanges are being proposed, however, some opportunities for future land exchanges do exist with about 24,000 acres of private lands inside the Forest Boundary (6,300 acres in recovery area) in the evaluation area.

Timber Harvest

A number of timber sales have been and are occurring on the Gallatin National Forest, most of which have the purpose of raising funds needed to purchase the private inholdings.

On the Custer National Forest, large-scale timber management has been limited on the Beartooth District. Vegetation management has been primarily in the form of aspen slashing, post/pole sales, firewood cutting, and prescribed burning.

In 1994 the Shoshone National Forest amended the Forest Plan allowable timber sale quantity (ASQ). The ASQ was reduced from an annual average of 11.2 MMBF/yr to 4.5 MMBF/yr.

The Madison RD of the B-D, has had numerous timber sale and road projects in recent years (Appendix X-4). Timber harvest is occurring in the West Fork area. Salvage of bug killed lodgepole pine is taking place in the Forget-me-not, Quaking Aspen and Gazelle-Granite sales. State Lands Sale in the Idaho-Barton area. Post and pole harvest occurs in the West Fork Madison area. Firewood gathering also occurs within the West Fork, as well as, throughout the Gravelly area. The Madison range is primarily Wilderness.

Timber sale and road construction projects on the Madison RD of the B-D.

<u>Sale Name</u>	<u>Harvest Year</u>
Bozelle	1987-91
Bogus Bench	1978
Bogus Moose	1982
Cliff Lake Bench	1980
Forget-me-not	1984-85
Freezeout	1968-70
Frostbite	1982
Frostbite Overstory Removal	1990
Gazelle	1970-72
Granite Mountain	1987
Hoodoo	1980
Hooter Ridge	1984
Idaho-Barton	1987-89
Jack Pine Gulch	1978-79
Johnny Gulch	1981-85
Lost	1982-84
Lyon	1976
Meridian Creek	1984-86
Second Chance	1982
Soap-out	1985-86
Standard Creek	1968-72
Sudsy Salvage	1981
Switchback	1981
Timber Creek	1960-62
Twin Rivers	1985-86
Willow Creek Talc	1985

Recreation

On the Custer National Forest, recreation activities such as hiking, outfitter and guide permits, and big game hunting influence wildlife habitat security in the area.

Eleven fee and 6 dispersed camping/picnic areas are found within the 6 major drainages on the Beartooth Unit of the District. Three Forest Service built administration cabins are found on the District. Presently the primary activities within the Forest boundary that have long-term impacts on wildlife habitat and habitat use are mining and operations associated with the Red Lodge

Mountain Ski Area. The Red Lodge Mountain Ski Area encompasses 2,088 acres that includes 1,288 acres of National Forest System Lands. Expansion of this area is presently not proposed.

On the Madison Ranger District of the B-D, recreational activity is increasing in the Gravelly area. Summer shows moderate use by campers, hikers, fishermen, and recreational driver/sightseers. Fall has heavy use by hunters during the general rifle season.

Recreational use depends on the time of year. In general, recreational activity is increasing in the Madison area of the B-D. Summer shows moderate use by campers, hikers and fishermen. Fall has heavy use by hunters during the general rifle season.

Hunting accounts for much of the mortality of grizzly bears through human/bear encounters. Grizzlies are occasionally mistaken for black bears by black bear hunters and are accidentally shot. They also are encountered by hunters in camps, near kills, or on trails that may result in potential wounding and mortality. Almost every year hunters kill bears in self-defense. There appears to be little relationship in Wyoming between hunter numbers and bear mortality (ICST 2000 p. 67-68). Most bear losses could have been avoided if people follow the recommended safety standards. It appears that bears in some areas are not displaced from the area during hunting, but rather attracted by the potential of obtaining food such as viscera from big game carcasses that have been gutted (Tyers pers. comm.). By the time late hunts begin, bears are usually in their dens.

Livestock Grazing

Historically, interactions between livestock and grizzly bears led to the loss of grizzly bears. Most concern has been tied to sheep allotments; however, the number of sheep allotments in the Recovery Zone and elsewhere on the Forest has been reduced, and there are only a few remaining. For sheep allotments within MS1, if a bear/sheep incident occurs, the sheep are removed from the area. In MS2, the bear is moved. MS1 direction has been applied, as it should on the Ash/Iron Mountain sheep Allotment on the Gallatin National Forest. In recent years, there have been serious depredations on one particular cattle allotment in the southern part of the GYA (Bridger-Teton National Forest).

On the Bridger-Teton National Forest, the Blackrock-Spread Creek allotment is not being stocked this year; the Forest is working with livestock permittees as well as other forest users to encourage camp and herding practices that do not encourage conflicts with grizzly or black bears.

There are no active sheep allotments in MS1 on the Shoshone National Forest. A small portion of a vacant sheep allotment (< 10%) is within MS1. The operation was moved to other allotments that are almost entirely outside the recovery area after experiencing grizzly bear depredation problems.

On the Beartooth District of the Custer National Forest, there are presently 17 cattle and horse allotments and 3 administrative pastures.

In the Gravelly Range on the Madison Ranger District of the Beaverhead-Deerlodge National Forest, livestock grazing has occurred in the Gravelly Range for the past century. There are 31 grazing allotments: 25 cattle and horse and 6 sheep and goat in the Gravelly area. Cattle and

sheep grazing are occurring throughout the area within the 31 allotments. General condition of the allotments is good with specific riparian areas being poor. Uplands are generally good to very good condition. Livestock grazing has occurred in the Madison Range for the past century. There are 8 grazing allotments in the Madison Range. Cattle grazing occurs within 6 of the 8 allotments. General condition of the allotments is good with specific riparian areas being poor. Uplands are generally good to very good condition.

Mining

On the Madison Ranger District of the B-D, two active mines also occur in the Gravelly area, both being talc. Mining activity in the area is sporadic and depends upon the current market values of minerals. Current levels of activity are occurring at a slow steady rate. Two talc mines are the most active. Mine reclamation activity is occurring at the Willow Creek mine.

Motorized Road or Trail Access

In 1995 the Gallatin National Forest received an amended Biological Opinion on their Forest Plan from the USFWS and amended their plan (Amendment #19) on the subject of motorized route access and secure areas in the Recovery Zone. The Forest is required not to increase open or total motorized access route density and not to decrease secure habitat. The Forest has submitted semi-annual reports to the USFWS in the last 5 years, and has closed approximately 66 miles of motorized routes on the Forest in the Recovery Zone during that time. In addition, approximately 18 miles outside of the Recovery Zone but south of I-90 have been closed to motorized use. Prior to 1995, the Hebgen Lake Ranger District of the Gallatin National Forest began an extensive road closure program, and they have closed over 150 miles of motorized routes since 1990.

The 1990 Bridger-Teton National Forest Land and Resource Management Plan established standards for open road density, which vary by desired future condition or DFC (these are land allocations identified in the Forest Plan, with standards, guidelines, and resource objectives attached to them). Of the roughly 764,000 acres of the forest within the Recovery Zone, 695,000 acres, or 91 percent, are within the Teton Wilderness or in DFCs with no open roads. Of the remaining 9 percent, 40,000 acres (DFC 7a) have a open road density standard not to exceed .75 miles per square mile; 32,000 acres (DFC 10) have an open road density not to exceed 1 mile per square mile.

Because open road density standards have been exceeded in some areas, in the years since the forest plan was signed numerous motorized routes have been closed through the implementation of travel management plans. Many of the closed “roads” were user-created two-tracks and not constructed roads that were part of the forest transportation system, although some of those roads have been closed as well.

Of the 764,000 acres of the B-T Forest within the Recovery Zone, about 600,000 acres are within the primitive ROS class, defined as large wild areas exceeding 5,000 acres, at least 3 miles from a road or motorized trail. An additional 71,000 acres (including most of DFCs 2a, 7b, and 12) are considered semiprimitive non-motorized (roadless backcountry exceeding 2,500 acres, at least ½ mile from a road). All of this primitive/semiprimitive backcountry except the 585,000-acre Teton Wilderness is open to winter snowmobiling, though some is restricted to designated trails

where it passes through big game winter range. A summary of the entire Bridger-Teton Forest acreage in each Recreation Opportunity setting is presented below.

ROS class	Acres	Percent of Forest
Urban/rural	12,500	< 1%
Roaded-natural*	891,700	26%
Semiprimitive		
Motorized	293,800	9%
Semiprimitive		
Non-motorized**	848,000	24%
Primitive	1,419,000	41%

*Includes forest roads that become primary snowmobile trails in winter.

**Much of this acreage, if not in winter range closures, is open to winter snowmobiling.

Within the Recovery Zone, a higher percentage of semiprimitive non-motorized and primitive recreation settings occurs; 74% of the Jackson-Buffalo district is in one of these two settings.

On the Shoshone National Forest, a Forest Plan amendment included new direction for a “no net increase” in road miles. Since 1991, approximately 101 miles of road have been obliterated (43 miles in the last 2 years), compared to about 16 miles of new road construction (1 mile in the last 2 years). An additional 18 miles of road have been closed to public and administrative use during the same period. This means that over the last 10 years there has been a decrease of 103 miles (42 miles in the last year) of open road on the Shoshone National Forest.

The current Southwest Montana Interagency Visitor/Travel Map East Half, shows that the Gravelly Range on the Beaverhead-Deerlodge is being managed with area restrictions. There are also many specific roads and trails restricted to motorized use seasonally or yearlong. The majority of the Madison Ranger in the B-D is Wilderness so it does not have motorized access. There are approximately six sections of Bear Creek Wildlife Management Area that have yearlong motorized area restrictions with few designated routes (see Southwest Montana Interagency Visitor/Travel Map East Half).

The Shoshone National Forest Plan direction, due to an amendment in 1994, calls for no net increase in miles of road and projects an average annual of 4.5 miles per year for decommissioning. It is anticipated that the Forest will continue an aggressive program of road decommissioning and that the number of miles of road decommissioned per year will generally exceed the miles projected in the Forest Plan. No large scale transportation planning is in process, however, problem areas are being addressed on a site-specific basis.

Some further analysis of access has been done in the Greater Yellowstone Area for the Draft Conservation Strategy (ICST 2000). In that analysis, several Bear Management Subunits were designated as subunits needing reduction in amount of motorized route access and increases in secure habitat (ICST 2000 p. 6) (see Table 3). These include the Gallatin #3, Plateau #1 and 2, Henry’s Lake #1 and 2, and Madison #2. All or parts of these subunits lie within the Gallatin National Forest, Targhee National Forest and Yellowstone National Park. All of these subunits except Gallatin #3 lie partially within the Hebgen Lake Ranger District of the Gallatin National Forest, where efforts have been made to reduce motorized access route density. The acquisition of lands, which has recently occurred on the Forest, will allow the Forest to have more control

over road systems on the Forest (because they no longer provide access to private land), and will allow the Forest to reduce road densities in some areas. The Targhee National Forest is reducing motorized access route densities in accordance with their revised Forest Plan.

Appendix 11
“Winter Use”
Region One Approach

**Lynx, Wolverine, and Grizzly Bear Denning/Snow Machine Management
in Grizzly Bear Recovery Areas**

Step 1: Review Marion Cherry’s (Gallatin) literature review of June 20, 2000 on grizzly denning site characteristics/attributes. Review most current lynx/wolverine information. Augment with local forest denning site characteristics and knowledge. DONE, JUDD ET AL. 1986 and IGBST MODEL

Step 2: Communicate with neighboring Forests to ensure consistency and denning areas are similar. (Attempt to do on ecosystem bases or subset, i.e., eastside vs. westside.) DONE

Step 3: Map potential grizzly bear denning habitat within female home range sized BMU’s or subunits based on Step 1. (Take out rock/ice areas where possible.) Use current science to map lynx and wolverine important habitat. DONE

Step 4: Map forest areas where snow machine use is not allowed or landscape features make area use unlikely (closed areas). Show snow machine “allowed” areas that are: (1) confined to roads/trails, and (2) where these are off-road in “play” areas (open areas). Show Forest Plan allocation for open motorized use. DONE

Step 5: Overlay maps in Step 3 and Step 4 and determine “areas” where snow machine use and potential grizzly denning habitat overlap. Do additional map showing a 1 kilometer buffer of snow machine area used. (Literature on buffer is inconclusive.) DONE

Step 6: For a BMU/subunit analysis area, calculate percent (%) of potential grizzly denning area that is secure from snow machine use with and without buffer. DONE

Step 7: Review and evaluate mapping exercise with terrestrial Level 1 team. DONE

Step 8: Prepare draft snow machine/grizzly denning habitat management plan. To protect females with young consider need for spring date (i.e., April 1) snow machine use restrictions in potential grizzly bear denning areas. Informally collaborate draft management with State and FWS biologist colleagues. THIS DOCUMENT AND CONSULTATION

Step 9: Based on analysis and coordination, provide adequate protection to grizzly bear denning habitat. If substantial over or near snow machine use occurs to denning habitat, make ESA effects determination. THIS DOCUMENT AND CONSULTATION

Step 10: Incorporate above management practices into Forest Plans when amended/revised.

Appendix 15
Beaverhead-Deerlodge snowmobile trail counter data.

Area of Count	93/94	94/95	95/96	96/97	97/98	98/99	99/00	00/01
Wade Lake	3.3/day	7.2/day						
Virginia City: Alder Gulch Dump Road VC Hill		1497 300 160						
Standard Creek Gold Butte West Fork		3535 625	7260 1634	36,000* 2,537	20,225*	15,000*	29,223*	96,601*
Antelope Basin Red Rock Pass Dead Horse		23,289 20,761 3,838						
Elk Lake Resort				2,500	3,500	4,000	4,000	4,000

* indicates that the counts are unreasonably high and likely an unreliable count

Comments on the counts:

The Cuesta infrared counting system does not seem to provide accurate information during winter. Factors that affect the count include speed and weather conditions. Most counts are unrealistically high and should not be relied on.

Personal observation (Johnathan Klein Madison Ranger District) over the time from 1988 to 2001 may be a more reliable source of information. In Antelope Basin, for example, in 1988 snowmobiles were uncommon, less than an estimated 500 visits per season. By 2001, use had increased to somewhere in the neighborhood of 10,000 visits.

On the Standard Creek/Lobo Mesa Loop, I (JWK) feel that use has increased by 10% to 15% each year since 1994, with an even more pronounced increase in 2000/01 due to poor snow conditions elsewhere in the state. I would estimate use in this part of the Gravelly Range at between 6,000 and 10,000 visits per year. This estimate is based upon the number of cars observed parked in the Lyons Bridge trailhead parking lot on weekend days. Generally the lot is filled beyond capacity and overflow use spills onto the Standard Creek Road. Use in the Virginia City area into the North Gravelles is also on the increase, but not as dramatically as in Antelope Basin and the Standard Creek area.

Elk Lake counts are from John Scofield resort owner since 1996. Count is of everyone that walks through the door of the Elk Lake Resort. John feels that use has tapered off in the last two years due to poor snow conditions.