

Chapter 3 Affected Environment and Environmental Consequences

Introduction

This chapter summarizes the physical, biological, social, and economic environments of the six GYA national forests and the effects of implementing each alternative on those environments. It also presents the scientific and analytical basis for the comparison of alternatives presented in chapter 2.

Chapter 3 Changes between Draft and Final EIS

In this chapter, the effects of Alternative 2-Modified were added to the effects sections. Other additions and updates are listed at the beginning of each section.

Data Sources

The acreage information presented in the tables, figures, and maps in this FEIS was generated from a variety of sources. Several sources were used, including but not limited to data from ORACLE databases and ARC/INFO Geographic Information Systems (GIS) geospatial data sets. Each forest provided data sets about various activities on the six GYA national forests. Data sets have varying degrees of accuracy and the acreage figures from the various sources do not match exactly. When added, all acres (regardless of the source) are within 1 percent of the official land status.

Nature of Effects

Direction in the proposed action and alternatives is programmatic in nature and applies to future management activities—it does not prescribe site-specific activities on the ground or irreversibly commit resources. Council on Environmental Quality regulations define direct effects as those occurring at the same time and place as the proposed action and alternatives. Direct effects would result from site-specific projects and would be evaluated when those decisions are made. Most of the effects identified in this analysis would be indirect effects that would occur later in time.

The analysis of effects is based primarily on projections of how future activities and areas would change because of the proposed standards and guidelines.

This FEIS describes changes in effects resulting from incorporating grizzly bear conservation measures. Generally, effects are presented as changes from existing plans, represented by Alternative 1.

3.1 The Greater Yellowstone Area

Since the 1960s, the GYA has been acknowledged as an ecosystem that extends beyond the core of Yellowstone National Park. Numerous studies have described the national parks and surrounding national forests as a larger ecological system (Craighead 1991, Rasker and Hansen 2000, Hansen et al. 2002).

The GYA is approximately 18 million acres, including approximately 13.6 million acres of public lands (Rasker and Hansen 2000). These public lands represent about 76 percent of the GYA. In contrast, the PCA is approximately 98 percent in public ownership. As grizzly bears continue to extend their range beyond the PCA, increasingly more private lands will be affected. The proposed action and alternatives prescribe direction for National Forest System lands only.

The GYA includes portions of six national forests, Yellowstone and Grand Teton National Parks, two national wildlife refuges, state lands, tribal lands, BLM lands, Bureau of Reclamation lands, and private lands.

Public lands are concentrated around the Yellowstone Plateau as the central core. Geographically, the GYA includes the headwaters of the Missouri-Mississippi, Snake-Columbia, and Green-Colorado river systems, the Yellowstone Plateau, and 14 surrounding mountain ranges. Elevations in the PCA range from 4,288 feet to 12,496 feet and average 8,038 feet. Notable

changes between the forested terrain of the mountains and the rangelands of surrounding basins occur between 5,000 and 7,000 feet (Marston and Anderson 1991).

3.2 The Six GYA National Forests and Analysis Areas

The six national forests included in this proposal are the Beaverhead, Bridger-Teton, Custer, Gallatin, Shoshone, and the Targhee National Forests, with a total area of about 13 million acres within proclaimed boundaries (Figure 11). Parts of individual forests are outside of the area generally defined as the GYA. This proposal evaluates the effects of the alternatives on the entire area encompassed by these forests. The Custer National Forest is an exception, in that only the Beartooth Ranger District is included in the analysis.

Acres of the six GYA national forests for the various analysis areas referenced in this document are displayed in Figure 11. These acres include all private, state, and BLM inholdings. GIS coverages used in the various effects analyses varied as to whether inholdings were identified. Land management status on many of the national forests has changed since the time some of the coverages were developed. Direction identified in this proposal does not apply to inholdings. No attempts were made to refine these data due to the programmatic nature of this proposal. Acres of inholdings in each national forest as of 2003 are displayed in Figure 12.

Large lakes greater than 640 acres were not included in the analysis. Large lakes comprise about 43,000 acres on the six national forests (Figure 11). To be consistent with the approach used in the Conservation Strategy and to improve the accuracy of secure habitat calculations, large lakes were excluded from the analysis of grizzly bear secure habitat. Other publications referenced in this FEIS may not have excluded large lakes; therefore, comparing acres and calculations in this FEIS with other references and between the various sections in the FEIS may result in small discrepancies in acre totals due to the presence or absence of inholdings and large lakes in the analysis.

The PCA is approximately 5,894,000 acres in size and includes portions of six national forests, two national parks, and other intermingled lands. National forests account for 58.5 percent of the PCA, national parks account for 39.4 percent of the PCA, and other ownerships account for 2.1 percent of the PCA. These totals include about 118,000 acres of large lakes on all ownerships.

The Alternative 4 area outside the PCA and the PCA (including all ownerships) total about 12,194,000 acres. The approximately 9,836,000 acres in the Alternative 4 area inside proclaimed Forest Service boundaries inside and outside the PCA include about 330,000 acres of inholdings and 28,000 acres of large lakes. For the area of Alternative 4 outside the PCA, the approximately 6,301,000 acres inside proclaimed Forest Service boundaries include 15,000 acres of large lakes and 242,000 acres of inholdings (Figure 11 and Figure 12).

Figure 11. Area (in thousands of acres) of the six GYA national forests within proclaimed boundaries (acres of large lakes in parentheses)¹.

National forest	Total	Inside PCA	Outside PCA ²	Alternative 4 area outside PCA ³	Alternative 4 Area ⁴	Outside Alternative 4 and outside PCA
Beaverhead	2,198	70	2,127	1,580	1,650	548
Bridger-Teton	3,465(10)	724	2,741(10)	1,293	2,017	1,448(10)
Custer ⁵	603	114	489	341	455	148
Gallatin	2,126 (13)	909 (13)	1,217	1,004	1,912 (13)	213
Shoshone	2,468	1,232	1,236	1,099	2,330	138
Targhee	1,868(21)	486	1,381(21)	985(15)	1,471(15)	397(5)
Total	12,727(43)	3,536(13)	9,192(30)	6,301(15)	9,836(28)	2,891(15)

¹ Includes large lakes > 640 acres and non-Forest Service inholdings.

² This area is the sum of columns 5 and 7.

³ The Alternative 4 area outside the PCA is the current best estimate of the biologically suitable habitat for grizzly bears outside the PCA.

⁴ The Alternative 4 area includes the PCA plus the Alternative 4 area outside the PCA (columns 3 and 5).

⁵ Only the Beartooth Ranger District is included in the proposed action and alternatives.

Figure 12. Acres (in thousands) of inholdings inside the proclaimed boundaries of the six GYA national forests¹.

National forest	Total	Inside PCA	Outside PCA	Alternative 4 area outside PCA	Alternative 4	Outside Alternative 4 and outside PCA
Beaverhead	38	2	36	24	26	12
Bridger-Teton	39	3	35	14	17	21
Custer ²	13	1	12	3	4	9
Gallatin	277	62	215	144	206	71
Shoshone	31	9	22	17	26	5
Targhee	61	11	50	39	50	10
Total	459	88	371	242	330	128

¹ Acres of inholdings shown here may not match acres depicted as inholdings in the various effects analyses in this document. These acres reflect the land status as of 2003; many of the GIS coverages used in the effects analyses have not been updated to show changes due to land exchanges or acquisitions. In some cases, inholdings were included within GIS coverages depicting management area designations. Discrepancies are most pronounced for the Gallatin National Forest.

² Only the Beartooth Ranger District is included in the proposed action and alternatives.

Overview of Management Area Direction in Forest Plans

The six GYA national forest plans allocated lands to management area categories. A management area category describes the natural resource setting for an area of land and establishes the types of management actions that are allowed to occur within the area of land. All management areas can be placed into eight management area categories. (Management Area Category 7 is not used in the GYA.) The acres within these seven management area categories in the PCA and Alternative

4 areas vary by national forest (Figure 13 and Figure 14). The categories are summarized below. Management area descriptions with more detail can be found in appendix C and the project record.

Category 1. Ecological processes such as fire, insects, and disease are allowed to operate relatively free from the influence of humans. Typical types of Management Area Category 1 areas are designated as wilderness, roadless, and backcountry lands.

Category 2. These areas provide for conservation of representative or particularly rare and narrowly distributed ecological settings or components. These areas are often formally designated. Research natural areas, national recreation areas, designated wild and scenic rivers, and special interest areas are typically included in Management Area Category 2.

Category 3. Ecological values are in balance with human occupancy and consideration is given to both. Resource management activities may occur, but natural ecological processes and resulting patterns will normally predominate. Restrictions on motorized travel may vary from area to area and from season to season.

Category 4. Ecological values are managed to provide recreational use, but are maintained well within the levels necessary to sustain overall ecological systems. Sights and sounds of people on the site are expected and may even be desired. Motorized transportation is common.

Category 5. These areas are primarily forested ecosystems that are managed to meet a variety of ecological and human needs. A substantially modified natural environment often characterizes these areas. Users expect to see other people and evidence of human activities. Motorized transportation is common. Areas with a timber harvesting emphasis are included in this category.

Category 6. These areas are primarily grasslands or other non-forested ecosystems managed to meet a variety of ecological and human needs. Users expect to see other people and evidence of human activities. Motorized transportation is common. Areas with intensive grazing are included in this category.

Category 8. Ecological conditions, including processes, are likely to be permanently altered by human activities beyond the level needed to maintain natural-appearing landscapes and ecological processes. These areas include campgrounds, mining areas, and ski areas.

For all of the National Forest System lands in the GYA national forests, 64.2 percent of the acres within the PCA and 42.4 percent of the acres in Alternative 4 areas outside the PCA are in Management Area Category 1 (wilderness, roadless, and backcountry lands).

Figure 13. Acres (in thousands) of National Forest System lands within the PCA and percent within seven management area categories.

National forest	Acres within the PCA ¹	Percent within seven management area categories ²						
		1	2	3	4	5	6	8
Beaverhead	68	100	0	0	0	0	0	0
Bridger-Teton	724	80.7	4.2	6.2	5.5	3.3	0	0.1
Custer	114	92.8	0	5.8	0	1.4	0	0
Gallatin	809	51.7	9.7	21.8	15.3	1.1	0	0.5
Shoshone	1223	76.3	0.1	0	16.3	7.3	0	0
Targhee	475	16.8	20.8	8.5	0	53.6	0	0.2
Total	3,413	64.2	6.1	7.9	10.6	11.1	0	0.2

¹ These acres do not include large lakes > 640 acres. Large lakes comprise about 13,000 acres within proclaimed Forest Service boundaries in the PCA (Figure 11). Non-Forest Service inholdings are excluded except for the Bridger-Teton and Custer National Forests. Acres of non-Forest Service inholdings on the Gallatin National Forest have changed since the management area GIS coverages that generated these acres were developed. The acres of inholdings depicted in Figure 12 represent the status of inholdings on the six national forests. Management area direction applies only to National Forest System lands.

² Management Area Category 7 is not used in the GYA.

Figure 14. Acres (in thousands) of National Forest System lands in Alternative 4 areas outside the PCA and percent within seven management area categories.

National forest	Acres for Alternative 4 outside the PCA ¹	Percent within seven management area categories ²						
		1	2	3	4	5	6	8
Beaverhead	1,567	30.3	0.3	27.0	0.5	19.7	21.9	0.3
Bridger-Teton	1,293	60.6	17.9	2.0	0	19.2	0	0.3
Custer	341	67.9	0	9.5	4.0	15.2	0.9	2.5
Gallatin	783	50.2	3.6	11.2	13.1	20.5	1.2	0.3
Shoshone	1,081	44.4	0	0	35.6	19.9	0	0
Targhee	934	19.2	14.5	15.5	0.3	37.3	12.6	0.6
Total	5,999	42.4	6.7	11.9	8.5	22.2	7.9	0.4

¹ These acres do not include large lakes > 640 acres. Large lakes comprise about 15,000 acres within proclaimed Forest Service boundaries in Alternative 4 areas outside the PCA (Figure 11). Non-Forest Service inholdings are excluded except for the Bridger-Teton and Custer National Forests. Acres of non-Forest Service inholdings on the Gallatin National Forest have changed since the management area GIS coverages that generated these acres were developed. The acres of inholdings depicted in Figure 12 represent the status of inholdings on the six national forests. Management area direction only applies to National Forest System lands.

3.3 Grizzly Bears

Introduction

Grizzly bears in the lower 48 states occupy less than 2 percent of their historic range. Habitat loss and uncontrolled human-caused mortality have been the primary reasons for the elimination of bears from much of their former range. How and where bears use existing habitat is primarily a function of available foods moderated or precluded by the presence of humans. Management of human activities in grizzly bear habitat is key for long-term sustainability of grizzly bear populations.

A viable population exists today largely because of two tracts of NPS and Forest Service within habitats that function as a core for the grizzly population. These areas are the Greater Yellowstone Ecosystem and the NCDE.

Section 3.3 Changes between Draft and Final EIS

In this section, the following additions and updates were made:

- A more detailed discussion on the effects on secure habitat in the Alternative 4 area outside the PCA
- An evaluation of the effects on secure habitat in the 10-mile area outside the PCA
- An evaluation of the effects on secure habitat in the area outside the PCA in the area occupied by grizzly bears from 1990 through 2004
- Maps displaying secure habitat
- Clarification of the definition of long- and short-term secure habitat
- Description of past trends in secure habitat
- Grizzly bear population monitoring information was updated with 2004 data
- The map depicting the geographic extent of the grizzly bear in the GYA was updated with new information from 2001 through 2004
- Grizzly bear/human and grizzly bear/livestock conflict information were updated to include 2004 data.
- Recent publications on grizzly populations in the GYA were reviewed and summarized
- A section on habitat effectiveness and the CEM
- A section on what is known regarding the relationship between habitat and grizzly bear demographics
- A brief discussion on the potential affects of global warming on future management in the GYA
- Clarification as to why open and total motorized access route densities were not included as habitat standards
- Updated food habits section

3.3.1 Grizzly Bear Habitat—Affected Environment

Home Range Size

The home ranges of adult grizzly bears frequently overlap. The home ranges of adult male grizzlies are generally two to four times larger than that of females. The home ranges of grizzly females appear to be smaller while they are with cubs, but ranges expand when the young are yearlings in order to meet increased foraging demands. The average total home range for grizzly bears in the Yellowstone area is approximately 884 km² (341 mi²) for females and 3,757 km² (1,450 mi²) for males (Blanchard and Knight 1991).

Grizzly bears disperse as subadults. Typically, young males disperse further than females and eventually leave their mothers' home ranges entirely (McLellan and Hovey 2001). Grizzly bear mothers may tolerate female offspring and young females usually establish home ranges within the vicinity of their mothers' home ranges.

Home range sizes of grizzly bears vary in relation to food availability, weather conditions, and interactions with other bears. Individual bears may extend their range seasonally or from one year to the next (USDI FWS 1993).

BMUs are approximately the size of the lifetime home ranges of adult females; subunits approximate the size of the annual home ranges of adult females. These areas are important in evaluating the effect of human activities on grizzly bears because of their relationship to bear home ranges—impacts of human activities must be evaluated in the context of all other activities within a bear's home range.

Food Habits

The broad historic distribution of grizzly bears suggests adaptability in food habits of different populations. Although the digestive systems of bears are essentially that of carnivores, bears are successful omnivores, and in some areas may be almost entirely herbivorous. Bears feed on animal matter or vegetable matter that is highly digestible and high in starch, sugars, protein, and stored fat.

Grizzly bears must acquire foods rich in protein or carbohydrates in excess of daily maintenance requirements to survive denning and post-denning periods. Other plant materials are eaten as the plants emerge, when crude protein levels are highest.

Grizzly bears are opportunistic feeders and will prey or scavenge on almost any available food including ground squirrels, ungulates, carrion, and garbage. In areas where animal matter is less available, roots, bulbs, tubers, fungi, and tree cambium (thin layer in most vascular plants that is responsible for growth) may be important in meeting nutrient requirements. High quality foods such as berries, nuts, and fish are important in some areas.

The search for food has a primary influence on grizzly bear movements. Upon emergence from dens, they seek lower elevations, drainage bottoms, avalanche chutes, and ungulate winter ranges where their food requirements can be met. Throughout late spring and early summer, they follow plant maturity back to higher elevations. In late summer and fall, there is a transition to fruit and nut sources, as well as other plant materials. This is a generalized pattern and it should be kept in mind that bears are individuals trying to survive and will go where they can best meet their food requirements.

Grizzly bears in the GYA have the highest percent of meat consumption in their diet of any inland grizzly bear population (Hilderbrand et al. 1999). Approximately 30 to 70 percent of the Yellowstone grizzly bear diet is some form of meat. Adult males eat the greatest proportion of meat. Meat is considered to be any form of animal including ungulates (i.e., deer, elk, moose, bison), fish, army cutworm moths, other insects, and small mammals (i.e., ground squirrels, mice, voles).

Specific to the GYA, four seasonal foods have been identified as being important to the grizzly bear population.

- Ungulates (primarily elk and bison, but also deer and moose) are especially important during spring after emergence from dens and through the calving/fawning seasons (Cole 1972, Gunther and Renkin 1990, Mattson et al. 1991, Mattson and Knight 1992, Green et al. 1997, Mattson 1997). Recent research has demonstrated that grizzly bears seek hunter-killed carcasses and gut piles (Haroldson et al. 2004).
- Whitebark pine seeds are the most important fall food of Yellowstone grizzly bears. The availability of nuts influences annual feeding strategies and movement patterns and influences the number of grizzly bear/human conflicts and human-caused bear mortalities (Kendall 1983, Blanchard 1990, Mattson et al. 1992 a and 1992b, Mattson and Reinhart 1997, Mattson 1998, Felicetti et al. 2003, Schwartz et al. 2005c).
- Army cutworm moths are a preferred source of nutrition for many grizzly bears in the Yellowstone ecosystem and represent a high quality food that is available during the summer (Mattson et al. 1991, French et al. 1994, Ternent et al. 2001).
- Grizzly bears feed on spawning cutthroat trout along the tributaries of Yellowstone Lake during the spawning season from May 1 to July 15 (Mattson and Reinhart 1995). Felicetti et al. (2004) reported that male bears consumed 92 percent of all trout ingested by grizzly bears and that the estimated cutthroat trout intake per year by the grizzly bear population was only a small fraction of that estimated by previous investigators. These data suggest that female grizzly bears living near these spawning streams have a poorer quality diet than suggested by Mattson and Reinhart (1995).

Grizzly Bears

The four major foods identified above are limited in distribution and subject to wide annual fluctuations in availability. While these foods are the most important to bears, bears have learned to utilize alternative foods during times when these foods are in short supply. In general, grizzly bears are notoriously resourceful omnivores that will make behavioral adaptations regarding food acquisition (USDI FWS 2005a). Diets of grizzly bears vary among individuals and years reflecting their flexibility in finding adequate food resources as necessary. Mattson et al. (1991) hypothesized that grizzly bears are always sampling new foods in small quantities so that they have alternative options in years when preferred foods are scarce (USDI FWS 2005a).

During years when these food sources are abundant, there are few grizzly bear/human conflicts (Gunther et al. 1997). In contrast, during years when there are shortages of one or more of these foods, grizzly bear/human conflicts are more frequent as bears seek human foods and there are generally higher numbers of human-caused grizzly mortalities (Mattson et al. 1992a and 1992b, Gunther et al. 1997). As such, management efforts identified in the Conservation Strategy are focused on “providing adequate habitat and space and security for bears so they can meet their life requisite needs” and minimizing grizzly bear/human conflicts by controlling the availability of human food and garbage.

Concerns have been expressed over the potential future decline of these key foods for various reasons, especially whitebark pine, due to their importance to grizzly bears in the GYA (Pease and Mattson 1999, Willcox and Ellenberger 2000, Interagency Conservation Strategy Team 2003, Felicetti et al. 2003). For this reason, special interagency monitoring systems have been developed to monitor possible changes in these foods and these monitoring efforts would continue under the Conservation Strategy (Interagency Conservation Strategy Team 2003). If problems should occur, management strategies would be modified through appropriate interagency cooperative efforts.

Cover

The relative importance of cover to grizzly bears was documented by Blanchard (1978) in a four-year study in the GYA. Ninety percent of 2,261 aerial radio relocations of 46 instrumented grizzly bears were in forest cover too dense to observe the bears. The importance of an interspersed open parks as feeding sites associated with cover is also recorded in Blanchard's study, as only 1 percent of the radio relocations were in dense forest more than a kilometer from an opening.

Forest cover was found to be very important to grizzly bears for use as beds. Most beds were found less than a yard or two from a tree; only 16 of 233 beds observed (6.7 percent) were without immediate cover (Blanchard 1978, USDI FWS 1993).

The IGBST studied the effects of the large 1988 wildfires on grizzly bears. On the average, grizzly bears used burned habitats in proportion to their availability within individual annual ranges during 1989 to 1992. Seasonal indices of movement and annual range sizes of cohorts (bears of the same gender and age) were not statistically different from the 1975 to 1987 averages (Blanchard and Knight 1996, Interagency Conservation Strategy Team 2003). Standards for grizzly bear cover were not developed for the Conservation Strategy or for this proposal because changes in the distribution and quantity and quality of cover are not necessarily detrimental to grizzly bears.

Denning Chronology and Habitat

Grizzly bears in the GYA can den from the end of September to the last week in April or early May, with entrance and emergence dates being affected by the gender and reproductive status of the bears (Judd et al. 1986, Haroldson et al. 2002).

- Den entry for females began during the fourth week in September, with 90 percent denned by the fourth week of November.
- Earliest den entry for males occurred during the second week of October, with 90 percent denned by the second week of December.

- Mean week of den entry for known pregnant females was earlier than males. The earliest week of den entry for known pregnant females was earlier than other females and males.
- Male bears emerged from dens earlier than females. The earliest den emergence for males occurred during the first week of February, with 90 percent of males out of dens by the fourth week of April.
- Earliest den emergence for females occurred during the third week of March; by the first week of May, 90 percent of females had emerged.
- Denning periods differed among classes and averaged 171 days for females that emerged from dens with cubs, 151 days for other females, and 131 days for males.
- Known pregnant females tended to den at higher elevations and, following emergence, remained at higher elevations until late May. Females with cubs remained relatively close (< 3 km) to den sites until the last two weeks in May.

Denning habitat has been described as follows (Judd et al. 1986, Haroldson et al. 2002):

- Den sites are associated with moderate tree cover (26 to 75 percent canopy cover).
- Den sites are usually on 30 to 60 degree slopes.
- Den sites occurred on all aspects, although northerly exposures were most common.
- Grizzly bears usually dig new dens, but occasionally used natural cavities or a den from a previous year.
- Mean elevation at den sites for females with cubs that emerged from dens was 8,845 feet. Mean elevation for other females was 8,467 feet, and for males was 8,444 feet.

Denning habitat is well distributed and abundant throughout the GYA (Judd et al. 1986, Cherry 2001, Podruzny et al. 2002).

Habitat and Demographic Relationships

There are a number of studies linking the demographic performance of the GYA grizzly bear population to components of habitat, particularly the foods. Recent studies (Schwartz et al. 2005a) link litter size and litter production to counts of whitebark pine cones. As the median count of cones declined, the odds of a female producing a one-cub litter increased, whereas the odds of a three-cub litter declined. Models provided by Schwartz et al. (2005a) strongly suggested that litter size declined as median whitebark pine cone production declined. Typically, a year with a low proportion of females accompanied by cubs was followed by a year of high production, suggesting that reproduction was not entirely linked to abundant whitebark pine seed production.

Whitebark pine seed production and grizzly bear survival are also related in the GYA (Blanchard and Knight 1991, 1995; Mattson et al. 1992b; Mattson 1998). High mortality occurs during poor seed crop years; in adult and independent subadults, this mortality is a result of increased killing of bears by humans (Haroldson et al. 2005). Blanchard and Knight (1991 and 1995) and Mattson et al. (1992b) concluded that during years of poor whitebark seed production, bears made greater use of areas near humans and came into conflict more often with humans. As a result, management problems and the number of management-trapped bears increased. The annual number of recorded grizzly bear deaths from 1976 through 1992 was strongly related to whitebark pine seed use (Mattson 1998). Recorded mortalities were 1.8 to 3.3 times greater during years when pine seeds were not intensively used.

More recent results (Haroldson et al. 2005, Schwartz et al. 2005c) support these findings, but demonstrate a spatial component to bear survival. These studies indicate that changes in the abundance of whitebark pine had the least impact on female survival and population growth for independent females living inside Yellowstone National Park, followed by those living outside Yellowstone National Park but within the recovery zone. Survival for female grizzly bears is lowest for female grizzly bears living outside the recovery zone, with most mortality on or near private lands. These studies demonstrated a spatial component to bear survival.

Models by Schwartz et al. (2005b) suggested cub and yearling survival improved following severe winters, likely due to increased abundance of spring carrion. Mattson (1997) found

females that ate ungulate carcasses lost more cubs than females not using this food. Ungulates are an important food item for grizzly bears in the Greater Yellowstone Ecosystem (Green et al. 1997, Mattson 1997, Jacoby et al. 1999) probably more so during years with poor whitebark pine seed production (Felicetti et al. 2003).

Grizzly bears in the GYA are effectively one population. All the research discussed above provides insight into the relationships between the GYA grizzly bear population and components of habitat. All have focused on addressing the relationships among bears and environmental variables at the population level. The only attempts to address spatial components of demographics and habitat (Boyce et al. 2001; Schwartz et al. 2005 a, b, c; Haroldson et al. 2005) have assigned spatial variables to this population. The only model of habitat quality and habitat effectiveness that has been developed is the Cumulative Effects Model (Mattson et al. 2004). The IGBST currently has a contract with Montana State University to evaluate the model's content and a funded project to link components of demographics (reproduction and survival) to output from the CEM in an effort to determine if links exist. Because of limited sample size, all analyses are directed at the population level on an ecosystem basis.

Habitat Connectivity and Linkage Zones

Habitat fragmentation has been widely recognized as a primary cause of the decline of many species. The importance of maintaining or improving connectivity between blocks of important habitat for grizzly bears and other carnivores is receiving increased attention. Several models have been developed in an attempt to identify linkage zones in the Northern Rockies between and within ecosystems and at various scales (Walker and Craighead 1997, Craighead et al. 2001, Servheen et al. 2003, Merrill and Mattson 2003).

Servheen et al. (2003) define linkage zones as “the area between larger blocks of habitat where animals can live at certain seasons where they can find the security they need to successfully move between these larger blocks of habitat.” Linkage zones are not corridors, which imply an area used just for travel. Linkage zones are areas that can support low-density wildlife populations often as seasonal residents. The main factors generally considered to affect the quality of linkage zones are major highways, railroads, road density, human site development, availability of hiding cover, and the presence of riparian areas.

The concept of linkage zones is not specific to grizzly bears but rather an issue for many wildlife species, especially carnivores (Walker and Craighead 1997, Ruediger et al. 1999, Ruediger et al. 2000, Claar et al. 2003, Servheen et al. 2003). Human population increase is rapidly affecting many of the remaining possible linkage areas between ecosystems in the Northern Rockies and the time for maintaining these connection opportunities is growing short (Ruediger et al. 1999). As such, the IGBC has agreed through an MOU to support linkage zone identification and the maintenance of existing linkage opportunities for wildlife. The IGBC has appointed three task forces (public lands, private lands, and highways) to evaluate linkage opportunities. The private lands task force has completed a report (Parker and Parker 2002) that provides agency personnel with guidance for involving rural communities in the development of linkage zones.

Servheen et al. (2003) identified potential linkage zones between the northern grizzly bear ecosystems; the USFWS is currently working on a similar evaluation of habitat fracture and potential linkage between the Yellowstone recovery zone and the NCDE and Bitterroot recovery zones. Grizzly bears have never been documented moving between ecosystems in the Northern Rockies in recent times (USDI FWS 2005a).

Concerns for maintaining the genetic diversity of the Yellowstone grizzly bear population in the absence of movement between ecosystems is addressed in the Conservation Strategy. The Conservation Strategy recommends translocation of two or more bears from other ecosystems by 2022 if genetic analysis shows no movement into the GYA from the NCDE. The Conservation Strategy also recognizes that roads and highways may impact bear movements, and requires that monitoring and surveys be conducted throughout the GYA before designs are initiated. This

information would be used to complete a connectivity analysis to identify important crossing areas. This direction applies to all federal and state signatories of the Conservation Strategy.

Maintaining or improving connectivity between the GYA and other ecosystems is outside the scope of this proposal; all alternatives provide various amounts of protection to areas identified as important in maintaining or improving connectivity within the GYA (Walker and Craighead 1997, Willcox and Ellenberger 2000, Merrill and Mattson 2003).

Existing Management Direction for Grizzly Bears

Primary Conservation Area

The PCA has been divided into 18 BMUs and 40 BMU subunits to provide a basis for ensuring that habitats for bears were well distributed across the PCA (Figure 16 and appendix A).

The PCA was identified in an interagency effort and accepted by the USFWS as part of the Recovery Plan. The size and extent of the existing PCA and the management direction applied within have allowed the grizzly bear population to increase and achieve all demographic recovery targets (section 3.1). While there is some disagreement on the amount of population increase (Pease and Mattson 1999), most of the available information suggests that the population has increased between 3 percent and 7 percent annually (Eberhardt et al. 1994, Boyce 1995, Knight et al. 1995, Eberhardt and Knight 1996, Eberhardt and Cherry 2000, Boyce et al. 2001, Harris et al. 2005). See discussion in section 3.3.3 on the grizzly bear population in the GYA.

All forests follow the management direction in the Guidelines. Lands within the PCA were mapped and managed according to three different management situations (Figure 15). A brief description of each management situation can be found in chapter 2 under the description of Alternative 1. (Full descriptions are provided in appendix B.) For all of the National Forest System lands combined, 59.3 percent of the acres in the PCA are within MS 1, 37.3 percent are within MS 2, 1.4 percent are within MS 3, and 2 percent are not identified as a management situation. The acres not identified as a management situation are all on the Beaverhead National Forest and are primarily designated wilderness.

Secure Habitat

Secure habitat is defined as areas more than 500 meters from an open or gated motorized access route or recurring helicopter flight line and greater than or equal to 10 acres in size¹⁷. Secure habitat is divided into long- and short-term secure habitat for this analysis based on management area category. A management area category describes the natural resource setting for an area of land and the types of management actions that are allowed to occur within the area of land. See section 3.2 and appendix C for definitions of management area categories.

Long- and short-term habitats are presented below for the PCA and the Alternative 4 area outside the PCA. The Alternative 4 area outside the PCA was developed using existing evaluations of suitable habitat and linkage areas in the GYA (Mattson and Merrill 2002, Walker and Craighead 1997, Willcox and Ellenberger 2000, Barber 2005). The development of Alternative 4 is further described in the administrative record. This area outside the PCA is considered to be the current best estimate of the biologically suitable habitat for grizzly bears on the six GYA national forests. This area in Wyoming is similar to that defined by the Wyoming Game and Fish Department in their grizzly bear management plan as the area where grizzly bear populations outside the PCA are socially acceptable and would be managed to allow for a stable population. Designation of socially acceptable areas for Montana and Idaho will depend upon a dialogue with the public and focus on specific lands that grizzlies are occupying, as defined in the respective state plans.

¹⁷ Secure habitat in this FEIS did not include areas open to cross country off-highway vehicle (OHV) travel.

Figure 15. Acres (in thousands) of lands within the PCA and management situation emphasis.

Land management agency	Acres within the PCA ¹ (% of total PCA)	Percent of PCA acres in MS 1 for each agency	Percent of PCA acres in MS 2 for each agency	Percent of PCA acres in MS 3 for each agency
Beaverhead National Forest	68 (1.2%)	Not identified	Not identified	Not identified
Bridger-Teton National Forest	724 (12.5%)	90.7%	7.8%	1.5%
Custer National Forest	114 (2.0%)	3.0%	97.0%	0.0%
Gallatin National Forest	809 (14.0%)	60.3%	39.6%	0.1%
Shoshone National Forest	1,223 (21.2%)	33.8%	64.1%	2.1%
Targhee National Forest	475 (8.2%)	98.0% ⁴	0.0% ⁴	2.0%
National parks ²	2,225 (38.5%)	99.8%	0.1%	0.1%
Other ³	138 (2.4%)	Not applicable	Not applicable	Not applicable

¹ These acres do not include acres of lakes > 640 acres. Large lakes comprise 118,000 acres within the PCA (2 percent of the PCA). Non-Forest Service inholdings are excluded except for the Bridger-Teton and Custer National Forests. Acres of non-Forest Service inholdings on the Gallatin National Forest have changed since the GIS coverages that generated these acres were developed. The acres of inholdings depicted in Figure 12 represent the status of inholdings on the six national forests. Management situation direction only applies to federal lands.

² National parks include Yellowstone and Grand Teton National Parks and the Rockefeller National Parkway.

³ Other includes BLM lands, state lands, and private lands.

⁴ The 1997 Revised Forest Plan changed all Management Situation 2 areas to Management Situation 1.

In response to public comment on the DEIS, the amount of long- and short-term secure habitat within the habitat occupied by grizzly bears outside the PCA from 1990 through 2004 and the 10-mile area outside the PCA is also presented. The Recovery Plan requires counting all females with cubs inside the PCA and within 10 air miles outside the PCA boundary.

Long-term secure habitat is secure habitat within Management Area Categories 1, 2, and 3. These management area categories typically include Congressionally designated wilderness, backcountry lands, research natural areas, national recreation areas, designated wild and scenic rivers, special interest areas, and other areas where some management activities may occur but natural ecological process and resulting patterns will normally predominate. Generally, new motorized access routes will not be constructed in these areas. In some of these areas, oil and gas surface occupancy may be allowed. For this analysis, all secure habitat in these management categories that may allow surface occupancy inside the PCA are considered long term because oil and gas development would likely be very limited due to the mitigation necessary under the secure habitat and developed site standards. Surface occupancy is allowed on only 3 percent of the National Forest System lands inside the PCA. Outside the PCA, any secure habitat in these management categories that allows surface occupancy on the Bridger-Teton National Forest is considered short-term secure habitat (see definition below) due to the high occurrence potential for oil and gas (47,000 acres in the biologically suitable habitat outside the PCA). Similar areas on the Beaverhead and Targhee National Forests have primarily moderate to low potential and are considered long-term secure habitat (244,000 acres in biologically suitable habitat in the Alternative 4 area outside the PCA).

Short-term secure habitat is secure habitat within Management Area Categories 4, 5, 6, and 8. These categories typically include areas that are managed to provide recreational use, forested

ecosystems that are managed to meet a variety of uses, timber harvesting emphasis areas, areas of intensive grazing, and areas likely to be permanently altered by human activities. Short-term secure also includes habitat within Management Area Categories 1, 2, or 3 outside the PCA on the Bridger-Teton National Forest where surface occupancy for oil and gas is permitted and occurrence potential is high.

Secure Habitat (inside the PCA)

Currently there are 2,827,000 acres of secure habitat on National Forest System lands within the PCA, which is 83 percent of the total National Forest System lands within the PCA (Figure 16 and Figure 17). Eighty-seven percent of the secure habitat is long term secure habitat. Appendix A displays secure habitat for each BMU subunit.

Figure 16. Acres (in thousands) in the PCA and percent of area that is long- and short-term secure habitat on National Forest System lands for each of the GYA national forests¹.

National forest	PCA acres	Secure habitat acres and percent of PCA that is secure habitat	Acres of long-term secure habitat ² and percent of secure habitat that is long-term secure	Percent of area that is long-term secure habitat	Acres of short-term secure habitat ³ and percent of secure habitat that is short-term secure
Beaverhead	68	66 (96%)	66 (100%)	97%	0 (0%)
Bridger-Teton	724	637 (88%)	618 (97%)	85%	19 (3%)
Custer	114	111 (97%)	110 (99%)	96%	1 (1%)
Gallatin	809	587 (73%)	554 (94%)	69%	33 (6%)
Shoshone	1,223	1,137 (93%)	929 (82%)	76%	207 (18%)
Targhee	475	290 (61%)	181 (62%)	38%	109 (38%)
Total	3,413	2,827 (83%)	2,458 (87%)	72%	369 (13%)

¹ These acres do not include acres of lakes > 640 acres. Large lakes comprise 13,000 acres within national forest proclaimed boundaries in the PCA. Non-Forest Service inholdings are excluded except for the Bridger-Teton and Custer National Forests. Acres of non-Forest Service inholdings on the Gallatin National Forest have changed since the GIS coverages that generated these acres were developed.

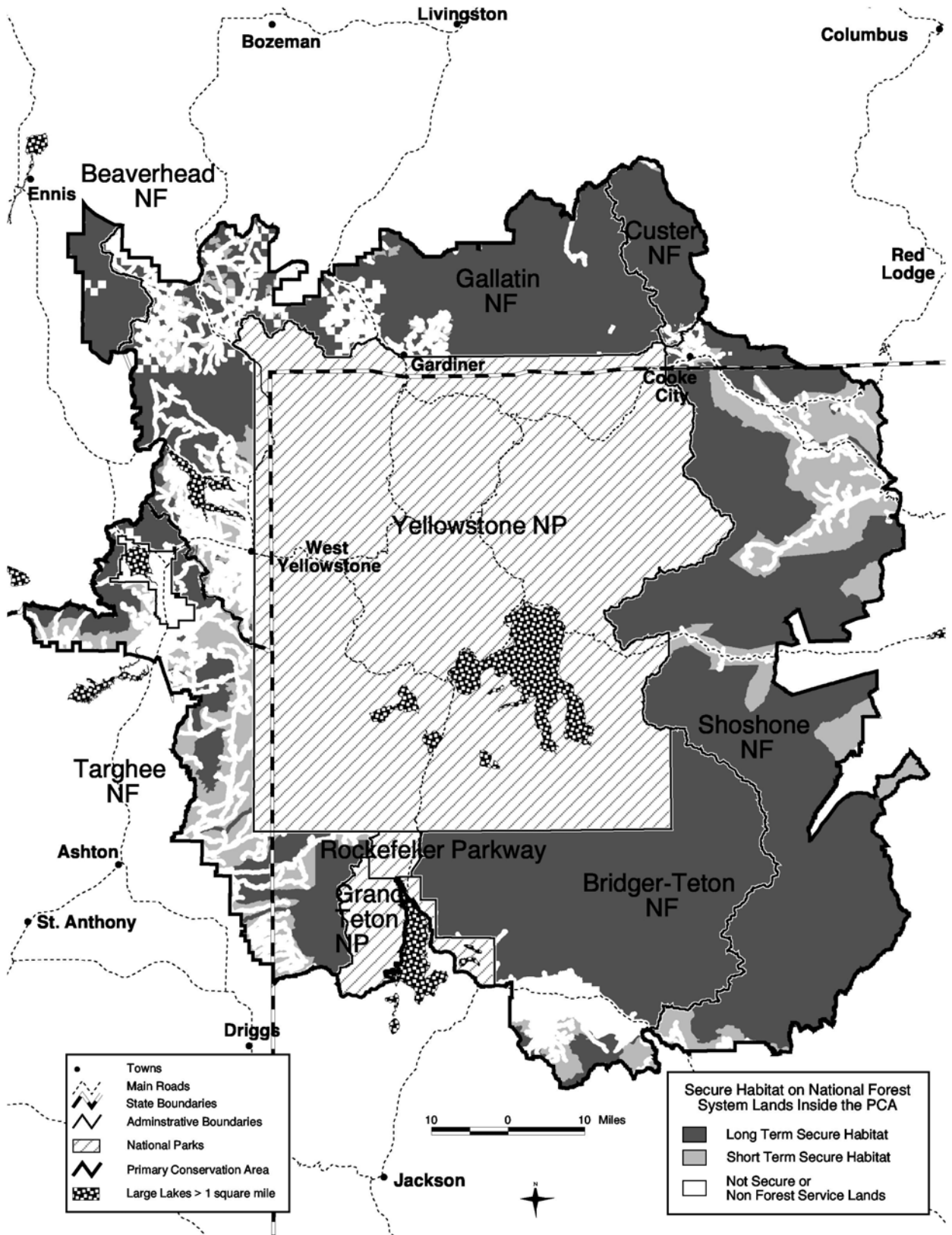
² Long term = secure habitat acres within Management Area Categories 1, 2, and 3.

³ Short term = secure habitat acres within Management Area Categories 4, 5, 6, and 8.

Beaverhead National Forest. There is no motorized access to the Beaverhead National Forest portion of the PCA. Ninety-six percent of the National Forest System lands within the PCA is secure habitat. The vast majority of this area is designated wilderness, and the relatively small non-wilderness portion of the PCA was closed to motorized use year round by Amendment 10 of the Beaverhead Forest Plan (Off-highway Vehicle Amendment). The amount of secure habitat in the Beaverhead National Forest portion of Hilgard BMU subunit 1 has not changed over the last 10 years.

Bridger-Teton National Forest. Management area prescriptions in the Bridger-Teton's Forest Plan emphasize motorized use on approximately 46,900 acres (7 percent) of the PCA within the Forest. Motorized use is prohibited or discouraged on the remaining 677,000 acres of the PCA. Currently, 88 percent of the National Forest System land within the PCA is secure habitat (Figure 16). The Bridger-Teton's Forest Plan does not contain Forestwide standard addressing open or total motorized access density or secure habitat areas. Access prescriptions and standards for individual management areas are variable, with some suggesting that motorized route density may exceed one mile per square mile of the management area. Over the last five years, the amount of secure habitat has remained unchanged.

Figure 17. Existing secure habitat within the PCA.



Custer National Forest. Most of the PCA (98.6 percent) is designated wilderness or in a management area which emphasizes wildlife habitat protection and discourages permanent road construction. Currently, 97 percent of the National Forest System land within the PCA is secure habitat. A small portion (1.4 percent of the PCA) emphasizes the exploration, development, and production of energy and mineral resources, but no activity has occurred. Secure habitat has remained the same over the last five to 10 years.

Gallatin National Forest. During the last five to 10 years, the Gallatin National Forest has closed or obliterated more than 100 miles of road within BMU subunits, increasing the amount of secure habitat. The road closures occurred mainly on the Hebgen Lake Ranger District in the Taylor Fork (Hilgard 1 and 2), the Madison 1 and 2, and the Henrys Lake 2 BMU subunits. Currently, 73 percent of the National Forest System land within the PCA is secure habitat.

Shoshone National Forest. The Shoshone's Forest Plan, as amended, has a standard for no net increase in roads. The activity levels associated with Plan objectives are relatively low. In practice, secure habitat is being maintained or increased. The amount of secure habitat has increased in Shoshone BMU subunits 3 and 4 due to road closures in the North Fork of the Shoshone River corridor. The amount of secure habitat has stayed the same over the last decade in all other BMU subunits. Currently, 93 percent of the National Forest System land within the PCA is secure habitat.

Targhee National Forest. Forestwide access management standards limit open motorized access route density to 0.6 miles per square mile in Henrys Lake subunits 1 and 2, the Plateau BMU, and the Bechler-Teton BMU. This standard also limits total motorized access route density in these same BMUs and subunits to one mile per square mile. The standards specify management requirements for road closures and administrative use on restricted roads. Standards associated with individual management areas supplement these Forestwide standards. The Targhee's Forest Plan contains a Forestwide goal to increase grizzly bear security. The amount of secure habitat within each BMU increased after the 1997 Revised Targhee Forest Plan was completed. The reason for the increase in the amount of secure habitat was that the Revised Forest Plan called for the decommissioning of about 433 miles of road within the BMUs to achieve the open motorized access route density standards and the total motorized access route density standards. All of the decommissioning work was completed by 2005 resulting in 61 percent of the National Forest System land within the PCA as secure habitat.

Secure Habitat (in the Alternative 4 Area outside the PCA)

For Alternative 4 areas, secure habitat outside the PCA is displayed in Figure 20. Currently, there are 4,331,000 acres of secure habitat on National Forest System lands outside the PCA, which is 72 percent of the total National Forest System lands within Alternative 4 areas outside the PCA. Seventy-one percent of the secure habitat is long-term secure habitat. This area includes 96 percent of the area known to be occupied by grizzly bears on National Forest System lands outside the PCA from 1990 through 2004 (Schwartz et al 2005d, Figure 23 and Figure 37) and 97 percent of the 10 mile area outside the PCA (Figure 21). Appendix A displays secure habitat for each analysis area outside the PCA within the Alternative 4 areas.

Secure Habitat (in the 10-mile Area outside the PCA)

In response to public comment, secure habitat for the 10-mile area outside the PCA is displayed in Figure 21. Currently, there are about 1.4 million acres of secure habitat on National Forest System lands within the 10-mile area outside the PCA, which is 71 percent of the total National Forest System lands in this area (Figure 20). Sixty percent of the secure habitat is long term secure. Approximately 97 percent of the area within 10 miles of the PCA is included within the Alternative 4 area outside the PCA. Further, approximately 66 percent of this area on National Forest System lands was occupied by grizzly bears from 1990 through 2004.

Figure 18. Acres (in thousands) of National Forest System lands for the Alternative 4 areas outside the PCA and the percent of the area that is long- and short-term secure habitat¹.

National forest	Acres for Alternative 4 areas outside the PCA	Acres of secure habitat for Alternative 4 areas outside the PCA (percent secure)	Acres of long-term secure habitat ² and percent of secure habitat that is long-term secure	Percent of area that is long-term secure habitat	Acres of short-term secure habitat ³ and percent of secure habitat that is short-term secure
Beaverhead	1,567	995 (64%)	707 (71%)	45%	289 (29%)
Bridger-Teton	1,293	985 (76%)	844 (86%)	65%	142 (14%)
Custer	341	307 (90%)	250 (82%)	73%	57 (18%)
Gallatin	783	619 (79%)	474 (77%)	61%	145 (23%)
Shoshone	1,081	852 (79%)	478 (56%)	44%	375 (44%)
Targhee	934	572 (61%)	336 (59%)	36%	236 (41%)
Total	5,999	4,331 (72%)	3,089 (71%)	52%	1,242 (29%)

¹These acres do not include acres of lakes > 640 acres. Large lakes comprise 15,000 acres within Forest Service proclaimed boundaries in the Alternative 4 areas outside the PCA. Non-Forest Service inholdings are excluded except for the Bridger-Teton and Custer National Forests. Acres of non-Forest Service inholdings on the Gallatin National Forest have changed since the GIS coverages that generated these acres were developed. The acres of inholdings depicted in Figure 12 represent the status of inholdings on the six national forests.

²Long term = secure habitat acres within Management Area Categories 1, 2, and 3.

³Short term = secure habitat acres within Management Area Categories 4, 5, 6, and 8.

Figure 19. Acres (in thousands) in the 10-mile area outside the PCA and the percent of the area that is long- and short-term secure habitat on National Forest System lands for each of the GYA national forests¹.

National forest	10-mile area outside the PCA	Secure habitat acres and percent of area that is secure habitat	Acres of long-term secure habitat ² and percent of secure habitat that is long-term secure	Percent of area that is long-term secure habitat	Acres of short-term secure habitat ³ and percent of secure habitat that is short-term secure
Beaverhead	133	89 (67%)	69 (77%)	52%	20 (23%)
Bridger-Teton	216	113 (52%)	59 (52%)	27%	54 (48%)
Custer	278	243 (87%)	195 (80%)	70%	47 (20%)
Gallatin	486	400 (82%)	331 (83%)	68%	69 (17%)
Shoshone	587	416 (71%)	121 (29%)	21%	295 (71%)
Targhee	252	134 (53%)	56 (42%)	22%	78 (58%)
Total	1,952	1,394 (71%)	830 (60%)	43%	564 (40%)

¹These acres do not include acres of lakes > 640 acres. Non-Forest Service inholdings are excluded except for the Bridger-Teton and Custer National Forests. Acres of non-Forest Service inholdings on the Gallatin National Forest have changed since the GIS coverages that generated these acres were developed.

²Long term = secure habitat acres within Management Area Categories 1, 2, and 3.

³Short term = secure habitat acres within Management Area Categories 4, 5, 6, and 8.

Figure 20. Secure habitat in the Alternative 4 area outside the PCA.

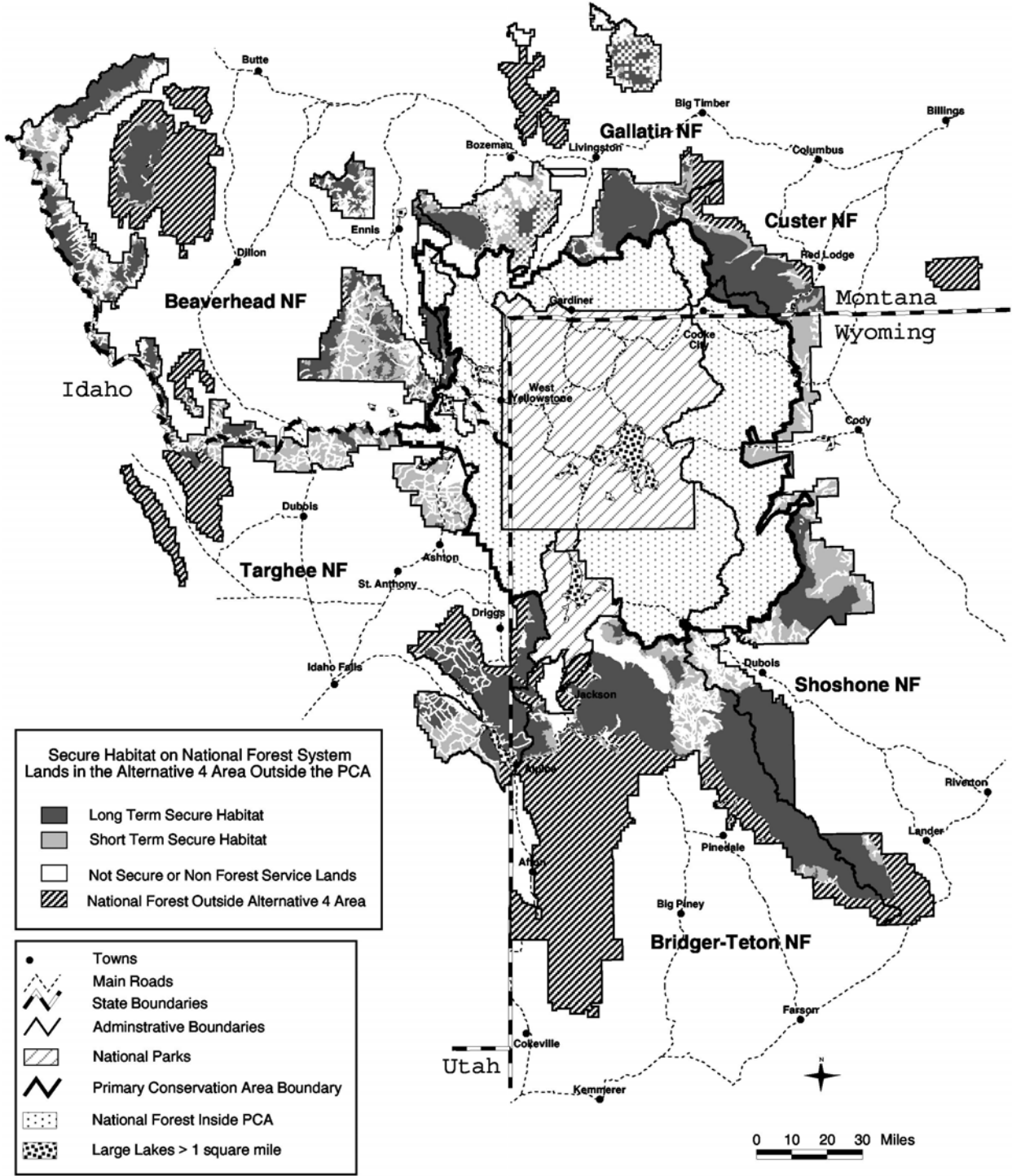
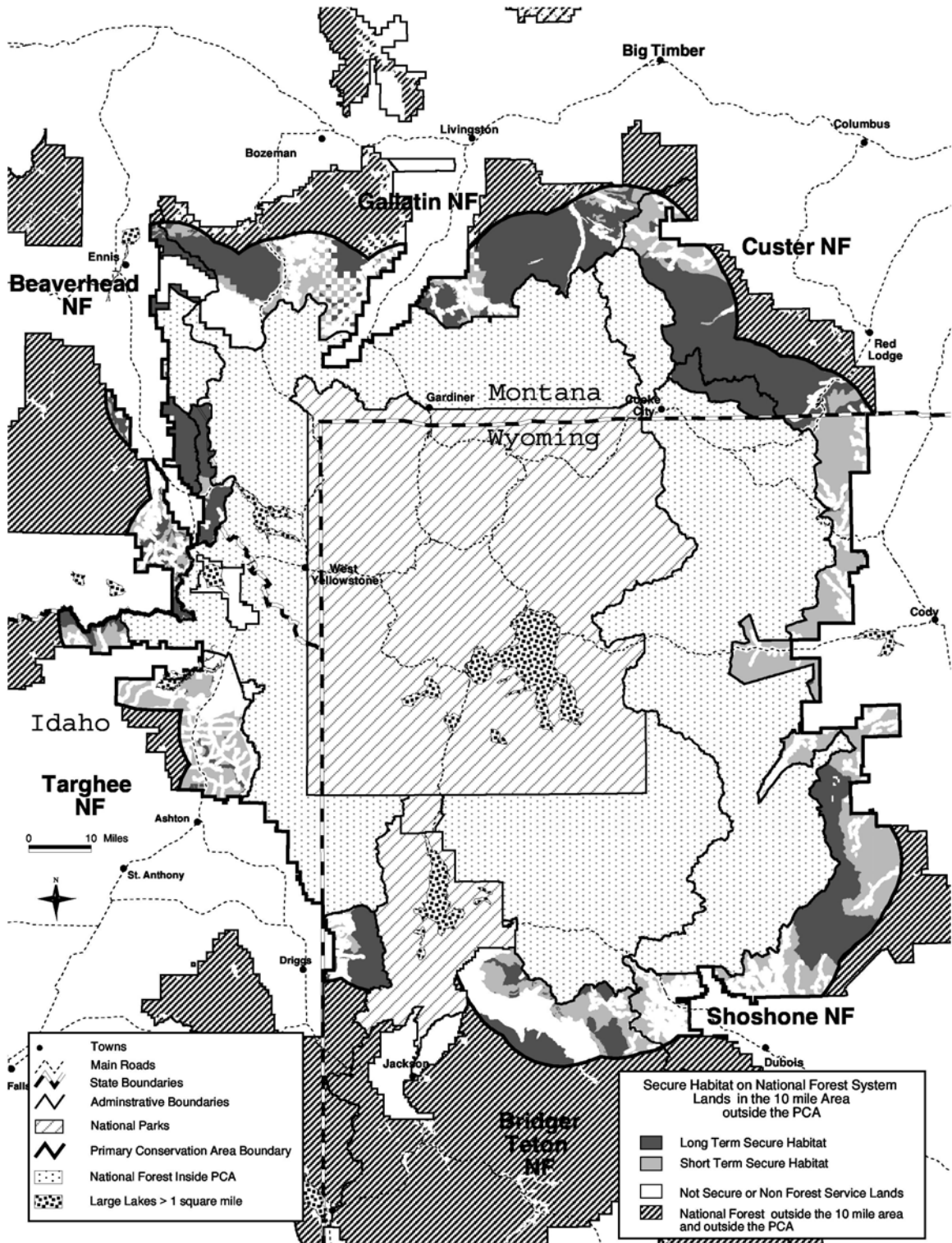


Figure 21. Secure habitat in the 10-mile area outside the PCA.



Secure habitat (in Occupied Grizzly Bear Habitat outside the PCA from 1990 through 2004)

Schwartz et al. (2002 and 2005d) estimated the area occupied by grizzly bears in the GYA from 1990 through 2004. This distribution is a reflection of areas occupied by grizzly bears; it is not a reflection of bear densities within these areas. Approximately 39 percent of the area occupied by grizzly bears during this period was outside the PCA (Figure 37). Twenty-one percent of the area occupied by grizzly bears was outside the PCA on National Forest System lands. The remaining occupied area outside the PCA was within Grand Teton National Park (2 percent) or on state, BLM, or private lands (15 percent). Further, 64 percent of the area occupied by grizzly bears on National Forest System lands was within the 10-mile area outside the PCA.

Ninety-six percent of this area is within the Alternative 4 area outside the PCA. Approximately 65 percent of the area occupied by grizzly bears on National Forest System lands is secure habitat (1.3 million acres) (Figure 22). Fifty-five percent of the secure habitat is long-term secure.

The estimated total population of grizzly bears during this time in the GYA was between 500 and 600 bears (IGBST 2005), with about 10 to 14 percent of the bears living outside the PCA (Schwartz et al. 2005d). The estimate of the number of bears outside the PCA is based on the initial sightings of females with COY and the proportion of time radio-collared bears spent inside and outside the PCA. The Conservation Strategy has a goal of maintaining at least 500 grizzly bears in the GYA.

Figure 22. Acres (in thousands) in the area occupied by grizzly bears outside the PCA (1990 through 2004) and the percent of the area that is long- and short-term secure habitat on National Forest System lands for each of the GYA national forests (Schwartz et al. 2002 and 2005d)¹.

National forest	Occupied area outside the PCA	Secure habitat acres and percent of area that is secure habitat	Acres of long-term secure habitat ² and percent of secure habitat that is long-term secure	Percent of area that is long-term secure habitat	Acres of short-term secure habitat ³ and percent of secure habitat that is short-term secure
Beaverhead	129	85 (66%)	56 (66%)	43%	29 (34%)
Bridger-Teton	605	343 (57%)	233 (68%)	39%	110 (32%)
Custer	9	9 (99%)	9 (100%)	99%	0
Gallatin	198	169 (86%)	140 (83%)	71%	30 (17%)
Shoshone	757	535 (71%)	200 (37%)	26%	335 (62%)
Targhee	256	135 (53%)	62 (46%)	24%	74 (54%)
Total	1,954	1,277 (65%)	699 (55%)	36%	578 (45%)

¹These acres do not include acres of lakes > 640 acres. Non-Forest Service inholdings are excluded except for the Bridger-Teton and Custer National Forests. Acres of non-Forest Service inholdings on the Gallatin National Forest have changed since the GIS coverages that generated these acres were developed.

²Long term = secure habitat acres within Management Area Categories 1, 2, and 3.

³Short term = secure habitat acres within Management Area Categories 4, 5, 6 and 8.

Past Trends in Secure Habitat

In the past 17 years, over 1,400 miles of road have been decommissioned in the GYA national forests, with less than 400 miles of road being constructed for a net reduction of over 1,000 miles of road (see section 3.10). The net reduction in miles of road has contributed almost 9 percent to the current level of secure habitat inside the PCA (Figure 24) and almost 3 percent in all areas outside the PCA (Figure 25) (includes Alternative 4 area outside the PCA and the area outside Alternative 4). Similarly, the average acres treated per year by timber harvest outside the PCA have been on a downward trend (Figure 50). Road construction and associated timber harvest have been limited in recent years in part due to the roadless policies in place from 2000 through 2005. Under current agency policies, an EIS is required to build roads inside inventoried roadless areas.

Figure 23. Secure habitat in the area occupied by grizzly bears outside the PCA from 1990 through 2004 (Schwartz et al. 2005d).

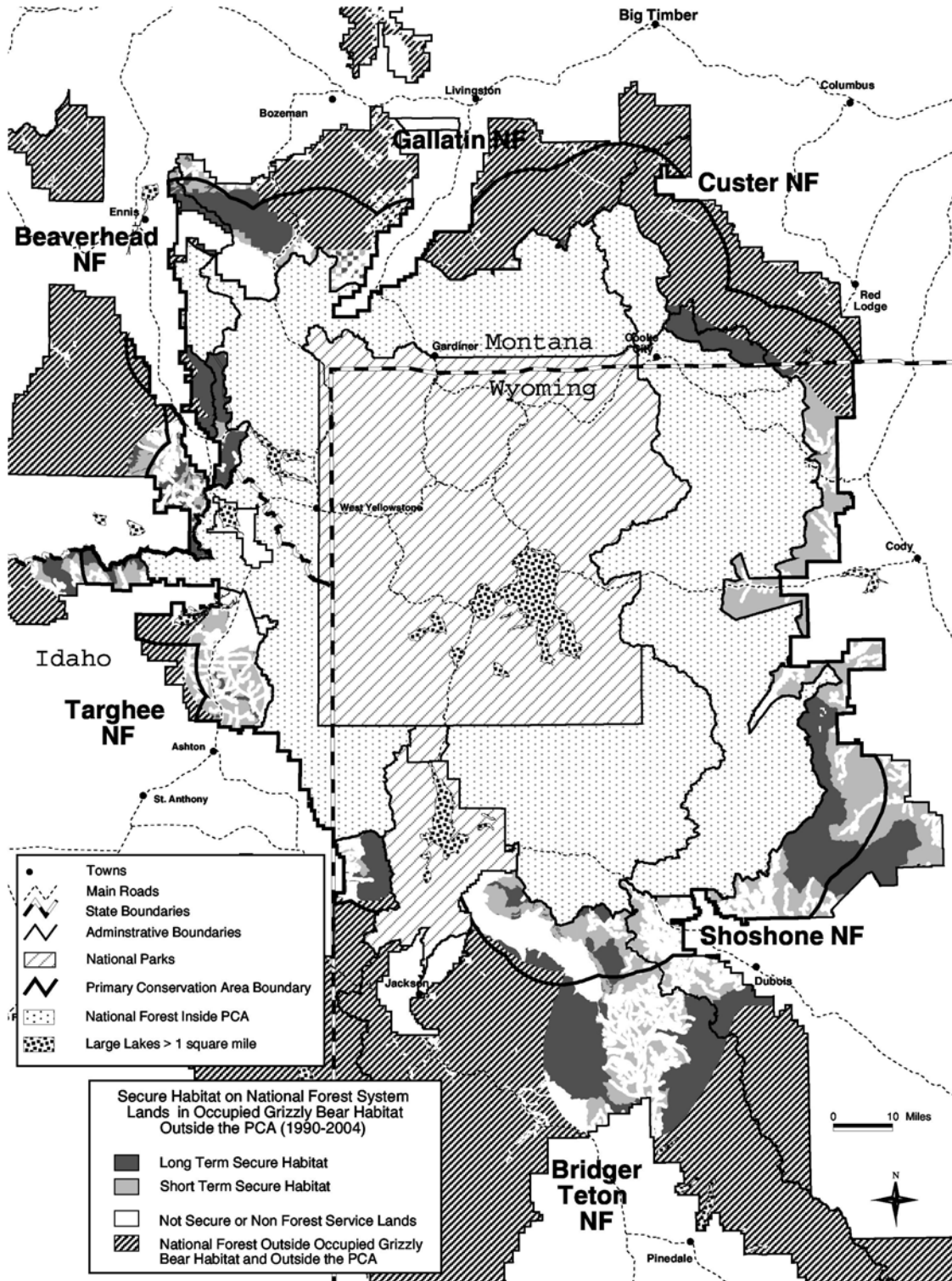


Figure 24. Average and total percent increase in the level of secure habitat inside the PCA on each GYA national forest due to the difference in average miles of road constructed per year and average miles of road decommissioned for the seventeen-year period (between 1986 and 2002)¹.

National forest	Secure habitat acres (in thousands) and percent that was secure in 2003	Average miles of road constructed per year	Average miles of road decommissioned per year	Average difference between miles constructed and miles decommissioned	Average acres of secure habitat lost/gained per mile of road constructed or decommissioned	Average acres secure habitat gained per year	Percent total secure habitat gained in the seventeen-year period ²
Beaverhead	66 (96%)	0	0	0	397.7	0	0%
Bridger-Teton	637 (91%)	1.5	0	+1.5	397.7	-597	-1.59%
Custer	111 (97%)	0	0	0	397.7	0	0%
Gallatin	587 (73%)	0.1	7.4	-7.3	397.7	2,903	8.41%
Shoshone	1,137 (93%)	1.3	2.1	-0.8	397.7	318	0.48%
Targhee	290 (61%)	2.6	33.1	-30.5	397.7	12,130	71.10%
Total	2,827 (83%)	5.5	42.7	-37.2	397.7	14,794	8.90%

¹These acres do not include acres of lakes > 640 acres. Large lakes comprise 15,000 acres within Forest Service proclaimed boundaries in the Alternative 4 areas outside the PCA. Non-Forest Service inholdings are excluded except for the Bridger-Teton and Custer National Forests. Acres of non-Forest Service inholdings on the Gallatin National Forest have changed since the GIS coverages that generated these acres were developed.

²The values in this column are calculated by multiplying the values in column 7 by 17 and dividing by the acres in column 2.

Figure 25. Average and total percent increase in the level of secure habitat outside the PCA on each GYA national forest due to the difference in average miles of road constructed per year and average miles of road decommissioned per year for the seventeen-year period (between 1986 and 2002)¹.

National forest	Secure habitat acres (in thousands) and percent that was secure in 2003	Average miles of road constructed per year	Average miles of road decommissioned per year	Average difference between miles constructed and miles decommissioned	Average acres of secure habitat lost/gained per mile of road constructed or decommissioned	Average acres secure habitat gained per year	Percent total secure habitat gained in the seventeen-year period ²
Beaverhead	1,271 (60%)	4.1	4.9	-0.8	397.7	318	0.43%
Bridger-Teton	1,919 (70%)	2.6	11.1	-8.5	397.7	3,380	2.99%
Custer	387 (79%)	0	0.2	-0.2	397.7	80	0.35%
Gallatin	710 (76%)	3.9	6.1	-2.2	397.7	875	2.10%
Shoshone	908 (75%)	1.2	4.3	-3.1	397.7	1,233	2.31%
Targhee	780 (59%)	3.5	14.0	-10.5	397.7	4,176	9.10%
Total	5,972 (68%)	15.3	40.6	-25.3	397.7	10,062	2.86%

¹ This analysis included all the area outside the PCA on the six GYA national forests, as information was not available just for the Alternative 4 areas outside the PCA. These acres do not include acres of lakes > 640 acres. Large lakes comprise 15,000 acres within Forest Service proclaimed boundaries in the Alternative 4 areas outside the PCA. Non-Forest Service inholdings are excluded except for the Bridger-Teton and Custer National Forests. Acres of non-Forest Service inholdings on the Gallatin National Forest have changed since the GIS coverages that generated these acres were developed.

² The values in this column are calculated by multiplying the values in column 7 by 17 and dividing by the acres in column 2.

3.3.2 Grizzly Bear/Human Interactions—Affected Environment

A primary factor in providing for the conservation of grizzly bears is the management of grizzly bear/human interactions. Grizzly bear mortality is almost solely attributable to grizzly bear/human conflicts with a common outcome of bear mortality by interagency bear managers or killing by other humans. In addition to mortality concerns, providing secure habitat (areas free of motorized access) is important to enable bears to fully use their food sources, denning sites, and meet other living needs. Human presence can limit bear use of habitat, create tolerance among some bears that allows for interaction at great risk to the bears, or attract bears to unnatural or unsecured food sources increasing the risks of food conditioning to unnatural foods and human conflict.

Grizzly Bear Mortalities

Figure 26 and Figure 27 display the trend of known and probable grizzly bear deaths in the GYA from 1973 (after closing the Yellowstone National Park garbage dumps) to 2004. Figure 26 shows human-caused grizzly bear deaths and Figure 27 shows natural and unknown-caused grizzly bear deaths. From 1973 to 2004, there were a total of 414 grizzly bear deaths (Haroldson and Frey 2003, Haroldson and Frey 2005). There have been 303 human-caused grizzly bear deaths (73 percent of the total) and 111 natural and unknown-cause grizzly bear deaths (27 percent of the total). The abundance of natural food sources, such as years of abundant whitebark pine cone production, contributes to fewer deaths. From 1973 through 1996, grizzly bear deaths occurred outside of the PCA in only four years. Starting in 1997, grizzly bear deaths have occurred each year outside the PCA.

Figure 26. Known and probable human-caused grizzly bear deaths in the GYA, 1973 through 2004.

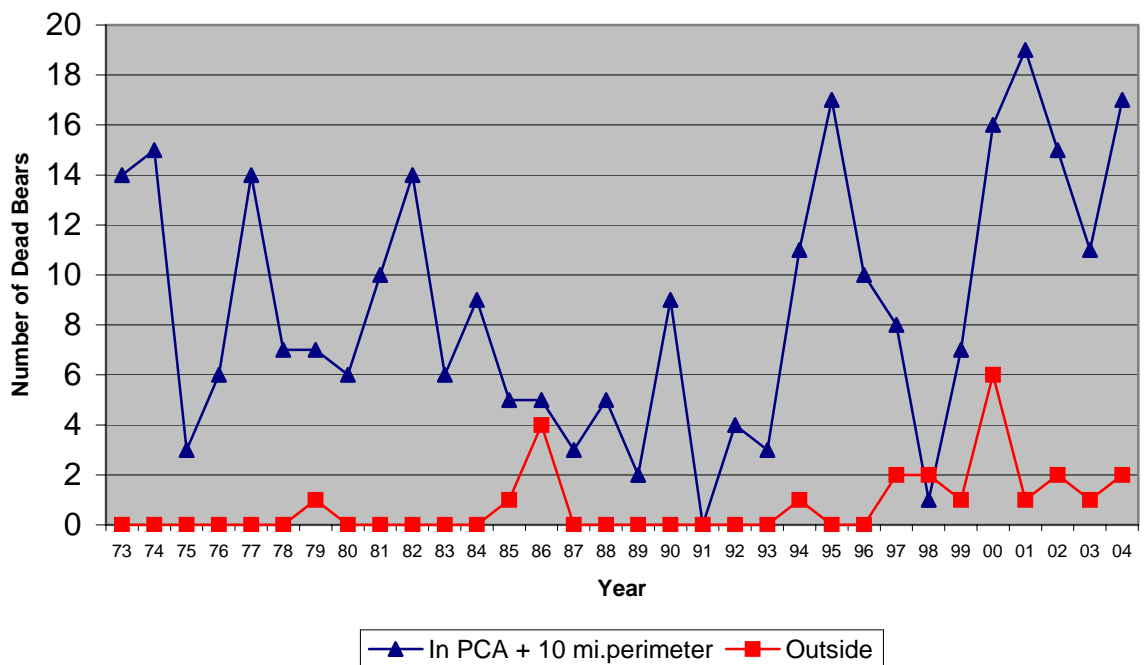
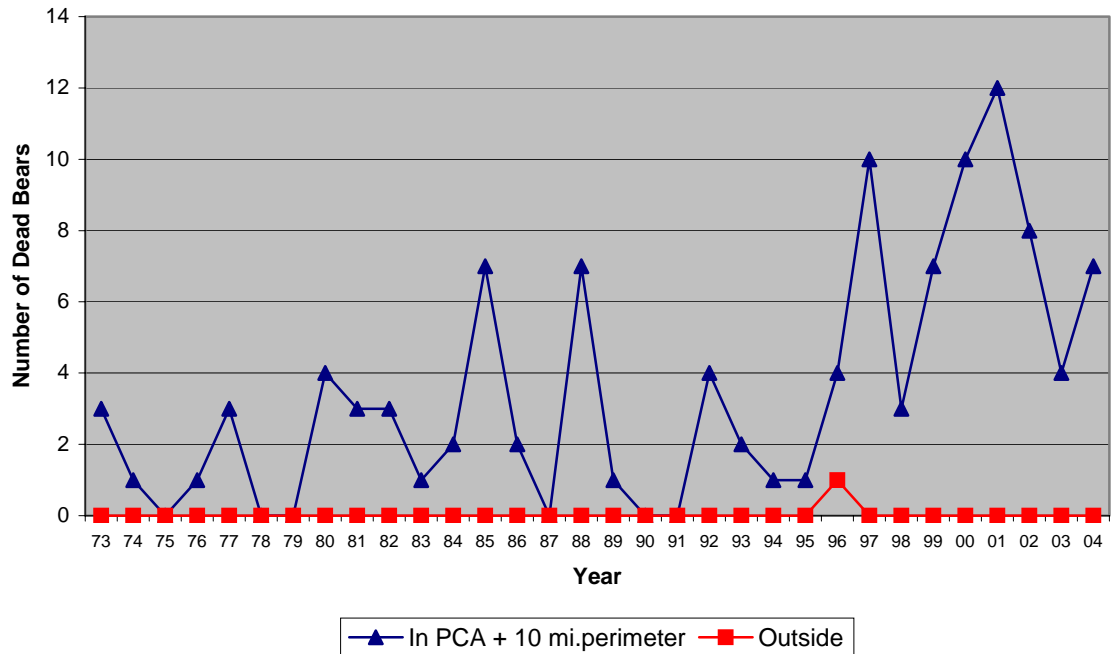


Figure 27. Natural- and unknown-caused grizzly bear deaths in the GYA, 1973 through 2004.



The causes of grizzly bear deaths and their distribution by landownership are shown in Figure 28. For the years 1975 to 2004, 60 percent of the grizzly bear deaths (161 out of 270) occurred on National Forest System lands. Not all of those deaths are attributable to Forest Service management activities or actions. On National Forest System lands, 123 of the 161 grizzly bear deaths (76 percent) are in the categories of accidents, mistaken identity, vandal killings, and hunter-related self defense, which are not directly attributable to Forest Service management activities or actions. The remaining 27 grizzly bear deaths (24 percent) are in the categories of site conflicts, and livestock or livestock related vandal killings, which are indirectly attributable to Forest Service management activities or actions. To reduce grizzly bear deaths on National Forest System lands, the Forest Service has closed domestic sheep allotments and cattle allotments with recurring conflicts, established food storage regulations, provided bear resistant containers for garbage and food storage, provided information and education materials and programs, established special grizzly bear requirements in contracts and permits, and issued access restrictions and regulations.

Grizzly Bear/Human Conflicts

Grizzly bear/human conflicts are defined as incidents in which grizzly bears injure people, damage property, kill or injure livestock, damage beehives, obtain anthropogenic (unnatural) foods, or damage or obtain garden and orchard fruits and vegetables. All conflicts reported to state and federal agencies are entered into state databases and compiled annually by Yellowstone National Park and reported in the IGBST Annual Report. Grizzly bear/human encounters that did not result in human injury or property damage are also recorded but categorized as confrontations rather than conflicts (Figure 28, Figure 29, and Figure 30). Figure 31 highlights the causes of conflicts and where they occur. From 1992 through 2004, 814 grizzly bear/human conflicts (47 percent of the total recorded conflicts) occurred on National Forest System lands. The majority of the conflicts on National Forest System lands were due to livestock depredation (59 percent), followed by unnatural foods (24 percent), property damage (14 percent), and human injury (4 percent).

Figure 28. Known and probable human-caused grizzly bear deaths by reason and landownership from 1975 through 2004 (excluding natural and undetermined causes) (IGBST data).

Landownership	Mortality Category						Total
	Site conflicts ¹	Self defense ²	Vandal killing ³	Mistaken identity	Livestock ⁴	Accidents	
Gallatin NF	7	9	11	3	0	5	35
Shoshone NF	8	15	19	5	1	6	54
Bridger-Teton NF	7	21	18	5	3	0	54
Caribou-Targhee NF	0	1	14	0	0	2	17
Beaverhead NF	0	0	0	0	1	0	1
Yellowstone NP	15	2	1	0	0	16	34
Grand Teton NP	1	0	0	1	1	0	3
Other public lands	1	0	0	2	0	1	4
Private	46	3	4	1	11	3	68
Total	85	51	67	17	17	33	270

¹ Includes 12 bears killed in self defense at backcountry camps, 69 management removals due to conflicts at front-country sites, and four management removals of bears that either injured humans or showed unnatural aggression towards humans.

²Forty-six of the 51mortalities are hunter related (90 percent).

³ Eleven of these are livestock related.

⁴ Includes 14 management removals (three sheep depredation, nine cattle depredation, and one horse depredation) and three bears legally killed by sheepherders in self defense.

Figure 29. Grizzly bear/human conflicts throughout the GYA, 1992 through 2004 (IGBST data).

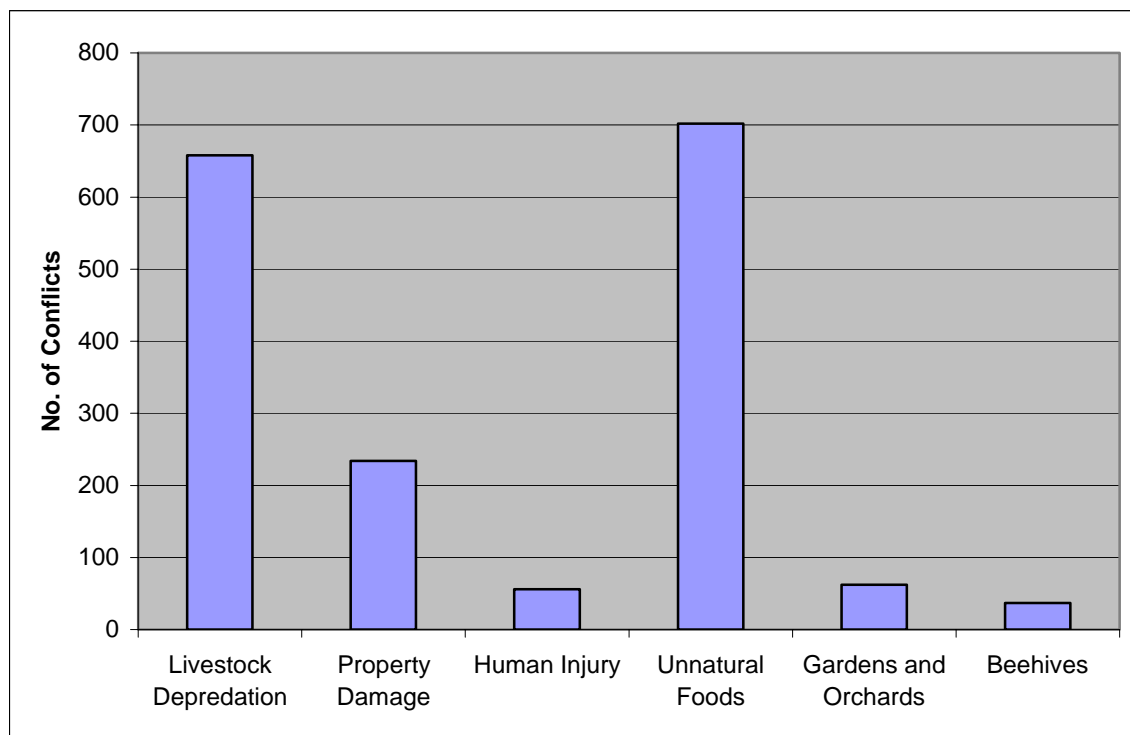


Figure 30. Grizzly bear/human and grizzly bear/livestock conflicts for the years 1992 through 2004 (IGBST data).

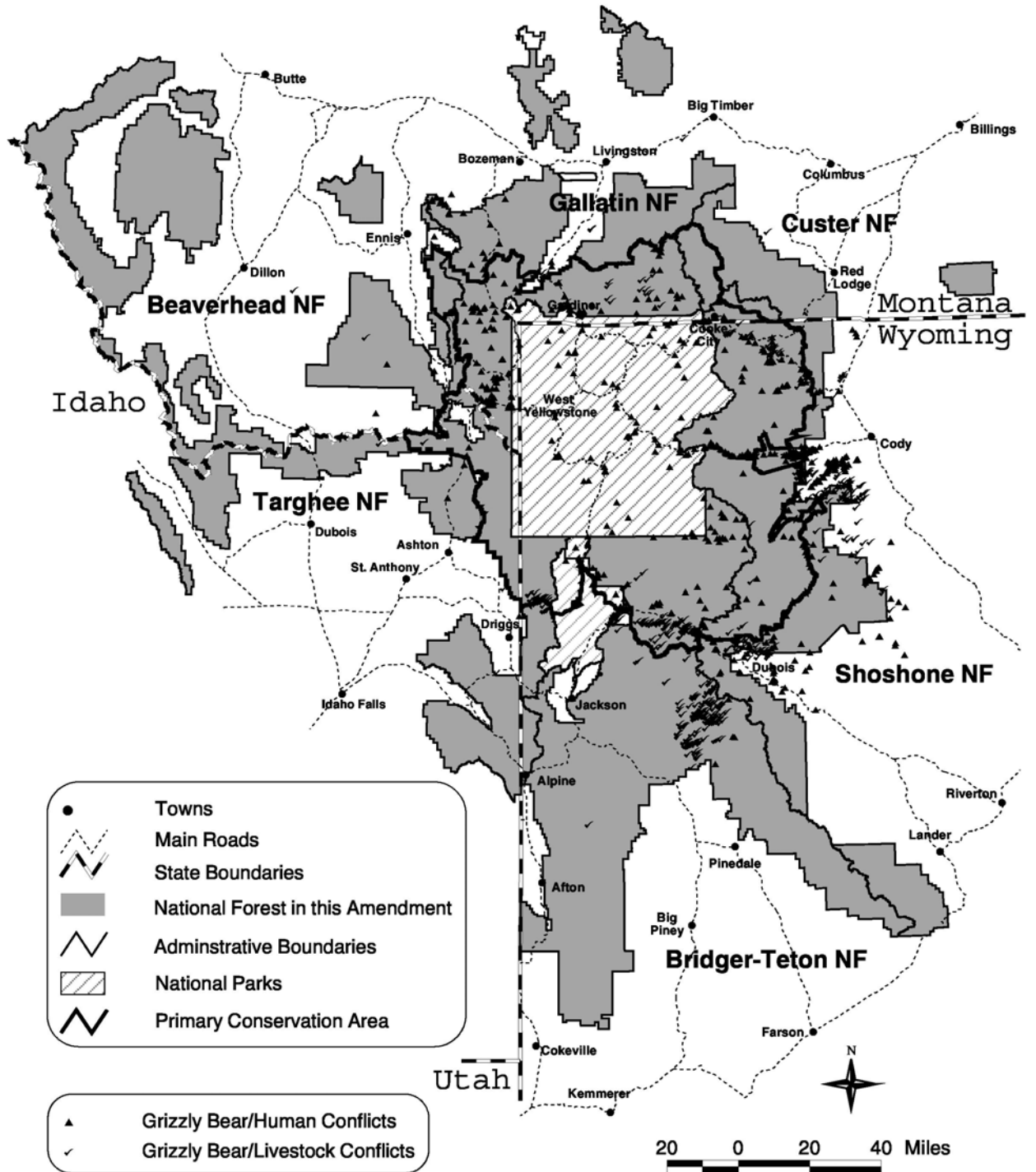


Figure 31. Number of grizzly bear/human conflicts by landowner and category, 1992 through 2004 (IGBST data).

Management agency	Category						Total
	Livestock depredation	Property damage	Human injury	Unnatural foods	Gardens and orchards	Beehives	
Beaverhead NF	1	1	0	1	0	0	3
Bridger-Teton NF	319	16	13	27	0	0	375
Custer NF	0	1	0	1	0	0	2
Gallatin NF	13	25	9	50	0	0	97
Shoshone NF	95	68	9	113	0	0	285
Targhee NF	50	0	0	2	0	0	52
Yellowstone NP	0	34	16	31	12	0	93
Grand Teton NP	35	1	5	3	0	0	44
Private MT	16	16	2	132	28	0	194
Private WY	123	67	2	318	21	35	566
Private ID	1	1	0	17	1	0	20
State MT	0	1	0	0	0	0	1
State WY	3	3	0	7	0	2	15
State ID	1	0	0	0	0	0	1
BLM	1	0	0	0	0	0	1
Total	658	234	56	702	62	37	1,749

Grizzly Bear/Motorized Access and Secure Habitat Interactions

The management of human use levels through access route management is one of the most powerful tools available to balance the needs of grizzly bears with the needs and activities of humans. It has been documented in several research projects, completed and ongoing, that unregulated human access and development within grizzly bear habitat can contribute to increased bear mortality and affect bear use of existing habitat (IGBC 1998, Interagency Conservation Strategy Team 2003).

Historically, management of motorized use has been primarily accomplished through restriction of certain types of motorized use on established access routes, i.e. management of open motorized route densities. Recent research has shown that secure habitat (areas that are free of motorized traffic, also referred to as core areas) is an important component of grizzly bear habitat (IGBC 1998).

By managing motorized access, the following grizzly bear management objectives can be met (IGBC 1998):

- Minimize human interaction and potential grizzly bear mortality
- Minimize displacement from important habitats
- Minimize habituation to humans
- Provide relatively secure habitat where energy requirements can be met

Grizzly Bears

The IGBC Taskforce Report (IGBC 1998) identifies three access parameters for measuring motorized access and its effect on habitat security for grizzly bears:

- TMARD
- OMARD
- Secure habitat or core areas

OMARD and TMARD are calculated using a GIS moving windows analysis as the percent of a BMU subunit in a defined density category, including areas with zero density. Secure habitat is calculated as the area greater than 500 meters from an open or gated motorized access route (greater than or equal to 10 acres in size) and closed to OHV use. In the process of the development of the Conservation Strategy and this FEIS it was determined that development of habitat standards for all three access parameters (OMARD, TMARD and secure habitat) in the GYA was unnecessary and somewhat redundant in meeting the grizzly bear management objectives identified above. Secure habitat is more straightforward for analysis, monitoring, and discussion. Opening a permanently restricted road or building a new road would affect secure habitat, except in areas between motorized access routes that are less than 1,000 meters apart. Reopening or constructing roads between existing routes less than 1,000 meters apart would be rare.

The IGBC Taskforce Report (IGBC 1998) defined restricted roads as "...as a road on which motorized use is restricted seasonally or yearlong and the road requires effective physical obstruction (generally gated)." Gated roads are not considered effective closures under the Conservation Strategy and this analysis (Figure 4).

History has demonstrated that grizzly bear populations survived where frequencies of contact with humans were very low. Populations of grizzly bears persisted in those areas where large expanses of relatively secure habitat were retained and where human-induced mortality was low. In the Yellowstone area, this is primarily associated with national parks, wilderness areas, and large blocks of public lands (IGBC 1998). Maintaining habitat security requires minimizing mortality risk and displacement from human activities in a sufficient amount of habitat to allow the population to benefit from this secure habitat and respond with increasing numbers and distribution. Habitat security allows a population to increase in numbers and distribution as lowered mortality results in more reproduction and cub recruitment into the adult population. This results in an increasing population. As the population increases, it begins to expand in range and distribution. Both of these responses to habitat security are currently ongoing in the Yellowstone population as the population has increased between 4 and 7 percent per year (Harris et al. 2005) and has increased in distribution (Schwartz et al. 2002, Schwartz et al. 2005d). See the discussion in section 3.3.3 on the grizzly bear population in the GYA. The PCA is 83 percent secure. By comparison, the average percent secure habitat inside the recovery areas for the Northern Continental Divide and Selkirk/Cabinet-Yaak grizzly bear ecosystems are 65 percent and 56 percent respectively.

Secure habitat must also provide the basic seasonal habitat requirements for grizzly bears and should be representative of seasonal habitats available to bears in the entire analysis area (IGBC 1998). The CEM was used to evaluate the relative habitat value of the existing secure habitat inside the PCA (Interagency Conservation Strategy Team 2003). Habitat value, as currently used in the CEM, is an index of the inherent productivity of grizzly bear habitat. The CEM is also used to measure habitat effectiveness, which is a measure of the energy potentially derived from an area given the impacts of human activities on bear habitat use. Habitat effectiveness is higher in secure habitat than non-secure habitat of the same habitat value because of the absence of motorized access routes.

Grizzly Bear/Developed Site Interactions

The effects of human activity associated with developments on grizzly bear habitat use have been reported by Mattson et al. (1987), and include the following:

- Grizzly bear use was lower in areas near human developments
- Foraging behavior was disrupted
- Dominant bears tended to displace subordinate bears into areas with more human development
- Adult females and subadult males residing closer to developments were more likely to be involved in management actions (such as being trapped and relocated)

The Forest Service and NPS have instituted food storage orders or regulations and have provided bear resistant garbage containers at developed sites throughout the PCA and many areas outside. This work was undertaken to reduce grizzly bear/human conflicts associated with developed sites as well as dispersed sites. Mattson and Knight (1991) analyzed grizzly bear mortality data by three eight-year periods (1962 through 1969, 1975 through 1982, and 1983 through 1990) and by association with different levels of human access, including major developments, primary roads, secondary roads, and backcountry areas. They reported that unit area mortality rates associated with all levels of access decreased over the three time periods. Renkin and Gunther (1996) evaluated bear mortalities in relation to developed sites over a 10-year period (1987 to 1996) and found that bear mortalities in relation to developed areas declined during that period. Even though grizzly bear/human conflicts still occur throughout the GYA, these studies show that efforts to reduce those conflicts have been successful.

Grizzly Bear/Livestock Interactions

Knight and Judd (1983) reported the following information about bears that kill livestock:

- All instrumented (radio-collared) grizzly bears known to have had the opportunity (bears that came in close contact with sheep), killed sheep.
- Most grizzly bears that encountered cattle did not make kills.
- All known cattle killers were adult bears, while sheep killers included both adults and subadults.
- They concluded that sheep grazing in occupied grizzly range is a serious problem, since bears kill sheep more readily and because the sheep are closely tended by herders that are protective of their flocks.

Anderson et al. (1997) reported the following information from a study on grizzly bear/cattle interactions on two cattle allotments in northwest Wyoming:

- From a minimum of 24 grizzly bears that were known to use two cattle allotments during a three-year period, seven bears (possibly eight) preyed on cattle.
- Thirty percent of 194 cattle mortalities documented during the three years were the result of bear predation, 65 percent were not bear-related, and 5 percent were classified as unknown.
- Predatory grizzly bears selected calves (51 of 58, or 88 percent) over adult and yearling cattle.
- All sex/age groups of grizzly bears, except subadult male, were associated with cattle depredations. Three adult males were responsible for 84 percent of the documented losses where individual depredators could be identified.
- Cattle depredations were limited to a relatively short period (three to eight weeks) during two of the three grazing seasons, and five of the eight bears suspected of killing cattle did not appear to kill more than one calf each.
- Translocating grizzly bears appears to be a viable option for reducing losses, since homing bears may not return before that depredation period ends. Additionally, translocation could prevent the occasional depredator, which appears to be common among grizzlies, from being unnecessarily removed from the population.

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- Removing cattle carcasses from allotments also appeared to reduce bear densities, but it could not be determined whether this would reduce depredations.
- Since adult males are responsible for the majority of cattle depredations, selective removal may also be a possible management option, particularly when habitual adult males are involved and translocation, aversion tactics, or carcass removal efforts are ineffective.

In summary, most, if not all, grizzly bears that come in contact with domestic sheep prey on sheep and conflicts are inevitable. Within the PCA, 40 percent of the sheep allotments active in 2003 have had documented grizzly bear conflicts. Several sheep allotments that have had conflicts with grizzly bears have been closed.

The majority of grizzly bears that come in contact with cattle do not make kills. Within the PCA, 24 percent of the cattle allotments active in 2003 have had documented grizzly bear conflicts (Figure 62).

Conflicts between livestock and grizzly bears have resulted in the relocation, removal, or direct mortality of grizzly bears. Many of the conflicts with grizzly bears and sheep have been resolved inside the PCA due to the closure of many of the affected allotments. Conflicts with livestock have increased in recent years primarily outside the PCA. There were 478 documented grizzly bear/livestock conflicts on the six national forests from 1992 to 2004 (Figure 31). Only 10 percent of the documented grizzly bear mortalities since 1975 have been livestock related (Figure 28).

Grizzly Bear/Snow Machine Interactions

Five of the GYA national forests (Beaverhead, Bridger-Teton, Custer, Gallatin, and Shoshone) analyzed the effects of snow machine use on grizzly bears and consulted with the USFWS (USDA Forest Service 2001a, USDI FWS 2002). This analysis provided the following findings:

- Snow machine use has been around for many years and has increased over a long period.
- Bears have had a chance to either habituate or move to new den sites if disturbed.
- Bears tend to den in remote areas with characteristics that are not entirely conducive to snow machining (steep, forested habitats).
- Snow is an excellent sound insulator.
- A large proportion of the PCA and area where bears may occur (68 and 63 percent, respectively) provide suitable denning habitat.
- A large proportion of known dens in the Yellowstone area (88 percent) are located in areas where snow machine use does not occur and suitable denning habitat is well distributed on the forests.
- On the five national forests, only 3 to 19 percent of the secure area within the PCA that is suitable for denning is potentially used by snow machines. In the area where bears may occur, 6 to 31 percent falls into this category.
- Information on effects of snow machining on bears is largely anecdotal, although there is sufficient information to indicate that some individual bears have the potential to be disturbed.
- Potential effects of snow machining on reproduction and survival in Yellowstone grizzly bears are not evident in the population statistics. The grizzly bear population in the GYA has achieved all demographic recovery parameters as established in the 1993 Grizzly Bear Recovery Plan.

The USFWS issued a Biological Opinion stating that current authorized snow machine activity is not likely to jeopardize the continued existence of the grizzly bear (USDI FWS 2002). The USFWS stated that the best information suggests that current levels of snow machine use are not appreciably reducing the likelihood of either the survival or recovery of grizzly bears in the

Yellowstone PCA. The USFWS did not anticipate a high level of incidental take¹⁸, and stated that incidental take was unquantifiable. The USFWS concluded that the level of take of grizzly bears that has and would result from snow machine use is low, based on the best available recent and long-term Yellowstone grizzly bear population information, the amount of protected and unprotected denning habitat available in the Yellowstone ecosystem, the location and characteristics of most grizzly bear den sites, the expert opinions of grizzly bear researchers in the Yellowstone ecosystem, and the best available information on grizzly bear denning.

For the Targhee National Forest, grizzly bear denning habitat and potential conflicts with snow machine use were analyzed and included in consultation with the USFWS as part of the 1997 Revised Forest Plan. There have been no documented grizzly bear/snow machine use conflicts on the Targhee. The 1997 Revised Forest Plan contains a standard allowing curtailment of snow machine use to resolve documented conflicts with grizzly bears within the PCA.

Habitat Effectiveness

The Yellowstone Grizzly Bear CEM was designed to assess the inherent productivity of grizzly bear habitat and to assess the effects of human activities on bear use of that habitat. The model uses GIS databases and relative value coefficients of human activities, vegetation, and key grizzly bear foods to calculate habitat value (HV) and habitat effectiveness (HE) (Weaver et al. 1986, Bevins 1997, Mattson et al. 2004). The CEM is the result of more than a decade of interagency effort. Interagency mapping protocols and procedures (Mattson and Despain 1985) have been developed and approved for the PCA. Research is limited as to what level of human activity on backcountry trails actually displaces bears from these habitats. Additional information on human use in the backcountry may help determine the relationship between human activities and bear use. The IGBST currently has a contract with Montana State University to evaluate model coefficients.

Habitat value in the CEM is a relative measure of the average net digested energy potentially available to bears in a subunit for each of four seasons. Habitat effectiveness is that part of the energy potentially derived from the area that is available to bears given their response to humans (Mattson et al. 2004). It is recognized that motorized access and site developments are the primary human activities influencing grizzly bear use of habitats. There are other activities that collectively may have significant impact on the effectiveness of the habitat for bears. The CEM can be used to estimate the cumulative effects of all human activities on the availability of habitats and associated foods to bears. The 1998 baseline seasonal HE values for each subunit from CEM are displayed in appendix A.

3.3.3 Grizzly Bear Population—Affected Environment

The Recovery Plan established three demographic (population) recovery targets that must be achieved for a recovered grizzly bear population, and defined a recovered grizzly bear population as one that could sustain a defined level of mortality and is well distributed throughout the PCA. The three demographic (population) recovery targets include:

- Maintain a minimum of 15 unduplicated females with COY over a six-year average both inside the PCA and within a 10-mile area immediately surrounding the PCA.
- Sixteen of 18 BMUs within the PCA must be occupied by females with young, including COY, yearlings, or two-year olds, as confirmed by the IGBST from a six-year sum of observations. No two adjacent BMUs may be unoccupied during the same six-year period. This is equivalent to verified evidence of a least one female grizzly bear with young at least once in each BMU over a six-year period.

¹⁸ The term “incidental take” is the taking of an endangered or threatened species incidental to an agency’s action. The term “take” means to harm, harass, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such contact.

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- The running six-year average of total known, human-caused grizzly bear mortality as confirmed by the IGBST is not to exceed 4 percent of the minimum population estimate. The running-six-year average known, human-caused female grizzly bear mortality is not to exceed 30 percent of the 4 percent total mortality limit over the most recent three-year period. These mortality limits cannot be exceeded in any two consecutive years. Beginning in 2000, probable mortalities were included in the calculation of mortality thresholds; COY orphaned as a result of human causes will be designated as probable mortalities.

At the end of 2004, the number of unduplicated females with COY over a six-year average both inside the PCA and within a 10-mile area immediately surrounding the PCA was 40, more than double the Recovery Plan target of 15 (Figure 22). The Recovery Plan target for the number of unduplicated females with COY (15) has been exceeded since 1988 (Interagency Conservation Strategy Team 2003). In 2004, 46 unduplicated females with COY were documented inside the PCA and within a 10-mile area immediately surrounding the PCA (Figure 34). Unduplicated females with COY were also documented outside the PCA and the 10-mile area. Schwartz et al. (2002 and 2005d) estimated the area occupied by females with COY in three time periods from 1973 through 2004 (Figure 35).

At the end of 2004, the distribution of females with young, based on the most recent six years of observations in the ecosystem, was 18 out of 18 BMUs. Figure 26 displays the BMUs occupied by verified female grizzly bears with young for the entire recovery zone (also the PCA). Since 1997, all eighteen BMUs have been occupied by a female with young within a six-year span, thereby achieving this recovery requirement. This criterion is important as it ensures that females occupy the majority of the PCA and that successful reproductive females are not concentrated in one portion of the ecosystem.

At the end of 2004, the minimum population estimate was 431 bears, the running six-year average of total known and probable, human-caused grizzly bear mortality was 13.3, and the running-six-year average of known, human-caused female grizzly bear mortality was 6.0. (Haroldson and Frey 2005). The total mortality is under the mortality threshold set in the Recovery Plan, but the female mortality exceeds the mortality threshold set in the Recovery Plan (Figure 32). Beginning in 2000, the number of mortalities counted each year includes known and probable mortalities, but the mortality thresholds are set using only the minimum population estimate.

In response to court direction to reconsider population and mortality monitoring systems, the USFWS asked the IGBST in 2000 to evaluate the existing systems and to develop new population and mortality management protocols using the best available science. In 2005, the IGBST completed this process and the results were made available for public comment through a notice in the Federal Register (USDI FWS 2005a). Upon review of the public comments, the USFWS intends to append these new methods and mortality thresholds to the Recovery Plan in response to the court and in order to use the best available science. The new methodology will also be appended to the Conservation Strategy prior to the USFWS making its final determination on the Proposed Rule to delist the grizzly bear (USDI FWS 2005a). These new methods are a more comprehensive mortality management approach and are derived from a more accurate model for establishing sustainable mortality limits for grizzly bear populations. Applying the new methods to 1999 through 2004 data, mortality limits have not been exceeded for consecutive years for any bear class (Figure 33) (IGBST 2005).

Figure 32. The status of the Recovery Plan demographic (population) recovery parameters, 1999 through 2004¹.

Recovery Plan demographic (population) recover parameters	Recovery Plan target six-year average	Existing number six-year average
Maintain a minimum of 15 unduplicated females with COY over a six-year average both inside the PCA and within a 10-mile area immediately surrounding the PCA.	>15	40
Sixteen of 18 BMUs within the PCA must be occupied by females with young, including COY, yearlings, or two-year olds, as confirmed by the IGBST from a six-year sum of observations. No two adjacent BMUs may be unoccupied during the same six-year period.	>16	18
Human-caused mortality: The running six-year average of total known, human-caused mortality ² as confirmed by the IGBST is not to exceed 4 percent of the minimum population estimate ² . The running-six-year average of known, human-caused female grizzly bear mortality ³ is not to exceed 30 percent of the 4 percent total mortality limit over the most recent three-year period.	<17.2 <5.2	13.3 6.0

¹Data for this table came from Haroldson and Frey 2005 and the Interagency Conservation Strategy Team 2003.

²At the end of 2004, the minimum population estimate was 431 bears (Haroldson and Frey 2005).

³ Beginning in 2000, probable mortalities were included in the calculation of mortality thresholds and COY orphaned as a result of human causes will be designated as probably mortalities (Interagency Conservation Strategy Team 2003).

Figure 33. Annual mortality limit, allowable mortality based on a three-year running average, and estimated total mortality for independent females, independent males, and dependent young grizzly bears in the GYA, 1999 through 2004 (IGBST 2005)¹.

Year	Independent females			Independent males			Dependent young		
	Estimated 9% mortality limit	Allowable mortality (three-year average)	Estimated total mortality	Estimated 15% annual mortality limit	Allowable mortality (three-year average)	Estimated total mortality	Estimated 9% annual mortality limit	Allowable mortality (three-year average)	Reported human-caused losses
1999	14		2	15		11	11		2
2000	21		9	21		35	13		7
2001	19	18	10	20	18	11	15	13	6
2002	23	21	14	24	21	12	16	15	5
2003	19	20	14	19	21	12	15	15	3
2004	23	22	17	23	22	23	16	16	11

¹ This data came from Reassessing Methods to Estimate Population Size and Sustainable Mortality Limits for the Yellowstone Grizzly Bear (IGBST 2005). Pending review of public comments, this new methodology will replace the existing methodology in the Recovery Plan and the Conservation Strategy (USDI FWS 2005a). This method considers mortalities from all causes and includes estimates of unknown and unreported mortality. Mortality limits are calculated using total population estimates rather than the minimum population estimates that were originally used in the Recovery Plan and Conservation Strategy. The estimated total number of independent females, independent males, and dependent young at the end of 2004 was 257, 156, and 174 respectively. This equates to a total population estimate of 588 bears.

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Figure 34. Unduplicated females with cubs-of-the-year in the GYA (Haroldson 2005).

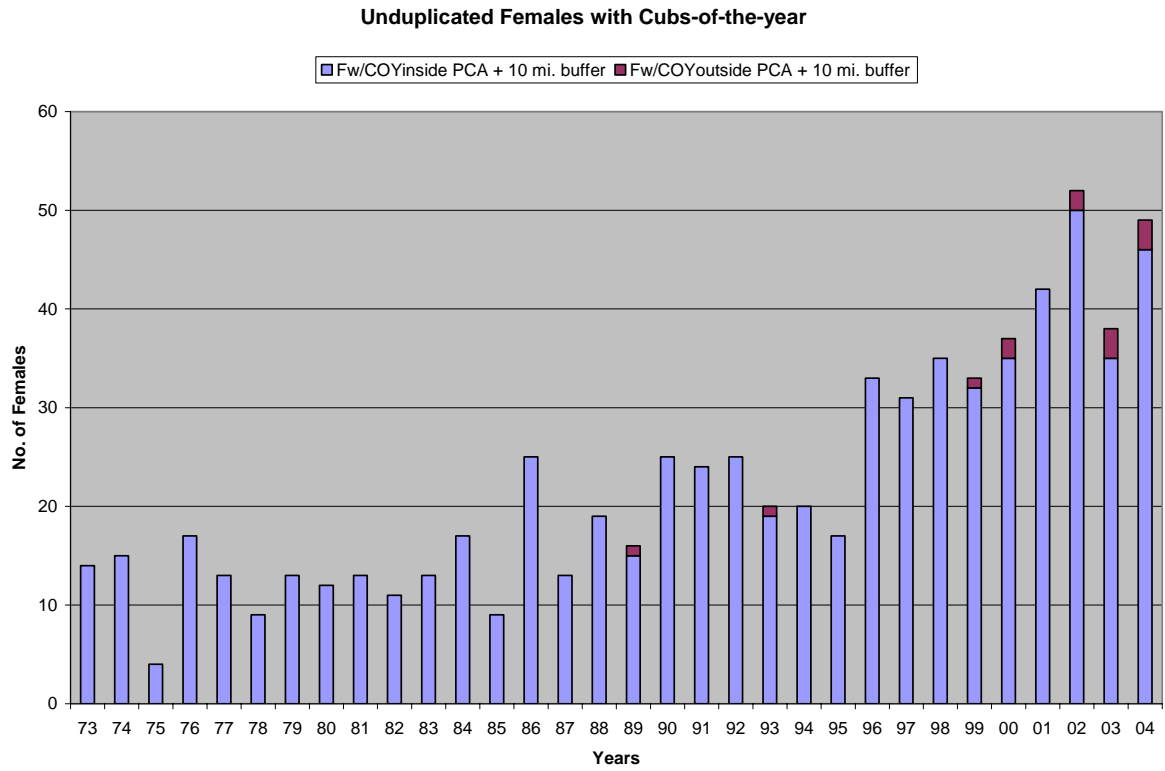


Figure 35. Distribution maps for female grizzly bears with cubs-of-the-year for three different time periods in the GYA (Schwartz et al. 2002 and 2005d).

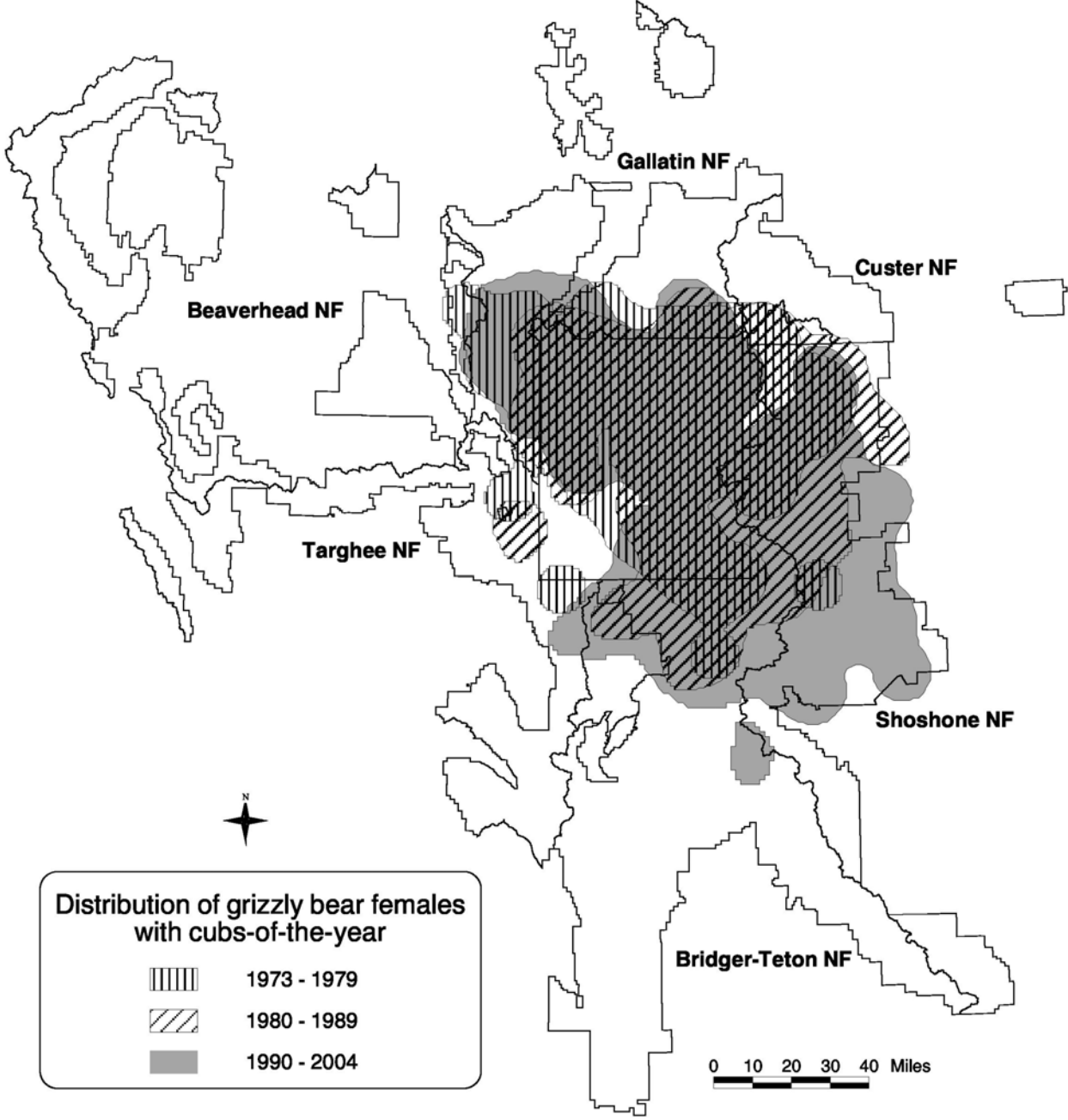


Figure 36. BMUs occupied by verified female grizzly bears with young within the PCA¹.

BMUs	Occupancy by year													Years occupied
	92	93	94	95	96	97	98	99	00	01	02	03	04	
Hilgard	x	x	x	x		x		x	x	x	x	x	x	11
Gallatin	x	x	x	x	x	x	x	x	x	x	x	x	x	13
Hellroaring/Bear		x				x		x	x	x	x	x		7
Boulder/Slough				x	x	x		x	x	x	x	x	x	9
Lamar	x	x	x	x	x	x	x	x	x	x	x	x	x	13
Crandall/Sunlight	x	x		x		x	x	x	x	x	x	x	x	11
Shoshone	x	x	x	x	x	x	x	x	x	x	x	x	x	13
Pelican/Clear	x	x	x	x	x	x	x	x	x	x	x	x	x	13
Washburn	x	x	x		x	x	x	x	x	x	x	x	x	12
Firehole/Hayden	x	x	x	x	x	x	x	x	x	x	x	x	x	13
Madison		x	x			x	x	x	x	x	x		x	9
Henry's Lake				x		x	x		x	x	x		x	7
Plateau			x					x	x	x	x	x	x	7
Two Ocean/Lake	x	x		x	x	x	x	x	x	x	x	x	x	12
Thorofare	x	x	x	x	x	x	x	x	x	x	x	x	x	13
South Absaroka	x	x	x	x	x	x	x	x	x	x	x	x	x	13
Buffalo/Spread Creek	x	x	x	x	x	x	x	x	x	x	x	x	x	13
Bechler/Teton	x	x			x	x	x	x	x	x	x	x	x	11
Number of BMUs occupied each year	13	15	12	13	12	17	14	17	18	18	18	16	17	--
Number of BMUs occupied at least once within a six-year span	--	--	--	--	--	18	18	18	18	18	18	18	18	--

¹Source of data: Annual Reports of the IGBST, 1997 - 2004

Grizzly Bear Population Research

Grizzly bear population trends in the GYA have been researched extensively. The following is a summary of research over the last decade pertaining to grizzly bear population trends in the GYA.

- Eberhardt et al. (1994): The trend of the Yellowstone grizzly bear (*Ursus arctos horribilis*) population was estimated using reproductive rates calculated from 22 individual females and survival rates from 400 female bear-years. The point estimate of the rate of increase was 4.6 percent, with 95 percent confidence limits of 0 and 9 percent. The major finding of the study was that the Yellowstone grizzly bear population appears to be increasing. Adult survival was the most important determinant of the rate of increase of the population, with reproductive rate the next most important factor and subadult survival somewhat less important than reproductive rate.
- Knight et al. (1995): Using annual totals of distinct family groups suggested an increasing trend. The slope of a log-linear regression ($R^2=0.41$) indicated a 3.9 percent annual increase.

Confidence limits (95 percent) obtained by bootstrapping were 2 to 6 percent. These results compared favorably with those of Eberhardt et al. (1994).

- Eberhardt and Knight (1996): The initial results of this study indicated a slow rate of decrease through 1980, roughly 2 percent per year (Knight and Eberhardt 1985). Current analyses (Eberhardt et al. 1994, Knight and Blanchard 1995; Knight et al. 1995) showed a positive annual rate of change (roughly 2 to 5 percent). The turning point appeared to occur in the mid 1980s, when the policy of preventing adult female mortalities whenever feasible began to be widely observed. A high adult female survival rate is essential to maintain large mammal populations having low reproductive rates.
- Pease and Mattson (1999) concluded that within the limits of uncertainty implied by the available data and methods of data analysis, the size of the Yellowstone grizzly bear population changed little from 1975 to 1995. The analysis used demographic data from 202 radio-telemetered bears followed between 1975 and 1992 and accounted for whitebark pine (*Pinus albicaulis*) crop failures during 1993 to 1995. The study calculated the population growth rate = 1.00 from 1975 to 1983 (four mast and five nonmast years) and 1.02 from 1984 to 1995 (seven mast and five nonmast years). Overall, the study found that population growth rate = 1.01 ± 0.04 (mean \pm 1 se) from 1975 to 1995.
- Eberhardt and Cherry (2000) reviewed Pease and Mattson (1999) and concluded that their analyses were questionable in various respects and their results regarding a lower population growth rate than reported by other authors were simply inconclusive. The authors stated that the real differences postulated by Pease and Mattson (1999) are not nearly as profound as claimed once the statistical uncertainties are acknowledged.
- Boyce et al.'s (2001) study provided a Monte Carlo technique, which confirmed that the Yellowstone ecosystem grizzly bear population increased during the period 1986 to 1998.
- Boyce et al. (2001) updated earlier research (Boyce 1995) and reported that the trend in the adjusted number of adult females with COY corroborates other data indicating that the GYE bear population increased during 1983 through 1997. Recent data provide optimistic projections of the likelihood of persistence for grizzly bears in the GYE—a 99.2 percent probability that the GYE grizzly bear population will persist for 100 years. Extending to a 500-year period, the study found that probability of persistence decreased to 96.1 percent. Hunters were the second greatest source of grizzly bear mortality in the GYE. Hunters shoot grizzly bears deliberately, in self-defense, or because they mistake grizzlies for black bears. Reducing hunter related mortalities could increase the probability of long-term persistence of grizzlies in the GYE. Count data, demographic analysis, and grizzly bear distribution all indicate that the GYE bear population increased during the past decade, probably because of cooperative efforts by state and federal agencies and the public to reduce conflicts between humans and bears. Managing to ensure capability of dispersal for bears among subpopulations through linkage zone management and/or by transplants can improve prospects for long-term viability of grizzly bear populations.
- Schwartz et al. (2002) reported that the Yellowstone grizzly bear has been expanding its range during the past two decades and now occupies historic habitats that had been vacant. The study used kernel estimators to develop distribution maps of occupied habitats based on initial sighting of unduplicated females (n=300) with cubs-of-the-year, information from radio marked bears (n=105), and locations of conflicts, confrontations, and mortalities (n=1,235). The distribution from 1990 to 2000 extends beyond the recovery zone identified in the Recovery Plan. Range expansion was particularly evident in the southern portion of the ecosystem in Wyoming. A comparison of results from the 1990s to previously published distribution maps show an approximate increase in occupied habitat of 48 percent and 34 percent from the 1970s and 1980s, respectively.
- Keating et al. (2002) reported that previous approaches underestimate the total number of females with COY, thereby underestimating population size and sustainable mortality. Estimated numbers of females with COY in the Yellowstone population ranged from 20

animals in 1987 and 1989 to 60 in 2000. The total number of unique females with COY actually observed ranged from 13 in 1987 to 42 in 2001. The number of unique females with COY detected through random sightings alone ranged from 12 in 1987 to 39 in 2001.

- Mattson and Merrill (2002) reported that with respect to current conservation, grizzly bears survived from 1920 to 1970 most often where ranges at the beginning of this period were either larger than 20,000 km² or larger than 7,000 km² but with a ratio of perimeter to area of <2. Without reductions in human lethality after 1970, there would have been no chance that core grizzly bear range would be as extensive as it is now. Although grizzly bear range in the Yellowstone region is currently the most robust of any to potential future increases in human lethality, bears in this region are threatened by the loss of whitebark pine.
- Pyare et al. (2004) reported that expansion in the southern end of the ecosystem was exponential and the area occupied by grizzly bears doubled approximately every 20 years. A complementary analysis of bear occurrence in Grand Teton National Park also suggests an unprecedented period of rapid expansion during the last 20 to 30 years. The grizzly bear population currently has reoccupied about 50 percent of the southern GYA. Based on assumptions of continued protection and ecological stasis, the model suggests total occupancy in 25 years.
- Schwartz et al. (2005a) reported that reproductive output, measured as cubs per litter, was most strongly influenced by indices of population size and whitebark pine cone production. Their data suggested a possible density-dependent response in reproductive output.
- Schwartz et al. (2005b) reported that survival was highest for cubs and yearlings living outside Yellowstone National Park but within the recovery zone. Cubs and yearlings living inside Yellowstone National Park had lower survival and those living outside the recovery zone had the lowest survival rates. Survival rates were negatively related to a population index, suggesting density-dependence. Survival improved with higher whitebark pine seed production, greater winter severity, larger litter size, and higher female (mother's) age.
- Haroldson et al. (2005) found that randomly sampled bears survived better than bears trapped in conflict situations, that females survived better than males, survival was lowest during autumn, and survival increased during years with good whitebark pine cone production. Bears with a higher proportion of annual locations outside the recovery zone exhibited poorer survival than individuals located more frequently inside Yellowstone National Park, the recovery zone, or both. Indices of winter severity, ungulate biomass, and population size, plus individual covariates including presence of dependent young, prior conflicts with humans, and age class were not important predictors of survival in their models. They also documented a trend of increased survival from 1983 through 2001 that was offset in recent years by lower survival of bears located more frequently outside the recovery zone. This result suggests that efforts to reduce female mortality initiated in 1983 by the IGBC were successful, and similar measures outside the recovery zone would improve the prospect for continued growth and expansion of the GYE grizzly bear population.
- Harris et al. (2005) estimated population trajectory from 1983 through 2002 to be between 1.04 and 1.07. For the chance of a population decline to be ≤5 percent under conditions occurring during from 1983 through 2002, annual mortality of independent females would have to be ≤10 percent.
- Schwartz et al. (2005c) demonstrated a source–sink dynamic in the GYA with bear survival high inside Yellowstone National Park and the recovery zone, but low outside the recovery zone, with most mortality outside the recovery zone on or near private lands. Changes in survival and reproduction among these three defined zones of residency were principally influenced by three factors: humans killing bears, changes in food abundance, and density dependent factors affecting reproduction and survival of dependent young.
- Schwartz et al. (2005d) provided an update of the distribution map developed in Schwartz et al. 2002 with data through 2004. The current distribution (1990 through 2004) extends beyond the distribution map generated with data from 1990 through 2000. Range expansion

is particularly evident in parts of the Targhee National Forest in Idaho, and north of Spanish Peak on the Gallatin National Forest in Montana. The distribution map is a reflection of areas occupied by grizzly bears in the GYE. It is not a reflection of bear density within this area. Although fully 38.6 percent of occupied habitat exists outside the recovery zone, this analysis suggests only 10 to 14 percent of the bears currently live in this area. As the population continues to grow within secure areas outside the recovery zone, one would expect these densities to increase and eventually approach those within the recovery zone.

In summary, current information indicates that this population of grizzly bears has increased between 4 and 7 percent annually (Harris et al. 2005). In addition, the grizzly bear has increased its distribution in the GYA by almost 50 percent since the 1970s; this expansion is expected to continue into suitable habitats. While there is some debate related to the actual level of population increase since the bear was listed in 1975, all of the current information (i.e., number of unduplicated females, distribution of reproducing females, distribution of bears, informal sightings by agency personnel, and areas where nuisance bears are being managed) indicates this population has increased in both numbers of bears and the geographic area they occupy (Interagency Conservation Strategy Team 2003). The geographic extent of the grizzly bear population from 1990 through 2004 is displayed in Figure 37 (Schwartz et al. 2005d).

3.3.4 Effects on Grizzly Bear Habitat

Effects on Secure Habitat

Research has shown that secure habitat (areas that are free of motorized access) is an important component of grizzly bear habitat (IGBC 1998). Secure habitat is defined as areas more than 10 acres in size and more than 500 meters from an open or gated motorized access route or recurring helicopter flight line¹⁹. All alternatives provide secure habitat for the grizzly bear both inside and outside the PCA. Alternative 4 provides the most secure habitat with no allowance for management activities that would decrease the secure habitat. Existing secure habitat in Alternatives 1, 2, 2-Modified, and 3 is at 88 percent, 88 percent, 88 percent, and 90 percent, respectively, of Alternative 4 amounts. Alternatives 1, 2, 2-Modified, and 3 would allow varying amounts of management activities within portions of the existing secure habitat that could temporarily or permanently decrease the amount of secure habitat.

Secure habitat is divided into long- and short-term secure habitat for this analysis based on management area category²⁰. A management area category describes the natural resource setting for an area of land and the types of management actions that are allowed to occur within the area of land. See section 3.2 for a definition of management area categories and section 3.1 for definitions of long and short term secure habitat.

Details on how long- and short-term secure habitat vary by alternative within the PCA and outside the PCA in the Alternative 4 area are described below. A summary of how long- and short-term secure habitat vary within the 10-mile area outside the PCA, and within habitat occupied by grizzly bears from 1990 through 2004, is also presented.

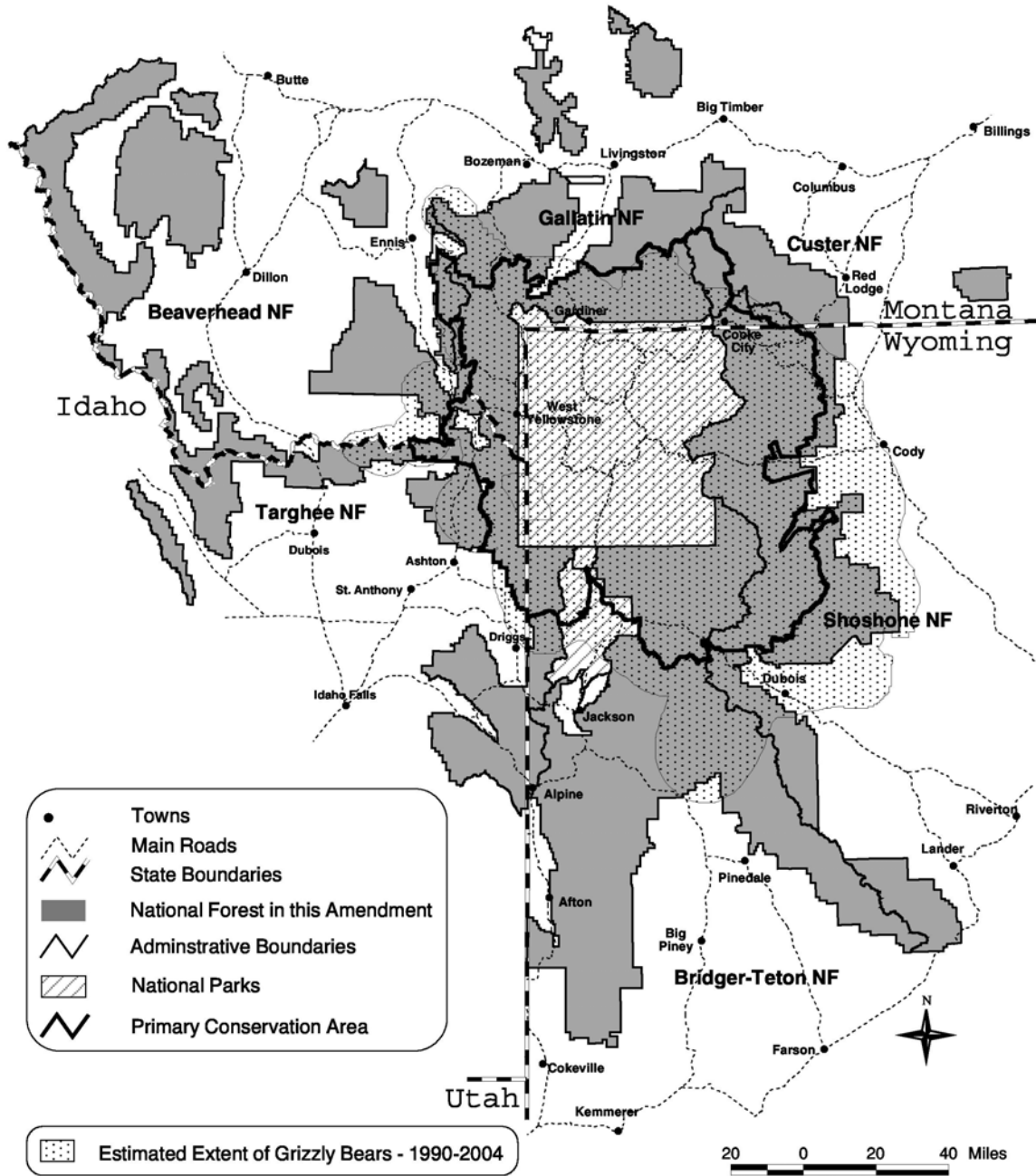
The area outside the PCA and outside the Alternative 4 area is not discussed because secure habitat is the same under all alternatives. Although this area may provide some habitat for grizzly bears, in general the current level of human activity and/or land uses are assumed to be incompatible with grizzly occupancy. This area in Wyoming is similar to the area where the Wyoming Game and Fish Department will discourage occupancy by grizzly bears under the state grizzly bear management plan.

¹⁹ Secure habitat in this FEIS did not include areas open to cross country off-highway vehicle (OHV) travel.

²⁰ The long-term secure habitat subject to the 1 percent rule under Alternatives 2 and 2-Modified inside the PCA is defined as short-term secure habitat under Alternative 1 as it is within Management Areas Categories 4, 5, 6, and 8 that allow for management activities. Under Alternatives 2 and 2-Modified, any secure habitat affected by the 1 percent rule would be restored after project completion and is considered long-term secure habitat for this analysis.

Grizzly Bears

Figure 37. The geographic extent of the grizzly bear population 1990 through 2004 (Schwartz et al. 2005d).



Within the PCA

There are 2,827,000 acres of secure habitat on National Forest System lands within the PCA (83 percent secure), with 87 percent considered long-term secure habitat (2,458,000 acres) and 13 percent allowing for management activities that may temporarily or permanently reduce the amount of secure habitat (369,000 acres).

Alternatives 2 and 2-Modified increase the amount of long-term secure habitat to 2,827,000 acres, but allow changes in the secure habitat according to the 1 percent rule as described in chapter 2. Under Alternatives 2 and 2-Modified, any secure habitat affected by the 1 percent rule would be restored after project completion (Figure 38). Even if all subunits had simultaneous projects on National Forest System lands inside the PCA, which is unlikely, only 29,500 acres of secure habitat could be temporarily affected at any one time (Figure 38). This means that 82 percent of the habitat on National Forest System lands inside the PCA would always be secure.

Alternatives 3 and 4 increase the amount of long-term secure habitat to 3,017,000 acres (88 percent secure) with no allowance for management activities that would change the amount or location of the secure habitat (Figure 38).

Following is a discussion of the effects of the alternatives by individual national forest. Appendix A displays information for each BMU subunit.

Beaverhead National Forest

Within the PCA, there would be no change in existing secure habitat with any of the alternatives. There is no motorized access to the Beaverhead National Forest portion of the PCA. Currently, 96 percent of the National Forest System land within the PCA is secure habitat (Figure 16). The vast majority of this area is designated wilderness, and the relatively small non-wilderness portion of the PCA was closed to motorized use year round by Amendment 10 of the Beaverhead Forest Plan. The amount of secure habitat in the Beaverhead National Forest portion of Hilgard BMU subunit 1 has not changed over the last 10 years.

Bridger-Teton National Forest

For Alternative 1, management area prescriptions in the Bridger-Teton's Forest Plan emphasize motorized use on approximately 7 percent of the PCA within the Forest. In Alternative 1, there are 19,000 acres of secure habitat (3 percent of the total secure habitat) within those areas that could allow motorized use (Figure 16). Motorized use is prohibited or discouraged on the remaining 93 percent of the PCA. Currently, 88 percent of the National System Land within the PCA is secure habitat (Figure 16). Therefore, the amount of secure habitat within the PCA could be reduced from 88 to 85 percent under the existing Forest Plan. The Bridger-Teton Forest Plan does not contain any Forest wide standard addressing open or total motorized access density or secure habitat areas. Access prescriptions and standards of individual management areas are variable, with some suggesting that motorized route density may exceed one mile per square mile of the management area. There is nothing in the Forest Plan that compels the creation of new motorized routes in excess of the conditions in 1998, or the reduction in the amount of secure habitat from 1998 levels. Over the last five years, the amount of secure habitat has remained unchanged.

For Alternatives 2 and 2-Modified, the existing secure habitat (637,000 acres, 88 percent of the National Forest System land within the PCA) (Figure 38) would be maintained, with the allowance of the 1 percent rule to accomplish various management objectives.

For Alternatives 3 and 4, secure habitat would be increased to 649,000 acres (90 percent of the National Forest System land within the PCA) to meet requirements of Standard 1. This secure habitat would be maintained, with no rules for variance or deviation (Figure 38).

Figure 38. Secure habitat acres (in thousands) on each GYA national forest within the PCA for each alternative¹.

National forest	Alternative 1		Alternatives 2 and 2-Modified			Alternative 3 ⁶	Alternative 4 ⁶
	Secure habitat long term ²	Secure habitat short term ³	Secure habitat long term	% of long-term secure habitat subject to the 1% rule ⁴	Maximum acres affected at one time under 1% rule ⁵	Secure habitat long term	Secure habitat long term
Beaverhead	66	0	66	0	0	66	66
Bridger-Teton	618	19	637	3.0%	-- ⁵	649	649
Custer	110	1	111	0.9%	-- ⁵	112	112
Gallatin	554	33	587	5.6%	-- ⁵	701	701
Shoshone	929	207	1,137	18.2%	-- ⁵	1,159	1,159
Targhee	181	109	290	37.6%	-- ⁵	332	332
Total acres	2,458	369	2,827	13.1%	29.5 ⁵	3,017	3,017
Total percent secure	83%		83%			88%	88%

¹ These acres do not include acres of lakes > 640 acres. Non-Forest Service inholdings are excluded except for the Bridger-Teton and Custer National Forests. See Figure 12.

² Long term = secure habitat acres within Management Area Categories 1, 2, and 3.

³ Short term = secure habitat acres within Management Area Categories 4, 5, 6, and 8.

⁴ The long-term secure habitat subject to the 1 percent rule was defined as short-term secure habitat under Alternative 1 as it is within Management Area Categories 4, 5, 6 and 8 that allow for management activities. Under these alternatives any secure habitat affected by the 1 percent rule would be restored after project completion.

⁵ One percent rule: a) large lakes were not included when calculating the 1 percent rule, b) acres are only those BMUs with National Forest System land included within the BMU. Because of overlap between national forests and national parks, it is not possible to display accurately the acres in the 1 percent rule for each national forest.

⁶ In Alternatives 3 and 4, all existing secure habitat would be maintained, motorized access routes within inventoried roadless areas would be closed, and secure habitat would be increased to 70 percent secure in all BMU subunits that are below 70 percent secure. (See appendix A for data on individual BMU subunits.)

Custer National Forest

For Alternative 1, most of the PCA (98.6 percent) is designated wilderness or a management category that emphasizes wildlife habitat protection and discourages permanent road construction. Currently, 97 percent of the National Forest System land within the PCA is secure habitat (Figure 16). Management Area E (1.4 percent of the PCA) emphasizes the exploration, development, and production of energy and mineral resources, but no activity has occurred. In Alternative 1, less than 1,000 acres of existing secure habitat (less than 1 percent of the total secure habitat) could allow motorized use. Secure habitat has remained the same over the last five to 10 years.

For Alternatives 2 and 2-Modified, the existing secure habitat (111,000 acres, 97 percent of the National Forest System land within the PCA) would be maintained, with the allowance of the 1 percent rule to accomplish various management objectives (Figure 38).

For Alternatives 3 and 4, secure habitat would be increased to 112,000 acres (97 percent of the National Forest System land within the PCA) to meet requirements of Standard 1. This secure habitat would be maintained, with no rules for variance or deviation.

Gallatin National Forest

Past actions have increased secure habitat. The Gallatin National Forest has closed or obliterated more than 100 miles of road within BMU subunits, which increased the amount of secure habitat. The road closures occurred mainly on the Hebgen Lake Ranger District in the Taylor Fork (Hilgard 1 and 2) and in the Madison 1 and 2 and Henrys Lake 2 BMU subunits. Currently, 73 percent of the National Forest System land within the PCA is secure habitat (Figure 16). In Alternative 1, 33,000 acres of existing secure habitat (5.6 percent of the total secure habitat) could allow motorized use (Figure 38).

For Alternatives 2 and 2-Modified, the existing secure habitat (587,000 acres, 73 percent of the National Forest System land within the PCA) would be maintained, with the allowance of the 1 percent rule to accomplish various management objectives.

For Alternatives 3 and 4, secure habitat would be increased to 701,000 acres (87 percent of the National Forest System land within the PCA) (Figure 38) to meet requirements of Standard 1. This secure habitat would be maintained, with no rules for variance or deviation.

Shoshone National Forest

The Shoshone's Forest Plan, as amended, has a standard for no net increase in roads. The activity levels associated with Plan objectives are relatively low. In practice, secure habitat is being maintained or increased. The amount of secure habitat has increased in Shoshone BMU subunits 3 and 4 due to recent road closures in the North Fork Shoshone River corridor. The amount of secure habitat has stayed the same in all other BMU subunits. Currently, 93 percent of the National Forest System land within the PCA is secure habitat (Figure 16).

In Alternative 1, the standard for no net increase in roads would result in stable amounts of secure habitat. The location of secure habitat could change over time when roads are constructed in some areas and closed in other areas to meet the standard of no net increase.

For Alternatives 2 and 2-Modified, the existing secure habitat (1,137,000 acres, 93 percent of the National Forest System land within the PCA) would be maintained, with the allowance of the 1 percent rule to accomplish various management objectives (Figure 38).

For Alternatives 3 and 4, secure habitat would be increased to 1,159,000 acres (95 percent of the National Forest System land within the PCA) to meet requirements of Standard 1. This secure habitat would be maintained, with no rules for variance or deviation.

Targhee National Forest

In Alternative 1, there are 290,000 acres of existing secure habitat, with 181,000 acres (62.3 percent) within management prescriptions that maintain the secure habitat long term (Figure 38). The remaining secure habitat (109,000 acres, or 37.7 percent) is within management prescriptions that allow project work and potential motorized access that could affect a portion of this secure habitat. Forest Plan standards for open motorized access route density (0.6 miles per square mile) and total motorized access route density (1.0 miles per square mile) limit the amount of secure habitat that could be affected. In addition, there are guidelines for maintaining large areas (no less than 7,000 acres in size) without project activities adjacent to the areas with project activities, which limits the amount of secure habitat that could be affected.

For Alternatives 2 and 2-Modified, the existing secure habitat (290,000 acres, 61 percent of the National Forest System land within the PCA) would be maintained, with the allowance of the 1 percent rule to accomplish various management objectives.

For Alternatives 3 and 4, secure habitat would be increased to 332,000 acres (70 percent of the National Forest System land within the PCA) to meet requirements of Standard 1. This secure habitat would be maintained, with no rules for variance for deviation.

Alternative 4 Area outside the PCA

There are 4,331,000 acres of secure habitat on National Forest System lands in the Alternative 4 area outside the PCA (72 percent secure), with 71 percent considered long-term secure and 29 percent allowing for management activities that may temporarily or permanently reduce the amount of secure habitat.

Alternatives 1, 2, 2-Modified, and 3 do not change existing management direction in forest plans outside the PCA in the Alternative 4 area; Alternatives 2, 2-Modified, and 3, which adopt the Conservation Strategy, would provide some additional guidance for management of grizzly bear habitat. The Conservation Strategy emphasizes the importance of continued coordination and cooperative working relationships among management agencies to continue application of best scientific principles and maintain effective actions to benefit the coexistence of grizzly bears and humans in the ecosystem. The Conservation Strategy also states, “The agencies are committed to be responsive to the needs of the grizzly bear by dynamic management actions based on the results of detailed annual population and habitat monitoring.” In addition, all activities in or out of secure habitat, under Alternatives 2, 2-Modified, and 3, would require a biological evaluation on the effects of those activities on grizzly bears, which would be designated a sensitive species. Land management activities would be managed so as not to contribute to a trend for listing or loss of viability for the grizzly bear. There must be no impacts to sensitive species without an analysis of the significance of adverse effects on the populations, their habitat, and on the viability of the species. Secure habitat would be a consideration in these evaluations. Under Alternative 1, all Forest Service activities that could affect secure habitat in areas occupied by grizzly bears in the best estimate of biologically suitable area would require a biological assessment and consultation with the USFWS as required by the ESA. Projects would continue under existing forest plan direction with mitigation likely the result of consultation. The 1986 Guidelines apply only inside the PCA.

Alternative 2-Modified provides additional guidance and monitoring for the Alternative 4 area outside the PCA not included with Alternatives 1, 2, or 3. The preferred alternative has a goal for outside the PCA that states, “Manage grizzly bear habitat within the PCA to sustain the recovered Yellowstone grizzly bear population. Outside the PCA in areas identified in state management plans as biologically suitable and socially acceptable for grizzly bear occupancy, accommodate grizzly bear populations to the extent that accommodation is compatible with the goals and objectives of other uses.” In addition, outside the PCA in areas identified in state management plans as biologically suitable and socially acceptable for grizzly bear occupancy, the Forest Service would monitor, and submit for inclusion in the IGBST Annual Report, changes in secure habitat outside the PCA by national forest every two years. Monitoring of secure habitat outside the PCA would be used along with all other required habitat and population monitoring to annually evaluate the status of the grizzly bear population and make necessary modifications in management as required by the Conservation Strategy. Accommodating grizzly bear populations in areas outside the PCA would require giving consideration to the secure habitat needs of grizzly bears in project planning and implementation.

Alternative 4 increases the amount of long-term secure habitat to 5,095,000 acres (85 percent secure), with no allowance for management activities that would change the amount or location of the secure habitat (Figure 39). The Conservation Strategy’s adaptive management process would also apply under this alternative.

Figure 39. Secure habitat acres (in thousands) on each GYA national forest in the Alternative 4 area outside the PCA for each alternative¹.

National forest	Alternative 1		Alternatives 2 and 2-Modified		Alternative 3		Alternative 4
	Secure habitat long term ²	Secure habitat short term ³	Secure habitat long term ²	Secure habitat short term ³	Secure habitat long term ²	Secure habitat short term ³	Secure habitat long term ⁴
Beaverhead	707	289	707	289	707	289	1,273
Bridger-Teton	844	142	844	142	844	142	1,129
Custer	250	57	250	57	250	57	314
Gallatin	474	145	474	145	474	145	660
Shoshone	478	375	478	375	478	375	949
Targhee	336	236	336	236	336	236	769
Total acres	3,089	1,242	3,089	1,242	3,089	1,242	5,095
Total percent secure	72%		72%		72%		85%

¹ These acres do not include acres of lakes > 640 acres. Non-Forest Service inholdings are excluded except for the Bridger-Teton and Custer National Forests.

² Long term = secure habitat acres within Management Area Categories 1, 2, and 3.

³ Short term = secure habitat acres within Management Area Categories 4, 5, 6, and 8.

⁴ In Alternative 4, all existing secure habitat would be maintained, motorized access routes within inventoried roadless areas would be closed, and secure habitat would be increased to 70 percent secure in all analysis units that are below 70 percent secure. (See appendix A for data on individual analysis units.)

Following is a discussion of the effects of the alternatives by individual national forest. Appendix A displays information for each analysis unit in the Alternative 4 area outside the PCA.

Beaverhead National Forest

There are 995,000 acres of secure habitat within the analysis area outside the PCA (64 percent of the National Forest System land within the analysis area). For Alternatives 1, 2, 2-Modified, and 3 there are 707,000 acres (71 percent) of existing secure habitat that are in management area prescriptions that provide for long-term security (Figure 18). There are 289,000 acres (29 percent) of existing secure habitat in management area prescriptions that may allow motorized access for management activities, and this would result in a decrease or change in location of the secure habitat.

For Alternative 4, all of the existing secure habitat (995,000 acres) would be maintained for long-term security. An additional 278,000 acres of new secure habitat would be added to existing secure habitat in eight analysis units to meet the requirements of Standard 1. To create this new secure habitat, a minimum of 278 miles of open motorized access would need to be closed—this would bring the total secure habitat to 1,273,000 acres (81 percent of the National Forest System land within the analysis area) (Figure 39).

Bridger-Teton National Forest

There are 985,000 acres of secure habitat within the analysis area outside the PCA (76 percent of the National Forest System land within the analysis area). For Alternatives 1, 2, 2-Modified, and 3 there are 844,000 acres (86 percent) of existing secure habitat that are in management area prescriptions that provide for long-term security (Figure 18). There are 142,000 acres (14 percent) of existing secure habitat in management area prescriptions that may allow motorized access for

Grizzly Bears

management activities, and this would result in a decrease or change in location of the secure habitat.

For Alternative 4, all of the existing secure habitat (985,000 acres) would be maintained for long-term security. An additional 144,000 acres of new secure habitat would be added to existing secure habitat in six analysis units to meet the requirements of Standard 1. To create this new secure habitat, a minimum of 299 miles of open motorized access would need to be closed, or some areas currently open to cross-country OHV use would need to be closed. This would bring the total secure habitat to 1,129,000 acres (87 percent of the National Forest System land within the analysis area) (Figure 39).

Custer National Forest

There are 307,000 acres of secure habitat within the analysis area outside the PCA (90 percent of the National Forest System land within the analysis area). For Alternatives 1, 2, 2-Modified, and 3 there are 250,000 acres (82 percent) of existing secure habitat that are in management area prescriptions that provide for long-term security (Figure 18). There are 57,000 acres (18 percent) of existing secure habitat in management area prescriptions that may allow motorized access for management activities, and this would result in a decrease or change in location of the secure habitat.

For Alternative 4, all of the existing secure habitat (307,000 acres) would be maintained for long-term security. An additional 7,500 acres of new secure habitat would be added to existing secure habitat in two analysis units to meet the requirements of Standard 1. To create this new secure habitat, a minimum of 10 miles of open motorized access would need to be closed. This would bring the total secure habitat to 314,000 acres (92 percent of the National Forest System land within the analysis area) (Figure 39).

Gallatin National Forest

There are 619,000 acres of secure habitat within the analysis area outside the PCA (79 percent of the National Forest System land within the analysis area). For Alternatives 1, 2, 2-Modified, and 3 there are 474,000 acres (77 percent) of existing secure habitat that are in management area prescriptions that provide for long-term security (Figure 18). There are 145,000 acres (23 percent) of existing secure habitat in management area prescriptions that may allow motorized access for management activities, and this would result in a decrease or change in location of the secure habitat.

For Alternative 4, all of the existing secure habitat (619,000 acres) would be maintained for long-term security. An additional 41,000 acres of new secure habitat would be added to existing secure habitat in six analysis units to meet the requirements of Standard 1. To create this new secure habitat, a minimum of 86 miles of open motorized access would need to be closed. This would bring the total secure habitat to 660,000 acres (84 percent of the National Forest System land within the analysis area) (Figure 39).

Shoshone National Forest

There are 852,000 acres of secure habitat within the analysis area outside the PCA (79 percent of the National Forest System land within the analysis area). For Alternatives 1, 2, 2-Modified, and 3, there are 478,000 acres (56 percent) of existing secure habitat that are in management area prescriptions that provide for long-term security (Figure 18). There are 375,000 acres (44 percent) of existing secure habitat in management area prescriptions that may allow motorized access for management activities, and this would result in a decrease or change in location of the secure habitat.

For Alternative 4, all of the existing secure habitat (852,000 acres) would be maintained for long-term security. An additional 97,000 acres of new secure habitat would be added to existing secure habitat in eight analysis units to meet the requirements of Standard 1. To create this new secure habitat, a minimum of 210 miles of open motorized access would need to be closed. This would

bring the total secure habitat to 949,000 acres (88 percent of the National Forest System land within the analysis area) (Figure 39).

Targhee National Forest

There are 572,000 acres of secure habitat within the analysis area outside the PCA (61 percent of the National Forest System land within the analysis area). For Alternatives 1, 2, 2-Modified, and 3 there are 336,000 acres (59 percent) of existing secure habitat that are in management area prescriptions that provide for long-term security (Figure 18). There are 236,000 acres (41 percent) of existing secure habitat in management area prescriptions that may allow motorized access for management activities, and this would result in a decrease or change in location of the secure habitat.

For Alternative 4, all of the existing secure habitat (572,000 acres) would be maintained for long-term security. An additional 197,000 acres of new secure habitat would be added to existing secure habitat in six analysis units to meet the requirement of Standard 1. To create this new secure habitat, a minimum of 564 miles of open motorized access would need to be closed, or some areas currently open to cross-country OHV use would need to be closed. This would bring the total secure habitat to 769,000 acres (82 percent of the National Forest System land within the analysis area) (Figure 39).

Other Areas outside the PCA

The following analyses for special areas outside the PCA are in response to comments on the DEIS. The Alternative 4 boundary encompasses 96 percent and 97 percent, respectively, of the occupied grizzly habitat outside the PCA and the 10-mile area outside the PCA. To simplify the analysis, it is assumed that secure habitat standards for Alternative 4 will be applied entirely to each area.

10-mile Area outside the PCA

There are 1,394,000 acres of secure habitat (71 percent of the National Forest System land) in the 10-mile area outside the PCA with 60 percent considered long-term secure and 40 percent allowing for management activities that may temporarily or permanently reduce the amount of secure habitat. Alternatives 1, 2, 2-Modified, and 3 do not change existing management direction in forest plans in this area, so there is no change in secure habitat among these alternatives. Alternative 4 increases the amount of long-term secure habitat to 1,564,000 acres (80 percent secure), with no allowance for management activities that would change the amount or location of the secure habitat (Figure 40).

Area Occupied by Grizzly Bears outside the PCA 1990 through 2004

There are 1,277,000 acres of secure habitat (65 percent of the National Forest System lands) outside the PCA in the area occupied by grizzly bears from 1990 through 2004 (Schwartz et al. 2005d), with 55 percent considered long-term secure and 45 percent allowing for management activities that may temporarily or permanently reduce the amount of secure habitat. Alternatives 1, 2, 2-Modified, and 3 do not change existing management direction in forest plans for this area, so there would be no change in secure habitat among these alternatives. Alternative 4 increases the amount of long-term secure habitat to 1,514,000 acres (77 percent secure), with no allowance for management activities that would change the amount or location of the secure habitat (Figure 39).

Figure 40. Secure habitat acres (in thousands) on each national forest in the 10-mile area outside the PCA for each alternative¹.

National forest	Alternative 1		Alternatives 2 and 2 -Modified		Alternative 3		Alternative 4
	Secure habitat long term ²	Secure habitat short term ³	Secure habitat long term ²	Secure habitat short term ³	Secure habitat long term ²	Secure habitat short term ³	Secure habitat long term ⁴
Beaverhead	69	20	69	20	69	20	106
Bridger-Teton	59	54	59	54	59	54	154
Custer	195	47	195	47	195	47	249
Gallatin	331	69	331	69	331	69	421
Shoshone	121	295	121	295	121	295	458
Targhee	56	78	56	78	56	78	176
Total acres	830	564	830	564	830	564	1,564
Total percent secure	71%		71%		71%		80%

¹ These acres do not include acres of lakes > 640 acres. Non-Forest Service inholdings are excluded except for the Bridger-Teton and Custer National Forests.

² Long term = secure habitat acres within Management Area Categories 1, 2, and 3.

³ Short term = secure habitat acres within Management Area Categories 4, 5, 6, and 8.

⁴ Under Alternative 4, all existing secure habitat inside the Alternative 4 boundary would be maintained, motorized access routes within inventoried roadless areas would be closed, and secure habitat would be increased to 70 percent secure in all analysis units that are below 70 percent secure. Actual acres are not available.

Figure 41. Secure habitat acres (in thousands) on each GYA national forest in areas occupied by grizzly bears outside the PCA from 1990 through 2004 (Schwartz et al. 2005d)¹.

National forest	Alternative 1		Alternative 2 and Alternative 2 - modified		Alternative 3		Alternative 4
	Secure habitat long term ²	Secure habitat short term ³	Secure habitat long term ²	Secure habitat short term ³	Secure habitat long term ²	Secure habitat short term ³	Secure habitat long term ⁴
Beaverhead	56	29	56	29	56	29	102
Bridger-Teton	233	110	233	110	233	110	457
Custer	9	0	9	0	9	0	9
Gallatin	140	30	140	30	140	30	180
Shoshone	200	335	200	335	200	335	586
Targhee	62	74	62	74	62	74	179
Total acres	699	578	699	578	699	578	1,514
Total percent secure	65%		65%		65%		77%

¹ These acres do not include acres of lakes > 640 acres. Non-Forest Service inholdings are excluded except for the Bridger-Teton and Custer National Forests.

² Long term = secure habitat acres within Management Area Categories 1, 2, and 3.

³ Short term = secure habitat acres within Management Area Categories 4, 5, 6, and 8.

⁴ Under Alternative 4, all existing secure habitat would be maintained, motorized access routes within inventoried roadless areas would be closed, and secure habitat would be increased to 70 percent secure in all analysis units that are below 70 percent secure. (See appendix A for data on individual analysis units.)

Summary of Effects on Secure Habitat for Alternatives 1, 2, 2 - Modified, and 3 in the Alternative 4 Area outside the PCA

The Alternative 4 area is considered to be the current best estimate of biologically suitable habitat outside the PCA. Existing evaluations of suitable habitat and linkage areas were used as the basis for delineation of this boundary (Mattson and Merrill 2002, Walker and Craighead 1997, Willcox and Ellenberger 2000). This area in Wyoming is similar to the area where grizzly bear populations outside the PCA would be managed to allow for population growth and eventually for a sustainable population under the Wyoming Grizzly Bear Management Plan. Designation of socially acceptable areas for Montana and Idaho will depend upon a dialogue with the public and focus on specific lands that grizzlies are occupying, as defined in the respective state plans. In general, this is the area most likely to be occupied as grizzly populations expand. This area encompasses 96 percent and 97 percent, respectively, of the occupied grizzly habitat outside the PCA and the 10-mile area outside the PCA

In the best estimate of biologically suitable area outside the PCA, 72 percent (4.3 million acres) of the almost six million acre area is secure habitat (Figure 18). Seventy-one percent of that secure habitat is long-term secure. The other 29 percent (1,242,000 acres) would be available for project activities. Under these alternatives, existing management area direction in the best estimate of biologically suitable area would be the same as how these areas have been managed for the last 17 years. Comments on the DEIS suggested more protection should be provided for secure habitat in areas occupied by grizzly bears outside the PCA and the effects of the alternatives on this area evaluated. Similar concerns were expressed regarding the area outside the PCA where female grizzly bears were counted in regards to meeting demographic parameters under the Recovery Plan. National Forest System lands provided approximately 1,300,000 acres of secure habitat (700,000 acres of long-term secure) in the area occupied by grizzly bears from 1990 through 2004 (Schwartz et al. 2002 and 2005d, Figure 22). Similarly, there are approximately 1,400,000 acres of secure habitat (over 800,000 acres of long-term secure) in the 10-mile area outside the PCA on National Forest System lands (Figure 20). The best estimate of biologically suitable area outside the PCA provides approximately three million acres more secure habitat and over two million acres more long-term secure habitat than that being used by bears outside the PCA from 1990 through 2004 and that within the 10-mile area outside the PCA. Generally, new motorized access routes will not be constructed in areas defined as long-term secure habitat. See section 3.1 for more complete definitions of long- and short-term secure habitat.

Comments were received on the DEIS that more secure habitat should be maintained to offset the potential decline of whitebark pine and the impact on the carrying capacity of the ecosystem for grizzly bears. The several million acres of secure habitat inside the biologically suitable area that is not yet occupied by grizzly bears could allow for range expansion to help maintain grizzly numbers if carrying capacity declines in other areas of the GYA

Most of the 1,242,000 acres of short-term secure habitat in the best estimate of biologically suitable area outside the PCA would likely remain. Some secure habitat may be lost, but past trends show a decline in road miles and an increase in secure habitat. In the past 17 years, over 1,400 miles of road have been decommissioned in the GYA national forests, with less than 400 miles of road being constructed, a net reduction of over 1,000 miles of road. In all areas outside the PCA the net reduction in miles of road has contributed almost 3 percent to the current level of secure habitat (Figure 24). Similarly, the average acres treated per year by timber harvest outside the PCA have been on a downward trend (Figure 50). Road construction and associated timber harvest have been limited in recent years in part due to the roadless policies in place from 2000 through 2005. Under current policies, an EIS is required to build roads inside inventoried roadless areas.

Approximately 30 percent of the short-term secure habitat in the biologically suitable habitat outside the PCA is on the Shoshone National Forest (375,000 acres). The Shoshone's Forest Plan

has a standard for no net increase in road miles. While the standard does not say where a road must be closed to compensate for any new roads constructed, it is likely that any road built in the biologically suitable habitat will be mitigated within this area and the amount of secure habitat maintained. Only the very southern tip of the Shoshone is estimated to be biologically unsuitable. The Targhee National Forest has road and motorized trail density standards for all areas outside the PCA (236,000 acres of short-term secure habitat in the best estimate of biologically suitable habitat area). All but about 1,500 acres of the 141,000 acres of short-term secure habitat in the best estimate of biologically suitable area on the Bridger-Teton National Forest has road density standards. These standards will allow only small changes in existing motorized access route density and associated secure habitat. The Gallatin National Forest is currently developing a travel management plan that is targeted for completion in 2006. The preferred alternative in the Gallatin's DEIS includes a Forestwide standard for no increase in public motorized access routes. A Forestwide guideline in the Gallatin's DEIS for the preferred alternative states: "Temporary roads constructed for project activity or other administrative purposes should be gated and public motorized use restricted. Once the activity is complete, these roads should be permanently and effectively closed and revegetated." The May 2005 draft of the revised forest plan for the Beaverhead-Deerlodge National Forest (USDA Forest Service 2005b) includes an objective to "Manage for 60% or greater secure areas in the Gravelly Landscape" which is within the best estimate of biologically suitable area on the Beaverhead National Forest (Figure 14). The Custer Forest Plan does not have specific road density direction; there are only 57,000 acres of short-term secure habitat within the biologically suitable area.

Approximately 37 percent of the short-term secure habitat is open to leasing for oil and gas where surface occupancy is allowed. Much of this area has a very low to moderate potential for oil and gas occurrence. There are only eight active leases on approximately 7,000 acres in the Alternative 4 area outside the PCA (section 3.12.2 and Figure 93).

Effects on Denning Habitat

Within the PCA, there are over two million acres of grizzly bear denning habitat (Figure 43). Outside the PCA, in the area defined by Alternative 4, there are also over two million acres of grizzly bear denning habitat (Figure 44). Distribution of grizzly bear denning habitat on the six national forests is displayed in Figure 42.

Within the PCA, 68 percent of the grizzly bear denning habitat would be closed to snow machine use in Alternatives 1, 2, and 2-Modified. In Alternatives 3 and 4, 100 percent of the grizzly bear denning habitat would be closed to snow machine use (Figure 43).

Outside the PCA in the area defined by Alternative 4, 35 percent of the grizzly bear denning habitat would be closed to snow machine use in Alternatives 1, 2, and 3. In Alternative 4, 100 percent of the grizzly bear denning habitat would be closed to snow machine use (Figure 44).

A 2002 Biological Opinion from the USFWS requires all forests in the GYA, except the Caribou-Targhee, to monitor winter snowmobile use around grizzly bear denning sites and to confer with the USFWS and IGBST regarding any necessary mitigation (USDI FWS 2002). A guideline in Alternatives 2 and 2-Modified states that localized restrictions would be used to address conflicts with winter use activities inside the PCA. The current information on effects of snow machining on grizzly bears as outlined in section 3.3.2 shows that the disturbance/incidental take effects on grizzly bears would be low in Alternatives 1, 2, 2-Modified, and 3, and potentially nonexistent in Alternative 4 (if all snow machine use could be effectively stopped). There have been no documented conflicts or mortalities associated with denning grizzly bears that can be linked to snow machine activity (USDA Forest Service 2001a).

Figure 42. Grizzly bear denning habitat (Podruzny et al. 2002).

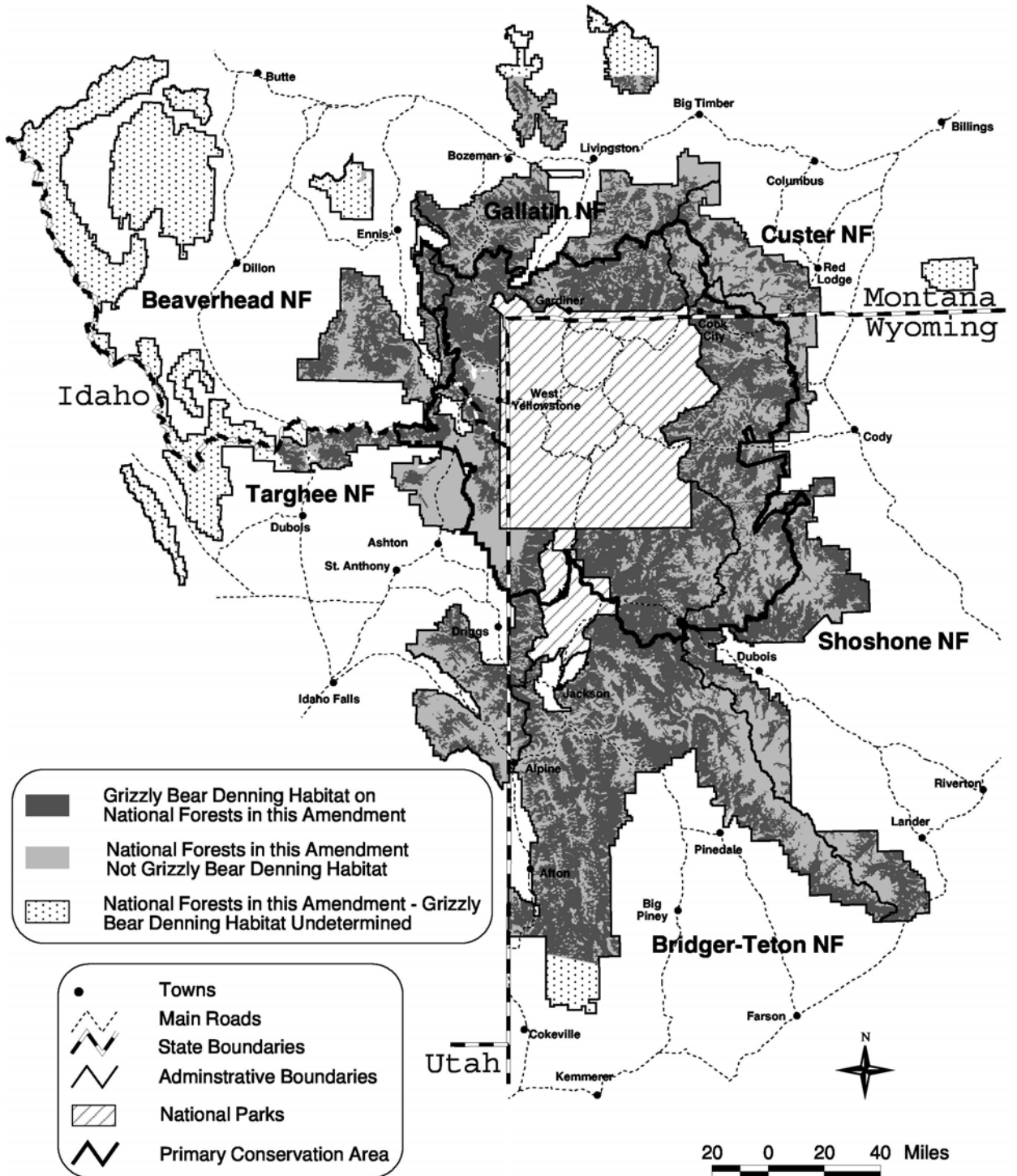


Figure 43. Grizzly bear denning habitat¹, in thousands of acres, closed to snow machine use within the PCA.

National forest	Acres of denning habitat	Alternative 1 acres (%) closed to snow machine use	Alternatives 2 and 2-Modified acres (%) closed to snow machine use	Alternative 3 acres (%) closed to snow machine use	Alternative 4 acres (%) closed to snow machine use
Beaverhead	51	49 (96%) ²	49 (96%)	51 (100%)	51 (100%)
Bridger-Teton	560	467 (83%) ²	467 (83%)	560 (100%)	560 (100%)
Custer	35	28 (80%) ²	28 (80%)	35 (100%)	35 (100%)
Gallatin	644	369 (57%) ²	369 (57%)	644 (100%)	644 (100%)
Shoshone	731	567 (78%) ²	567 (78%)	731 (100%)	731 (100%)
Targhee	220	49 (22%) ³	49 (22%) ²	220 (100%)	220 (100%)
Total acres	2,241	1,529 (68%)	1,529 (68%)	2,241 (100%)	2,241 (100%)

¹ Podruzny et al. 2002

² These forests are required to confer with the USFWS when there is a known den site to evaluate if snow machine use needs to be curtailed in the immediate denning area.

³ For Alternatives 1, 2 and 2-Modified the 1997 Revised Forest Plan has a standard to curtail snow machine use in areas with documented conflicts with denning grizzly bears.

Figure 44. Grizzly bear denning habitat¹, in thousands of acres, closed to snow machine use outside the PCA for the area defined by Alternative 4.

National forest	Acres of denning habitat	Alternative 1 acres (%) closed to snow machine use	Alternatives 2 and 2-Modified acres (%) closed to snow machine use	Alternative 3 acres (%) closed to snow machine use	Alternative 4 acres (%) closed to snow machine use
Beaverhead	283	41 (14%)	41 (14%)	41 (14%)	283 (100%)
Bridger-Teton	698	335 (48%)	335 (48%)	335 (48%)	698 (100%)
Custer	117	50 (43%)	50 (43%)	50 (43%)	117 (100%)
Gallatin	450	184 (41%)	184 (41%)	184 (41%)	450 (100%)
Shoshone	510	178 (35%)	178 (35%)	178 (35%)	510 (100%)
Targhee	358	58 (16%)	58 (16%)	58 (16%)	358 (100%)
Total acres	2,416	846 (35%)	846 (35%)	846 (35%)	2,416 (100%)

¹ Podruzny et al. 2002

3.3.5 Effects on Grizzly Bear/Human Interactions

Effects on Grizzly Bear/ Human Conflicts and Displacement Associated with Developed Sites

Developed sites in grizzly bear habitat increase the potential for conflict with humans primarily due to the potential availability of human foods. Developments also reduce the effectiveness of the natural habitat near these sites. Dominant bears sometimes displace subordinate bears into less desirable habitat, resulting in increased conflicts compared to bears using habitats further away from developed sites. The larger the developed site and the more people using the site, the greater the potential for conflicts and reduction in the effectiveness of the adjacent habitat for bears (Mattson et al. 1987).

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Inside the PCA

There are 371 developed sites on the six national forests inside the PCA (appendix A). Forest Service food storage regulations minimize the potential for grizzly bear/human conflicts independent of the alternatives. Minerals development under the 1872 General Mining Law would be permitted and mitigated as possible.

Alternative 1. Conflicts with grizzly bears and people would likely continue at existing levels in association with the current number of developed sites. Changes in the number and capacity of developed sites would be managed under the Guidelines and increases minimized in MS 1. In most cases, increases in capacity and number of sites could occur in MS 2 and 3. Oil and gas development could occur on lands open to surface occupancy in MS 2 and 3 and phosphate leases on the Targhee National Forest could be developed; mitigation would be guided by the Guidelines. Grizzly bear/human conflicts would increase and the effectiveness of habitats adjacent to these sites would be reduced.

Alternatives 2 and 2-Modified. Increases in capacity and the number of developed sites would not be allowed unless it were determined that there were no impacts to grizzly bears or the impacts could be mitigated effectively within the same BMU subunit. Conflicts at developed sites would likely remain at current levels or decrease, and the acreage of impacted habitat would decrease or remain at 1998 levels. The few existing inactive oil and gas leases on the Gallatin National Forest and the phosphate leases on the Targhee National Forest would be honored. Impacts would be mitigated where possible according to the Application Rules for Standard 2, but increases in conflicts and displacement of grizzly bears would occur if those leases were developed.

Alternatives 3 and 4. No increases in the number and capacity of developed sites would be allowed. Sites with recurring conflicts would be eliminated and there would be no new oil and gas leases. Grizzly bear/human conflicts would be reduced over current levels if developed sites with recurring conflicts were removed and associated habitat restored. The potential for any increase in conflicts and displacement of grizzly bears would be minimized, as no increases in capacity or number of sites would be allowed. Effects from the existing oil and gas leases on the Gallatin National Forest and the phosphate leases on the Targhee National Forest are the same as Alternatives 2 and 2-Modified.

Alternative 4 Area outside the PCA

There are 598 developed sites on the six national forests in the area identified for Alternative 4 outside the PCA (appendix A). Existing Forest Service food storage regulations outside the PCA would continue to minimize the potential for grizzly bear/human conflicts independent of the alternatives. Minerals development under the 1872 General Mining Law would be permitted and mitigated as possible.

Alternatives 1, 2, 2-Modified, and 3. The number and capacity of developed sites would be subject to management direction in existing forest plans. Recreation use and associated demand for developed sites is expected to increase (section 3.9.3) and there are eight active oil and gas leases in the Alternative 4 area outside the PCA (Figure 93) with the potential for additional leases. The highest potential for occurrence of oil and gas in the six GYA national forests is mostly outside the Alternative 4 area on the Bridger-Teton and Custer National Forests (section 3.12.2). Consultation with the USFWS would be required under Alternative 1 for projects that may affect the grizzly bear. A biological evaluation would be required under the other alternatives for projects that may affect the grizzly bear as a regional sensitive species. The number and capacity of developed sites would likely increase outside the PCA under Alternatives 1, 2, 2-Modified, and 3. Grizzly bear/human conflicts would increase outside the PCA as bears expand their range even with the existing level of developed sites. An increase in number and capacity of developed sites would further increase the potential for conflicts and displacement.

Alternative 4. There would be no new developed sites or increases in capacity of existing sites in the area identified for Alternative 4 outside the PCA. New oil and gas leases would not be

allowed. Existing leases would be honored and mitigated as possible according to the Application Rules for Standard 2. Food storage orders would be extended to include all of the six national forests. The potential for grizzly bear/human conflicts and displacement would be reduced over that identified for Alternatives 1, 2, 2-Modified, and 3. Outside the Alternative 4 areas, conflicts and displacement would increase with increases in the number and capacity of developed sites in areas occupied by bears. Food storage orders in these areas would help minimize conflicts.

Effects on Grizzly Bear/Livestock Conflicts

Inside the PCA

In 2003, there were 70 active cattle allotments and seven active sheep allotments (Figure 59) inside the PCA. Seventeen cattle allotments active in 2003 had documented grizzly bear conflicts between 1992 and 2003 and two sheep allotments active in 2003 had documented grizzly bear conflicts. Several additional sheep allotments that experienced conflicts during this period have been closed. Four cattle allotments active in 2003 have experienced recurring conflicts (Figure 62). One of these cattle allotments with recurring conflicts was closed after the 2003 grazing season. Recurring conflicts for this analysis are defined as three or more years of recorded conflicts during the most recent five-year period.

Alternative 1. The two remaining sheep allotments on the Targhee National Forest would be phased out. (Three of the five active sheep allotments in 2003 were closed in early 2004.) The two sheep allotments in MS 1 on the Gallatin National Forest active in 2003 are proposed for closure in 2006. Conflicts with bears and sheep could occur on the two remaining allotments on the Targhee National Forest before they are phased out.

Grizzly bear conflicts with cattle would be managed under the Guidelines. Cattle allotments in MS 1 would be closed if conflicts could not be resolved. Cattle allotments in MS 2 would remain; conflicts with cattle are anticipated to occur.

Sheep and cattle allotments could be created inside the PCA and numbers of sheep could increase, particularly in MS 2. This is highly unlikely, based on past trends; Alternative 1 does not preclude these actions. Increased numbers of livestock would increase the potential for conflicts. The past management of grizzly bear livestock conflicts under the Guidelines has not precluded achieving recovery of the grizzly bear.

Alternative 2. Sheep AMs would remain at or below 1998 levels inside the PCA. The last two sheep allotments inside the PCA on the Targhee National Forest would be phased out as opportunities arise with willing permittees. Conflicts with grizzly bears and sheep could continue until all sheep allotments were closed. No new allotments would be created in the PCA and numbers of cattle would likely remain close to 1998 levels in existing allotments. Conflicts with cattle would likely continue at current levels, and any potential for increase in conflicts would not be a result of new allotments. Cattle numbers could increase in existing allotments, although any increases would likely be minor. Restocking of vacant cattle allotments inside the PCA would result in an increase in cattle numbers. Any such restocking would require an evaluation of impacts to grizzly bears and the potential for an increase in conflicts. Similar to Alternative 1, the past level of conflicts and grizzly bear mortalities has not precluded achieving recovery of the grizzly bear and, in addition, sheep conflicts would eventually be eliminated.

Alternative 2-Modified. The effects are similar to Alternative 2 except the numbers of cattle-associated conflicts would likely decline as cattle allotments with recurring conflicts that could not be resolved through modification of grazing practices were retired with willing permittees.

Alternatives 3 and 4. Conflicts with grizzly bears and livestock are expected to continue in the PCA, but would eventually be reduced below existing levels. All sheep allotments would be closed within three years and those portions of cattle allotments with recurring conflicts would be closed. Only those allotments that do not experience recurring conflicts would remain.

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Outside the PCA

Outside the PCA, within the area defined by Alternative 4, there are currently 280 active cattle allotments and 73 active sheep allotments (Figure 60). During the years 1992 through 2003, there were 11 cattle allotments (4 percent of the active allotments) and six sheep allotments (8 percent of the active allotments) with documented grizzly bear conflicts. Two cattle allotments on the Bridger-Teton National Forest have experienced recurring conflicts (Figure 62). Recurring conflicts for this analysis are defined as three or more years of recorded conflicts during the most recent five-year period.

Alternatives 1, 2, and 3. The existing sheep allotments would be maintained. Grizzly bear conflicts are expected on the six sheep allotments that have had previous conflicts, and are anticipated on the other sheep allotments if the grizzly bear population expands into these areas. Grizzly bear conflicts are also expected on the 11 cattle allotments outside the PCA that have had previous conflicts, and are anticipated on some but not all of the other cattle allotments if the grizzly bear population expands into these areas. Both cattle and sheep conflicts would be handled under state nuisance grizzly bear guidelines. These nuisance grizzly bear guidelines allow a variety of management actions, depending on site-specific conditions and situations. Conflicts would likely increase under all three alternatives outside the PCA as bears continue to expand their range. Consultation with the USFWS would be required under Alternative 1.

Alternative 2- Modified. Similar to Alternatives 1, 2, and 3, grizzly bear conflicts are expected on sheep and cattle allotments with previous conflicts, and conflicts are anticipated on other sheep allotments and some but not all of the other cattle allotments in areas of grizzly bear expansion. Both cattle and sheep conflicts would be handled under state nuisance grizzly bear guidelines. Initially, conflicts would likely increase outside the PCA as bears continue to expand their range. Under this alternative, sheep and cattle allotments with recurring conflicts that could not be resolved through modification of grazing practices would be retired as opportunities arise with willing permittees. As allotments with recurring conflicts are retired and as grizzly bear expansion stabilizes, conflicts would decrease.

Alternative 4. All existing sheep allotments would be closed within three years, and conflicts with grizzly bears and sheep would eventually be eliminated within the Alternative 4 boundary. Those portions of cattle allotments with recurring grizzly bear conflicts would be closed. Conflicts between grizzly bears and livestock would be minimal, as only those portions of cattle allotments that do not experience recurring conflicts would remain. Both cattle and sheep conflicts would be handled under state nuisance grizzly bear guidelines.

As bears effectively occupy more of the area defined by Alternative 4, conflicts with sheep and cattle outside of the Alternative 4 boundary would likely increase.

3.3.6 Effects on the Grizzly Bear Population

Effects Common to All Alternatives

All alternatives provide some level of protection to grizzly bear habitat; the quantity and quality of available habitat are only two of the factors that influence total population numbers.

Controlling human-caused mortality has been key to increases in bear numbers over the last 25 years. Human-caused mortality, coupled with the amount of effective habitat, would be the ultimate limiting factors for the grizzly bear population in the GYA.

Coordinated management of nuisance bears, food storage orders, information and education efforts, and the availability of Forest Service facilities to store food unavailable to bears would minimize conflicts and grizzly bear mortalities under all alternatives.

Numbers inside the PCA would likely remain stable, as it appears most habitats inside the PCA are at carrying capacity and bears would likely increase occupation and use of habitats outside the PCA under all alternatives. Recreational use of National Forest System lands is expected to

increase over the next decade as the human population in the counties in the GYA continues to grow (Figure 105).

Grizzly bear/human conflicts and human-caused mortalities would likely increase with increased contact between bears and humans on the six national forests. Many of the grizzly bear/human conflicts occur on private lands in the GYA, where the Forest Service has no authority to require food storage (Figure 31).

Weather conditions play a key role in the yearly availability of foods for bears, which in turn affects female fecundity (fertility) and cub survival (Schwartz et al. 2005a). In poor food years, bears often seek non-traditional foods and end up in conflicts with humans, increasing the risk of mortality. Regardless of the amount of habitat protection, weather conditions would still influence the basic productivity of the land and the foods available to bears and ultimately the carrying capacity of the landscape for grizzly bears.

Future minerals development could impact grizzly bears but would be minimized by mitigation efforts (section 3.12).

Effects of Alternative 1 on the Grizzly Bear Population

The grizzly bear population has increased in numbers and expanded its range with the current habitat protections under Alternative 1. Project level direction contained in the Guidelines emphasizes minimizing grizzly bear/human conflicts and disturbance to grizzly bears during project activities. This direction would continue to minimize conflicts and mortalities associated with land management activities inside the PCA. Current management area designations identify about 2.5 million acres as long-term secure habitat inside the PCA (Figure 38); current standards for habitat management on the remaining acres provide no specific direction for maintaining secure habitat. Activities requiring new roads, such as timber sales or oil and gas development, could occur, particularly in MS 2 and 3, without mitigating for any permanent loss of secure habitat. Though unlikely, incremental loss of secure habitat could occur over time to a point where less security could affect bear numbers. Additionally, connectivity options could be reduced, impacting the ability of bears to move effectively between key habitats in the PCA.

The number and capacity of developed sites inside the PCA could increase under Alternative 1. Consultation with the USFWS would continue and mitigation would result. The Guidelines provide direction on management of developed sites inside the PCA. New developed sites would be permitted if proposed, especially in MS 2, and the potential for grizzly bear/human conflicts, displacement, and mortalities associated with developed sites could increase over time.

Conflicts with existing sheep allotments could result in grizzly bear mortalities before existing allotments on the Targhee National Forest are phased out. Two sheep allotments on the Gallatin National Forest are proposed for closure in 2006 under a process separate from the guidance in this FEIS. The potential for increased numbers of livestock, especially sheep, even though unlikely, would increase grizzly bear/livestock conflicts and associated mortality. The past management of grizzly bear/livestock conflicts under the Guidelines has not precluded achieving recovery of the grizzly bear.

Alternative 1 provides no specific direction for grizzly bear habitat management outside the PCA, though Management Area Categories 1, 2, and 3 areas provide about 3.1 million acres of secure habitat outside the PCA (Figure 39). These management area designations would continue. Consultation with the USFWS is required for all land management activities outside the PCA that may affect the grizzly bear. This situation outside the PCA should allow bears to continue to occupy existing habitat and to expand into new suitable areas not currently occupied. Even with consultation, existing road densities, land management activities, and proximity to private land developments would preclude some areas from being effectively occupied by grizzly bears.

Total human-caused bear mortality has been within identified limits since at least 1998, but the female mortality exceeds the mortality threshold set in the Recovery Plan. Applying a new, more comprehensive mortality management approach to 1999 to 2004 data, the new mortality limits

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have not been exceeded for consecutive years for any bear class (section 3.1.3). Bear numbers are estimated to have increased between 4 and 7 percent per year (Harris et al. 2005).

Monitoring of grizzly bear population parameters and the abundance of the four major foods would continue under the auspices of the YES and the IGBST. Monitoring of grizzly bear habitats under current forest plans would continue. Results from these efforts would provide managers with the base information needed to evaluate the status of the habitat and the grizzly bear population and the need for changes in management direction. As habitat monitoring requirements differ among forests, the full picture on the status of the habitat for grizzly bears in the GYA may not be obvious. Coordinated, consistent monitoring efforts identified for the action alternatives may be more effective in evaluating the habitat conditions for the grizzly bear on a larger scale.

Effects of Alternative 2 on the Grizzly Bear Population

Long-term maintenance of secure habitat, developed sites, and numbers of livestock allotments at 1998 levels inside the PCA would likely allow bear numbers to continue to increase at current rates and allow bears to occupy new habitats outside the PCA. Numbers inside the PCA would likely remain stable, as it appears most habitats inside the PCA are at carrying capacity.

Phasing out the remaining sheep allotments inside the PCA would eliminate conflicts with bears and sheep and the associated mortality risk. Cattle conflicts could increase slightly if vacant cattle allotments were restocked and without the Guidelines that favor the bear over cattle in MS 1. The nuisance grizzly bear standards inside the PCA would require that all livestock-depredating bears would be relocated at least once. Removal of nuisance female grizzly bears would be minimized. Only two cattle allotments with recurring conflicts remain in MS 1 (Figure 62). Livestock-related grizzly bear mortalities account for only 10 percent of the known human-caused grizzly bear mortalities since 1975 (Figure 28).

While this alternative would allow a temporary 1 percent deviation in secure habitat within the PCA, this level of secure habitat modification is consistent with land management practices over the last decade, which resulted in an increase in bear numbers. Population numbers would more likely be limited by human-caused mortality and the carrying capacity of the habitat, rather than temporary displacement from habitat due to the 1 percent rule inside the PCA.

Project-level direction in the Guidelines would no longer apply. In many cases, management activities could occur without regard to seasonal timing restrictions, project duration limits, and other site-specific standards for grizzly bears. Site-specific measures would still be considered and applied as necessary during the NEPA process for the grizzly bear as a sensitive species, but individual projects could have a greater potential for displacing bears from important seasonal habitats than under Alternative 1. Under Alternative 2, projects would be limited in size and only one project could occur at a time in a subunit. Most of the subunit would remain secure, providing refuge from ongoing projects. Large projects requiring extensive roading and/or site development would not occur under the 1 percent rule unless additional roads were closed for mitigation, whereas under Alternative 1 they would be allowed in most MS 2 and 3 areas.

Alternative 2 would preclude any permanent large-scale changes to the existing level of secure habitat and developed sites and would be more effective in providing long-term protections to the habitat and the grizzly bear population than Alternative 1. Connectivity between key habitats in the PCA is more likely to be maintained with Alternative 2 than Alternative 1.

Outside the PCA, the effects are similar to Alternative 1 with the exception that consultation with USFWS would not occur with the grizzly bear delisted. The grizzly bear would be designated a Forest Service sensitive species throughout its range in the GYA. Land management activities would be managed so as not to contribute to a trend for listing or loss of viability for the grizzly bear. There must be no impacts to sensitive species without an analysis of the significance of adverse effects on the populations and habitat of the species. The Forest Service would cooperate with state wildlife management agencies in attaining population goals for grizzly bears. Existing

long-term secure habitat would remain and much of the short-term secure habitat would also remain, but existing road densities and land management activities would preclude some areas from being effectively occupied by grizzly bears.

The Conservation Strategy, which would apply when the bear is delisted, sets a GYA-wide mortality limit based on the total population estimate. The level of mortality, managed by the state wildlife management agencies and the NPS, is expected to facilitate population increase and expansion. Allowable mortality would likely be increased when bears occupy all the areas where the states have agreed to manage for grizzly bears. Hunting would likely be used as a tool by the state wildlife management agencies to keep bears at desired population levels.

Each forest would monitor adherence to the secure habitat, developed site, and livestock standards. Habitat effectiveness would be monitored collectively on a regular basis to track any changes to the habitat from fire, insects and disease, and human activities not measured by the habitat standard monitoring efforts. Results of habitat monitoring along with the demographic and foods monitoring required under the Conservation Strategy would be reviewed annually by the YGCC. The Conservation Strategy requires a management review if population or habitat standards are not met. This coordinated approach would better ensure that potential threats to the grizzly bear or its habitat were evaluated quickly and efficiently.

The long-term common protections to the habitat provided by Alternative 2 and the consistent coordinated monitoring efforts would improve the potential for long-term sustainability of the grizzly bear population in the GYA over that provided by Alternative 1.

Effects of Alternative 2-Modified on the Grizzly Bear Population

Effects on the grizzly bear population under this alternative are the same as Alternative 2 with the following exceptions.

Alternative 2-Modified includes direction not found in Alternative 2 for concentrating project activities that affect secure habitat in time and space to the extent feasible and limiting project implementation to a maximum of three years. These measures have been commonly used to minimize disturbance to grizzly bears from project activities and would likely continue under Alternative 1. Potential increases in grizzly bear mortality or decreases in female fecundity due to displacement by project activities would be reduced as compared to Alternative 2.

Alternative 2 provides no specific direction for management of habitats for grizzly bears outside the PCA other than that afforded a regionally designated sensitive species. Under Alternative 2-Modified, grizzly bears would be accommodated in biologically suitable and socially acceptable habitats outside the PCA. Consideration would be given to maintaining secure habitat, minimizing effects from developed sites, and minimizing impacts from livestock allotments, to the extent that accommodation is compatible with the goals and objectives of other uses.

Direction under this alternative that allows for the retirement of cattle and sheep allotments with recurring conflicts with willing permittees both inside and outside the PCA would help to reduce livestock conflicts and associated grizzly bear mortalities.

Although it is assumed under Alternative 2 that food storage regulations would remain and efforts to minimize grizzly bear conflicts would continue, no specific direction is identified. The inclusion of standards and guidelines in Alternative 2-Modified for minimizing grizzly bear conflicts through information and education, food storage regulations inside and outside the PCA, and other management tools increases management emphasis on conservation of bear habitat. The connection with state wildlife management agency determinations of biologically suitable and socially acceptable habitats for implementation of these management tools outside the PCA is important in effective management of an expanding grizzly bear population.

Alternative 2-Modified provides direction not included in Alternative 2 for maintaining the productivity of the four key grizzly bear foods inside and outside the PCA with emphasis on maintaining and restoring whitebark pine. Seasonal area closures could be implemented to the extent feasible to facilitate bear use of four key foods. Similar to Alternative 2, each forest would

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monitor adherence to the secure habitat, developed site, and livestock standards. Habitat effectiveness would be monitored collectively on a regular basis to track any changes to the habitat from fire, insects and disease, and other activities not measured by the habitat standard monitoring efforts. Monitoring of the four key grizzly bear foods would occur as directed by the Conservation Strategy. Alternative 2-Modified includes additional monitoring requirements for monitoring whitebark pine occurrence, productivity, and health both inside and outside the PCA. Changes in secure habitat outside the PCA would be monitored and included in the IGBST Annual Report every two years. Similar to Alternative 2, results of habitat monitoring along with the demographic monitoring required under the Conservation strategy would be reviewed annually by the YGCC. The Conservation Strategy requires a Biology and Monitoring Review if population or habitat standards are not met. The additional monitoring of whitebark pine and secure habitat outside the PCA would provide increased understanding of the habitat conditions for grizzly bears throughout the GYA over that identified for Alternative 2 or Alternative 3. Threats to the habitat would be more easily identified on a larger scale than any other alternative, except Alternative 4.

Similar to Alternative 2, the long-term common protections to the habitat and the consistent coordinated monitoring efforts of Alternative 2-Modified would improve the potential for long-term sustainability of the grizzly bear population in the GYA over that provided by Alternative 1. Alternative 2-Modified further increases that potential through the increased emphasis on resolution of grizzly bear/human and grizzly bear/livestock conflicts, maintaining and restoring key grizzly bear foods, and accommodating grizzly bear populations outside the PCA.

Effects of Alternative 3 on the Grizzly Bear Population

Under Alternative 3 inside the PCA, existing secure habitat would remain with few exceptions and additional secure habitat would be created through closure of motorized routes in inventoried roadless areas or in areas below 70 percent habitat security, or both. This increase in security would improve the connectivity between key habitats inside the PCA over that provided by Alternatives 1, 2, and 2-Modified. Many of the areas where security would be improved are not currently effective grizzly bear habitat and may be barriers to movement. Motorized use would be limited to designated routes and snow machining would be eliminated in denning habitat. Developed sites would be maintained at 1998 levels with few exceptions for mitigation or eliminated if conflicts could not be resolved. Dispersed sites and outfitter camps with a trend of recurring conflicts would be removed and human use of backcountry trails would be limited or restricted in areas of conflict. Area closures would be used to ensure adequate security to bears in critical foraging areas. Sheep allotments and those portions of cattle allotments that experience recurring conflicts with grizzly bears would be closed. Overall, human use inside the PCA would be reduced from existing levels and the potential for grizzly bear/human conflicts reduced. Any potential for impacts to denning bears from snow machines would be eliminated.

Similar to Alternatives 2 and 2-Modified, project level direction provided by the Guidelines would no longer apply. No projects would be allowed in secure habitat inside the PCA. Grizzly bears would not be displaced temporarily or permanently due to project activities. Potential increases in grizzly bear mortality or decreases in female fecundity due to displacement by project activities would be eliminated. Habitat management projects in secure habitat would be limited primarily to prescribed fire or fuels treatments, and maintaining and restoring critical food sources.

In general, grizzly bear habitat and security would be improved above 1998 levels inside the PCA. These high levels of habitat protection would provide additional assurances above Alternatives 2 and 2-Modified that habitat loss or displacement inside the PCA would not limit bear population numbers. Activities on National Forest System lands would always be managed in favor of the bear and the potential for conflicts and human-caused mortalities would be even further reduced over that in Alternatives 1, 2, or 2-Modified.

Monitoring under Alternative 3 would be the same as that identified for Alternative 2 and would improve the ability of managers to identify threats to the habitat and population over the monitoring in Alternative 1. Monitoring requirements under Alternative 2-Modified are more comprehensive than those identified for Alternatives 2 or 3.

While Alternative 3 provides greater protection to habitats inside the PCA than Alternative 2-Modified, Alternative 3 provides no direction for accommodating grizzly bears outside the PCA. Effects of Alternative 3 on areas outside the PCA would be similar to Alternatives 1 and 2. Existing long-term secure habitat would remain. Potentially higher bear numbers inside the PCA could result in even greater expansion of bears into marginal habitats outside the PCA. Road densities and land management activities would preclude some areas outside the PCA from being effectively occupied by grizzly bears, and conflicts could increase both on public and private lands. Similar to Alternatives 2 and 2-Modified, the grizzly bear would be managed as a Forest Service sensitive species and the states would adhere to the mortality limits identified in the Conservation Strategy, until state occupancy goals were reached. Habitats determined by the states to be desirable for grizzly bear occupancy would likely become occupied sooner under Alternative 3 but may be more effectively occupied under Alternative 2-Modified, which includes requirements for minimizing conflicts and accommodating bears in those areas identified by the states. Hunting would likely be used as a management tool by the state wildlife management agencies to limit total bear numbers in the GYA.

Effects of Alternative 4 on the Grizzly Bear Population

Inside the PCA, the effects of Alternative 4 are the same as those identified for Alternative 3.

Outside the PCA, the same restrictions on human activities identified for Alternative 3 would be applied to the larger area identified for Alternative 4. Sheep allotments and those portions of cattle allotments that experience recurring conflicts with grizzly bears would be closed both inside the PCA and in the Alternative 4 area outside the PCA. Critical food sources would be restored where needed both inside and outside the PCA and food storage regulations would be implemented forest wide on all six national forests. Grizzly bears would be managed as a Forest Service sensitive species. Existing long-term secure habitat (Management Area Category 1 areas) would remain and additional secure habitat would be created through closure of motorized routes in inventoried roadless areas or in areas below 70 percent habitat security, or both.

The Forest Service would coordinate with the states of Idaho and Wyoming to close black bear baiting in the area defined for Alternative 4 outside the PCA. Some of these areas are currently closed in Wyoming. Further restrictions on black bear baiting in this area would serve to preclude the potential for grizzly bears becoming habituated to human foods and killed over baits because of misidentification.

The improvement in the existing levels of secure habitat and restrictions on human activities, in the area defined for Alternative 4, would significantly enhance the effectiveness of habitats for bears outside the PCA. Grizzly bear populations could likely be sustained at a higher level than what could be maintained under the other alternatives. A higher level of secure habitat for grizzly bears may provide additional assurances against catastrophic changes in food availability for bears in the GYA. Connectivity between key habitats in the six GYA forests would be improved even above that identified for Alternative 2-Modified and Alternative 3. Habitats that provide little opportunity for occupancy by bears under the other alternatives outside the PCA would be improved to at least 70 percent security.

Monitoring under Alternative 4 would be the same as that identified for Alternatives 2 and 3 inside the PCA, but would extend habitat monitoring outside the PCA into the Alternative 4 areas. Alternative 2-Modified is the only other alternative that proposes to monitor habitats outside the PCA for grizzly bears. In addition to monitoring adherence to the habitat standards, habitat effectiveness would be monitored outside the PCA. Threats to the habitat would be more

easily identified on a larger scale than under the other alternatives, providing more information to assist in modifying management direction as necessary to protect the grizzly bear population.

The high level of occupancy by bears outside the PCA could result in bears expanding even further into marginal habitats and increasing conflicts with humans. Food storage regulations throughout the six national forests would minimize conflicts with recreational users, even outside the area defined for Alternative 4. Livestock conflicts would likely expand into adjacent areas, conflicts on private lands could increase, and grizzly bear mortality would be high in these areas. The larger population of bears likely to occur under this alternative could sustain more human-caused mortality. Hunting would likely be used as a management tool by the state wildlife management agencies to significantly limit bear numbers in marginal habitats.

3.4 Other Wildlife Species

Introduction

Analysis for other wildlife species in the six GYA national forests includes the following groups:

Endangered, threatened, proposed, and candidate species listed under authority of the ESA. This group includes 19 wildlife, fish, and snail species. These species, their listed status, and their distribution among the six national forests are displayed in Figure 134 in appendix D. All of these species are discussed in section 3.4.1, except the grizzly bear, which is discussed in previous sections.

Forest Service sensitive wildlife, fish, and insect species. This group includes 62 wildlife, fish, and insect species that are designated Forest Service sensitive species on the six GYA national forests. A sensitive species is one designated by the regional forester because of concern about the viability of its population as evidenced by significant current or predicted downward trends in population numbers or density, and in habitat capability that may reduce an existing species' distribution. Management direction is provided in Forest Service Manual 2600 Wildlife, Fish, and Sensitive Plant Management. These species are discussed in section 3.4.2 and their distribution among the six national forests is displayed in Figure 135 (appendix D).

Management indicator species. Fifty wildlife and fish species within the six national forests are designated forest management indicator species (MIS). MIS can include species listed under the authority of the ESA and Forest Service sensitive species. MIS are managed under the authority of the NFMA and are identified in existing forest plans. MIS were selected because their population changes are believed to indicate the effects of management activities. These species are discussed in section 3.4.3 and their distribution among the six national forests is displayed in Figure 137 (appendix D).

Migratory birds. To analyze effects on migratory birds, the High Priority or Level I bird species identified in bird conservation plans for Idaho, Montana, and Wyoming were used. There are 75 High Priority or Level I bird species identified in the state plans; they are discussed in section 3.4.4 and shown in Figure 138 (appendix D).

Section 3.4 Changes between Draft and Final EIS

In this section, the following updates and additions were made:

- Updated lists from the USFWS for endangered, threatened, proposed, and candidate species listed under authority of the ESA
- Recent changes to the list of sensitive species
- Updated list of management indicator species for the Bridger-Teton National Forest
- Additional analysis of the effects on migratory birds

3.4.1 Endangered, Threatened, Proposed, and Candidate Species

As required by the ESA, when each forest plan was completed, forests consulted with the USFWS for the species that were listed at that time. All the forest plans were given a “no jeopardy” opinion²¹ by the USFWS.

Since completion of forest plans, additional consultations have occurred for project level work, forest plan amendments, new species listings such as the Canada lynx, and other activities as required by the ESA.

Alternative 1 meets existing requirements for listed species (except Canada lynx) as defined in consultations, biological opinions, and recovery plans for these species. For Canada lynx, the Forest Service is currently in the process of amending 18 forest plans in the Northern Rockies (Northern Rockies Lynx Amendment) (USDA Forest Service and USDI BLM 2004a) to incorporate management direction needed for lynx conservation that was not included in the existing plans.

Proposed direction in this FEIS does not change existing forest plan management direction that maintains or improves habitat or otherwise benefits listed species. For example, forest plan direction to protect bald eagle nest sites still applies and would not be affected by this proposal. This proposal does not change or conflict with the Northern Rockies Lynx Amendment that is currently in progress. Comparisons of effects between the alternatives are described in this section.

Summary of the Comparison of the Effects of the Alternatives on Listed Species

Listed species and their distribution among the six national forests are displayed in Figure 134 in appendix D. Tables summarizing and comparing the effects of each alternative on these species are included in appendix E. Figure 139 displays a summary of the habitat changes and/or management/activity changes associated with the standards and guidelines for each of the alternatives and Figure 140 shows which standards, guidelines, and alternatives may have complementary or beneficial effects on listed species. In this analysis, comparisons of effects between the alternatives are made in relation to Alternative 1.

All the effects are considered potential indirect effects because of the programmatic nature of this analysis. We do not know the exact locations of on-the-ground actions that would implement the standards and guidelines. For example, increasing secure habitat may be beneficial to the bald eagle if the increased secure habitat were located within the range of the bald eagle. If the secure habitat were located outside the range of the bald eagle, the benefit would not occur.

Black-footed Ferret

Potential black-footed ferret habitat (prairie dog towns) is present only on the Custer and Shoshone National Forests, outside the PCA. At present, there are no known populations of black-footed ferrets on these forests. The forest plans for the Custer and Shoshone National Forests contain direction to protect and retain suitable habitat. None of the alternatives would have an effect on the existing management direction for black-footed ferret habitat. Because there is no change to existing management direction, and no known populations of black-footed ferrets exist on these forests, there are no effects to this species in any of the alternatives.

Canada Lynx

Due to lack of guidance for conservation of lynx and snowshoe hare habitat in existing forest plans, Canada lynx were listed as a threatened species in 2000. At this time, no recovery plan has been developed for the Canada lynx. The Forest Service is in the process of amending 18 forest plans in the northern Rockies (Northern Rockies Lynx Amendment) (USDA Forest Service and USDI BLM 2004a) to incorporate recommended management direction needed for lynx conservation that was not included in the existing forest plans. In 2005, the Proposed Rule to designate critical habitat for the Canada Lynx was published in the Federal Register (USDI FWS

²¹ A no jeopardy opinion states “agency action not likely to jeopardize the continued existence of the species.”

2005b). The GYA is not recommended as critical habitat in the Proposed Rule. The USFWS is developing a recovery plan for the Canada lynx. Recommended management direction for lynx was developed by an interagency team of government biologists and was written into the Lynx Conservation Assessment and Strategy (Ruediger et al. 2000). The recommended management direction focuses on managing vegetation within the historic range of variability, maintaining dense understory conditions for prey (primarily snowshoe hares), minimizing snow compaction, and identifying and maintaining connectivity within and between habitat areas.

At the present time, the best scientific information suggests that historically only a few areas in the contiguous United States had lynx habitat of high enough quality and quantity to support resident populations and these are areas where resident populations currently continue to persist—northern Maine, northeastern Minnesota, western Montana, and north central and northeastern Washington (USDI FWS 2003c). Northern New Hampshire and northern Idaho currently have habitat conditions presumed capable of supporting lynx and are directly adjacent to resident populations; therefore, we expect lynx [to] occupy these areas (USDI FWS 2003c). In the remainder of the lynx range where some boreal forest exists in smaller patches, is of marginal quality, or is relatively isolated from source lynx populations, lynx occur as dispersers (USDI FWS 2003c).

Alternatives 2, 2-Modified, 3, and 4, to different degrees, are complementary to the Northern Rockies Lynx Amendment that is in progress. Increasing amounts of secure habitat, limiting creation or expansion of developed sites, and limiting oil and gas leasing or development would contribute toward maintaining connectivity within and between habitat areas for lynx. Restricting or eliminating winter over-the-snow use in habitats used by lynx (i.e., grizzly bear denning habitat), reducing the potential for disturbance or displacement caused by human presence, and reducing potential competition from other predators would complement the recommended management direction in the Northern Rockies Lynx Amendment for minimizing snow compaction in habitats used by lynx.

The actual benefits from the standards and guidelines may be limited for the following reasons (USDI FWS 2003c):

- There is no information to indicate that mining and grazing pose threats to lynx
- There is no information demonstrating that forest roads negatively impact lynx
- There continues to be no data on the role of competition between lynx and other species, therefore we do not consider competition to be a threat to lynx
- There is no evidence that packed snow trails facilitate competition to a level that negatively affects lynx; packed snow trails are not considered a threat to lynx at this time

Gray Wolf

Gray wolves were reintroduced into the GYA in late winter 1995. Gray wolves east of Interstate 15 are part of the Yellowstone Nonessential Experimental Population Area, and gray wolves west of Interstate 15 are part of the Central Idaho Nonessential Experimental Population Area (USDI FWS 1994a and b). When gray wolves were reintroduced, the USFWS stated that the reintroduction would not conflict with existing or anticipated federal agency actions or traditional public uses of park land, wilderness areas, or surrounding lands (USDI FWS 1994b). The intent of the experimental rule is that land-use restriction not be routinely used solely to enhance wolf recovery. Land-use restrictions may be temporarily used by land or resource managers to control intrusive human disturbance, primarily around active den sites between April 1 and June 30, when there are five or fewer breeding pairs of wolves in a recovery area. After six or more breeding pairs become established in a recovery area, land-use restrictions would not be needed (USDI FWS 1994a). At the end of 2004 in the Yellowstone Nonessential Experimental Population Area there was a minimum wolf population of 324, with 40 wolf packs and 30 breeding pairs. At the end of 2004 in the Central Idaho Nonessential Experimental Population Area there was a minimum wolf population of 452, with 50 wolf packs and 30 breeding pairs

(USDI FWS et al. 2005). The final report covering the year 2005 was not available at the time of this writing.

Alternative 1 has provided habitat that has allowed wolf populations to meet or exceed the recovery parameters established by the USFWS for the nonessential experimental population areas (USDI FWS 1994a, 1994b, 2003a, USDI FWS et al. 2005). Alternatives 2, 2-Modified, 3, and 4, to different degrees, could have indirect beneficial effects on gray wolf habitat compared to Alternative 1, primarily by increasing secure habitat, reducing motorized access during summer and winter, not increasing and possibly reducing livestock grazing, and improving ungulate wintering habitat.

The amount of motorized access in the Yellowstone and Central Idaho nonessential experimental population areas was evaluated prior to wolves being released. This evaluation concluded with the following summary: “Open road densities outside of national parks and USDA Forest Service wilderness areas in the Yellowstone (up to 0.90 miles open road per sq. mi.) and central Idaho (up to 0.98 miles open road per sq. mi.) areas were close to but below the theoretical threshold of 1 mile of open road per sq. mi. of habitat. Based upon 1) current open road information, 2) the success of wolf packs in highly roaded habitats in Montana, and 3) that these roaded areas of public land being proposed for wolf recovery are adjacent to large (about 4 to 5 million acres) roadless areas, it appears unlikely that road density guidelines must be employed as a wide-spread land management strategy to support wolf recovery” (USDI FWS 1994a).

Reducing domestic livestock grazing on National Forest System lands has the potential to reduce opportunities for wolves to prey on domestic livestock—this could potentially reduce the number of wolves being trapped and relocated or removed from the wolf population. In 2004 in the GYA, 100 cattle and 99 sheep were confirmed wolf kills (USDI FWS et al. 2005). For the Wyoming portion of the GYA, 58 percent of all depredations occurred on public grazing allotments and 42 percent on private property (USDI FWS et al. 2005). In 2004, a total of 54 wolves were removed as the result of livestock depredations in the GYA (USDI FWS et al. 2005).

Restricting winter motorized access has the potential to reduce human uses in habitats used by wolves, reducing the potential for disturbance or displacement caused by human presence and associated activities. This effect would be of greatest benefit to wolves in areas where big game animals winter, since big game animals are the primary prey for wolves. The alternatives consider restricting winter motorized access in grizzly bear denning habitat. Usually, grizzly bear denning habitat is at higher elevations and in deep snow areas. These denning areas are usually not the important winter areas for big game animal; therefore, potential benefit to wolves may be slight.

Bald Eagle

The six national forests are within the area covered by the Pacific Bald Eagle Recovery Plan (USDI FWS 1986). The Bald Eagle Recovery Plan population goal for the six GYA national forests is 71 breeding pairs. Currently, the number of breeding pairs for this area is more than double the Bald Eagle Recovery Plan population goal (Day et al. 2000, State of Wyoming 2003, State of Idaho 2003, Whitfield et al. 2003).

Alternatives 2, 2-Modified, 3, and 4, to different degrees, beneficially affect bald eagles compared to Alternative 1. Standards 1, 2, 8, and 9 have the potential to restrict or reduce human uses in habitats used by bald eagles, reducing the potential for disturbance or displacement caused by human presence and associated activities. Standard 10 and Guideline 4 have the potential to improve habitats and food sources potentially used by bald eagles.

Eskimo Curlew

For the six GYA national forests, this species is listed for the Bridger-Teton National Forest (USDI FWS 2005c). For the Bridger-Teton National Forest, the USFWS stated that if the proposed action will lead to water deletion (consumption) in the Platte River system, or affect downstream riparian or riverine habitat of the Platte River system, impacts to the Eskimo curlew and critical habitat should be included in the evaluation (USDI FWS 2005c).

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None of the alternatives occur in the areas that are used by the Eskimo curlew (USDA Forest Service 2005h). None of the alternatives contributes to any of the threats identified for the Eskimo curlew; none of the alternatives would result in water deletion (consumption) in the Platte River system or any river system in the Mississippi Basin and would not affect downstream riparian and riverine habitat of these river systems. There would be no effect on the population or habitat for this species as a result of incorporating any of the alternatives into existing forest plans.

Interior Least Tern

For the six GYA national forests, this species is listed for the Bridger-Teton and the Custer National Forests (USDI FWS 2005c). Interior populations of the least tern, formerly well distributed in the Mississippi Basin, now survive only in scattered remnants (NatureServe Explorer). Habitat has been decimated by extensive water management projects and increased use of beaches and sandbars (NatureServe Explorer). For the Bridger-Teton National Forest, the USFWS stated that if the proposed action will lead to water deletion (consumption) in the Platte River system, impacts to the interior least tern and critical habitat should be included in the evaluation (USDI FWS 2005c).

None of the alternatives occur in the areas that are used by the interior least tern. None of the alternatives contributes to any of the threats identified for the interior least tern; none of the alternatives would result in water deletion (consumption) in the Platte River system or any river system in the Mississippi Basin and would not affect downstream riparian and riverine habitat of these river systems. None of the alternatives would result in increased use of beaches and sandbars. There would be no effect on the population or habitat for this species as a result of incorporating any of the alternatives into existing forest plans.

Piping Plover

For the six GYA national forests, this species is listed for the Bridger-Teton National Forest (USDI FWS 2005c). For the Bridger-Teton National Forest, the USFWS stated that if the proposed action will lead to water deletion (consumption) in the Platte River system, or affect downstream riparian or riverine habitat of the Platte River system, impacts to the piping plover and critical habitat should be included in the evaluation (USDI FWS 2005c).

None of the alternatives occur in the areas that are used by the piping plover (USDA Forest Service 2005h). None of the alternatives contributes to any of the threats identified for the piping plover; none of the alternatives would result in water deletion (consumption) in the Platte River system or any river system in the Mississippi Basin and would not affect downstream riparian and riverine habitat of these river systems. There would be no effect on the population or habitat for this species as a result of incorporating any of the alternatives into existing forest plans.

Whooping Crane

For the six GYA national forests, this species is listed for the Bridger-Teton National Forest (USDI FWS 2005c). Whooping cranes are also designated an MIS on the Bridger-Teton National Forest. For the Bridger-Teton National Forest, the USFWS stated that if the proposed action will lead to water deletion (consumption) in the Platte River system, or affect downstream riparian or riverine habitat of the Platte River system, impacts to the whooping crane and critical habitat should be included in the evaluation (USDI FWS 2005c).

An experiment to reintroduce whooping cranes to their historic range in the Rocky Mountains began in 1975, testing the cross-fostering technique of placing whooping crane eggs in nests of greater sandhill cranes. In 1978, whooping crane critical habitat was designated in four areas to benefit the whooping cranes being reintroduced into the Rocky Mountains (USDI FWS 1997). The reintroduction effort was not successful, and in 1997, the USFWS removed all four critical habitat designations and designated all remaining whooping cranes in the Rocky Mountain population as an experimental nonessential population (USDI FWS 1997). By 2002, no whooping cranes were known to exist in the Rocky Mountain population and the USFWS considered this population to be extinct (Stehn personal communication 2002).

None of the alternatives occur in the areas that are used by the whooping crane (USDA Forest Service 2005h). None of the alternatives contributes to any of the threats identified for the whooping crane; none of the alternatives would result in water deletion (consumption) in the Platte River system or any river system in the Mississippi Basin and would not affect downstream riparian and riverine habitat of these river systems. There would be no effect on the population or habitat for this species as a result of incorporating any of the alternatives into existing forest plans.

Yellow-billed Cuckoo

This species is listed as a candidate species for the Targhee National Forest and a sensitive species for the Shoshone National Forest. This species is associated with riparian deciduous forests along rivers. For the Targhee National Forest, the historic and current range of this species is only adjacent to the Targhee, and the range is outside of the PCA and Alternative 4 area (TREC, Inc. 2003, NatureServe Explorer). On the Shoshone National Forest, habitat for this species can be found both inside and outside the PCA. None of the alternatives has an effect on the riparian deciduous forests along rivers. Therefore, there are no effects to this species or its habitat in any of the alternatives.

Bonytail Chub

This species is listed as an endangered species on the Bridger-Teton National Forest. Its habitat is outside the PCA. The bonytail chub is restricted to the Colorado River system, where only a few scattered remnant populations remain. This species has not been found in Wyoming since the construction of Flaming Gorge Dam around 1963 (Neal personal communication 2005). Habitat for this species includes the main stream of mid-sized to large rivers, where the fish is usually in or near deep swift water, in flowing pools and backwaters, or over mud or rocks. They are also frequently associated with eddies just outside the main current. They are also found in reservoirs (NatureServe Explorer). Available data suggest that habitats required for conservation include river channels and flooded, ponded, or inundated, riverine habitats, especially those where competition from non-native fishes is absent or reduced (USDI FWS 1994c). Identified threats include habitat destruction (diversion and impoundment of river) and competition and predation from exotic fish species (NatureServe Explorer).

The bonytail chub is not located in the areas where the alternatives would apply. None of the alternatives would affect habitat components that are required for this species or threats that have been identified for this species.

Bull Trout

This fish species is present on the Beaverhead National Forest and only outside the PCA. Only Alternative 4 would have potential effects compared to Alternative 1. With the application of road closures and increased secure habitat, reduced livestock grazing, reduced OHV travel, and reduced oil and gas leasing and development, some water quality improvements may occur for this species in Alternative 4 areas, depending on site-specific conditions,

Colorado Pikeminnow

The Colorado pikeminnow is listed as an endangered species on the Bridger-Teton National Forest and its habitat is outside the PCA. This species is restricted to the Colorado River system where distribution and abundance are far below historical levels due to the effects of dams and to a lesser degree exotic fishes. One female Colorado pikeminnow was caught in the Little Snake River (in Wyoming) in 1990 by a researcher, but subsequent surveys by the Wyoming Game and Fish Department and the USFWS have found no fish (Neal personal communication 2005). Generally, this species has not been found in Wyoming since the construction of Flaming Gorge Dam around 1963 (Neal personal communication 2005). Habitat for this species includes medium to large rivers. Young prefer small, quiet backwaters. Adults use various habitats, including deep turbid strongly flowing water, eddies, runs, flooded bottoms, or backwaters (especially during high flow). Lowlands inundated during spring high flow appear to be important habitats (NatureServe Explorer). Identified threats include dam construction (which replaces riverine

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habitat with impoundments, makes downstream habitat too cold, blocks migrations, and reduces peak flows) and introduction of non-native fishes (NatureServe Explorer). Potential detrimental impacts from activities would occur only from the cumulative impact of water depletions from the Green and Colorado River Systems.

The Colorado pikeminnow is not located in the areas where the alternatives would apply. None of the alternatives would affect habitat components that are required for this species or threats that have been identified for this species.

Humpback Chub

This species is listed on the Bridger-Teton National Forest. Its habitat is outside the PCA. The humpback chub is restricted to the Colorado River system. Its habitat includes large rivers. Adults use various habitats, including deep turbulent currents, shaded canyon pools, areas under shaded ledges in moderate current, riffles, and eddies. Young have been taken in backwaters over nonrocky substrate (NatureServe Explorer). Identified threats include destruction and modification of habitat through impoundment (e.g., stream inundation, reduced water temperatures, and reduced spring flows resulting from construction of Hoover Dam, Glen Canyon Dam, and Flaming Gorge Dam), introduced competitors and predators, and hybridization with two other species of chubs (NatureServe Explorer). Potential detrimental impacts to the humpback chub from activities would occur only from the cumulative impact of water depletions from the Green and Colorado River Systems.

The humpback chub is not located in the areas where the alternatives would apply. None of the alternatives would affect habitat components that are required for this species or threats that have been identified for this species.

Kendall Warm Springs Dace

This fish species is present only on the Bridger-Teton National Forest, outside the PCA. None of the alternatives would have any effect on this species or its habitat.

Montana Arctic Grayling

For the six GYA national forests, this species is listed as a candidate species for the Beaverhead-Deerlodge National Forest (USDI FWS 2005c). It is also listed as a Forest Service sensitive species for the Beaverhead-Deerlodge and Gallatin National Forests. Habitat for this species includes open water of clear, cold (47 to 52°F), medium to large rivers and lakes. Adults move to pools after spawning and spend winter in deep water. Spawning takes place in creeks with gravel-bottomed riffles. Spawning in lakes is rare, but lake populations can spawn in either inlet or outlet streams. Arctic grayling have not been documented as being a food source for grizzly bears in the GYA (USDA Forest Service 2005h).

With the application of road closures and increased secure habitat, reduced livestock grazing, reduced OHV travel, and reduced oil and gas leasing and development, some water quality improvements may occur for this species in Alternatives 2, 2-Modified, 3, and 4 areas, depending on site-specific locations and conditions.

Pallid Sturgeon

The pallid sturgeon is listed on the Bridger-Teton National Forest and its habitat is outside the PCA. This species is restricted to the larger channels of the Mississippi-Missouri river system, where the species is uncommon/rare everywhere (NatureServe Explorer). This species requires large, turbid, free-flowing riverine habitat and occurs in strong current over firm gravel or sandy substrate; it also occurs in reservoirs (NatureServe Explorer). Threats identified for this species include habitat modification (construction of larger dams, channelization) that has severely reduced or eliminated successful reproduction, past commercial exploitation, pollution, and significant hybridization with shovelnose sturgeon (NatureServe Explorer).

The pallid sturgeon is not located in the areas where the alternatives would apply. None of the alternatives would affect habitat components that are required for this species or threats that have been identified for this species.

Razorback Sucker

The razorback sucker is listed on the Bridger-Teton National Forest. Its habitat is outside the PCA, confined to the Colorado River system, where a large decline in distribution and abundance has occurred as a result of alteration and destruction of habitat by dams and interactions with non-native fishes (NatureServe Explorer). This species has not been found in Wyoming since the construction of Flaming Gorge Dam around 1963 (Neal personal communication 2005). Habitats include slow areas, backwaters and eddies of medium to large rivers, and impoundments (NatureServe Explorer). Threats identified for this species include low (or absent) recruitment despite spawning and hatched larvae, habitat change (e.g., high winter flows, reduced high spring flows, altered river temperatures, and reduced flooding, resulting primarily from dam construction), competition and especially predation on larvae and juveniles by introduced fishes, competition and predation by exotic crayfish, paucity of spawning adults, and hybridization with other suckers (NatureServe Explorer).

The razorback sucker is not located in the areas where the alternatives would apply. None of the alternatives would affect habitat components that are required for this species or threats that have been identified for this species.

Utah Valvata Snail

This species is listed on the Targhee National Forest. The Utah valvata snail is part of the native mollusk fauna of the Middle Snake River. The species historically occurred in Utah Lake, Utah and in the Snake River in Southern Idaho. In March 2004, the Chubbuck Field Office of the USFWS extended the range of the species up the Snake and Henrys Fork Rivers, which includes portions of the Caribou-Targhee National Forest. The species has been collected only from the mouth of the Henrys Fork in the Snake River and in the Henrys Fork downstream from the Highway 33 Bridge. The species is currently not known to exist on or near the Caribou-Targhee National Forest. The recovery area for the species extends from Hagerman, Idaho upstream to American Falls, Idaho (USDA Forest Service 2005g). Additional presence/absence surveys by an interagency team cooperatively funded by the BLM, Bureau of Reclamation, and Idaho Transportation Department occurred during the summer of 2004. Final results of these surveys are not available. If the snail is not detected, the extended range established by the USFWS Field Office may not include the Caribou-Targhee National Forest. In the meantime, the Caribou-Targhee National Forest consults with the USFWS on projects that have the potential of affecting the species or its habitat (USDA Forest Service 2005g).

In the Snake River, the species appears to prefer margin and backwater habitat with deep sand/silt/mud substrate, pools adjacent to rapids, and large spring complexes. The species avoids areas with high water velocity or rapids. The snail prefers deep mud and silt that provides habitat for submergent aquatic vegetation. Chara or elodea are common plants observed in preferred habitat. The snail is absent from pure gravel to boulder sized substrate (USDA Forest Service 2005g).

Utah valvata is primarily a detritivore (organism that eats waste material), grazing along the mud surface ingesting diatoms (very minute, elementary plants) or small plant debris. In habitats with boulders projecting above mud/silt/sand surfaces, the snail has been observed grazing diatoms and other aquatic plants (USDA Forest Service 2005g).

Threats to this species include direct trampling, dewatering of habitat, burying habitat with extreme deposits such as landslides, affecting the frequency of aquatic vegetation in margin water habitat, dam releases that mobilize sediment from habitat sites, channelization/simplification of habitat, and the invasion of the non-native New Zealand mudsnail (*Potamopyrgus antipodarum*) (USDA Forest Service 2005g).

This species has not been located in the areas where the alternatives would be applied. The closest known population occurs downstream on the Henrys Fork of the Snake River at the Highway 33 Bridge. No land disturbance is expected from any of the alternatives, nor would the alternatives affect habitat components that are required for this species. None of the alternatives

would affect threats that have been identified for this species. There would be no effect on the population or habitat for this species as a result of incorporating any of the alternatives into existing forest plans.

3.4.2 Forest Service Sensitive Wildlife Species

When each forest plan was completed, biological evaluations of the effects on sensitive species were completed. The effects of forest plans on sensitive species ranged from “beneficial impact” to “no impact” to “may impact individuals or habitat, but will not likely contribute to a trend toward federal listing or loss of viability to the population or species.” Since completion of forest plans, additional biological evaluations have occurred for project level work, forest plan amendments, and other activities as required by Forest Service policy.

Alternative 1 meets all requirements for sensitive species as defined by Forest Service policy.

Proposed direction in this FEIS does not change existing forest plan direction that maintains or improves habitat or otherwise benefits sensitive species. For example, forest plan direction to protect northern goshawk nest sites still applies and would not be affected by this proposal. Comparisons of effects between the alternatives are described in this section.

Summary of the Comparison of the Effects of the Alternatives on Sensitive Species

Sensitive species and their distribution among the six national forests are displayed in Figure 135 in appendix D. Tables summarizing and comparing the effects of each alternative on sensitive species are included in appendix E. Figure 139 displays a summary of the habitat changes and/or management/activity changes associated with the standards and guidelines for each of the alternatives and Figure 141 shows which standards, guidelines, and alternatives may have complementary or beneficial effects on sensitive species. In this analysis, comparisons of effects between the alternatives are made in relation to Alternative 1.

All the effects are considered potential indirect effects because of the programmatic nature of this analysis. We do not know the exact locations of on-the-ground actions that would implement the standards and guidelines. For example, increasing secure habitat may be beneficial to the trumpeter swan if the increased secure habitat were located within the range of the trumpeter swan. If the secure habitat were located outside the range of the trumpeter swan, the benefit would not occur.

American (Pine) Marten

The pine marten is listed as a sensitive species on the Shoshone National Forest, but it is present on all six GYA national forests; habitat occurs both inside and outside the PCA. Habitat for the pine marten includes dense deciduous, mixed, or (especially) coniferous upland and lowland forest, but may use rocky alpine areas (NatureServe Explorer). When inactive, pine marten occupy holes in dead or live trees or stumps, abandoned squirrel nests, conifer crowns, rock piles, burrows, snow cavities, etc.; pine marten also use mainly subnivean (under the snow) sites, often associated with coarse woody debris, in winter (NatureServe Explorer). Past extensive logging and trapping for pelts led to extirpation in some areas. Marten are susceptible to overharvest when food supplies are low (NatureServe Explorer). Alternatives 2, 2-Modified, 3, and 4, to different degrees, beneficially affect the pine marten compared to Alternative 1, by increasing secure habitat and restricting or reducing human uses in habitats used by this species, reducing the potential for disturbance or displacement caused by human presence and associated activities. Restricting or eliminating winter over-the-snow use in habitats used by this species reduces the potential for overharvest and disturbance or displacement during the winter season.

Black-tailed Prairie Dog, White-tailed Prairie Dog

The black-tailed prairie dog is a sensitive species on the Custer National Forest; the white-tailed prairie dog is a sensitive species on the Custer and Shoshone National Forests. These two species are present on the Custer and Shoshone National Forests and are found only outside the PCA. Prairie dogs are associated with grassland and shrub grassland habitats. Major threats to prairie

dogs and their habitat include disease, poisoning on private lands, recreational shooting in localized areas, and agricultural land conversions. The existing forest plans for the Custer and Shoshone National Forests have direction to protect and retain suitable habitat. None of the alternatives would have direct or indirect effects on prairie dogs or their habitat.

Fisher

The fisher is listed as a sensitive species on three GYA national forests and habitat occurs both inside and outside the PCA. Fishers inhabit upland and lowland forests, including coniferous, mixed, and deciduous forests. They occur primarily in dense coniferous or mixed forests, including early successional forest with dense overhead cover (NatureServe Explorer). Fishers are regarded as habitat specialists in the western United States, occurring only at mid- to lower elevation in mature conifer and mixed conifer/hardwood forests characterized by dense canopies and abundant large trees, snags, and logs (NatureServe Explorer). Several studies have shown that fishers are associated with riparian areas, which are in some cases generally more productive, having the dense canopy closure, large trees, and general structural complexity associated with fisher habitat. Riparian areas may be important to fishers because they provide important rest site elements, such as broken tops, snags, and coarse woody debris (NatureServe Explorer). The fishers' range was reduced dramatically in the 1800s and early 1900s through overtrapping, predator and pest control, and alterations of forested habitats by logging, fire, and farming (NatureServe Explorer). Since the 1950s, fishers have recovered in some of the central and eastern portions of their historic range in the United States as a result of trapping closures, changes in forested habitats (e.g., forest regrowth in abandoned farmland), and reintroductions (NatureServe Explorer). Alternatives 2, 2-Modified, 3, and 4, to different degrees, beneficially affect the fisher compared to Alternative 1 by increasing secure habitat and restricting or reducing human uses in habitats used by this species, reducing the potential for disturbance or displacement caused by human presence and associated activities. Restricting or eliminating winter over-the-snow use in habitats used by this species reduces the potential for disturbance or displacement during the winter season.

Fringe-tailed Myotis

This bat species is listed as a sensitive species on the Shoshone National Forest. It appears to use a fairly broad range of habitats. The most common habitats in which this species has been found are oak, pinyon, and juniper woodlands or ponderosa pine forest at middle elevations (Keinath 2004). They also appear to use deserts, grasslands, and other types of woodlands. When trying to generalize all published information, one observes that this species is mostly found in dry habitats where open areas (e.g., grasslands and deserts) are interspersed with mature forests (usually ponderosa pine, pinyon-juniper, or oak), creating complex mosaics with ample edges and abundant snags (Keinath 2004). Ideal habitat includes nearby water sources and suitable cliff or snag roost habitat (Keinath 2004). Habitat for this bat species includes mature forest ecosystems, in which it depends on old-growth conditions with abundant, large roosting snags (Keinath 2004). Like many bat species, it is very sensitive to disturbance at or modification of roosts and the surrounding environment. The most important roosts are maternity colonies and hibernacula (hibernation sites) (Keinath 2004). None of the standards and guidelines in the alternatives has a direct effect on this species. There is a potential beneficial indirect effect in Alternatives 2, 2-Modified, 3, and 4 with increasing amounts of secure habitat (Standard 1). This indirect effect would depend upon specific maternity sites, hibernacula sites, or roost sites being located within the secure habitat.

Great Basin Pocket Mouse

The Great Basin pocket mouse is listed as sensitive on the Beaverhead-Deerlodge National Forest. Habitat for this species occurs outside the PCA, and includes arid, sandy, short-grass steppes; brushland covered with sagebrush, bitterbrush, and rabbit brush; and pinyon-juniper woodland. The pocket mouse is usually found in habitats with light-textured, deep soils, but also among rocks (NatureServe Explorer). The pocket mouse is primarily a seed eater, but also feeds

Other Wildlife Species

on insects and some green vegetation in spring/summer (NatureServe Explorer). Alternatives 2-Modified and 4 may have beneficial indirect effects on this species, compared to Alternative 1, by reducing livestock grazing in some rangelands. These effects would depend on site-specific locations and conditions. Alternative 4 may have beneficial indirect effects on this species, compared to Alternative 1, by not allowing new oil and gas leases, but this would depend on site-specific locations and conditions of rangelands where oil and gas leases could occur.

Long-eared Myotis

This bat species is listed as sensitive on the Custer National Forest. Habitat for this species occurs both inside and outside the PCA and includes mostly forested areas, especially those with broken rock outcrops, shrubland, over meadows near tall timber, along wooded streams, and over reservoirs. This species often roosts in buildings, but also in hollow trees, mines, caves, fissures, etc. (NatureServe Explorer). Threats to this species include disturbance at maternity colonies, hibernacula, and roosts, cutting of large snags, closure of abandoned (unsurveyed) mines, recreational caving, some forestry management practices, activities (such as highway construction, water impoundments, blasting of cliffs for avalanche control) that impact cliff faces or rock outcrops, and regional insecticide applications (NatureServe Explorer). None of the standards and guidelines in the alternatives has a direct effect on this species. There is a potential beneficial indirect effect in Alternatives 2, 2-Modified, 3, and 4 with increasing amounts of secure habitat. This indirect effect would depend upon site-specific locations and conditions of maternity sites, hibernacula sites, or roost sites being located within the secure habitat.

Long-legged Myotis

This bat species is listed as sensitive on the Custer National Forest. Habitat for this species occurs both inside and outside the PCA and includes primarily montane coniferous forests, but also riparian and desert habitats. This species uses caves and mines as hibernacula; winter habits are poorly known. This species roosts in abandoned buildings, rock crevices, under bark, etc. In some areas, hollow trees are the most common nursery sites, but buildings and rock crevices are also used (NatureServe Explorer). Threats to this species include closure of abandoned mines without adequate surveys, disturbance by humans, and certain forest management practices (NatureServe Explorer). None of the standards and guidelines in the alternatives has a direct effect on this species. There is a potential beneficial indirect effect in Alternatives 2, 2-Modified, 3, and 4 with increasing amounts of secure habitat. This indirect effect would depend upon site-specific locations and conditions of maternity sites, hibernacula sites, or roost sites being located within the secure habitat.

North American Wolverine

The wolverine is listed as a sensitive species on all six GYA national forests; habitat occurs both inside and outside the PCA. Habitat includes alpine and arctic tundra and boreal and mountain forests (primarily coniferous). It is generally limited to mountains in the south, especially large wilderness areas. It is usually in areas with snow on the ground in winter. Riparian areas may be important winter habitat. Wolverines may disperse through atypical habitat. When inactive, wolverines occupy dens in caves, rock crevices, under fallen trees, in thickets, or similar sites (NatureServe Explorer). Threats that have been identified include fur trapping and conflicts with backcountry trappers, habitat degraded through timber harvesting, ski area construction, road construction, general human disturbance, loss of ungulate wintering areas, and displacement of ungulate populations (NatureServe Explorer).

Alternatives 2, 2-Modified, 3, and 4, to different degrees, beneficially affect the wolverine compared to Alternative 1, by increasing secure habitat and restricting or reducing human uses in habitats used by this species, reducing the potential for disturbance or displacement caused by human presence and associated activities. Restricting or eliminating winter over-the-snow use in habitats used by this species reduces the potential for disturbance or displacement and overharvest during the winter season. Maintenance and improvement of ungulate winter ranges would also benefit this species.

Northern Bog Lemming, Water Vole

The northern bog lemming is listed as sensitive on the Beaverhead and Custer National Forests, and the water vole is listed as sensitive on the Shoshone National Forest. Habitat for these two species occurs inside and outside the PCA. These species are associated with wetland and riparian habitats and adjacent upland habitats including meadows and wet/moist forests (NatureServe Explorer). For the northern bog lemming, sphagnum mats (collections of mossy plants) and mossy streamsides are important habitat components (NatureServe Explorer). For the northern bog lemming, management recommendations include maintaining riparian areas where sphagnum mats occur in good condition by minimizing management activities and minimizing domestic livestock grazing (NatureServe Explorer). For the water vole, management recommendations include maintenance of riparian habitat in subalpine and alpine meadows close to water, and maintenance of riparian habitat adjacent to marsh and pond edges. Alternatives 2, 2-Modified, 3, and 4 may have beneficial indirect effects on these species, compared to Alternative 1, by increasing secure habitat and reducing livestock grazing. These effects would depend on site-specific locations and conditions.

Pallid Bat

The pallid bat is listed as a sensitive species on the Custer National Forest. Habitat includes arid deserts and grasslands, often near rocky outcrops and water. It is less abundant in evergreen and mixed conifer woodland. It usually roosts in rock crevices or buildings, less often in caves, tree hollows, mines, etc. Young are born in maternity colonies, usually in rock crevices or buildings (NatureServe Explorer). Management concerns include human disturbance at roosts, maternity sites, and hibernacula. None of the standards and guidelines in the alternatives has a direct effect on this species. There is a potential beneficial indirect effect in Alternatives 2, 2-Modified, 3, and 4 with increasing amounts of secure habitat (Standard 1). This indirect effect would depend upon specific maternity sites, hibernacula sites, or roost sites being located within the secure habitat.

River Otter

The river otter is listed as a sensitive species on the Shoshone National Forest. The river otter occurs both inside and outside the PCA. Its habitats include streams, ponds, lakes, rivers, and adjacent riparian habitats. Alternatives 2, 2-Modified, 3, and 4 may have beneficial indirect effects on these species, compared to Alternative 1, by increasing secure habitat that could provide less disturbance from human activities depending on site-specific locations and conditions.

Rocky Mountain Bighorn Sheep

Rocky Mountain bighorn sheep are present on all six GYA national forests, but are designated a sensitive species on the Custer National Forest. Alternatives 2, 2-Modified 3, and 4, to different degrees, beneficially affect bighorn sheep compared to Alternative 1. Increasing secure habitat and restricting or reducing human uses in habitats used by bighorn sheep reduce the potential for disturbance or displacement caused by human presence and associated activities. Reduction or elimination of some domestic livestock grazing reduces the potential for forage competition with domestic livestock during the grazing season on National Forest System lands. Reduction or elimination of domestic sheep grazing reduces the potential for disease transfer from domestic sheep to bighorn sheep.

Spotted Bat

The spotted bat is a sensitive species on four of the six GYA National Forests. It has been found in various habitats ranging from desert to montane coniferous stands, including open ponderosa pine, pinyon-juniper woodland, canyon bottoms, open pasture, and hayfields. It roosts in caves and in cracks and crevices in cliffs and canyons, with which this species consistently is associated (NatureServe Explorer). In Wyoming, the spotted bat is associated with canyons, cliffs, and nearby permanent water (NatureServe Explorer). None of the standards and guidelines in the alternatives has a direct effect on this species. There is a potential beneficial indirect effect in Alternatives 2, 2-Modified, 3, and 4 with increasing amounts of secure habitat. This indirect

effect would depend upon specific maternity sites, hibernacula sites, or roost sites being located within the secure habitat.

Western (Townsend's) Big-eared Bat

The western big-eared bat is a sensitive species on all six GYA national forests. Maternity and hibernation colonies typically are in caves and mine tunnels; the western big-eared bat prefers relatively cold places for hibernation, often near entrances and in well-ventilated areas. Females gather in small nursery colonies in the warm parts of caves or mines, and sometimes in buildings. This bat uses caves, buildings, and tree cavities for night roosts (NatureServe Explorer). Throughout much of the known range, it commonly occurs in moist habitats characterized by coniferous and deciduous forests, but also occupies a broad range of habitats (NatureServe Explorer). Management concerns include human disturbance at roosts, maternity sites, and hibernacula, and maintenance of canopy cover at these sites. None of the standards and guidelines in the alternatives has a direct effect on this species. There is a potential beneficial indirect effect in Alternatives 2, 2-Modified, 3, and 4 with increasing amounts of secure habitat. This indirect effect would depend upon specific maternity sites, hibernacula sites, or roost sites being located within the secure habitat.

Baird's Sparrow, Grasshopper Sparrow, Loggerhead Shrike, Long-billed Curlew, Mountain Plover, Sprague's Pipit

These species are identified as sensitive species on the Custer and Shoshone National Forests, and their habitats occur outside the PCA. Most of these species' ranges are outside the areas affected by the alternatives (NatureServe Explorer). They use open habitats, such as short-grass prairies, shrub/grasslands, grassy meadows, and for Sprague's pipit, wetlands. They are present only during the spring and summer seasons. Major threats include loss of native habitat due to agricultural developments, urban sprawl, heavy grazing, drought, drainage of wetlands, predation, and parasitism. None of the alternatives is likely to have any measurable effects on these species, because the alternatives do not reduce the major threats for these species and the majority of these species' ranges are outside of the areas affected by the alternatives.

Black Tern

The black tern is listed as a sensitive species on the Shoshone National Forest and occurs only outside the PCA. It is present during the spring and summer seasons. Major identified threats include loss of fresh water marsh habitat, human disturbance of nesting sites, pesticide use, and problems along migration routes or in winter range (NatureServe Explorer). Increasing secure habitat in Alternative 4 may have indirect benefits if the secure habitat included specific fresh water marsh habitats used by this species.

Black-backed Woodpecker

This species is listed as a sensitive species on four GYA national forests and habitat occurs both inside and outside the PCA. In Montana, it is more abundant in lower elevation pine and Douglas-fir forests than in high-elevation subalpine spruce forests. In the northern Rocky Mountains of the United States, a region-wide landbird survey and literature review revealed that the species is almost exclusively associated with early successional burned forests, although it is occasionally observed in mixed conifer, lodgepole pine, Douglas-fir, and spruce-fir forests (NatureServe Explorer). This species may invade burns immediately after a fire, but use of burns appears to be restricted to the first years following a fire, as long as wood-boring insects are present and abundant (NatureServe Explorer). Threats include timber harvest, fire suppression, removal of fire-killed or insect-infested trees, and the conversion of mature and old-growth forests to young stands with few decayed trees (NatureServe Explorer). Alternatives 2, 2-Modified, 3, and 4 may have beneficial indirect effects on this species, compared to Alternative 1, by increasing secure habitat that could reduce or alter timber harvesting; depending on site-specific conditions, this could provide additional mature and older forest habitat and less disturbance from human activity. Fires and insect and disease agents are the primary actions that create snags in forested

environments. None of the alternatives would change fires and insect and disease agents when compared with Alternative 1.

Blue-gray Gnatcatcher

This species is listed as a sensitive species on the Custer National Forest and its habitat occurs both inside and outside the PCA. Habitat for this species includes deciduous forest, open woodland, second growth, scrub, brushy areas, chaparral, and open pinyon-juniper woodland associated with rosaceous shrubs and rock outcrops (NatureServe Explorer). It nests especially where tracts of brush, scrub, or chaparral are intermixed with taller vegetation (e.g., forest edge, riparian corridors). It uses a wide range of brushy habitats in winter (NatureServe Explorer). None of the alternatives is likely to have any measurable effects on this species, because the alternatives do not produce changes in the habitats used by this species.

Boreal Owl

The boreal owl is listed as a sensitive species on three of the GYA national forests and habitat occurs both inside and outside the PCA. Habitat for this species includes dense coniferous forest, mixed forest, thickets of alder, aspen, or stunted spruce, most commonly in proximity to open grassy situations and muskeg bogs (thick, wet vegetation). In the Rockies, this species occurs generally in mature, multilayered spruce-fir forests. It roosts in dense cover by day, in cool microsites in summer; it frequently changes roosting sites (NatureServe Explorer). Identified threats may be indirect effects of forest harvesting practices, which may reduce primary prey populations, remove forest structure used for foraging, and eliminate nesting cavities (NatureServe Explorer). Alternatives 2, 2-Modified, 3, and 4 may have beneficial indirect effects on this species, compared to Alternative 1, by increasing secure habitat that could reduce or alter timber harvesting, and depending on site specific conditions, this could provide additional mature and older forest habitat and less disturbance from human activity. These indirect effects would depend upon site-specific locations and conditions.

Brewer's Sparrow, Columbian Sharp-tailed Grouse, Pygmy Rabbit, Sage Grouse

The Brewer's sparrow is identified as a sensitive species on the Shoshone National Forest; the Columbian sharp-tailed grouse and pygmy rabbit are identified as sensitive species on the Beaverhead and Targhee National Forests; and the sage grouse is identified as a sensitive species on four GYA national forests. These species are associated with sagebrush, grassland, and mountain brush habitats (Janson 1940, Green and Flinders 1980a and b, White et al. 1982, Giesen and Connelly 1993, Connelly et al. 2000, Gabler et al. 2000, Gabler et al. 2001, Roberts 2003, NatureServe Explorer). Loss of sagebrush habitats from fire and agricultural developments, invasion of noxious weeds, and modifications that can occur from livestock grazing have been identified as major concerns for these species and their habitats. Alternatives 2, 2-Modified, 3, and 4 may have beneficial indirect effects on these species, compared to Alternative 1, by increasing secure habitat, reducing possible future developments, and reducing livestock grazing. These potential benefits would all depend on site-specific locations and conditions.

Burrowing Owl, Ferruginous Hawk, Northern Harrier, Short-eared Owl

The burrowing owl is listed as a sensitive species on the Custer and Shoshone National Forests. The ferruginous hawk, northern harrier, and short-eared owl are listed as a sensitive species on the Shoshone National Forest. These four species occur only outside the PCA. Ferruginous hawk habitat includes open country, primarily prairies, plains and badlands, sagebrush, saltbush-greasewood shrubland, the periphery of pinyon-juniper and other woodland, and desert (NatureServe Explorer). Northern harrier habitat includes marshes, meadows, grasslands, and cultivated fields (NatureServe Explorer). Burrowing owl habitat includes open grasslands, especially prairie, plains, and savanna, and sometimes open areas such as vacant lots near human habitation or airports (NatureServe Explorer). Short-eared owl habitat includes broad expanses of open land with low vegetation for nesting and foraging. Habitat types frequently mentioned as suitable include fresh and saltwater marshes, bogs, dunes, prairies, grassy plains, old fields, tundra, moorlands, river valleys, meadows, savanna, open woodland, and heathland (NatureServe

Explorer). Alternative 4 may have beneficial indirect effects on these species, compared to Alternative 1, by increasing secure habitat and reducing oil and gas leasing and development that could provide fewer disturbances from human activities depending on site-specific conditions.

Common Loon, Harlequin Duck, Trumpeter Swan

The common loon is listed as a sensitive species on two GYA national forests. The harlequin duck is listed as a sensitive species on all six GYA national forests. The trumpeter swan is listed as a sensitive species on five GYA national forests. These three species occur both inside and outside the PCA. Their habitats include streams, ponds, lakes, rivers, and adjacent riparian habitats. Alternatives 2, 2-Modified, 3, and 4 may have beneficial indirect effects on these species, compared to Alternative 1, by increasing secure habitat that could provide less disturbance from human activities depending on site-specific locations and conditions.

Flammulated Owl

The flammulated owl is listed as a sensitive species on four GYA national forests and habitat occurs both inside and outside the PCA. Habitat includes montane forest, usually open conifer forests containing pine, with some brush or saplings. This species shows a strong preference for ponderosa pine and Jeffrey pine throughout its range. It prefers mature growth with open canopy and avoids dense young stands. It is found in cooler, semi-arid climates, with high abundance of nocturnal arthropod (insects, spiders) prey and some dense foliage for roosting (NatureServe Explorer). Identified threats include timber harvesting, loss of snags and trees with suitable nest cavities, fire suppression, disturbance during the nesting season, and use of pesticides that may reduce moth populations (NatureServe Explorer). Alternatives 2, 2-Modified, 3, and 4 may have beneficial indirect effects on this species, compared to Alternative 1, by increasing secure habitat that could reduce or alter timber harvesting, and depending on site-specific conditions, this could provide additional mature and older forest habitat and less disturbance from human activity. These indirect effects would depend upon site-specific locations and conditions.

Great Gray Owl

The great gray owl is listed as a sensitive species on two GYA national forests and habitat occurs both inside and outside the PCA. Habitat includes dense coniferous and hardwood forest, especially pine, spruce, paper birch, poplar, as well as second growth, especially near water. This species forages in coniferous forest and meadows in mountains. This species nests in the top of large broken-off tree trunks, in old nests of other large birds (e.g., hawk nests), or in debris platforms from dwarf mistletoe, frequently near bogs or clearings. Alternatives 2, 2-Modified, 3, and 4 may have beneficial indirect effects on this species, compared to Alternative 1, by increasing secure habitat that could reduce or alter timber harvesting, and depending on site-specific conditions, this could provide additional mature and older forest habitat and less disturbance from human activity. These indirect effects would depend upon site-specific locations and conditions.

Lewis's Woodpecker

This species is listed as a sensitive species on the Shoshone National Forest and habitat occurs outside the PCA. Habitat includes open forest and woodland, often logged or burned, including oak, coniferous forest (primarily ponderosa pine), riparian woodland and orchards, and less commonly in pinyon-juniper. This species' distribution is closely associated with open ponderosa pine forest in western North America, and is strongly associated with fire-maintained old-growth ponderosa pine (NatureServe Explorer). This species is vulnerable to processes that result in a permanent loss of large snags (nesting sites) or degradation of foraging habitat. Drought and overgrazing pose continued threats to riparian habitats in arid regions. Fire suppression encourages the replacement of ponderosa pine forests by Douglas-fir and leads to denser, closed-canopy forest stands. This species will decline with fire suppression in ponderosa pine/Douglas-fir stands compared to regular fire intervals of 10 to 30 years (NatureServe Explorer). Fires and insect and disease agents are the primary actions that create snags in forested environments. None of the alternatives would affect habitat conditions when compared to Alternative 1.

Northern Goshawk

The northern goshawk is listed as a sensitive species on all six GYA national forests and habitat occurs both inside and outside the PCA. The goshawk nests in a wide variety of forest types including deciduous, coniferous, and mixed forests. The goshawk has a complexity of habitat needs in the breeding season, which vary among forest types and region (Johnsgard 1990). It typically nests in mature or old-growth forests. The goshawk forages in both heavily forested and relatively open habitats. Its habitat requirements during winter are poorly understood, especially in the United States (NatureServe Explorer). Identified threats include timber harvesting, disturbance during the nesting season, displacement and predation from other raptors, predation by forest carnivores such as pine marten, and bacterial and fungal diseases (NatureServe Explorer). Fire suppression, grazing, and insect and tree disease outbreaks can result in the deterioration or loss of nesting habitat. Alternatives 2, 2-Modified, 3, and 4 may have beneficial indirect effects on this species, compared to Alternative 1, by increasing secure habitat that could reduce or alter timber harvesting, and depending on site-specific conditions, this could provide additional mature and older forest habitat and less disturbance from human activity. Alternatives 2, 2-Modified, 3, and 4 may have beneficial indirect effects on this species, compared to Alternative 1, by reducing livestock grazing that may improve understory habitat conditions for prey species. These indirect effects would depend upon site-specific locations and conditions.

Olive-sided Flycatcher

This species is identified as a sensitive species on the Shoshone National Forest, but its range occurs throughout all six GYA national forests. Its habitat occurs inside and outside the PCA. It is present only during the spring and summer seasons. It prefers openings with some standing trees; therefore, burns and some types of logging are beneficial for this species (NatureServe Explorer). None of the alternatives is likely to have any measurable effects on this species.

Peregrine Falcon

The peregrine falcon is listed as a sensitive species on four GYA national forests and occurs inside and outside the PCA. Peregrine falcon populations are now increasing, with the most significant event in the recovery of the peregrine falcon being the restriction placed on the use of organochlorine pesticides (USDI FWS 1995). Other known factors, such as illegal shooting and collisions with wires, fences, cars, and buildings, are much less significant to the western peregrine falcon (USDI FWS 1995). None of the alternatives is likely to have any measurable effects on this species.

Three-toed Woodpecker

This species is listed as a sensitive species on three GYA national forests and habitat occurs both inside and outside the PCA. In the west, this species occurs in dense coniferous forests and is associated with subalpine fir and Engelmann spruce at higher elevations; they occur mainly in lodgepole pine forests or in mixed-conifer forests with a lodgepole component at lower elevations (NatureServe Explorer). They seem to prefer disturbed coniferous forests with trees that exhibit thin, flaky bark such as spruce and lodgepole pine. Optimal habitat includes areas with 42 to 52 snags per 100 acres, with snags occurring in clumps and measuring 12 to 16 inches diameter at breast height and 20 to 40 feet tall, and mostly with bark still present (Spahr et al. 1991). Threats include incompatible forestry practices and deforestation. This species' association with spatially unpredictable disturbance and its large home range make it sensitive to logging and forest fragmentation (NatureServe Explorer). Alternatives 2, 2-Modified, 3, and 4 may have beneficial indirect effects on this species, compared to Alternative 1, by increasing secure habitat that could reduce or alter timber harvesting; depending on site-specific conditions, this could provide additional mature and older forest habitat and less disturbance from human activity. Fires and insect and disease agents are the primary actions that create snags in forested environments. None of the alternatives would change fires and insect and disease agents when compared with Alternative 1.

Yellow-billed Cuckoo

The yellow-billed cuckoo is discussed in section 3.4.1.

Boreal (Western) Toad, Columbia Spotted Frog, Northern Leopard Frog

The boreal (western) toad is a sensitive species on the Beaverhead, Custer, Gallatin, and Shoshone National Forests. The Columbia spotted frog is a sensitive species on the Bridger-Teton, Shoshone, and Targhee National Forests. The northern leopard frog is a sensitive species on the Beaverhead, Custer, Gallatin, and Shoshone National Forests. Collectively, the range of these three amphibian species occurs across all six GYA national forests. These species are associated with wetland and riparian habitats, although at times they can be found various distances in upland habitats. Threats to these species include loss of wetland habitat due to drought or drainage, human disturbances such as livestock grazing, chemicals that can cause death and deformities, predation, and other factors. Recent information strongly implicates global warming, which also increases susceptibility to chytrid fungus (a fungus that attacks a frog's skin, making breathing difficult), as a major factor in global amphibian declines. Alternatives 2, 2-Modified, 3, and 4, to different degrees, may beneficially affect sensitive amphibian species compared to Alternative 1. Standards 1, 3, and 8 have the potential to restrict or reduce human uses in habitats used by these species, reducing the potential for disturbance or displacement caused by human presence and associated activities. The degree of benefit would depend on site-specific locations and conditions.

Great Plains Toad

This species is listed as sensitive on the Custer National Forest and habitat for this species is located outside the PCA. Habitats for this species include deserts, grasslands, semidesert shrublands, open floodplains, and agricultural areas, typically in stream valleys (NatureServe Explorer). It burrows underground when inactive. It breeds in rain pools, flooded areas, ponds, and reservoirs that fluctuate in size. Eggs and larvae develop in shallow water (usually clear) (NatureServe Explorer). Threats that have been identified for this species include intensive cultivation and herbicide/pesticide use. Suburban sprawl has eliminated breeding and nonbreeding habitats in areas adjacent to growing cities, and some adults at these sites experience road mortality. None of the alternatives is likely to have any measurable effects on this species, because the alternatives do not produce changes in the habitats used by this species, and none of the alternatives reduce or augment the threats that have been identified for this species.

Greater Short-horned Lizard

This species is listed as sensitive on the Custer National Forest and habitat for this species is located both inside and outside the PCA. Habitats of this lizard range from semiarid plains to high mountains; usually the species is in open, shrubby, or openly wooded areas with sparse vegetation at ground level. Soil may vary from rocky to sandy (NatureServe Explorer). When not active on the surface, the lizards burrow into the soil or occupy rodent burrows. Habitat loss and degradation (e.g., urbanization and intensive cultivation, conversion of native shrubland to dense grass) have caused local declines, but the species appears to face no major threats over most of the vast range (NatureServe Explorer). None of the alternatives is likely to have any measurable effects on this species because the alternatives do not produce changes in the habitats used by this species, and none of the alternatives reduce or augment the threats that have been identified for this species.

Plains Spadefoot

This toad species is listed as sensitive on the Custer National Forest and habitat for this species is located both inside and outside the PCA. This species occurs in plain lands like shrublands, grasslands, and semi-desert areas. It is almost always found around temporary pools formed by rainfall. Eggs and larvae develop in flooded areas such as these temporary pools, but they also breed in permanent waters, especially those that fluctuate greatly in size. It is usually found in areas with friable (crumbly) soils. It burrows underground or occupies rodent burrows when inactive. This species is very resistant to climate changes and modification of the original habitats

(NatureServe Explorer). None of the alternatives is likely to have any measurable effects on this species because the alternatives do not produce changes in the habitats used by this species, and none of the alternatives reduce or augment the threats that have been identified for this species.

Milksnake, Western Hognose Snake

These two species are listed as sensitive on the Custer National Forest and habitat for these species is located outside the PCA. For the milksnake, habitat varies greatly among different geographic regions: semiarid to wet, lowland valleys to mountains, grasslands and shrublands to forests and forest edges, primary forest to secondary forest, sand dunes to rocky areas, and wilderness to semiagricultural and suburban (NatureServe Explorer). Identified threats of the milksnake include intensive agricultural development and urbanization that have caused localized declines, and collectors probably have depleted accessible populations near roads, but in most areas this snake is not threatened (NatureServe Explorer). For the western hognose snake, habitat consists of areas with sandy or gravelly soils, including prairies, sandhills, wide valleys, river floodplains, mesquite grassland, thornscrub, semidesert areas, creosotebush desert, open montane woodland, semiagricultural areas (but not intensely cultivated land), margins of irrigation ditches, and sometimes mountain canyon bottoms (NatureServe Explorer). Conversion of prairie habitat to agricultural use has caused local declines of the western hognose snake (NatureServe Explorer). None of the alternatives is likely to have any measurable effects on these two species because the alternatives do not produce changes in the habitats used by these species, and none of the alternatives reduce or augment the threats that have been identified for these species.

Colorado River Cutthroat Trout, Bonneville Cutthroat Trout

These fish species are listed as sensitive on the Bridger-Teton National Forest and occur only outside the PCA. With the application of road closures and increased secure habitat, reduced livestock grazing, reduced OHV travel, and reduced oil and gas leasing and development, some water quality improvements may occur for these species in Alternative 4 areas, compared to Alternative 1, depending on site-specific conditions,

Mountain Sucker

This species is listed as sensitive on the Shoshone National Forest and occurs inside and outside the PCA. With the application of road closures and increased secure habitat, reduced livestock grazing, reduced OHV travel, and reduced oil and gas leasing and development, some water quality improvements may occur for this species, compared to Alternative 1, depending on site-specific conditions,

Yellowstone Cutthroat Trout, Snake River Fine Spotted Cutthroat Trout, Westslope Cutthroat Trout

Collectively, the range of these three fish species occurs across all six GYA national forests and they occur inside and outside the PCA. With the application of road closures and increased secure habitat, reduced livestock grazing, reduced OHV travel, and reduced oil and gas leasing and development, some water quality improvements may occur for these species, compared to Alternative 1, depending on site-specific conditions.

Montana Arctic Grayling

See section 3.1.1 for this species.

Northern Redbelly Dace

This species is listed as a sensitive species for the Custer National Forest and habitat for this species is both inside and outside the PCA. Habitat includes boggy lakes, ponds, beaver ponds, pools of headwaters, and creeks. It is often in tea-colored water over fine detritus or silt, usually near vegetation (NatureServe Explorer). Threats identified for this species include stream channelization, reductions in discharge, and changes in water quality. The species is now threatened by continued urban development (NatureServe Explorer). With the application of road closures and increased secure habitat, reduced livestock grazing, reduced OHV travel, and

reduced oil and gas leasing and development, some water quality improvements may occur for these species, compared to Alternative 1, depending on site-specific conditions.

Sturgeon Chub

This species is listed as a sensitive species for the Custer National Forest; habitat for this species is outside the PCA and outside of the areas affected by any of the alternatives. Habitat for this species includes continuously and heavily turbid, warm, medium to large rivers, in shallow areas of strong current with coarse sand or gravel bottom. It is highly specialized for highly turbid waters (NatureServe Explorer). Threats that have been identified for this species include dams that have flooded river habitat, altered temperature and flow regimes, reduced sediment transport and turbidity, fragmented populations, and reduced movement opportunities; channelization that has reduced habitat diversity and reduced overbank flooding; pollution and water depletion from industry and agriculture that may have altered water quality; sand and gravel excavation that have removed habitat and restricted fish movements in some areas; dredging for channel maintenance and sand/gravel extraction; severe drought in the early 1990s that may have eliminated populations in some Missouri River tributaries; and negative impacts from the numerous species of non-native fishes that have been introduced into the habitat (NatureServe Explorer). None of the alternatives will have any effects on this species because habitat for the species is outside of the areas affected by the alternatives, and none of the alternatives will reduce or augment the threats that have been identified.

Hudsonian Emerald Dragonfly

This species is listed as sensitive on the Shoshone National Forest; there are no documented locations of this species occurring on the Shoshone National Forest (Packauskas 2005). In Wyoming, the few records that exist are from two rather specific locales: (1) near Moran in Grand Teton National Park and (2) along the North Fork of the Little Laramie River in the Medicine Bow National Forest. A possible third locale listed as “Medicine Bow Mtns.” could be close to the second locale (Packauskas 2005). Packauskas (2005) characterized the habitat for this species as being that of deep, sedge-bordered lakes and ponds, but also as ponds with lake inlets, boggy edges, and sedge marshes. They may also be found at boggy slow streams, ditches, and sloughs. The larvae are found mostly in mucky edges of woodland streams and bogs, and develop in water of a comparatively low summer temperature. Trees and shrubs near the aquatic habitat may be of some importance for adult dragonflies for foraging, perch sites, shade, and protection from inclement weather. Possible threats include changes to the landscapes surrounding the aquatic environment, such as road building, timber harvesting, wildfires or burning procedures, grazing practices, and mining (Packauskas 2005). None of the alternatives will have any effects on this species because the known distribution and habitat for the species is outside of the areas affected by the alternatives.

3.4.3 Management Indicator Species

For the 56 wildlife and fish MIS, 27 species are uniquely MIS (that is, they are not already covered by endangered, threatened, proposed, candidate, or sensitive species discussed previously). Species that have been discussed previously will not be discussed in this section.

Direction proposed in this FEIS does not change management direction in existing forest plans that maintains or improves habitat or otherwise benefits MIS. For example, forest plan direction to protect old growth or nest sites still applies; old growth and nest sites would not be affected by this proposal. Comparisons of effects between the alternatives are described in this section.

Overall, the effects of the action alternatives would be minor and many activities would be held at or below the 1998 baseline inside the PCA; there would not be a measurable change in expected populations and habitat trends projected under the forest plans.

Summary of the Comparison of the Effects of the Alternatives on MIS

The distribution and designations of MIS among the six national forests are displayed in Figure 137 in appendix D. Tables summarizing and comparing the effects of each alternative on these species are included in appendix E. Figure 139 displays a summary of the habitat changes and/or management/activity changes associated with the standards and guidelines for each of the alternatives and Figure 142 shows which standards, guidelines, and alternatives may have complementary or beneficial effects on MIS. In this analysis, comparisons of effects between the alternatives are made in relation to Alternative 1.

All the effects are considered potential indirect effects because of the programmatic nature of this analysis. We do not know the exact locations of on-the-ground actions that would implement the standards and guidelines. For example, increasing secure habitat may be beneficial to the red squirrel if the increased secure habitat were located within the range of the red squirrel. If the secure habitat were located outside the range of the red squirrel, the benefit would not occur.

Rocky Mountain Elk, Mule Deer, White-tailed Deer, Shiras Moose, Mountain Goat, Pronghorn Antelope, and Elk and Deer Winter Range

These species are present on all six GYA national forests, inside and outside the PCA. Alternatives 2, 2-Modified, 3, and 4, to different degrees, beneficially affect these species compared to Alternative 1. Standards 1, 2, 7, 8, and 9 have the potential to restrict or reduce human uses in habitats used by these species, reducing the potential for disturbance or displacement caused by human presence and associated activities. Standard 3 reduces or eliminates some domestic livestock grazing, reducing disturbance from domestic livestock and associated human activities during the grazing season on National Forest System lands. Guideline 4 and Standard 10 have the potential to improve some big game habitats.

Beaver and Red Squirrel

These species are present on all six GYA national forests, inside and outside the PCA. These two species would primarily be benefited by Standards 1 and 8 that have the potential to restrict or reduce human uses in habitats used by these species, reducing the potential for disturbance or displacement caused by human presence and associated activities.

Blue Grouse, Ruffed Grouse

These species are present on all six GYA national forests, inside and outside the PCA. Blue grouse are designated MIS on the Shoshone National Forest and ruffed grouse are designated MIS on the Custer and Shoshone National Forests. These species are associated with forested habitats and use a variety of forest stages and conditions to meet their habitat needs. None of the alternatives would change habitat conditions that would measurably affect these species compared to Alternative 1.

Primary Cavity Nesting Species (Red-napped Sapsucker, Williamson's Sapsucker, Downy Woodpecker, Hairy Woodpecker, and Northern Flicker)

Primary cavity nesting species are present on all six GYA national forests, inside and outside the PCA. These species are associated with forested habitats and require mature and older forests to meet some of their habitat needs. They also require snags and defective trees in which to build their nest cavities. Fires and insect and disease agents are the primary actions that create snags in forested environments. Alternatives 2, 2-Modified, 3, and 4 may have beneficial indirect effects on these species, compared to Alternative 1, by increasing secure habitat that could reduce or alter timber harvesting; depending on site-specific conditions, this could provide additional mature and older forest habitat and less disturbance from human activity. None of the alternatives would change fires and insect and disease agents when compared with Alternative 1.

Western Kingbird, Lark Sparrow, Bullock's Oriole (formerly Northern Oriole), Yellow Warbler, Ovenbird, Spotted (Rufous-sided) Towhee

The ranges of these bird species cover all six GYA national forests; their habitats are outside the PCA. Habitat for the western kingbird and lark sparrow includes desert grasslands and shrub lands to open woodlands (NatureServe Explorer). Habitat for the Bullock's oriole includes open

woodland, deciduous woodland, and forest edges (NatureServe Explorer). Habitat for the yellow warbler includes riparian shrubs and riparian deciduous woodlands and thickets (NatureServe Explorer). Habitat for the ovenbird includes mid-to-late seral forests and second growth forests with a dense canopy, deep leaf litter, and limited understory (NatureServe Explorer). Habitat for the spotted towhee includes forest interiors, forest edges, and riparian areas, all with shrubby understories (NatureServe Explorer). In the three-state area, all of these species are considered secure (NatureServe Explorer). None of the alternatives would measurably affect habitat for these species, compared with Alternative 1.

Rainbow Trout, Wild Taut, Game Trout, Largemouth Bass

All these trout are found inside and outside the PCA. They occur both inside and outside the PCA, but largemouth bass occur only outside the PCA. With the application of road closures and increased secure habitat, reduced livestock grazing, reduced OHV travel, and reduced oil and gas leasing and development, some water quality improvements may occur for these species, compared to Alternative 1, depending on site-specific conditions.

Boreal Chorus Frog

The boreal chorus frog's range covers all six GYA national forests. Habitat for this species occurs both inside and outside the PCA. Habitat includes shallow water pools (breeding sites) and a variety of wetland habitats such as bogs/fens, forested wetlands, herbaceous wetlands, riparian areas, scrub-shrub wetlands, and temporary pools (NatureServe Explorer). The species uses a wide variety of terrestrial habitats (such as cropland/hedgerow, grassland/herbaceous, conifer and hardwood forests, suburban/orchards, and conifer and hardwood woodlands), usually within 100 meters of breeding pools (NatureServe Explorer). Most populations are unthreatened (NatureServe Explorer). Because of the wide variety of habitats used by this species and its wide distribution, none of the alternatives would measurably affect habitat for this species, compared with Alternative 1.

3.4.4 Migratory Birds

To analyze effects on migratory birds, we used the High Priority or Level I bird species identified in bird conservation plans for Idaho, Montana and Wyoming (Idaho Partners in Flight 2000, Montana Partners in Flight 2000, Cerovski et al. 2001). There are 75 High Priority or Level I bird species identified in these three state plans. Twenty-eight of these bird species are also listed as endangered, threatened, proposed, candidate, sensitive, or MIS species and have been previously discussed in sections 3.4.1 through 3.4.3. Another 13 of these bird species have distributions that are outside of the areas affected by the alternatives in this FEIS. The remaining 34 bird species are evaluated in this section.

Direction and guidance proposed in this FEIS does not change management direction in existing forest plans that maintains or improves habitat or otherwise benefits these species. For example, forest plan direction to protect old growth or nest sites still applies; old growth and nest sites would not be affected by this proposal. Comparisons of effects between the alternatives are all made in relation to Alternative 1.

Summary of the Comparison of the Effects of the Alternatives on Migratory Birds

High Priority or Level I bird species and their distribution among the six national forests are displayed in Figure 138 in appendix D. Tables summarizing and comparing the effects of each alternative on these species are included in appendix E. Figure 139 displays a summary of the habitat changes and/or management/activity changes associated with the standards and guidelines for each of the alternatives and Figure 143 shows which standards, guidelines, and alternatives may have complementary or beneficial effects on these bird species. In this analysis, comparisons of effects between the alternatives are made in relation to Alternative 1.

All the effects are considered potential indirect effects because of the programmatic nature of this analysis. We do not know the exact locations of on-the-ground actions that would implement the

standards and guidelines. For example, increasing secure habitat may be beneficial to the black-chinned hummingbird if the increased secure habitat were located within the range of the black-chinned hummingbird. If the secure habitat were located outside the range of the black-chinned hummingbird, the benefit would not occur.

Effects of Standard 1—Secure Habitat

Six bird species (Barrow's goldeneye, brown creeper, golden eagle, Hammond's flycatcher, hooded merganser, and prairie falcon) have the potential to be benefited by Standard 1. Compared to secure habitat in Alternative 1, Alternative 4 provides the most potential benefit, followed by Alternative 3, Alternative 2-Modified, and Alternative 2. Standard 1 has the potential to restrict or reduce human uses in habitats used by these species, reducing the potential for disturbance or displacement caused by human presence and associated activities.

Effects of Standard 2—Developed Sites

Three bird species (black rosy-finch, golden eagle, and MacGillivray's warbler) have the potential to be benefited by Standard 2. Compared to Alternative 1, Alternative 4 provides the most potential benefit, followed by Alternative 3, Alternative 2-Modified, and Alternative 2. Standard 2 has the potential to restrict or reduce human uses in site-specific habitats used by these species, reducing the potential for disturbance or displacement caused by human presence and associated activities.

Effects of Standard 3—Livestock Grazing and Guideline 2—Livestock Grazing

Seven bird species (calliope hummingbird, dusky flycatcher, MacGillivray's warbler, prairie falcon, rufous hummingbird, Sprague's pipit, and willow flycatcher) have the potential to be benefited by the livestock grazing standard or guideline. Compared to Alternative 1, Alternative 4 provides the most potential benefit, followed by Alternative 2-Modified, Alternative 3, and Alternative 2. Generally, habitat for these bird species improves with restrictions or reductions in livestock grazing. Any benefits would depend on site-specific range conditions.

Effects of Standard 8—Oil and Gas Leasing

Three bird species (golden eagle, MacGillivray's warbler, and prairie falcon) have the potential to be benefited by Standard 8. Compared to Alternative 1, Alternative 4 provides the most potential benefit, followed by Alternative 3. Standard 8 has the potential to restrict or reduce human uses in site-specific habitats used by these species, reducing the potential for disturbance or displacement caused by human presence and associated activities. Standard 8 also has the potential to maintain habitat that might become developed and lost through oil and gas leases and subsequent development.

3.5 Soil, Water, and Air

Affected Environment

Overall direction for management of the soil, water, and air resources is provided in forest plans, Forest Service Manual 2500 Watershed and Air Management, and related Forest Service handbooks. All forests incorporate water conservation practices or best management practices, which meet or exceed state best management practices. All six forests participate in the Greater Yellowstone Hydrology Group that is comprised of hydrologists from each of the forests. This group focuses on management of soil and water resources in the GYA.

In the past 17 years, there has been a net reduction of approximately 1,000 miles of roads (section 3.10). These tended to be roads that were in excess of what was needed for management or recreational activities, or were difficult or expensive to maintain, or both. Roads were also decommissioned to benefit wildlife and improve water quality. In the past, roads have been a primary cause in the reduction of water quality due to sedimentation from roads that were connected to streams. Decommissioning has disconnected many of these roads as a sediment source; roads constructed in the last decade meet standards for water conservation practices.

Much of the road decommissioning has taken place inside the PCA, with little accompanying road construction.

The proposed action and other action alternatives would not add management direction that would change the effects on air quality when compared to existing plans. The main activity that affects air quality, use of fire, would occur as described under existing plans. Future treatments would analyze the effects on air quality based on current laws and regulations.

Effects of Alternatives 1, 2, and 2-Modified on Soil and Water

The effects on soil and water resources from the alternatives for GYA grizzly bear habitat conservation are in direct proportion to the amount of activity that is allowed. In general, there would be no adverse effects. Alternative 1 would allow the present levels of activities to continue and would maintain the current condition of soil and water resources. There are additional opportunities for road decommissioning outside the PCA as forests address excess roads from past logging or tie hacking activities and heavily roaded National Forest System lands recently acquired through land exchanges. Some additional road construction may be needed to address access needs for fuel hazard reduction, especially within 1½ miles of structures.

Alternatives 2 and 2-Modified would not have any greater impacts than Alternative 1 because activities that would cause disturbance (road building, developed sites) would remain at the 1998 baseline. The secure habitat standard and the developed site standard would limit these activities.

Effects of Alternative 3 on Soil and Water

Alternative 3 would reduce activities inside the PCA and would likely lead to long-term improvements in soil and water resources due to decommissioning of roads to achieve 70 percent secure habitat. Nearly 500 miles of road would need to be decommissioned in the next 10 years to achieve 70 percent secure habitat inside the PCA and to increase secure habitat in inventoried roadless areas. The types of management standards proposed (limiting developed sites, reducing grazing allotments, reducing road densities) would generally lead to less activity in riparian areas, with fewer opportunities for disturbance to stream channels. Consequently, where current conditions are less than desired, reduction of disturbance levels would provide an opportunity for recovery. Where current conditions reflect desired conditions, there would be no effect.

Effects of Alternative 4 on Soil and Water

Alternative 4 would further reduce activities and would likely lead to long-term improvements in soil and water resources due to decommissioning of roads to achieve 70 percent secure habitat. About 1,850 miles of road would need to be decommissioned in the next 10 years to achieve 70 percent secure habitat inside and outside the PCA and to increase secure habitat in roadless areas. Some temporary sedimentation would occur through decommissioning activities but would be temporary. In the long term, decommissioning roads generally reduces sources of sedimentation because roads are no longer connected to streams and a source of sedimentation. (Roads are revegetated as part of decommissioning.)

Decommissioning roads could lead to longer response times and larger fires across the GYA based on current fire management capabilities (section 3.6.2). Large burns do not necessarily contribute large amounts of sediment. For example, in 2003 the Shoshone National Forest experienced five large fires that burned approximately 27,000 acres. None has produced extraordinary amounts of sediment to date. Road decommissioning would most likely be timed such that currently needed fuels treatments would be accomplished prior to the decommissioning.

The types of management standards proposed (limiting developed sites, reducing grazing allotments, reducing road densities) would generally lead to less activity in riparian areas, with fewer opportunities for disturbance to stream channels. Consequently, where current conditions are less than desired, reduction of disturbance levels would provide an opportunity for recovery. Where current conditions reflect desired conditions, there would be no effect.

3.6 Vegetation

Introduction

This section presents the existing condition of the forest vegetation and the timber resource within the PCA and surrounding areas within National Forest System lands for the Beaverhead, Bridger-Teton, Custer, Gallatin, Shoshone, and Targhee National Forests. The section addresses the issue of potential effects on activities such as timber harvest and treatment of fuels and effects on composition and structure of forest types. A summary of suitable timberlands affected by the proposal is included. The analysis reflects changes in the ability to manage lands identified as suitable for timber production on those portions of the forests affected by any of the action alternatives.

Section 3.6 Changes between Draft and Final EIS

In this section, the following additions and updates were made:

- The affected environment section on whitebark pine includes recent information on the extent of blister rust infections and mountain pine beetle infestations in the GYA
- A map depicting the estimated distribution of whitebark pine in the GYA

Vegetation Description

At low elevations on National Forest System lands in the GYA, various species of sagebrush dominate, including Great Basin big sagebrush, Wyoming big sagebrush, and mountain big sagebrush. Grasses are dominated by bluebunch wheatgrass, Idaho fescue, and needle-and-thread grass. Riparian species found along waterways include willow species, red osier dogwood, wild rose, and chokeberry. Trees include one of three species of cottonwood, plus spruce in some parts of the southern end of the ecosystem including the upper Gros Ventre, Hoback, and upper Wind River Range.

Depending on the location, either ponderosa pine, Douglas-fir, or Rocky Mountain juniper is the first tree species that typically delineates the lower tree line. Ponderosa pine is relatively scarce in the region and tends to be found where summer precipitation is highest (Knight 1994 cited in Noss et al. 2002). Ponderosa pine is found in the northeast section of the ecosystem along the Yellowstone River from Big Timber, Montana eastward. Juniper is found in some parts of southeast Idaho, east of the Beartooth Mountains along the Clarks Fork drainage, and scattered in small pockets elsewhere in the ecosystem, such as the Gardiner, Montana area. Throughout most of the ecosystem, Douglas-fir is the dominant low elevation tree species and is even common in those areas where juniper or ponderosa pine also occurs. Limber pine occurs throughout the ecosystem on dry windy sites; it is found both at the lower timberline and at the high elevations on the mountains.

At higher elevation, Douglas-fir is intermixed with aspen. Aspen is most abundant in the southern end of the ecosystem and relatively uncommon in the northern reaches of the area, most likely because of greater summer precipitation that characterizes the southern mountains of the ecosystem.

Engelmann spruce, subalpine fir, and lodgepole pine dominate mid-elevation forests. The spruce-fir forest tends to be the climax association and would dominate more of the area were it not for recurring stand-replacement fires that favor lodgepole pine. Nearly all of Yellowstone's plant communities have burned at one time or another. Some plant communities ignite and carry fire more readily than others. Natural historic fire intervals range from 20 to 25 years for the grass and shrublands and to 200+ years for lodgepole pine forests, depending on the fire regime (USDI NPS 2005). At the highest elevations, whitebark pine is a dominant tree species. This pine is most common in the eastern and northern parts of the ecosystem, particularly on the Shoshone and Gallatin National Forests (Figure 46).

Beyond timberline, extensive tracts of alpine tundra occur at elevations above 10,000 feet. Over half of the Absaroka/Beartooth Mountains consists of tundra, the most extensive continuous occurrence of alpine tundra in the lower 48 states. Extensive tracts of alpine tundra are common

in the Wind River Range, Absaroka Mountains, Madison Range, and other higher mountains of the ecosystem (Noss et al. 2002).

Conditions are changing for many of the vegetation types in the GYA. Aspen has declined in density and extent due to fire suppression and grazing by wildlife and livestock. Douglas-fir and ponderosa pine have increased in extent with an accompanying reduction in rangelands. Drought conditions, mild winters, and warm dry summers have created a situation that has led to outbreaks of the various indigenous bark beetle populations (USDA Forest Service 2005j). In some areas of the GYA, these outbreaks have led to high levels of mortality in spruce, lodgepole pine, and Douglas-fir in localized areas. Whitebark pine has been reduced by mountain pine beetle, as discussed below.

Whitebark Pine

Whitebark pine in the GYA occurs in the subalpine zone in an environment of poor soils, steep slopes, windy exposures, and extreme cold temperatures. Whitebark pine is considered a keystone species of alpine ecosystems (Tomback et al. 2001). Whitebark pine nuts (seeds) are recognized as a major food source for grizzly bears (section 3.1.1), black bears, and for small birds and mammals (Tomback et al. 2001). Over 95 percent of all the whitebark in the GYA is found on public lands (Keane 2000). Figure 46 displays the estimated distribution of whitebark pine on the national forests and national parks in the GYA (Podruzny et al. 2004).

Whitebark pine populations in the GYA are threatened by the presence of white pine blister rust and the mountain pine beetle. Climate change may increase the susceptibility of whitebark to these threats. In addition, increasing temperatures associated with climate change could eventually lead to decreases in range availability for whitebark and increases in large, stand replacing fires. In areas of the Rocky Mountains north of the GYA, whitebark pine has been decimated due to blister rust and mountain pine beetle (Greater Yellowstone Whitebark Pine Monitoring Working Group 2005). In the GYA, blister rust has been present since the 1940s and no major die-offs of whitebark pine due to blister rust have been noted. Mountain pine beetle is currently causing considerable mortality of mature whitebark pine in the GYA. Epidemic infestations of mountain pine beetle have occurred periodically during the last century in many areas of the Rocky Mountains (Tomback et al. 2001, Walsh 2005).

It is generally assumed that fire, especially low to mixed intensity fires, favors whitebark pine over other tree species and the exclusion of fire results in the successional replacement of whitebark by shade tolerant species (Tomback et al 2001). Recent work by Walsh (2005) suggests that fire suppression is not a major concern for many whitebark pine forests in the GYA and that stand structure is well within the historic range of variability. Walsh (2005) also notes, "At landscape scales mountain pine beetle infestations may have similar ecological consequences as spatially extensive mixed-severity fires, as beetles rarely kill all trees in a stand".

The Greater Yellowstone Whitebark Pine Subcommittee of the GYCC was established in 1998 to monitor the health of whitebark pine and the overall ecological importance of whitebark pine in the GYA. In 2003 through 2004, an additional interagency working group was formed (Greater Yellowstone Whitebark Pine Monitoring Working Group) to develop a unified monitoring program. The group includes representatives of the Forest Service, NPS, U.S. Geological Survey, and Montana State University. In general, the group's major objectives are to 1) estimate the extent of blister rust infection and how the infection rate is changing over time, 2) determine the severity of blister rust infection, and 3) estimate tree survival, taking into account infection of blister rust, mountain pine beetle, dwarf mistletoe, and fire. These objectives are intended to determine if white pine blister rust is increasing within the GYA and if the resulting mortality of whitebark pine is sufficient to warrant consideration of management intervention (e.g., active restoration). These objectives will also allow a direct determination of the vulnerability of whitebark in the GYA to blister rust rather than estimating the impact based on information from other areas (Greater Yellowstone Whitebark Pine Monitoring Working Group 2005).

In 2004, 51 transects were established and monitored inside the PCA by the Greater Yellowstone Whitebark Pine Monitoring Working Group. They estimated that about 19 percent of the trees in the PCA were infected with blister rust. Although blister rust was relatively widespread throughout the PCA, the infection severity was relatively low. As for mountain pine beetles, less than 1 percent of the live trees examined showed evidence of infestation, while about 27 percent (94 of 348) of the dead trees showed evidence of successful mountain pine beetle attack (Greater Yellowstone Whitebark Pine Monitoring Working Group 2005).

In 2005, 76 transects were established and monitored outside the PCA. Preliminary results indicate that approximately 27 percent of the trees examined outside the PCA were infected with blister rust. Combining the information from 2004 and 2005, about 25 percent of the trees sampled in the GYA were infected with blister rust. In most cases, both inside and outside the PCA, the number of cankers per tree was low with approximately 73 percent of the infected trees having two or fewer cankers, 80 percent of which were branch cankers. Branch cankers are generally considered to pose less threat to trees than cankers located on the trunks (Greater Yellowstone Whitebark Pine Monitoring Working Group 2006). Information on the mountain pine beetle infestation outside the PCA in 2005 will be included in the final report.

Established transects both inside and outside the PCA will be monitored on a regular basis. A final determination on how to stratify the sampling of these transects will be part of the final report for the 2005 season (Greater Yellowstone Whitebark Pine Monitoring Working Group 2006).

The Greater Yellowstone Whitebark Pine Monitoring Working Group is also considering evaluating the recruitment of whitebark into the population and the effects of forest succession on existing whitebark pine. "Persistence of whitebark pine within the GYE depends on not only the survival of seed-producing trees, but also the recruitment of immature trees to the seed producing segment of the population. Monitoring changes in survival could result in misleading conclusions without some knowledge of the extent to which increased mortality is offset by recruitment." A better understanding regarding the degree to which shade-tolerant conifers are replacing whitebark could provide insights for potential restoration management (Greater Yellowstone Whitebark Pine Monitoring Working Group 2005).

Increasing numbers of whitebark pine have been killed in the Northern Rockies during the past five years due primarily to drought and mountain pine beetle. Indications are that warmer than normal temperatures have increased mountain pine beetle activity. There are approximately 1 million acres of whitebark pine dominated forested stands in the GYA. In 2005 about 16 percent of those acres were identified as containing some level of mountain pine beetle-caused mortality. Over 700,000 whitebark pine trees were identified as having been killed in 2004 (recorded as faders in 2005, Figure 45). These estimates were recorded in 2005 during annual aerial detection surveys by the Forest Service's Forest Health Protection Group. Surveys in the GYA are conducted annually but not all areas are surveyed each year. Unusually high populations of mountain pine beetle have been noted in most areas only during the last four to five years. Total whitebark mortality over the last five years from mountain pine beetle is not available as data from preceding years are not additive. Currently fading trees may be recorded as tree mortality on many of the acres in succeeding years (Gibson 2006).

In 2005, Forest Service specialists flew over much of the GYA. Estimates of tree mortality and other damages are made from about 1,000 feet above ground level; specialists make visual observations of species affected, number affected, geographic location, and type and cause of damage. This is an overview survey rather than a detailed, precise assessment. Although there is some level of precision, care must be taken in the interpretation of the data since most of the damage is not verified on the ground. Damage is for those trees that are apparent from the air, so it tends to be the larger trees that extend into the upper canopy when multiple layers exist. Even in more open stands, smaller diameter individuals are usually not noted because of their size. The mountain pine beetle does not normally attack these smaller trees (DeNitto 2006).

The impact of this mountain pine beetle-caused mortality is difficult to discern. While the current outbreak is unusual, it is likely not unprecedented. A similar series of mountain pine beetle outbreaks occurred in the 1930s in southeastern Idaho, southwestern Montana, and Yellowstone National Park when temperatures were also unusually warm. Although few records are available documenting the extent of those outbreaks, by most accounts, those outbreaks were similar to the current one. A 1934 report for Yellowstone National Park indicated that almost every stand of whitebark pine was infested with mountain pine beetle (Gibson 2006). Other factors such as white pine blister rust and warming temperatures may influence the trajectories of these ecosystems in different ways than past bark beetle epidemics (DeNitto 2006).

Figure 45. Estimated acres of whitebark pine dominated forest stands (WBP) in the GYA, estimated acres infested with mountain pine beetle (MPB), and estimated tree mortality as recorded in 2005 during annual aerial detection surveys conducted by the Forest Service, Forest Health Production Group (Gibson 2006).

Administrative unit	Acres of WBP	WBP infested acres (2005)	Estimated faders (trees killed in 2004)	Average trees per acre killed in 2004¹
Custer National Forest	68,700	1,087	1,300	1.2
Beaverhead National Forest	108,800	42,411	136,600	3.2
Bridger-Teton National Forest	115,000	34,373	131,100	3.8
Gallatin National Forest	256,100	20,316	37,500	1.8
Shoshone National Forest	232,000	41,746	43,700	1.0
Targhee National Forest	56,000	1,982	3,900	1.9
Grand Teton National Park	9,300	Not Flown	Not Flown	--
Yellowstone National Park	218,700	29,215	365,200	12.5
Total	1,064,600	171,160	719,300	4.2

¹ Average trees per acre killed in 2004 within the acres infested by mountain pine beetle (column 4 divided by column 3).

Because it is a high elevation species, management actions to improve or restore whitebark are limited to prescribed burning and hand planting of rust resistant whitebark pine for remote areas; a wide variety of silvicultural and prescribed burning techniques are available if restoration sites are near roads. Keane and Arno (2001) have been researching methods of restoring declining whitebark pine stands for 10 years and their results show promise. Wildland fire use (naturally ignited fires that are not suppressed for resource benefit) appears to be the most practical tool for whitebark pine restoration in the GYA because of its roadless setting. It appears that the single greatest process for ensuring the continued presence of whitebark pine on the landscape is to maintain the flow of propagules (seeds) across the landscape and this is only possible if the Clark's nutcrackers (the only dispersal agent) can cache these seeds in disturbed areas. Planting burned areas with apparent rust-resistant seedlings would accelerate the restoration process. Managers are collecting cones from trees that appear to be rust resistant. The Greater Yellowstone Whitebark Pine Subcommittee is currently developing restoration decision guidelines for whitebark pine in the GYA. These guidelines are designed to help managers determine which attributes to consider when evaluating the condition of whitebark pine communities and to determine when, where, and if restoration should occur (Jenkins 2005).

Additional research may identify other opportunities to maintain or improve whitebark pine stands.

Effects of All Alternatives on Forest Vegetation

Across the national forests in the GYA, the overall composition and structure of the different forest types would not be expected to change much in any alternative due to motorized access restrictions affecting potential vegetation treatments. Vegetation treatments would affect only about 0.1 percent of the National Forest System lands in Alternatives 1, 2, and 2-Modified. Within the suitable timber base and based on historical harvest rates in the past 17 years, about 6 percent of the area would be treated in one decade (about 98,000 acres out of the 1,500,000 acres in the suitable timber base). This can help improve conditions for some of the key forest types such as aspen and lodgepole pine within the suitable timber base. Because of restrictions to access to the suitable timber areas, Alternatives 3 and 4 would likely treat fewer acres and there would be less opportunity to improve conditions for some of the key forest types, such as aspen, ponderosa pine, and lodgepole pine. These restrictions under Alternative 4 would result in about 33 percent fewer acres being potentially treated than Alternatives 1, 2, and 2-Modified; Alternative 3 would be potentially about 10 percent less.

Prescribed fire and fire use would be the most significant methods to improve or maintain composition and structure in the GYA. About 170,000 acres, or a little over 1 percent, of the GYA national forests and Yellowstone National Park are affected each year through fire use or wildland fire. This number is variable, depending on drought and other factors. None of the standards for grizzly bear habitat management in any of the alternatives would directly affect vegetation by restricting prescribed fire or fire use (section 3.6.2).

Effects on Whitebark Pine

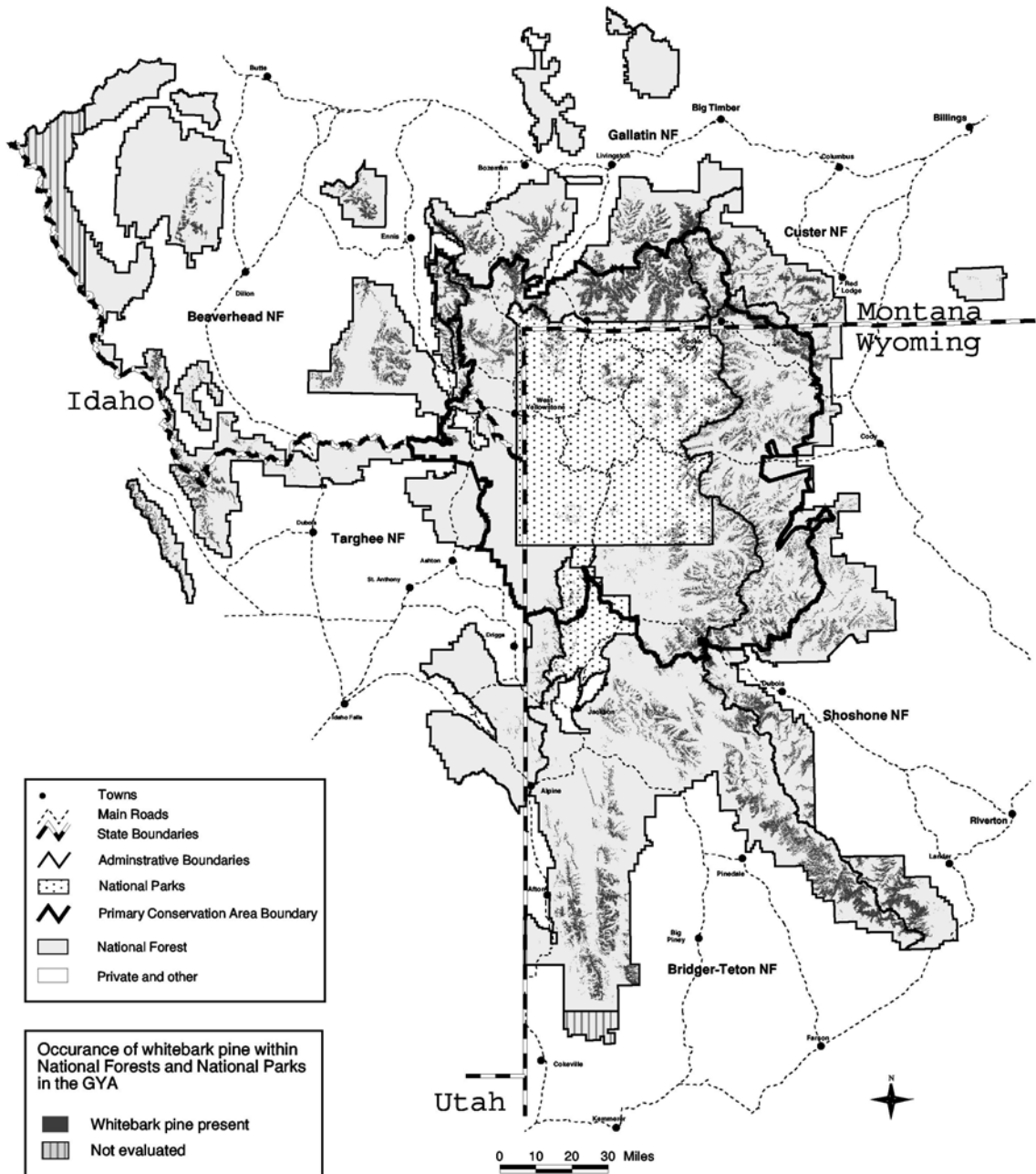
Alternative 1 emphasizes whitebark pine management as described in the Guidelines and through current efforts with the Greater Yellowstone Whitebark Pine Subcommittee and the Greater Yellowstone Whitebark Pine Monitoring Working Group. These efforts include selection of rust-resistant whitebark pine and monitoring occurrence of whitebark pine blister rust and mountain pine beetle, as well as identifying those areas where whitebark pine is in the greatest danger of decline.

In Alternative 2, the efforts described for Alternative 1 could continue through agreements or cooperative action with other agencies; no assurances are stated in the proposed action.

In Alternative 2-Modified, the efforts described for Alternative 1 would continue because Guideline 4 would emphasize maintaining and restoring whitebark pine stands inside and outside the PCA. Alternative 2-Modified would apply to a larger area because direction under Alternative 1 is limited to the PCA. This emphasis may lead to improved conditions for whitebark pine if additional funds are available for research or restoration activities.

Alternative 3 emphasizes the maintenance of whitebark pine through an additional formalized standard inside the PCA, while Alternative 4 extends this standard to additional areas outside the PCA. This emphasis may lead to improved conditions for whitebark pine inside the PCA under both Alternatives 3 and 4 and also outside the PCA under Alternative 4 if additional funds are available for research or restoration activities.

Figure 46. Estimated distribution of whitebark pine on national forests and national parks in the GYA (Produzny et al. 2004).



3.6.1 Timber Management

Timber management provides one of the tools (the others are prescribed fire and fire use) to restore vegetative conditions, reduce hazardous fuels, and treat insect and disease infestations, as well as provide wood products for local communities. Since the existing forest plans were approved, two forests have revised the ASQ (allowable sale quantity) through either amendments or revisions (Shoshone and Targhee National Forests). Harvesting is not allowed in about 78 percent of the National Forest System lands in the PCA—it is unavailable, either through wilderness designations (64 percent) or in a management area that does not emphasize timber harvesting. For lands within the Alternative 4 area outside the PCA, timber harvesting is not allowed in 61 percent of those areas. Of that, 43 percent is wilderness.

Timber management goals, objectives, and standards were identified in existing forest plans for each forest along with a numerical upper limit for timber harvest, or ASQ. Timber quantities were expressed either by board feet or by acres treated. This number is considered a ceiling of the maximum amount of timber to be harvested per decade.

Forest Plan Direction Related to Timber Management inside the PCA

Beaverhead National Forest

Inside the PCA, the Beaverhead National Forest does not have any acres suitable for timber management and does not treat or harvest any lands.

Bridger-Teton National Forest

Approximately 90 percent of the Bridger-Teton National Forest within the PCA is designated as wilderness or is in a management area that does not allow timber harvesting. Since implementation of the Guidelines, the Forest has averaged less than 100 acres treated per year.

Custer National Forest

Approximately 96 percent of the Custer National Forest within the PCA is designated wilderness. Eighty-one percent of the non-wilderness portion of the PCA is allocated to management areas that discourage road development. No timber harvesting has occurred inside the PCA in the last 17 years.

Gallatin National Forest

The Gallatin Forest Plan includes a standard for the recovery zone that states, “within Bear Management Subunits (unless allowed through consultation with the USFWS): 1) do not increase open motorized access route density from the current [1995] level, 2) do not increase total motorized access route density from the current level, and 3) do not decrease the amount of core area(s) from the current level.” Treatment levels have been around 1,000 acres per year since the implementation of the Guidelines. From 2000 to 2002, the Gallatin National Forest has averaged about 200 acres per year inside the PCA with this standard in place.

Shoshone National Forest

Approximately 76 percent of the PCA is designated wilderness on the Shoshone National Forest. Inside the PCA, the Forest averaged about 50 acres treated per year from 2000 to 2002, and about 400 acres treated per year since the Guidelines were implemented. The Forest had several large sales after the 1988 fire season. In 1994, the Shoshone Forest Plan implemented a standard for no net increase in roads, which is similar to the requirement for mitigation if secure habitat is changed.

Targhee National Forest

The Targhee National Forest has the most land suitable for timber harvest in the PCA of any GYA national forest. About 53 percent is in a management category that would allow timber harvest. During the 1980s, harvest levels were high to address the mountain pine beetle epidemic. The Forest is harvesting much less timber in recent years than the past decade—from 1,600 acres per year down to around 100 acres per year inside the PCA. Timber harvest is allowed only under

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conditions that maintain the grizzly habitat as first priority. Grizzly bear coordination requirements may not make it feasible to remove the timber.

Summary of Areas with Timber Harvest Emphasis

Figure 47 displays the percent of each forest where timber harvest is allowed or emphasized as determined by management area category designation inside the PCA and in Alternative 4 areas outside the PCA.

Figure 47. Percent of each of the GYA national forests where timber harvest is allowed or emphasized as determined by management area category inside the PCA and Alternative 4 areas outside the PCA¹.

Management area categories inside the PCA	BNF	BTNF	CNF	GNF	SNF	TNF	Total
Categories 1, 2, and 3 (no timber harvesting emphasis)	100.00%	91.1%	98.6%	81.8%	76.4%	46.1%	77.8%
Categories 4, 5, 6, and 8 (timber harvesting may be allowed or emphasized)	0.0%	8.9%	1.4%	18.2%	23.6%	53.9%	22.2%
Management area categories in the Alternative 4 area outside the PCA							
Categories 1, 2, and 3 (no timber harvesting emphasis)	57.3%	80.5%	77.4%	65.0%	44.4%	49.2%	60.9%
Categories 4, 5, 6, and 8 (timber harvesting may be allowed or emphasized)	42.7%	19.5%	22.6%	35.0%	55.6%	50.8%	39.1%

¹Management Area Categories 4 and 5 emphasize timber harvest.

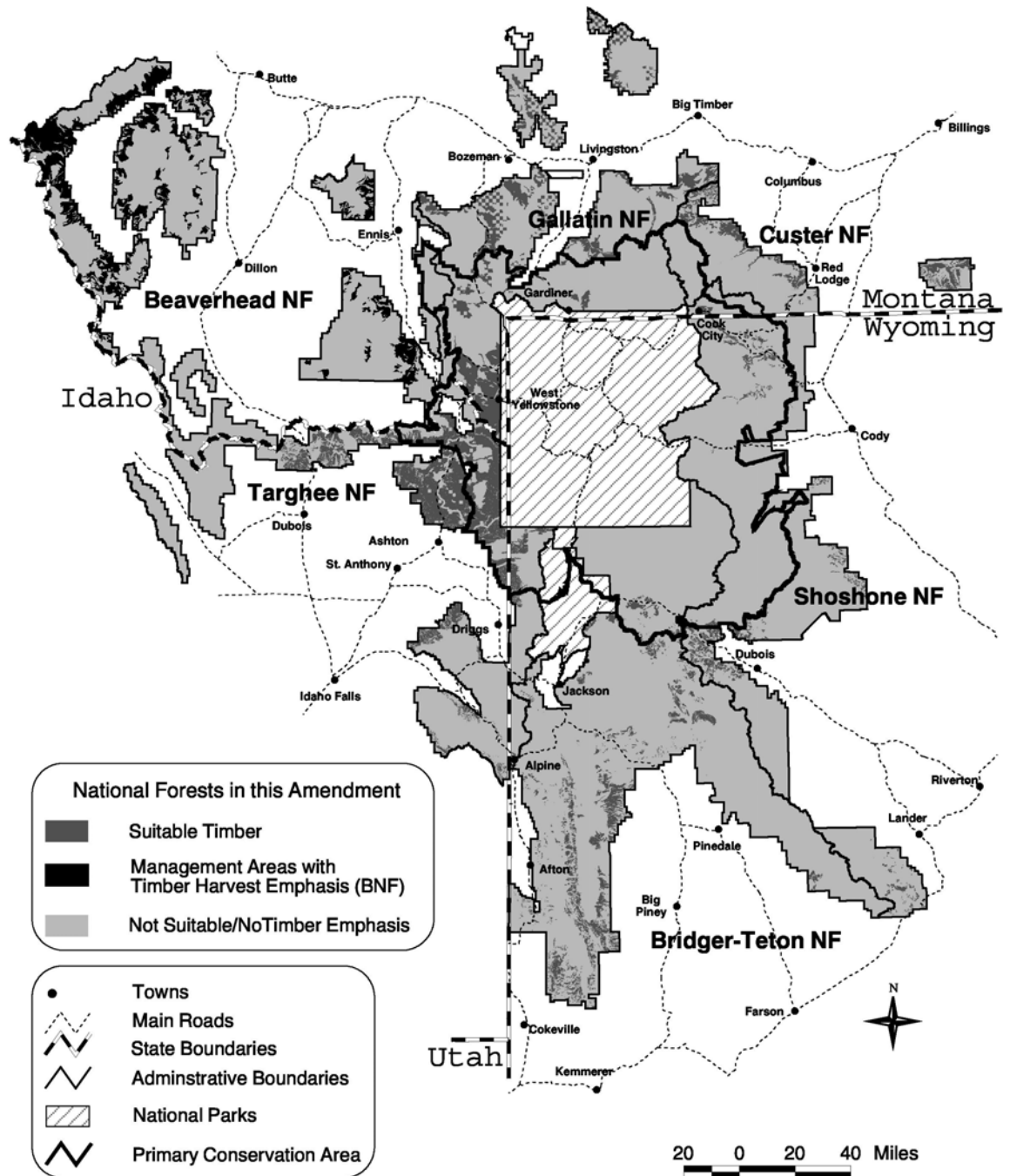
Suitable timberlands (Figure 48 and Figure 49) are those lands that are capable and available for timber harvest and are in a management area category that would emphasize timber harvesting. Suitable areas for timber harvesting would occur in Management Area Categories 4 and 5. Categories 6 and 8 include rangelands and campgrounds where timber harvesting does not occur except for salvage or other reasons.

Figure 48. Acres suitable for timber harvest inside and outside the PCA by secure habitat and forest.

Suitable acres inside the PCA	BNF¹	BTNF	CNF	GNF	SNF	TNF	Total
Secure habitat	0	6,800	400	38,700	13,600	96,900	156,000
Not secure habitat	0	6,900	700	105,800	13,800	125,300	252,000
Total	0	13,700	1,000	144,600	27,400	222,000	408,800
Suitable acres outside the PCA							
Secure habitat	83,300	85,800	56,000	81,600	12,300	108,000	427,000
Not secure habitat	142,200	126,400	33,700	130,300	46,200	171,200	649,800
Total	225,500	212,200	89,700	211,800	58,500	279,300	1,077,000

¹Suitable acres for the Beaverhead National Forest are estimated.

Figure 49. Suitable timberlands in five of the GYA national forests, and management areas that emphasize timber harvest for the Beaverhead National Forest.



Historical Harvest of Timber

Figure 50 displays acres harvested from 1986 through 2002, followed by a display of acres harvested within the PCA. This period was chosen because 1986 is the year the Guidelines were implemented and is indicative of the level of harvest under this direction. The period 2000 through 2002 is also displayed and was chosen to demonstrate recent downward trends. The number of acres annually treated through timber harvesting has been variable in recent years.

Figure 50. Average acres treated per year by timber harvesting 1986 through 2002 and 2000 through 2002 for inside and outside the PCA.

Average acres treated per year inside the PCA	BNF	BTNF	CNF	GNF	SNF	TNF	Total
1986 through 2002	0	100	0	370	400	1,600	2,510
2000 through 2002	0	30	0	40	50	110	230
Average acres treated per year outside the PCA							
1986 through 2002	1,520	1,400	70	1,070	480	2,840	7,340
2000 through 2002	300	410	130	200	0	200	1,230

Effects on Timber Management

Each alternative would have varying effects on land managers’ abilities to treat forest vegetation using timber harvest. As stated elsewhere in this document, this is a programmatic decision that does not identify site-specific actions. Therefore, the comparison of alternatives described here is based on generalized effects associated with the secure habitat standard. Effects are analyzed in terms of differences from the no action alternative.

Based on direction in the National Fire Plan, the Healthy Forests Initiative, and the Healthy Forests Restoration Act of 2003, the Forest Service has initiated proposals for maintaining or restoring healthy forests and lands by reducing heavy fuel loading and insect and disease risks. Management of vegetation and reduction of fuels loads is generally emphasized around structures. Effects of the all alternatives on treating vegetation around structures is discussed in section 3.6.3.

Each alternative would provide varying amounts of secure habitat that would affect land managers’ abilities to access suitable timberlands and respond to needs created by fire, windthrow, and insects and disease. Each alternative would have indirect effects on vegetation and the timber resource. Access is necessary to respond to forest health needs, to manage vegetation to achieve restoration goals, and to provide commodity outputs. The programmatic effects on vegetation and the timber resource were measured as a loss of administrative access to suitable acres. See section 3.13.3 for a discussion of the potential impacts to the communities within the analysis area.

Figure 51 and Figure 52 used changes in suitable acres to indicate the degree of change in access for vegetation and timber management. The percent of acres treated is in comparison to Alternative 1.

Figure 51. Average acres treated under Alternative 1 and the percent of acres potentially treated in each action alternative, in comparison to Alternative 1, by national forest.

	BNF	BTNF	CNF	GNF	SNF	TNF	Total
Alternative 1 (1986 through 2002)	1,520 acres	1,490 acres	70 acres	1,430 acres	880 acres	4,480 acres	9,870 acres
Alternative 2	100%	100%	100%	100%	100%	100%	100%
Alternative 3	100%	97%	100%	90%	74%	84%	88%
Alternative 4	74%	84%	72%	62%	64%	61%	67%

Figure 52. Average acres treated under Alternative 1 and the percent of acres potentially treated in each action alternative, in comparison to Alternative 1, inside and outside the PCA.

	Inside PCA	Alternative 4 area outside the PCA	Outside Alternative 4 area and outside PCA	Total
Alternative 1 (1986 through 2002)	2,510 acres	4,610 acres	2,760 acres	9,870 acres
Alternative 2	100%	100%	100%	100%
Alternative 3	54%	100%	100%	88%
Alternative 4	54%	54%	100%	67%

Effects of Alternatives 1 and 2 on Timber Management

Alternative 1 represents vegetation management under the Guidelines and establishes the baseline for comparing alternatives. Since implementation of the Guidelines, vegetation management has been limited to those activities that did not adversely affect grizzly bears. For all six GYA national forests, nearly 10,000 acres have been treated each year through timber harvesting since 1986, although in the three-year period from 2000 through 2002, only 1,400 acres were treated annually. This does not include treatments of vegetation through prescribed fire. The 10,000 acres represent 0.1 percent of the area of National Forest System lands in the GYA and 1 percent of the suitable acres. A review of five-year vegetation treatment plans indicates that this number may increase from the past three years, but is expected to be within the seventeen-year average, with vegetation treatment expected to be around 5,000 to 10,000 acres per year in order to address insect, disease, and fuel hazard concerns.

Alternative 1 allows timber harvesting to occur at a time and season only when the area is of little or no importance to grizzly bears and restricts harvesting when the areas are important to the bears. This usually implies a limit on the duration of the activity or the timing of that activity. These restrictions may not change the amount of acres harvested, but may increase the cost of operations.

Alternative 2 would implement the standards for the Conservation Strategy. It would provide about the same amount of flexibility in treating vegetation as Alternative 1. Because the secure habitat standard allows a 1 percent temporary reduction in secure habitat, timber harvesting activities that take place under the Guidelines could take place in this alternative. Temporary reductions in secure habitat could occur if all of the following conditions are met:

- Only one project is active per grizzly subunit at any one time.
- The total acreage of active projects within a given BMU would not exceed 1 percent of the acreage in the largest subunit within that BMU (appendix A). The acreage of a project that counts against the 1 percent limit is the acreage associated with the 500-meter buffer around

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any gated or open motorized access route or recurring low-level helicopter flight line, where the buffer extends into secure habitat.

- Secure habitat would be restored within one year after completion of the project.

A 1 percent change in secure habitat means, on average, that about 2,000 acres of secure habitat could be temporarily changed in a BMU subunit since BMU subunits average around 200,000 acres. Most timber sale and mechanical treatment activities are temporary in nature and would fit within this standard. Additionally, road decommissioning would occur within one year after project completion. Harvesting activities, other than road construction, do not affect secure habitat. Road construction and motorized access routes affect secure habitat at the rate of 500 meters either side of an access route. This means that up to five miles of temporary road could be constructed within each subunit to access areas for vegetation management.

Almost all harvesting activities that have taken place in the last 15 years could still take place within this standard. A condition is that the roads would be decommissioned after construction, and not just gated and closed. During the last decade, the rate of road decommissioning has been greater than the rate of road construction both inside and outside the PCA, indicating that the past level of harvesting activities would be consistent with the 1 percent temporary change in secure habitat.

The Application Rules also allow changes in secure habitat on a permanent basis if habitat is appropriately mitigated.

- A project may permanently change secure habitat provided that replacement secure habitat of equivalent habitat quality is provided in the same grizzly subunit.
- Mitigation for loss of secure habitat due to road construction would likely be available because of the amount of road decommissioning that has been accomplished since 1998 and could be used to mitigate future road construction. Additional road decommissioning is expected in order to address soil and water concerns. Mitigation would be needed only to access areas with more than five miles of road construction.
- Vegetation activities and road construction in habitat that was not secure would not be affected by this standard.

In the long term, a reduction in access to suitable acres could occur in Alternative 2 if managers needed permanent access to an area and mitigation were not available. Projects could potentially be limited in size if needed temporary access exceeded the 1 percent rule and no roads were available to decommission for permanent mitigation. Treating multiple areas within a subunit for insect infestations could be limited, as only one project at a time is allowed in a subunit.

Under Alternative 2, more flexibility would be allowed in the timing and duration of timber sale activities than Alternative 1 because limits on project length and timing of activities in important bear habitat would not apply. These timing restrictions are part of the 1986 Guidelines or directed through consultation with the USFWS but are not a guideline in Alternative 2. Alternative 2 would provide slightly more flexibility in treating vegetation than Alternative 1, but would likely have no effect on changes in outputs when compared with Alternative 1.

Alternative 2 would not alter the desired future condition of the land and resources or the anticipated goods and services to be produced when compared with Alternative 1.

For Alternative 1, the standards and guidelines in the 1997 Revised Targhee Forest Plan meet the intent of maintaining secure habitat levels.

Effects of Alternative 2-Modified on Timber Management

Effects of Alternative 2-Modified on timber management are similar to Alternative 2. Alternative 2-Modified adds clarification on the definition of a temporary project, and also a recommendation on the timing of projects:

- To qualify as a temporary project, implementation would last no longer than three years.

- Project activities should be concentrated in time and space to the extent feasible to minimize disturbance.

Alternative 2-Modified is generally consistent with Alternative 1. Both alternatives provide guidance on timing of logging activities. Where Alternative 1 provides direction for logging to occur at a time when the area is of little or no biological importance to grizzlies, Alternative 2-Modified states, “project activities should be concentrated in time and space to the extent feasible.” Logging activities would be expected to continue under either alternative. The three-year temporary project length is similar to what is followed by the national forests as recommended through consultation with USFWS and would not alter the amount of acres treated from what has occurred in the past 17 years.

Overall, Alternative 2-Modified would have no effect on timber outputs when compared with Alternative 1. Alternative 2-Modified would not alter the desired future condition of the land and resources or the anticipated goods and services to be produced when compared with Alternative 1.

Effects of Alternative 3 on Timber Management

Alternative 3 would not allow any temporary changes in secure habitat inside the PCA. Without the 1 percent temporary change allowed in Alternative 2, land managers’ abilities to access suitable timberlands and respond to needs created by fire, windthrow, and insects and disease would be reduced by nearly half of the 2,500 acres treated per year (46 percent) inside the PCA. Overall, this would result in a 12 percent reduction—or 1,200 acres—in treatment of lands for all six GYA national forests. Timing restrictions on timber harvesting in important bear habitat would apply.

Timber stands on these forests typically yield about 10 thousand board feet (MBF) per acre. Loss of about 1,200 acres per year would result in 12 million board feet (MMBF) per year. The recent trend in harvesting has been down in the last three years—about one-tenth of that total. Effects could range from one to 12 MMBF per year. Forest expectations are that harvest may increase to address fuel loadings, especially those areas that are near structures in the PCA. Economic effects of this loss are discussed in section 3.14.

Even though nearly half the acres would no longer be accessible, a significant portion of the treatment of acres would take place on suitable acres that are not secure either outside the PCA or inside the PCA. This alternative would not affect treatment of acres on lands that are not secure inside the PCA unless those lands are inventoried roadless areas.

Suitable timberlands in inventoried roadless areas, regardless of whether they are secure, are assumed not to allow timber harvesting.

On the Beaverhead, Bridger-Teton, and Custer National Forests, Alternative 3 would have little or no effect when compared with Alternative 1 because timber harvest is not permitted or is at low levels inside the PCA.

On the Gallatin, Shoshone, and Targhee National Forests, a 10 to 25 percent loss in treatment of acres would be expected with the most potential loss of acres on the Shoshone National Forest.

Effects of Alternative 4 on Timber Management

Alternative 4 would not allow temporary changes in secure habitat inside the PCA and in additional areas bound by Alternative 4. Without the 1 percent temporary change, land managers’ abilities to access suitable timberlands and respond to needs created by fire, windthrow, and insects and disease would be reduced by nearly half of the 6,000 acres treated per year (46 percent) for those areas inside Alternative 4. Some suitable acres outside Alternative 4 would not be affected. Overall, this would result in a one-third reduction—or 3,300 acres—in treatment of lands for all six GYA national forests. Timing restrictions on timber harvesting in important bear habitat would apply.

Timber stands on these forests typically yield about 10 thousand board feet (MBF) per acre. Loss of about 3,300 acres per year would result in 33 million board feet (MMBF) per year. The recent downward trend in harvesting has resulted in less than 20 percent of the past 17 years' annual average harvest. Effects could range from six to 33 MMBF per year. Forest expectations are that harvest may increase to address fuel loadings, especially in those areas that are near structures in the PCA. Economic effects of this loss are discussed in section 3.14.

This alternative would not affect treatment of acres on lands that are not secure, unless those lands are in an inventoried roadless area. Suitable timberlands in inventoried roadless areas are assumed not to allow timber harvesting, regardless of whether they are secure for areas defined by Alternative 4. About 20 percent of the suitable acres are in inventoried roadless areas that is not secure habitat, but would become secure habitat under Alternative 4 and could not be harvested.

For all six GYA national forests, a 16 to nearly 40 percent loss in treatment of acres would be expected in Alternative 4. The Bridger-Teton would be least affected by this alternative because a large portion of the suitable acres for the Forest is not in areas covered by Alternative 4. The Gallatin, Shoshone, and Targhee National Forests would be most affected, with Alternative 4 reducing acres treated by nearly 40 percent. Much of the suitable timberlands for these forests are included in Alternative 4. The Beaverhead and Custer would anticipate a one-fourth reduction in acres treated.

3.6.2 Fire and Fuels

Affected Environment

This section presents the existing conditions of the fire regime and condition class as they relate to fire management. For a general vegetation description in the GYA, see section 3.6. Nearly all of the vegetation in the GYA has burned at one time or another. All of the major plant communities have adaptations to fire, although some plant communities ignite and carry fire more readily than others. Conditions under which any given vegetation community will burn vary, depending on a wide variety of parameters including temperature, humidity, and vegetation type.

Based on direction in the National Fire Plan, the Healthy Forests Initiative, and the Healthy Forests Restoration Act of 2003, the Forest Service has initiated proposals for maintaining or restoring healthy forests and lands by reducing heavy fuel loading and insect and disease risks. Management of vegetation and reduction of fuels loads is generally emphasized around structures.

Although only a small portion of National Forest System lands could be treated for fuels in any alternative, strategic placement of fuels treatments can affect the intensity and pattern of wildland fires. Treatment of areas in the wildland urban interface is of particular concern because of communities at risk from destruction of wildland fire, such as Cooke City or West Yellowstone, Montana. National Forest System lands within 1½ miles of structures are defined as areas in the wildland urban interface, or WUI.

Within the GYA, three natural (historical) fire regimes are classified based on the average number of years between fires (fire frequency) combined with the severity (amount of replacement) of the fire on the dominant overstory vegetation²².

- Fire regime I—0 to 35 year frequency
- Fire regime II—35 to 100+ year frequency
- Fire regime III—200+ year fire frequency

Condition class (CC) is a classification of the amount of departure from the natural regime (Hann and Bunnell 2001). The classification is based on a relative measure describing the degree of departure from the historical natural fire regime. The three classes are based on low (CC 1),

²² For more information about fire regimes and condition classes see <http://www.frcc.gov/>

moderate (CC 2), and high (CC 3) departure from the central tendency of the natural (historical) regime. Low departure is considered to be within the historical range of variability while moderate and high departures are outside. An analysis of the national fire regime and condition class data sets provided the following results²³:

Figure 53. Fire regime and condition class within the PCA (including Yellowstone National Park).

Fire regime	Condition class 1		Condition class 2		Condition class 3	
	Acres	Percent	Acres	Percent	Acres	Percent
I	46,000	1	180,000	3	84,000	1
II	1,581,000	27	2,110,000	37	141,000	2
III	1,359,000	24	0	0	0	0
Total	2,986,000	52	2,290,000	40	225,000	3

The remaining 4 percent of the area is agricultural or non-vegetated lands. Not all combinations are present in the GYA. Of concern to resource managers is that 3 percent of the area is in CC 3 (high departure from historic fire regimes) and 40 percent is in CC 2 (moderate departure from historic fire regimes).

Figure 54. Fire regime and condition class for Alternative 4 (including the PCA and Yellowstone National Park)¹.

Fire Regime	Condition Class 1		Condition Class 2		Condition Class 3	
	Acres	Percent	Acres	Percent	Acres	Percent
I	122,000	1	481,000	4	206,000	2
II	3,414,000	28	3,686,000	31	470,000	4
III	2,958,000	25	0	0	0	0
Total	6,494,000	54	4,167,000	35	882,000	6

¹These results are a general representation of the situation in the GYA. The data was compiled for national planning and analysis.

CCs 2 and 3 are the primary concerns. The potential concerns are departure of fire behavior, effects, and other associated disturbances; composition and structure of fuel and fire; and risk to key ecosystem components.

Approximately 2.9 million acres of the PCA are in CC 1, 2.3 million acres are in CC 2, and 0.23 million acres are in CC 3. The majority of CCs 2 and 3 are within Yellowstone National Park or wilderness areas. The areas that do extend into general forest or to the edge of national forest ownership are mostly rural in nature. Approximately 6.5 million acres of Alternative 4 (including the PCA) are in CC 1, 4.1 million acres are in CC 2, and 0.68 million acres are in CC 3. This additional acreage is adjacent to private lands and WUI (Figure 55).

Lightning is the most frequent cause of fire and burns the most acres (Figure 56). Fire history information was analyzed for the period 1986 to 1996 (USDA Forest Service 1999b).

²³Available on the Web at <http://www.fs.fed.us/fire/fuelman/>

Figure 55. Fire condition class in the six GYA national forests.

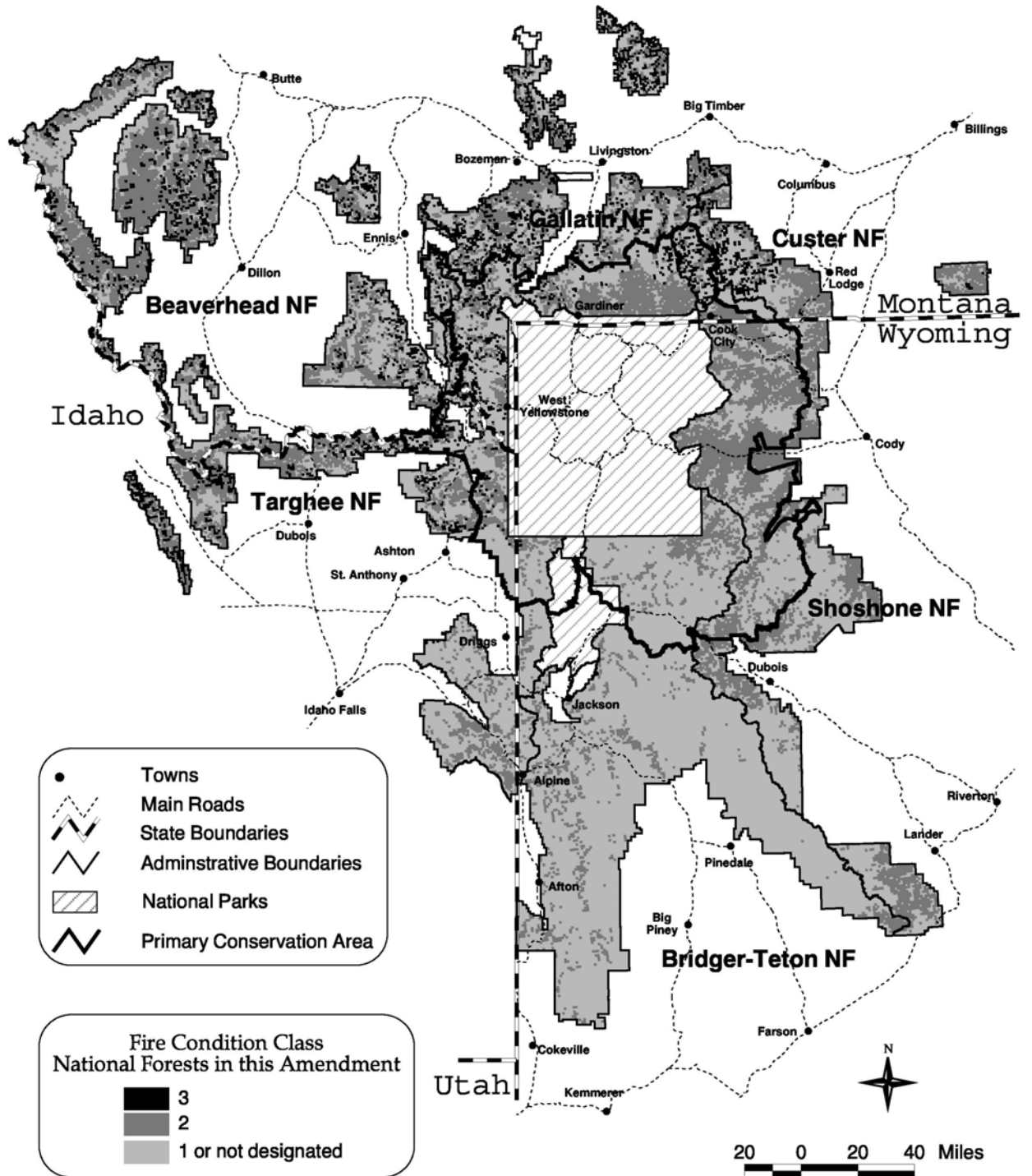


Figure 56. Fire occurrence (1986 through 1996).

Within the PCA (including Yellowstone National Park)				
Cause	Acreage	Percent	Number of fires	Percent
Lightning	1,033,117	56	451	58
All other	807,595	44	325	42
Alternative 4 area outside the PCA				
Lightning	25,630	70	536	55
All other	11,143	30	429	45

Effects on Fire and Fuels*Effects of Alternatives 1, 2, and 2- Modified on Fire and Fuels*

Alternatives 1, 2, and 2-Modified are consistent with current wildland fire management, prescribed fire, or fuels management activities. As demonstrated in Figure 56, the majority of wildfires are started by lightning and those fires burn the most acreage. The objectives, standards, and guidelines proposed in Alternatives 2 and 2-Modified would have little effect on fire starts or acreages burned. Roads currently available would remain available for use. Wildland fire management activities do not create roads and would have no impact on secure habitat. Dozer lines that may be created as part of wildland fire activities are rehabilitated as part of normal fireline operations and would not reduce secure habitat.

Because the same number of acres can be treated under these three alternatives, Alternatives 2 and 2-Modified would have no effects on mechanical treatment of fuels when compared to Alternative 1. For Alternatives 2 and 2-Modified, the Application Rule would allow up to nearly five miles of road to be temporarily built for fuels treatment in a subunit at one time. This would generally be more than adequate to treat fuels within 1½ miles of structures or communities. The current efforts to return CCs 2 and 3 to CC 1 would not be impacted based on the ability to utilize the 1 percent change in secure habitat to facilitate project accomplishment. There may be some instances where a mechanical fuels reduction project may be constrained due to the secure habitat standard limits on multiple projects within a subunit or size of individual projects.

Effects of Alternative 3 on Fire and Fuels

Alternative 3 would have limited effect on wildland fire management activities in those units that would close roads to meet the secure habitat standard, as described in Alternative 3. The closure of about 500 miles of road could lead to longer response times and larger fires in several BMU subunits. Wildland fire management activities do not create roads and would have no impact on secure habitat. Dozer lines that may be created as part of wildland fire activities are rehabilitated as part of normal fireline operations and would not reduce secure habitat.

Alternative 3 would allow 10 percent fewer acres to be mechanically treated than Alternatives 1, 2, or 2-Modified. Mechanically treated acres within the PCA would be reduced by nearly 50 percent because no temporary reduction in secure habitat would be allowed. Mechanical treatment (with heavy equipment) of fuels more than 500 meters from a road would not be allowed. Some structures and communities occur within the PCA, such as the North Fork of the Shoshone River and Crandall in Wyoming, and Cooke City and West Yellowstone in Montana. These areas are also considered to be in or surrounded (completely or in part) by CC 2. Alternative 3 would limit the ability to mechanically treat, with heavy equipment, hazardous fuels in these areas if secure habitat is present and treatment is needed more than 500 meters from a road. Use of prescribed fire and mechanical treatment (without heavy equipment) would be permitted inside and outside the 500-meter buffer.

The road closures required to implement the secure habitat standard may require projects be dropped or delayed because of the lost access. Prescribed fires and mechanical fuels treatments

Vegetation

are typically conducted without the construction of new roads, but often require road access. Activities related to preparing a site for burning such as fire line construction or fuelbed modification are consistent with the requirement to maintain secure habitat.

Implementing treatments in those subunits that do not meet the 70 percent secure habitat standards may see an increased cost when roads are closed to meet the secure habitat standard. For example, areas that might have been ignited by drip torch (handheld ignition device) or terra torch (trailer-mounted torch) may have to be ignited with a helitorch (ignition device suspended from a helicopter), which is significantly more expensive. In the PCA, increased fuel loadings and larger, more intense fires may be expected as an effect of implementing Alternative 3.

Effects of Alternative 4 on Fire and Fuels

Alternative 4 would have the greatest effect on wildland fire management activities in those units that would close roads to meet the secure habitat standard. The estimated number of roads closed to meet this standard in Alternative 4 is about 1,850 miles. The closure of these roads could lead to longer response times and larger fires across the GYA based on current fire management capabilities. Access for firefighters can still be accomplished via aerial delivery (helicopter or airplane (smokejumpers) and currently firefighters respond to fires on foot as well. Currently, every wildland fire is evaluated for potential impacts and managed appropriately. Wildland fire management activities do not create roads and would have no impact on secure habitat. Dozer lines that may be created as part of wildland fire activities are rehabilitated as part of normal fireline operations and would not reduce secure habitat.

Because of access needs, road closures would likely not take place around communities; wildland fire management activities around communities would not be affected.

This alternative has the greatest impact of all alternatives on the ability to utilize prescribed fire or mechanical fuels treatments to manage vegetation. As demonstrated in Figure 54, in Alternative 4 approximately one-third of the area is in CCs 2 and 3. Alternative 4 also has the most national forest boundary common to private lands.

Alternative 4 would allow one-third fewer acres to be mechanically treated (with heavy equipment) than Alternatives 1, 2, or 2-Modified. Within Alternative 4 boundaries, acres mechanically treated (with heavy equipment) would be reduced by nearly 50 percent because no temporary reduction in secure habitat would be allowed and an estimated 1,850 miles of roads would be closed. Many structures and communities occur within Alternative 4. In addition to those communities described in Alternative 3, Jackson, Wyoming would be another community adjacent to the Alternative 4 boundary. These areas are considered in or adjacent to CCs 2 or 3. Alternative 4 would limit the ability to mechanically treat (with heavy equipment) hazardous fuels in these areas if secure habitat is present and treatment is needed more than 500 meters from a road. Use of prescribed fire and mechanical treatment (without heavy equipment) would be permitted inside and outside the 500-meter buffer.

The road closures required to implement the secure habitat standard as described in Alternative 4 would impact the ability to utilize mechanical treatment with heavy equipment, and would increase project costs for prescribed fire and other mechanical treatments. For example, areas that might have been ignited by drip torch or terra torch may have to be ignited with a helitorch, which is significantly more expensive. Road closures affect all six GYA national forests in Alternative 4.

The current efforts to return CCs 2 and 3 to CC 1 would be impacted based upon the loss of road access. The nature of the loss would depend upon the timing of both fuels treatment projects and road closures that would be determined at the project level. Overall, in Alternative 4, increased fuel loadings and larger, more intense fires may be expected as an effect of implementing Alternative 4.

3.6.3 Noxious Weeds

Affected Environment

Forest Service direction for management of noxious weeds is provided in the following:

- Forest Service Manual 2080 Noxious Weed Management
- Executive Order 13112 of February 3, 1999—Invasive Species
- Noxious weed control programs unique to each forest
- Forest plans
- Programmatic NEPA decisions

All six forests participate in the GYA Weed Committee that is comprised of a diverse group of weed specialists; managers working for counties, states, and federal agencies; as well as private individuals and non-governmental groups with an interest in weed management. The focus of the Weed Committee is management of noxious weeds in the GYA.

Cooperative Weed Management Areas cover nearly all the GYA—these Areas serve the region as one of the most effective avenues through which the private sector, counties, and all partners can cooperate in noxious weed management.

Noxious weeds threaten the GYA's native biological diversity. Noxious weeds can disrupt grazing patterns, reduce palatable forage on big game winter ranges, increase the intensity and frequency of natural fires, lower water tables, and increase soil erosion rates.

Effects of All Alternatives on Noxious Weeds

The proposed action and alternatives represent programmatic decisions; therefore, they will have no direct effects on invasive plant species. Any direct effects would occur later at the project level when site-specific decisions are made. Most of the effects identified in this analysis would be indirect effects in that they would occur later in time because of this programmatic decision.

Current direction in the forest plans and other weed control documents for the site-specific application of weed management guidelines would not be changed under any alternative.

Implementation of any one of the alternatives could result in changes in noxious weed management approaches on a case-by-case basis. Depending on the site, effects could be

- Positive (closing areas without noxious weeds to access would slow the advance of vehicle and domestic animal spread of seeds)
- Negative (areas presently infested could become more difficult to access and treat)
- Self-canceling (decreased potential for infestation and decreased ability to access and treat)

Figure 57. A qualitative assessment of each alternative for weed spread and treatment access.

Alternative 1	Negligible change in potential for change in weed spread. Maintains existing access for treatment of weed infestations.
Alternatives 2 and 2-Modified	Maintains existing access for treatment of weed infestations. Remaining sheep allotments within the PCA would be phased out.
Alternative 3	Motorized access (roads or motorized trails) would be closed on almost 500 miles of road with proportionate potential for changes in weed spread and treatment of infestations. All sheep allotments within the PCA would be closed. Cattle allotments with recurring conflicts would be closed.
Alternative 4	Motorized access (roads or motorized trails) would be closed on about 1,850 miles of road with proportionate potential for changes in weed spread and treatment of infestations. All sheep allotments within the PCA would be closed immediately. Cattle allotments with recurring conflicts would be closed.

None of the alternatives would alter current programmatic direction for noxious weeds.

Costs of monitoring and treating existing weed infestations along roads and trails could increase if the areas are no longer accessible by motorized vehicles. For example, if smaller spray rigs or

backpack sprayers must be used in an area that was formerly accessible by larger spray rigs or pickup trucks, efficiency would be reduced. Either the overall cost of treating the infestation would be higher or fewer acres could be treated, depending on the availability of funding.

Conversely, restricting motorized access and reducing domestic livestock grazing would reduce the potential for spreading weed seeds and expanding existing infestations or for bringing seeds into areas that have been relatively weed free.

3.6.4 Threatened, Endangered, and Sensitive Plants

Affected Environment

There are no plant species listed as endangered that are known or suspected to occur within the national forests in the GYA. One federally listed threatened species, Ute ladies'-tresses (*Spiranthes diluvialis*), is known to occur in eight states: Nevada, Utah, Colorado, Idaho, Washington, Nebraska, Wyoming, and Montana. Habitat is primarily restricted to relatively low elevations within old river meanders, meadows, and river margins that are inundated and remain moist throughout the growing season. The plant is adapted to relatively sparse vegetation because of disturbances such as flooding and grazing. There are no known populations within the PCA.

A sensitive species is a species, subspecies, or variety of plant for which a regional forester has determined a concern for population viability due to current or predicted downward habitat or population trends. Provisions for sensitive plant protection are contained in Forest Service Manual 2600 Wildlife, Fish, and Sensitive Plant Habitat Management and in forest plans. Sensitive plants occur throughout the analysis area and habitats are identified and avoided on a site-by-site basis.

Appendix D includes a list of threatened, endangered, and sensitive plant species identified on the GYA national forests and identifies which species are within the PCA.

Effects of All Alternatives on Sensitive Plants

The proposed action and alternatives represent programmatic decisions and would have no direct effects on threatened, endangered, or sensitive plant species. None of the alternatives would alter current forest plan direction for threatened, endangered, or sensitive plant species. Because populations of these plants are infrequent and generally have localized distributions and because current Forest Service policy and direction require site-specific analyses before implementing projects, none of the alternatives would have any direct or indirect effects on these plant species.

Because threatened, endangered, and sensitive plant species habitats and populations are consistently identified through site-specific surveys and protected from impacts by ground-disturbing activities through avoidance and/or site-specific design criteria and mitigation, the proposal would not contribute to any cumulative negative effects on threatened, endangered, or sensitive plant species or their habitats. Along with other restrictive measures such as existing closures and management area direction, the proposal may contribute to a positive cumulative effect in limiting development and disturbance in close proximity to threatened, endangered, or sensitive plant populations and habitats.

3.6.5 Management Indicator Species Plants

Only the Bridger-Teton National Forest has plants listed as MIS. All of the MIS plants are listed as sensitive species except for Shultz milkvetch, which was found to be more common than originally believed. Shultz milkvetch is endemic (native) to Wyoming in the Teton, Salt River, and Wind River ranges within subalpine forb (broad-leaved herb, not grass) communities on shallow, rocky, calcareous (containing calcium) soils.

Sheep grazing may be a potential threat to the species, indicating that Standard 3 in all action alternatives may indirectly benefit the species. For all other MIS plants, the effects would be the same as discussed for sensitive plants in section 3.6.4. MIS plants for the six national forests are shown in Figure 137 (appendix D).

Overall, the effects of the action alternatives would be minor and many activities would be held at or below the 1998 baseline inside the PCA; there would not be a measurable change in expected populations and habitat trends projected under the forest plans.

3.7 Grazing

Introduction

This section presents information on the commercial livestock grazing programs for the six GYA national forests.

Section 3.7 Changes between Draft and Final EIS

In this section, the following additions and updates were made:

- Table footnotes show changes in numbers of sheep allotments outside the PCA in 2004 and planned closure of sheep allotments inside the PCA in 2006

Affected Environment

The total number of active commercial livestock grazing allotments is displayed in Figure 58 and their distribution in Figure 61. Although numbers of sheep on the six national forests has increased slightly from 1998 to 2003, there were six fewer active allotments in 2003. The increase in numbers of cattle allotments and AMs between 1998 and 2003 is primarily the result of restocking vacant cattle allotments during the five-year period and converting some sheep allotments to cattle allotments.

Figure 58. The number of active commercial livestock grazing allotments and associated permitted AMs¹ within the six GYA national forests for 1998 and 2003.

Year	Active sheep		Active cattle ²		Total	
	Allotments	AMs	Allotments	AMs	Allotments	AMs
1998	143	412,929	419	358,699	562	772,628
2003	137	414,291	462	422,129	600	836,420
Difference	-6	+1,362	+43	+63,430	+38	63,792

¹ One AM is one sheep, cow, or horse with or without young grazing on the allotment for one month.

² Horse grazing and horse AMs are included in these totals.

PCA and the Alternative 4 Area outside the PCA

Figure 59 displays the number of active commercial livestock grazing allotments inside the PCA. The livestock grazing standard in the proposed action identifies 1998 as the baseline year for monitoring changes in livestock grazing inside the PCA. The baseline year for monitoring changes in livestock grazing for the Alternative 4 area outside the PCA is 2003. Since 1998 and before 2003, several changes occurred in the grazing program. Four sheep allotments, two on the Shoshone National Forest and two of seven on the Targhee National Forest, were closed inside the PCA. In addition, three sheep allotments on the Targhee National Forest were closed in early 2004 and two additional sheep allotments on the Gallatin National Forest are planned for closure in 2006.

Figure 59. The number of active commercial livestock grazing allotments within the PCA for 1998 and 2003.

Year	Active sheep allotments	Active cattle allotments ¹	Total livestock allotments
1998	11	68	79
2003	7 ²	70	77
Difference	-4	+2	-2

¹Includes horse grazing.

²Three of the sheep allotments shown as active in 2003 were closed in early 2004. Two additional sheep allotments on the Gallatin National Forest are planned for closure in 2006.

Since 1998, and earlier in some cases, all grazing allotments that were entirely or partially within MS 1 or 2 and many allotments outside the PCA have had Allotment Management Plans, Annual Operating Instructions, and/or Livestock Grazing Permits that allow an authorized Forest Service officer to order the immediate removal of livestock in the event of or to prevent grizzly bear/human conflicts. Additionally, measures specifying the timely removal of livestock carcasses, food storage requirements, and protection of important grizzly bear food sources were included.

Figure 60 displays the number of active commercial livestock grazing allotments in 2003 inside the PCA and in the Alternative 4 area outside the PCA for each of the six national forests.

Figure 60. Number of active commercial livestock grazing allotments in 2003 inside the PCA and in the Alternative 4 area outside the PCA for each of the six GYA national forests.

National forest	Allotments inside the PCA		Allotments in Alternative 4 outside the PCA	
	Cattle ¹	Sheep	Cattle ¹	Sheep
Beaverhead	3	0	108	10
Bridger-Teton	9	0	35	24
Custer	0	0	13	0
Gallatin	23	2 ³	47	0
Shoshone	25	0	33	0
Targhee ²	10	5 ²	44	40 ⁴
Total	70	7	280	74

¹ Includes horse grazing

² Three of the sheep allotments shown as active inside the PCA in 2003 were closed in early 2004.

³ The two sheep allotments shown as active inside the PCA in 2003 are planned for closure in 2006.

⁴ Two sheep allotments in the Alternative 4 area outside the PCA were closed in 2004 and one vacant sheep allotment restocked.

Grizzly bear/livestock Conflicts

Conflicts between livestock and grizzly bears have resulted in the relocation or removal of grizzly bears or the permitted livestock, depending on the location of the incident and the associated management situation designation. While there have been recent increases in bear conflicts with livestock in the GYA, the number of allotments, stocking rate, and distribution of livestock inside the PCA in 1998 has not precluded achieving recovery of the grizzly bear. Most of the conflicts with grizzly bears and sheep have been resolved inside the PCA due to the closure of many of the affected allotments. Increases in conflicts with bears and livestock are primarily outside the PCA in areas where the grizzly bear is expanding its range. Conflicts with cattle and grizzly bears often occur sporadically, sometimes going years between incidents.

During the years 1992 through 2003, grizzly bear conflicts were documented on 17 of the 70 cattle allotments active in 2003 inside the PCA (Figure 62). Two of the seven sheep allotments active in 2003 inside the PCA had documented grizzly bear conflicts during this time. Several additional sheep allotments that experienced conflicts with grizzly bears were closed between 1992 and 2003.

In 2003, outside the PCA in the area defined by Alternative 4, there were 280 active cattle allotments (Figure 60). During the years 1992 through 2003 there were 11 cattle allotments active in 2003 (4 percent) with documented grizzly bear conflicts. Six of the 74 sheep allotments active in 2003 (8 percent) outside the PCA in the area defined by Alternative 4 had documented grizzly bear conflicts during this period. At least two cattle allotments that had conflicts with grizzly bears between 1992 and 2003 are currently vacant. The Custer, Gallatin, and Shoshone National Forests do not have any sheep allotments in Alternative 4 areas outside the PCA.

Several existing cattle allotments and two existing sheep allotments have a history of recurring conflicts. Recurring livestock/grizzly bear conflicts for this analysis are defined as three or more years of recorded conflicts during the most recent five-year period.

Figure 62. Number of active livestock allotments in 2003 inside and outside the PCA (within the area defined by Alternative 4) with grizzly bear/livestock conflicts, 1992 through 2003¹.

National forest	Allotments inside PCA		Allotments in the Alternative 4 area outside PCA	
	Cattle ²	Sheep	Cattle ²	Sheep
Beaverhead	0	0	0	1
Bridger-Teton	3	0	2	4
Custer	0	0	0	0
Gallatin	0	1	0	0
Shoshone	12	0	9	0
Targhee	2	1	0	1
Total	17	2	11	6

¹ Four cattle allotments on the Bridger-Teton National Forest (two in the PCA, two in the Alternative 4 area outside the PCA) and two cattle allotments in the PCA on the Shoshone National Forest have experienced recurring conflicts between 1992 and 2003. One of the cattle allotments with recurring conflicts on the Bridger-Teton National Forest inside the PCA was closed after the 2003 grazing season. One existing sheep allotment inside the PCA on the Gallatin National Forest and one in the Alternative 4 area outside the PCA on the Bridger-Teton National Forest have experienced recurring conflicts. Section 3.1.2 was updated to include livestock conflicts for 2004. No new allotments were documented with conflicts nor did the addition of the 2004 information result in any new allotments being classified as experiencing recurring conflicts.

² Includes horse grazing.

Summary

As shown in Figure 59, Figure 60, and Figure 62, for the period of 1998 through 2003, there has been a general trend to reduce sheep allotments, both inside and outside the PCA. In some cases this has been in response to grizzly bear/livestock conflicts, but more commonly to address other resource management concerns such as disease transmission between bighorn sheep and domestic sheep, achieving a desired rangeland condition, or adverse economic conditions.

Livestock grazing can be used as a resource management tool to manipulate the range resource toward a desired condition. Livestock grazing, in addition to providing forage for livestock, can be used to change the seral stage of the plant community, remove decadent plant growth to rejuvenate forage species, reduce fine fire fuels, or improve the quality of forage for wildlife.

Effects on Grazing

This section discloses the effects to commercial livestock grazing resulting from implementation of the alternatives described in chapter 2. Effects are analyzed in relation to the no action alternative. Each alternative would have varying effects on the rangeland resource. This is a programmatic decision that does not identify site-specific actions; the comparison of alternatives described here is based on generalized effects associated with grazing. Additional discussion of the social and economic impacts to permitted livestock operators can be found in the social and economic sections.

Figure 63 and Figure 64 summarize changes in livestock grazing for all alternatives. For Alternatives 1, 2, and 2-Modified sheep allotments would be monitored, evaluated, and phased out as the opportunities arise with willing permittees. For Alternative 2-Modified an additional sheep allotment with recurring conflicts in the Alternative 4 area outside the PCA could be retired. Alternatives 3 and 4 would require the termination of sheep grazing within three years within the boundaries of the respective alternative; those portions of cattle allotments that have a trend of recurring conflicts with grizzly bears would be closed.

Figure 63. Reduction in sheep AMs for each of the six GYA national forests by alternative.

National forest	Alternative 1	Alternative 2	Alternative 2-Modified	Alternative 3	Alternative 4
	Allotments/AMs	Allotments/AMs	Allotments/AMs	Allotments/AMs	Allotments/AMs
Beaverhead	0/0	0/0	0/0	0/0	10/24,885
Bridger-Teton ¹	0/0	0/0	0/0 to 1/3,000	0/0	24/84,802
Custer	0/0	0/0	0/0	0/0	0/0
Gallatin ²	2/3,540	2/3,540	2/3,540	2/3,540	2/3,540
Shoshone	0/0	0/0	0/0	0/0	0/0
Targhee ³	2/3,590	2/3,590	2/3,590	2/3,590	41/119,032
Total	4/7,130	4/7,130	4/7,130 to 5/10,130	4/7,130	77/232,260

¹ One allotment with recurring conflicts in the Alternative 4 area outside the PCA could be retired with a willing permittee if conflicts continue.

² The two sheep allotments on the Gallatin National Forest are planned for closure in 2006.

³ Three of the sheep allotments shown as active inside the PCA 2003 were closed in early 2004 and are not shown in this table. Similarly, the decrease in one sheep allotment in the Alternative 4 area due to the closure of two allotments and the restocking of a vacant allotment is not shown in this table.

Figure 64. Estimated reduction in cattle AMs¹ for allotments with recurring conflicts on each of the six GYA national forests by alternative².

National forest	Alternatives 1 and 2	Alternative 2 - Modified	Alternative 3	Alternative 4
	Allotments/AMs	Allotments/AMs	Allotments/AMs	Allotments/AMs
Beaverhead	0/0	0/0	0/0	0/0
Bridger-Teton	0/0	0/0 to 3/16,900	1/165	3/16,900
Custer	0/0	0/0	0/0	0/0
Gallatin	0/0	0/0	0/0	0/0
Shoshone	0/0	0/0 to 2/1,450	2/1,450	2/1,450
Targhee	0/0	0/0	0/0	0/0
Total	0/0	0/0 to 5/18,350	3/1,615	5/18,350

¹ Includes horse AMs

² Estimated reduction based on 50 percent of the AMs for those allotments known to have recurring conflicts. One of the allotments on the Bridger-Teton National Forest with recurring conflicts in the PCA was closed after the 2003 grazing season and is not included in these estimates.

Effects of Alternative 1 on Grazing

All forests would continue to follow the Guidelines, which require management of grizzly bear habitat by MS 1, 2, or 3.

- In MS 1, grizzly bear/human conflicts would be resolved in favor of grizzlies unless the bear is determined to be a nuisance. Inside the recovery zone on sheep allotments where conflicts have occurred, grazing practices would 1) be changed to avoid grizzly bears, or 2) the livestock class would be changed from sheep to cattle if suitable, or 3) the livestock would be removed and the allotment closed.
- In MS 2, managers would accommodate demonstrated grizzly populations and/or grizzly habitat use in other land use activities if feasible, but not to the extent of exclusion of other uses.
- In MS 3, any grizzly involved in a grizzly bear/human conflict would be controlled.

Implementation of MS 1 and 2 requirements could have negative impacts on commercial livestock grazing, particularly those allotments located wholly or partially in MS 1. These management requirements result in additional labor and expense to the livestock operator and limit the resource management options of the agency.

On the Gallatin National Forest, the two remaining sheep allotments inside the PCA are planned for closure in 2006. On the Targhee National Forest, the two remaining active sheep allotments (one which has experienced grizzly bear conflicts) would be phased out as required by the 1997 Revised Targhee Forest Plan. (Three of the five sheep allotments present in 2003 were closed in early 2004.) Until the remaining allotments are phased out, conflicts would be handled under nuisance grizzly bear guidelines (appendix F). Grizzly bear conflicts with sheep would likely continue to occur. These conflicts would be handled under nuisance grizzly bear guidelines, allowing a variety of management actions, with emphasis on favoring the grizzly bear.

The existing cattle allotments would be maintained and grizzly bear conflicts are anticipated to occur. These grizzly bear/livestock conflicts would be handled under nuisance grizzly bear guidelines.

Outside the PCA there would be no change in commercial livestock allotments except as may be required under Section 7 consultation with the USFWS.

Effects of Alternatives 2 and 2-Modified on Grazing

Inside the PCA, no new active commercial livestock grazing allotments would be created and there would be no increases in permitted sheep AMs from the 1998 baseline. Existing sheep allotments would be monitored, evaluated, and phased out as opportunities arise with willing permittees.

Combining or dividing existing allotments to improve commercial livestock management and/or achieve desired resource conditions could occur as long as the total acreage of the allotments does not increase. Prior to the issuance of any grazing permits authorizing commercial livestock of vacant cattle allotments an analysis by the action agency to evaluate impacts on grizzly bears would be completed. Where chronic conflicts occur on cattle allotments inside the PCA, the conflict may be resolved by permanently removing the livestock, if done in cooperation with and approval from the existing permit holder.

The significant differences between Alternative 1 and Alternatives 2 and 2-Modified are 1) there would no longer be management situations that either automatically favor the grizzly bear (MS 1) or result in immediate removal or relocation of the grizzly bear in cases of conflict (outside MS 1), and 2) within the PCA, management of nuisance bears would be addressed according to the nuisance bear standards in the Conservation Strategy (appendix G).

Bears preying on lawfully present commercial livestock inside the PCA would be managed according to the following criteria from the nuisance bear standards in the Conservation Strategy.

- No grizzly bear involved in livestock depredations inside the PCA shall be removed (from the population) unless it has been relocated at least one time and continues to cause livestock depredations. This does not apply to depredations occurring in sheep allotments inside the PCA in areas that were designated MS 1 under the Guidelines.
- Grizzly bears would not be removed or relocated from sheep allotments on federal land inside the PCA in areas that were designated MS 1 under the Guidelines.
- Before any removal, except in cases of human safety, management authorities would consult with each other by telephone or in person to judge the adequacy of the reason for removal.
- Bears displaying natural aggression are not to be removed, even if the aggression results in human injury or death, unless it is the judgment of management authorities that the particular circumstances warrant removal.
- Bears displaying unnatural aggression would be removed from the population.

The effects of implementing these alternatives could result in fewer impacts than Alternative 1 to the commercial livestock grazing program, particularly those cattle allotments wholly or partially within MS 1. Under MS 1 guidelines, livestock should be removed in situations where the conflict cannot be resolved. The greatest impacts would occur to the existing sheep operations in the PCA, which would be phased out with the cooperation of existing permittees.

Under Alternative 2-Modified, allotments with recurring conflicts that cannot be resolved through modification of grazing practices could have some additional effects on livestock grazing operations if they are retired, as described in Guideline 2. This applies to cattle allotments inside the PCA and both sheep and cattle outside the PCA. Retirement of grazing allotments would be with willing permittees only. For Alternative 2-Modified inside the PCA, this direction is not as restrictive as current direction in Alternative 1, where under the Guidelines in MS 1, livestock is removed and the allotment closed if adjustments cannot be made in livestock grazing practices where grizzly bear/livestock depredation has been authenticated. In practice, some allotments have been willingly vacated and used as grass banks where grazing can still occur on a temporary basis.

Outside the PCA, the existing cattle allotments would continue to be managed and grizzly bear conflicts are anticipated to occur. Under Alternative 2, existing forest plan direction and related project level decisions would determine whether those grazing allotments (or portions of those allotments that have recurring conflicts) that become vacant would be reauthorized for permitted

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grazing. Alternative 2-Modified would allow these allotments to be retired on a willing permittee basis. It is difficult to predict whether these allotments would be retired because the direction recommends the retirement of the allotment if the permittee is willing—not a mandatory closure. If the permittee were unwilling to retire the allotment, grazing would continue.

The two sheep allotments on the Gallatin National Forest are planned for closure in 2006 and the two remaining active sheep allotments on the Targhee National Forest inside the PCA would be phased out with willing permittees. Some of these sheep allotments have had grizzly bear conflicts. Grizzly bear conflicts would likely continue to occur until all of the allotments were closed. These conflicts would be handled under nuisance grizzly bear guidelines as described for Alternatives 2 and 2-Modified.

Where closure of a commercial livestock allotment occurs, livestock grazing and its physical impacts would no longer influence the rangeland resource. Forage previously allocated to and consumed by livestock would be available for wildlife use. Current stocking levels provide adequate forage for both existing wildlife populations and livestock numbers. Livestock, as a resource management tool, would no longer be available to manipulate the range resource toward a desired condition (change of seral stage), remove decadent plant growth to rejuvenate forage species, reduce fine fire fuels, or improve the quality of forage for wildlife.

Effects of Alternative 3 on Grazing

Inside the PCA, no new commercial livestock grazing allotments would be created and permitted sheep grazing would be phased out within three years, starting with those allotments with recurring conflicts with grizzly bears. Those portions of cattle allotments that have a trend of recurring conflicts with grizzly bears would be closed. For the years 1992 through 2003, 17 cattle allotments active in 2003 were documented with grizzly bear conflicts inside the PCA. The three remaining cattle allotments with recurring grizzly bear conflicts would be closed resulting in a reduction of about 1,600 AMs. Portions of cattle allotments that experience future recurring grizzly bear conflicts would be closed. The four existing sheep allotments inside the PCA would be closed, with the loss of about 7,100 sheep AMs.

The allotment closures and removals would result in a reduction in either livestock numbers or season of use, equivalent to the capacity of the affected pasture. The loss of this grazing capacity may require that the remainder of an affected allotment be combined with an adjacent allotment to maintain an economically viable livestock operation. Closure of the entire allotment could result if the remainder of an affected allotment is not large enough to be economically viable on its own and it is not possible to combine it with an adjacent allotment. For the purposes of this analysis, a reduction of 50 percent of the permitted AMs is expected to occur in those affected allotments. An estimate of the number of allotments that would be removed, and the associated loss of AMs by alternative, is based on those allotments currently identified as having recurring conflicts (Figure 64). Additional allotments may experience recurring conflicts as bears expand in range and numbers and the effects would be greater than that noted in the analysis.

Effects on the rangeland resource from closure of commercial livestock allotments would be similar to Alternative 2.

Outside the PCA there would be no change in commercial livestock allotments.

Effects of Alternative 4 on Grazing

Within the boundaries of Alternative 4, no new active commercial livestock grazing allotments would be created and permitted sheep grazing would be phased out within three years, starting with those allotments with recurring conflicts with grizzly bears. Those portions of cattle allotments that have a trend of recurring conflicts with grizzly bears would also be closed. Implementation of this alternative would result in the closure of 77 sheep allotments inside and outside the PCA for a total reduction of over 232,000 sheep AMs, and the closure of five cattle allotments inside and outside the PCA for a total reduction of about 18,000 AMs (Figure 63 and

Figure 64). Cattle allotments that experience future recurring grizzly bear conflicts would be closed.

The difference between Alternative 4 and Alternative 3 is the extent of the impact. Alternative 3 applies only to those allotments or parts of allotments within the PCA. Alternative 4 applies to an expanded area and would have greater impacts on the livestock grazing program than Alternative 3 and would affect livestock operations similarly to Alternative 3. Additional allotments may experience recurring conflicts as bears expand in range and numbers and the effects would be greater than that noted above. Additionally, the road decommissioning in Alternative 4 may increase administrative costs for some livestock allotments because of the increased costs of movement of cattle to and from allotments, salt packing, maintaining improvements, transporting horses and injured animals, and other administrative needs.

Effects on the rangeland resource from closure of commercial livestock allotments would be similar to Alternative 2, but would apply to a much larger area.

3.8 Heritage Resources

Heritage resources include areas, sites, traditional cultural properties, buildings, art, architecture, memorials, and objects that have scientific, historic, or cultural value. They link people to their cultural histories, provide insight into how people lived in the past, and reveal past and ongoing relationships between people and the natural world.

The NHPA (National Historic Preservation Act) and its implementing regulations require that federal agencies consider the effects of their undertakings on historic properties. The term historic properties refers to cultural properties that have been determined eligible for the NRHP (National Register of Historic Places).

Heritage resource objectives are outlined in the GYA forest plans. All the forests' heritage programs are committed to the identification and protection of cultural and historic resources. Objectives outlined in the forest plans have been designed to increase the understanding of cultural resources into forest management through consultation with state and federal agencies and tribal governments.

The Forest Service is required to protect and manage identified sites in the United States under several statutes. The following laws provide direction to all federal agencies and were considered in this proposal.

- National Historic Preservation Act of 1966
- American Indian Religious Freedom Act
- National Forest Management Act
- Native American Graves Protection and Repatriation Act of 1990
- Archaeological Resources Protection Act of 1979
- Interior Secretarial Order 3175
- Executive Orders 12866, 13007, 13084
- Religious Freedom Restoration Act

Treaty and trust responsibilities with tribes are discussed in more detail in section 3.13.1.

In accordance with Section 106 of the NHPA, forest plans require integration of cultural resource management into the overall multiple resource management effort. Site-specific cultural surveys or inventories to locate and identify sites with heritage values are required before implementation of ground-disturbing activities. Such surveys would be conducted during the NEPA analyses for site-specific projects. In addition, national forests must work closely with the appropriate scientific community and American Indian Tribes concerning cultural resources. The laws and policies that govern cultural resource protection on federal lands are coordinated with the State Historic Preservation Offices (SHPOs) of Idaho, Montana, and Wyoming that serve in an advisory capacity.

Effects on Heritage

Most of the effects identified in this analysis would be indirect effects in that they would occur later in time because of this programmatic decision.

Natural weathering, management practices, looting, and vandalism can impact heritage sites. Limited access provides a measure of site protection and unlimited access can exacerbate problems if they exist. Any further restrictions to road access provide an additional measure of protection for heritage sites by reducing the potential of looting and vandalism to sites, although decommissioning activities could impact heritage sites.

Effects of Alternatives 1, 2, and 2-Modified on Heritage Resources

Alternative 1 allows the present levels of activities to continue and would maintain the current condition of the heritage resource. Both road decommissioning and road construction would remain at present levels.

Alternatives 2 and 2-Modified would not have any greater impacts than Alternative 1 because activities that would cause disturbance (road building, developed sites) would remain at the 1998 baseline. The secure habitat standard and the developed site standard would limit these activities.

Effects of Alternatives 3 and 4 on Heritage Resources

Alternative 3 would reduce activities inside the PCA and would likely lead to some protection of heritage resources due to decommissioning nearly 500 miles of road inside the PCA in the next 10 years.

Alternative 4 would further reduce activities and would likely lead to some additional protection of heritage resources due to decommissioning of about 1,850 miles of roads inside and outside the PCA in the next 10 years.

3.9 Recreation

Introduction

The GYA is a land of steaming geysers, magnificent mountains, wild rivers, and abundant wildlife. The area contains the most intact assemblage of wildlife in one of the largest blocks of wild lands remaining in the continental United States (Marsh et al. 2005). The American public is largely attracted to the area and more than three million people visit each year. Viewing the grizzly bear and other wildlife is an integral part of the tourism and visitation.

Naturally, as people visit and recreate in the GYA, the potential exists for grizzly bears and humans to interact. Recreation activities and grizzly bear/human interactions have been monitored and evaluated over the last 25 years by the various land managing agencies, research scientists, the IGBC, and non-governmental organizations. Particular efforts that are deemed effective in managing grizzly bear/human interactions are:

- Information and education about recreating and living in bear country
- Ensuring that unnatural food sources are secure from bear use
- Limiting human development and access within bear areas
- Managers being responsive to grizzly bear/human conflicts

In this section, the current recreation setting is compared with current uses and trends to address the overall impacts of limiting recreational opportunities. The analysis area includes the six GYA national forests. It is recognized that this area attracts many visitors from outside the area: regionally, nationally, and internationally, and the impacts to recreation users includes all people who may visit the area.

The recreation environment is described in the following manner:

Recreation Setting²⁴

- Primitive
- Semi-primitive non-motorized
- Semi-primitive motorized
- Roaded (natural or modified)
- Rural or urban

Recreation Infrastructure

- Travel routes
- Developed recreation sites

Recreation Use

- Current use and trends

Comparison of Recreation Use Trends with Capacity

- Spring, summer, fall recreation
- Winter recreation

Section 3.9 Changes between Draft and Final EIS

In this section, the following additions and updates were made:

- Recreation setting information
- Motorized recreation use information in southeast Idaho
- Clarification of information regarding spring, summer, and fall recreation
- Updated ROS (Recreation Opportunity Spectrum) map and acres of recreation setting

3.9.1 Recreation Setting

The six GYA national forests span more than 12 million acres surrounding Yellowstone and Grand Teton National Parks. The abundant and diverse wildlife within this large, intact ecosystem, the unique geology and geothermal resources, and the historical legacy make this area not only a local and regional treasure but one that attracts several million national and international visitors each year.

The recreation setting within the national forests is largely undeveloped (primitive and semi-primitive non-motorized and semi-primitive motorized) and yet is interspersed with roads that provide opportunities for driving and viewing scenery and wildlife, among other uses. Figure 65 and Figure 66 depict the recreation setting by five different categories that reflect the least developed (primitive) to the most developed (rural or urban). Figure 67 provides a graph of the recreation setting within and outside the PCA. The recreation setting information has been updated in the FEIS with a 2006 interagency GYA recreation assessment (Marsh et al. 2005). Eleven wilderness areas contribute more than four million acres to a primitive or semi-primitive non-motorized recreation setting that provides for the recreation experiences of solitude, the challenges of survival, the viewing of scenery, and a full complement of wildlife and fish species. Nearly 50 percent of the primitive setting is within the PCA, so recreating among grizzly bears is a key part of the experience. The PCA includes far less of the more developed recreational settings, specifically, 7 percent in a semi-primitive motorized setting and 13 percent in a roaded setting. Figure 68 provides a spatial display of the recreation setting.

²⁴ Forest Service Manual 2300 Recreation, Wilderness, and Related Resource Management, 11.1 describes the Recreation Opportunity Spectrum (ROS)—a system that defines six recreation opportunity classes that range from natural, undisturbed, and undeveloped (e.g. primitive) to heavily used, modified and developed areas (e.g. rural or urban).

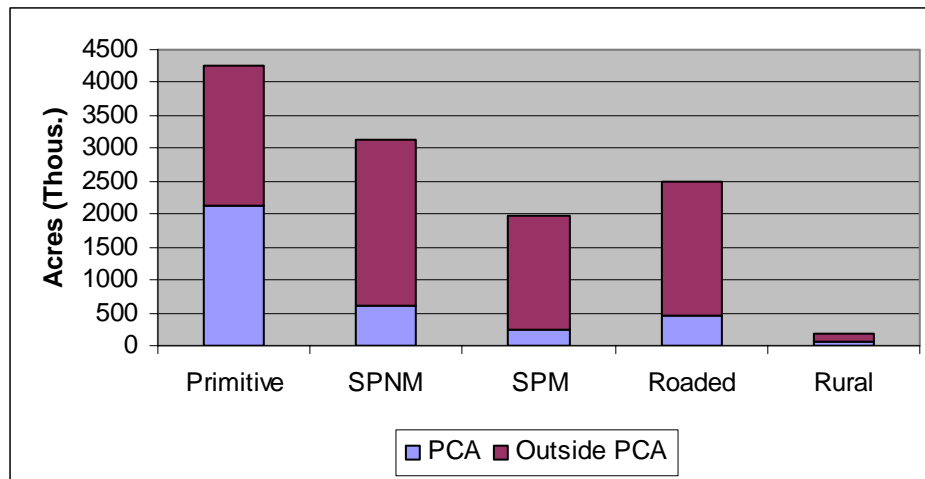
Figure 65. Recreation setting for the six GYA national forests (thousands of acres)²⁵.

National forest	Primitive and semi-primitive wilderness	Semi-primitive non-motorized	Semi-primitive motorized	Roaded natural	Rural/urban
Beaverhead	139	777	642	620	16
Bridger-Teton	1,523	1,004	311	611	14
Custer – Beartooth RD	335	127	13	38	13
Gallatin	726	314	402	342	69
Shoshone	1,364	572	292	207	1
Targhee	166	328	330	671	62
Total	4,253	3,122	1,990	2,489	175

Figure 66. Recreation setting within the PCA (thousands of acres).

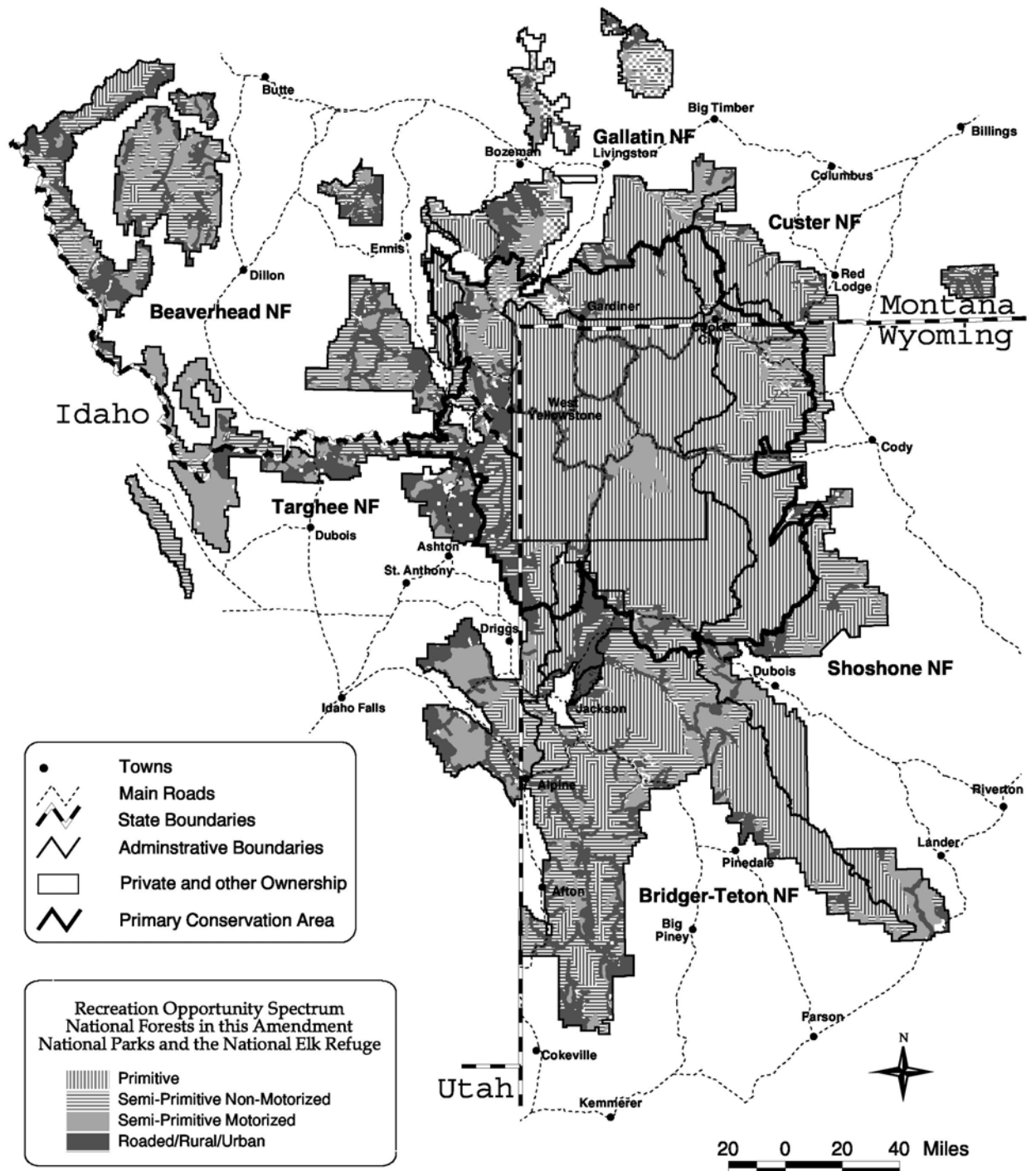
National forest	Primitive and semi-primitive wilderness	Semi-primitive non-motorized	Semi-primitive motorized	Roaded natural	Rural/urban
Beaverhead	68	2	1	0	0
Bridger-Teton	596	63	17	48	0
Custer – Beartooth RD	106	5	1	2	0
Gallatin	412	117	146	134	40
Shoshone	892	226	50	55	0
Targhee	66	181	24	204	12
Total	2,140	594	239	443	52

Figure 67. Recreation settings within and outside the PCA.



²⁵ The recreation setting reflects the existing situation (Marsh et al. 2005). The acres were estimated using GIS maps and include some interspersed private and state lands. The general proportions among the settings are the intent of the display.

Figure 68. ROS map, including the PCA boundary.



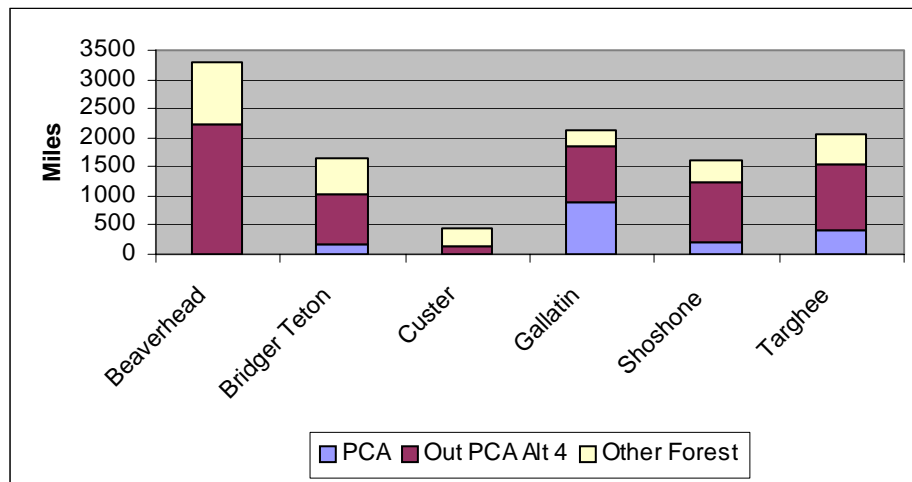
3.9.2 Recreation Infrastructure

Travel Routes

Travel routes include the roads and trails within the six GYA national forests. For spring, summer, and fall use, forest plans or subsequent amendments restrict motorized use to existing roads and trails except for small portions on the Bridger-Teton and the Targhee National Forests.

Some people commented on the DEIS that they were interested in knowing the amounts of motorized routes that were roads or trails. Roughly 20 percent of the total motorized access routes are motorized trails (Marsh et al. 2005). Figure 69 provides the miles of motorized access routes open for travel (year-around or seasonally) by forest. Within a forest, open motorized access routes are further distinguished by the miles within the PCA, the miles outside the PCA but within Alternative 4, and other miles on the forest that are not within an alternative (Other Forest). Forest plan direction for roads and trails is discussed in the transportation section.

Figure 69. Miles of open motorized access routes within the six GYA national forests.



Developed Recreation Sites

Developed recreation sites provide much of the infrastructure necessary for the enjoyment of a wide variety of recreation activities in the analysis area. Figure 70 through Figure 73 identify the categories of developed recreation sites and the numbers of sites by forest. In addition to specific categories such as campgrounds or trailheads, the other developed recreation category includes boat and fishing facilities, snow parks, ski areas, picnic areas, wildlife viewing, organization or outfitter developed sites, and interpretive, observation, or information sites.

More than 200 campgrounds offer rural or remote locations from which to stay overnight and experience the great outdoors or to gain closer access to day hikes or other recreation pursuits within the national forests or parks. More than 300 trailheads provide access into the national forests; slightly more than 100 of these trailheads are within the PCA. Major developed sites and lodges, similar to campgrounds, offer closer access and experiences within the core of the Yellowstone ecosystem. These lodges, resorts, dude ranches, or hotels serve a largely regional and national clientele. Nineteen (44 percent of the six national forest total) of these major developments are within the PCA. Summer home complexes are recreation residences that were established from the 1920s through the early 1960s and are a permitted use from the national forests. Thirty-two of these summer home complexes (59 percent of forest total) are within the PCA.

Each developed recreation site has an estimated capacity; for some sites this is calculated as a PAOT (persons at one time). These data are documented in the project record and are available from the Forest Service Infra database. Exceptions to the use of PAOTs and estimations of

capacity are recreation residences that are counted by permit or complex, or where the site has not been fully inventoried since the corporate data system, Infra, is relatively new. The proposed action proposes a standard to maintain the capacities of these sites at or below 1998 levels, with exceptions as explained in chapter 2. Other action alternatives propose variations.

Figure 70. Developed recreation sites on the six GYA national forests (numbers of sites).

National forest	Developed campgrounds	Trailheads	Major developed sites and lodges	Permitted summer home complexes	Other developed recreation	Total recreation Sites
Beaverhead	35	29	3	2	17	86
Bridger-Teton	45	60	4	1	55	165
Custer – Beartooth RD	16	33	0	3	6	58
Gallatin	43	132	5	22	65	266
Shoshone	35	51	19	17	52	174
Targhee	31	22	11	9	73	146
Total	205	327	42	54	268	895

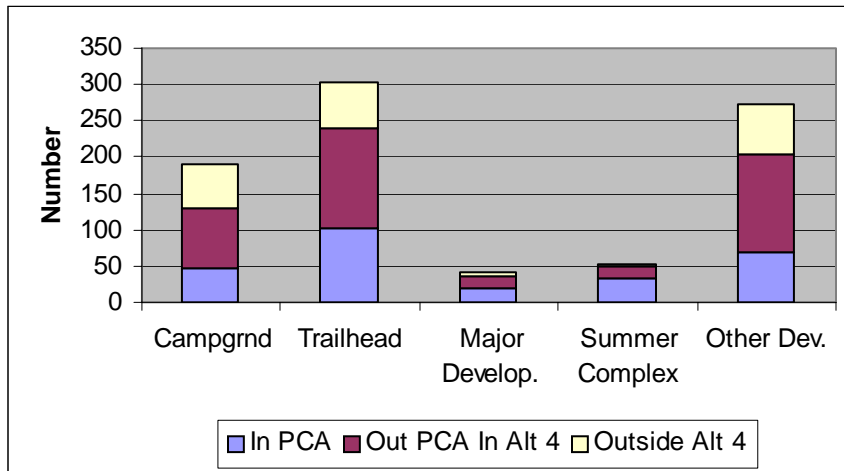
Figure 71. Developed recreation sites within the PCA on National Forest System lands (numbers of sites).

National forest	Developed campgrounds	Trailheads	Major developed sites and lodges	Permitted summer home complexes	Other developed recreation	Total recreation sites
Beaverhead	0	0	0	0	0	0
Bridger-Teton	6	8	3	1	6	24
Custer – Beartooth RD	0	2	0	0	0	2
Gallatin	18	64	3	19	19	123
Shoshone	17	21	11	9	22	80
Targhee	5	8	2	3	20	38
Total	46	103	19	32	67	267

Figure 72. Developed recreation sites within the area defined by Alternative 4.

National forest	Developed campgrounds	Trailheads	Major developed sites and lodges	Permitted summer home complexes	Other developed recreation	Total recreation Sites
Beaverhead	23	16	3	2	7	51
Bridger-Teton	22	33	3	1	27	86
Custer – Beartooth RD	13	27	0	3	10	53
Gallatin	39	121	5	22	63	250
Shoshone	31	47	18	16	46	158
Targhee	24	22	11	8	58	123
Total	152	266	40	52	211	721

Figure 73. Developed recreation within the PCA, Alternative 4, and remaining National Forest System lands.



Forest Plan Direction and Changes in Developed Site Capacity in the PCA

Beaverhead National Forest

There are no developed recreation sites within the Beaverhead National Forest portion of the PCA. This has not changed over the last 10 years.

Bridger-Teton National Forest

Forestwide access objectives include “retain, improve, and add developed [recreation] sites.” The Forestwide standard for developed recreation facilities states, “Appropriate facilities will be provided at developed sites to prevent resource damage, protect public health and safety, and meet the desires of people who use developed sites.” Plan objectives and standards are applied in an integrated way and with consideration of grizzly bear habitat needs. Over the last five to 10 years, the number and capacity of developed sites within the PCA has remained the same.

Custer National Forest

Inside the PCA, most of the area is managed as part of the Absaroka/Beartooth Wilderness. Direction outside wilderness includes the goal of maintaining or improving existing wildlife habitat. Standards for both these management areas preclude the establishment or maintenance of

dispersed campsites. Some capacity has been added to a campground outside the PCA, and a capital investment is in progress to add a campground outside the PCA (ten miles south of Red Lodge adjacent to the Beartooth All American Highway). This effort will meet some of the increased demand for developed site camp units, reduce the impacts of dispersed camping, and improve sanitation.

Gallatin National Forest

Appendix G of the Gallatin Forest Plan provides a detailed set of standards and guidelines for recreation related sites and facilities. These standards and guidelines focus on actions to avoid or minimize habituation of bears to human food sources, grizzly bear/human conflicts, and human-caused grizzly bear mortality. The Gallatin Forest Plan Forestwide recreation objectives state, recreation “activities will be managed to avoid displacement of threatened and endangered wildlife species and to provide for user safety, resolution of user conflict, and resource protection. . . . Areas of possible overuse will be evaluated and measures (such as educating users, providing more facilities, or limiting use) will be taken to reduce the effects of overuse.” Plan objectives and standards are applied in an integrated way and with consideration of grizzly bear habitat needs.

The capacity of developed sites has not changed and the number of sites has remained the same. Larger developed sites are in the West Yellowstone area—these are heavily used and managed but there has been no change over the last five to 10 years. In the Cooke City area, a new site was opened, but another was closed.

Shoshone National Forest

The Shoshone’s Forest Plan emphasizes that developed sites for recreation “be appropriate for the surrounding forest setting and not compete with the private sector or unnecessarily duplicate other public land facilities and services.” For the most part, existing development within the PCA is low. A Biological Opinion (USDI FWS 1996) related to projects along the North Fork Highway specified no net gain in developed sites. BMU subunits have stayed at the same capacity or lower.

Targhee National Forest

The Targhee’s Forest Plan includes a goal to “maintain or slightly increase the Forest’s developed site capacity in accordance with the CIP (Capital Improvement Projects) Implementation Schedule.” This goal is not focused on the PCA and could be achieved on the more than one million acres of the Targhee National Forest outside the PCA.

There is nothing in the Forest Plan that encourages an increase in the number or capacity of developed sites beyond 1998 levels. Plan objectives and standards are applied in an integrated way and with consideration of grizzly bear habitat needs. During the last 10 years, the number and capacity of developed sites within the PCA has remained the same.

3.9.3 Recreation Use and Trends

In the 1990s, Yellowstone National Park attracted nearly three million local, regional, national, and international visitors annually. Many of these visitors also recreate on adjoining national forests. Overall visitor use will continue to increase over the next decade as the national and international attraction of Yellowstone National Park continues and regional and local populations increase. Visitor use for Yellowstone National Park has been monitored since the 1930s and shows an approximate 15 percent increase in visits per decade (Figure 74) (Gunther 1999).

Figure 74. Visitor trends in the national parks.

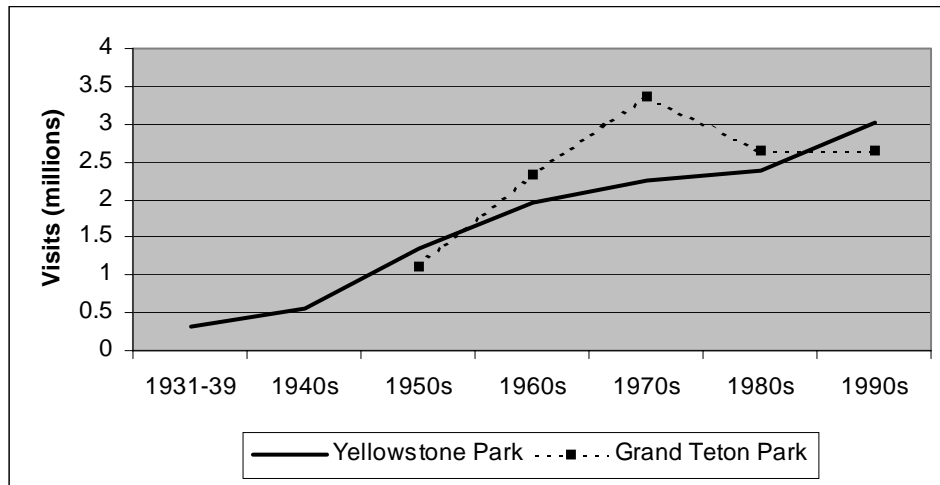
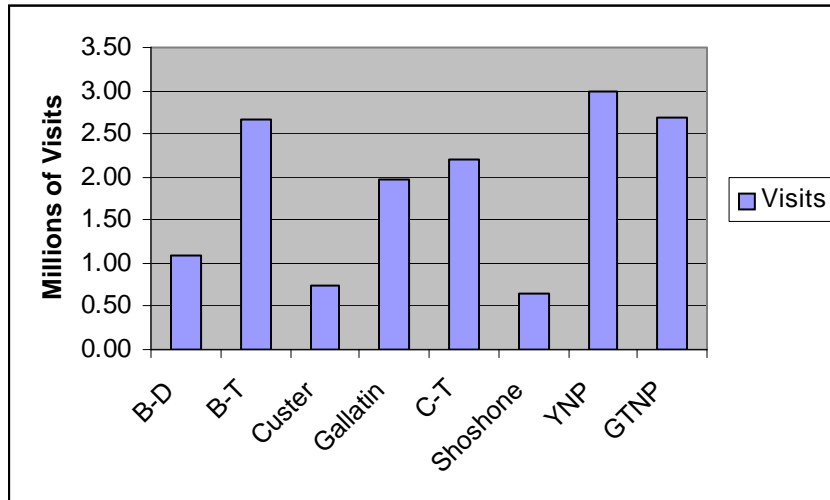


Figure 75 and Figure 76 provide estimated recreation use levels in the parks and national forests (English et al. 2001). On the southern and western flanks of Yellowstone and Grand Teton National Parks, the Bridger-Teton and Caribou-Targhee National Forests estimated more than two million visits in 2002 and 2000, respectively. The Gallatin National Forest to the north and west of Yellowstone National Park reported nearly two million visits in 2003. A small proportion of these visits, 1 to 3 percent of total visits, reflects backcountry use of the existing wildernesses (primitive recreation setting) as shown in Figure 76.

Figure 75. Estimated current visits to national parks and national forests.



National forests vary in their landscapes and attractions for recreational pursuits. Figure 77 indicates the top recreational activities that visitors claimed were their primary activities while recreating on a particular national forest. The Bridger-Teton, Gallatin, and Targhee National Forests reflect a year-around attraction—from skiing or snow machining in the winter to hiking/walking and viewing scenery and wildlife in the spring-to-fall months. Hunting is popular on the Beaverhead-Deerlodge, Custer, Gallatin, Shoshone, and Caribou-Targhee National Forests. Snow machine use is an important activity on the Caribou-Targhee with 26 percent of visitors traveling to the Caribou-Targhee primarily for that use.

Figure 76. Estimated recreation use.

National Forest System lands	Year sampled	Recreation visits (millions)	Wilderness visits (millions)
National level	2001	209.0	14.3
Northern Region (R1)	2001	13.2	0.3
Rocky Mountain Region (R2)	NA	NA	NA
Intermountain Region (R4)	2001	21.5	1.3
Analysis area forests			
Beaverhead (including Deerlodge)	2000	1.10	0.016
Bridger-Teton	2002	2.67	0.052
Custer	2002	0.74	0.023
Gallatin	2003	1.98	0.058
Shoshone	2003	0.65	0.027
Targhee (including Caribou)	2000	2.20	0.021

Figure 77. Primary recreation activity participation (top four activities per forest).

Recreation activity	National forests					
	Beaverhead-Deerlodge	Bridger-Teton	Custer	Gallatin	Shoshone	Caribou-Targhee
General relaxing	8%			11%	15%	
Viewing scenery or wildlife	16%	10%			11%	8%
Developed camping					21%	
Picnic or day use	13%					
Hiking or walking		13%	18%	29%	11%	
Hunting	24%		19%	9%		16%
Fishing			14%			8%
OHV use						8%
Skiing		24%	16%	8%		
Snow machining		11%		8%		26%

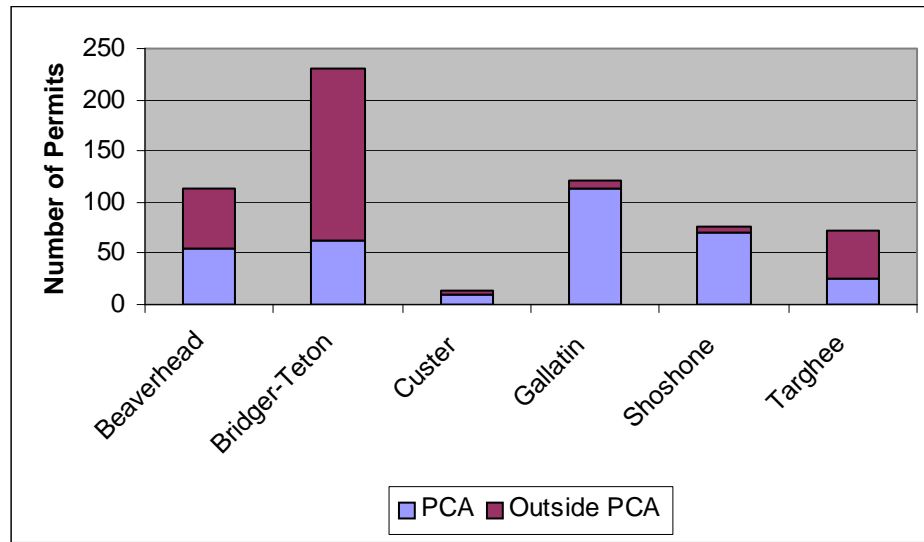
Specific Uses

Outfitting and Guiding

Many visitors to the GYA choose guided trips provided by national park interpretive services, local tourism businesses, or national forest outfitted and guided services. Approximately 629 outfitters and guides are under permit for operations on the six GYA national forests. These services provide a range of experiences including whitewater rafting, fishing, hunting, horseback riding, and other recreational experiences. Figure 78 shows the current situation.

The proposed action and other action alternatives could potentially affect outfitters and guides with regard to adherence to food storage orders and possible changes in camps and use with recurring grizzly bear/human conflicts. The proposal could affect the number of days permitted or user days if recurring grizzly bear/human conflicts result in closure of camps or trails.

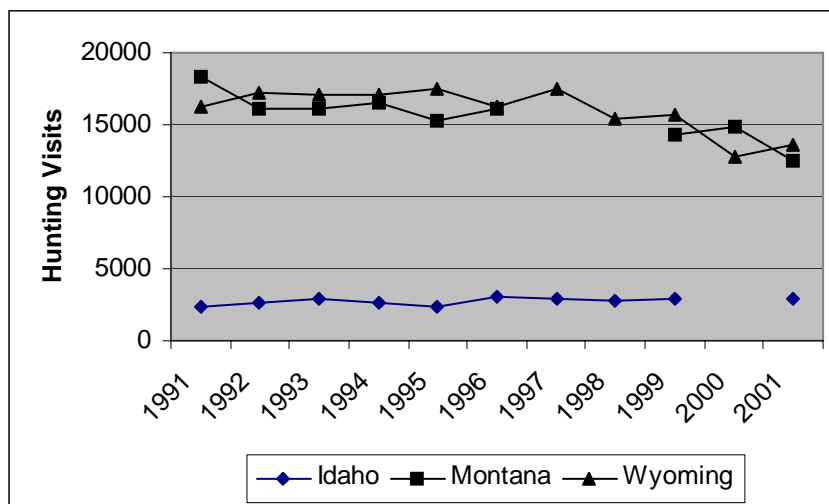
Figure 78. Outfitter and guides under permit, by national forest.



Hunting

Elk hunting is a key use in the GYA and holds high potential for grizzly bear/human conflicts since bears are attracted to the elk kills and gut piles. For four forests—Beaverhead, Custer, Gallatin, and Targhee—hunting is one of the top four primary recreation activities. For a period of years, the IGBC monitored hunting use trends within the PCA. Hunting levels were shown to be static in Idaho, but overall, hunting within the PCA has declined 26 percent from more than 36,000 hunter visits in 1991 to 29,000 visits in 2001 (Figure 79). The proposed action and other action alternatives could affect hunting through food storage orders and in the event of recurring grizzly bear/human conflicts, the closure of some areas (Haroldson et al. 2004).

Figure 79. Estimated numbers of elk hunters within the PCA plus a 10-mile perimeter in Idaho, Montana, and Wyoming for the years 1991 through 2001 (Conservation Strategy).

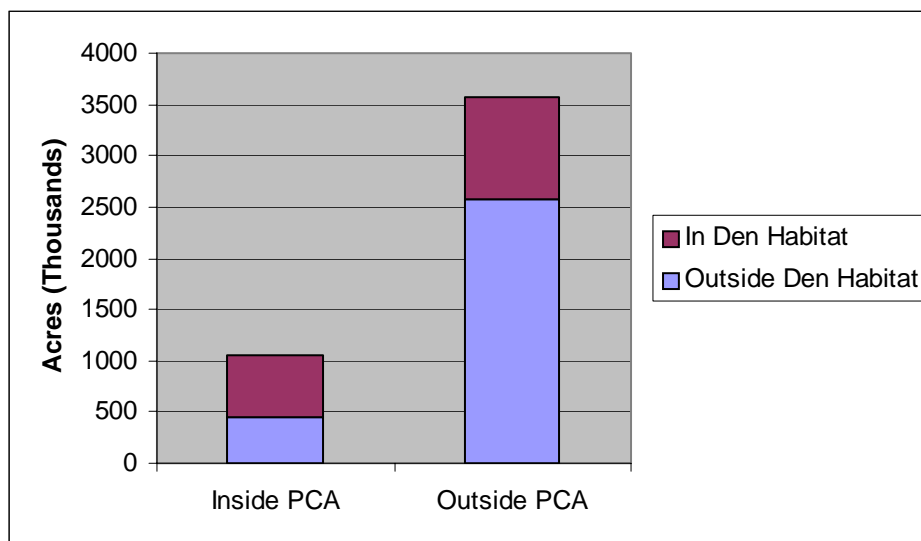


Winter Recreation Use

Winter recreational use of the parks and national forests in the analysis area has increased significantly in the past 15 years. This is exemplified in Yellowstone National Park, when the 1990 Winter Use Plan’s 10-year visitation threshold of 140,000 people was achieved in two years, by 1992 (USDA Forest Service 2003a). The State of Idaho registrations for snow machines in eastern Idaho increased 16 percent between 2000 and 2004 (State of Idaho 2003). Visitors

identified snow machining as a primary activity on the Targhee, Gallatin, and Bridger-Teton National Forests. Some action alternatives could affect snow machining by closing areas to this recreational use where the activity overlaps with bear denning habitat or throughout the Alternative 4 area. Figure 80 provides an estimation of snow machine acres and the overlap with denning habitat.

Figure 80. Potential snow machine acres, and overlap with grizzly bear denning habitat.



The six GYA national forests include five permitted downhill ski areas; at least three ski areas operate on private lands (unaffected by this proposed action). Downhill skiing is one of the top four primary recreation activities on the Bridger-Teton, Custer, and Gallatin National Forests. One area on the Shoshone National Forest is within the PCA and another area on the Targhee National Forest is within Alternative 4. Generally, national forest permitted ski areas have approved master development plans that specify the capacity for use, SAOT (skiers at one time). Capacity can also include lodging and mountain facilities. Potential effects to ski areas due to the developed site standard and motorized access related to denning habitat are discussed in the effects section.

Comparison of Recreation Use Trends and Capacity

For the purpose of this FEIS, recreation use and the available settings are organized into six categories based on season of use (winter or summer), mode of access (motorized or non-motorized), and amount of development (developed or dispersed). These classes of uses are compared to the capacities within the GYA to provide for these uses and trends.

Spring, Summer, and Fall Recreation—Developed

Use is estimated to increase 16 to 18 percent in this decade (by 2010) for developed camping and picnicking for the Rocky Mountain Region²⁶ (Bowker et al. 1999).

Greater Yellowstone Area. Forest managers suggest that most developed sites are currently not used to capacity, i.e., some individual units are not occupied during seasonal use periods. The exception to this generalization is that the more popular sites are usually filled to capacity on weekends. Campgrounds close to towns or along major highways are preferred. As uses increase, all forests will experience increasing pressure on developed sites and as more developed sites are filled to capacity, dispersed sites may also receive more use. As an example, the Custer National Forest's Beartooth Ranger District has noted increasing pressure on dispersed campsites because

²⁶ The Rocky Mountain Region includes the interior west states, and is not the same as Region 2, the Rocky Mountain Region, of the Forest Service.

of continually full campgrounds during the peak summer months. The Custer National Forest has planned for capital investments to increase capacity at several sites outside the PCA.

Major developed sites and lodges. Major developed sites include national forest permitted hotels, resorts, and dude ranches. The analysis area includes 43 of these sites; about one-half are on the Shoshone National Forest. These operations would generally aim to operate at capacity. No plans exist to increase capacity.

Permitted summer home complexes. Since summer homes are permitted recreation residences, the use of these residences is not directly affected by the increasing public recreation use.

Spring, Summer, and Fall Recreation—Non-motorized, Dispersed

Use is estimated to increase 11 to 16 percent by 2010 for horseback riding, hiking, fishing, and backpacking in the Rocky Mountain Region, while hunting is projected to increase 5 percent by 2010 for the same Region (Bowker et al. 1999).

Greater Yellowstone Area. Hiking, backpacking, and horseback riding will remain popular. Local residents desire day use or weekend opportunities, while the regional, national, and international visitors come for extended stays. More popular with non-local clientele are guided trips and multiple experiences (hiking, floating, horseback riding, wildlife viewing) within a stay. The recreation settings to serve these uses are plentiful; monitoring has not shown crowding from dispersed use.

Elk hunting is a key activity for the six national forests, attracting a regional and national clientele as well as local residents. Elk hunting as monitored within the PCA has declined 26 percent from 1991 to 2001 (Figure 79). The recreation settings to serve elk hunting uses are plentiful; the primary tension will be accommodating increasing populations of wolves and bears that regard elk as a key food source and can be attracted to recreational hunting sites.

Spring, Summer, and Fall Recreation—Motorized

By 2010, OHV use is estimated to increase 9 percent, sightseeing is estimated to increase by 20 percent, and dispersed camping is estimated to increase by 12 percent in the Rocky Mountain Region (Bowker et al. 1999).

Greater Yellowstone Area. Driving and viewing scenery and wildlife are some of the most popular activities in the GYA and will increase in use over the next decade. This type of use influences major travel routes in the analysis area, and in some cases, requires improvements and reconstruction. Three highway reconstruction projects in Wyoming are planned or underway: Sylvan Pass (Yellowstone National Park), Togwotee Pass (Bridger-Teton and Shoshone National Forests), and the Beartooth Highway (Shoshone National Forest). These projects are in or adjacent to the PCA.

OHV use encompasses three specialties: off-road four-wheeling, ATV use, and motorcycling. ATV and motorcycle riding are increasing faster than off-road four-wheel drive truck or jeep use (Marsh et al. 2005). OHV use is popular where the terrain accommodates this use. Managers estimate this motorized use has increased at faster rates in the past than what are projected for the larger Rocky Mountain Region (Klinger personal communication 2004). Idaho ATV registrations suggest that the rate of increase is significantly higher than the estimated 9 percent for the Rocky Mountain Region. In the south central and southeast regions of Idaho, ATV registrations more than doubled in a five-year period (1999 through 2003), from 6,387 to 15,601 registrations (State of Idaho 2003). OHV use is one of the top four activities on the Caribou-Targhee National Forest (Kocis et al. 2001a and b, 2003a and b, 2004a and b). The semi-primitive motorized and roaded recreation settings that serve this use have been reduced over the last decade as areas and routes have been closed to provide for wildlife security and reduce resource damage. Current recreation settings allowing for motorized use may not meet the estimated future use levels.

Dispersed camping has become more popular as RVs and campers have become more fully equipped and as campgrounds become full in peak seasons. The roaded and semi-primitive

motorized settings offer the opportunity for this use. Because dispersed sites are not inventoried or designated, it is unknown as to the capacity of the land to handle increased uses.

Winter Recreation—Developed

Downhill skiing is estimated to increase 14 percent by 2010 in the Rocky Mountain Region (Bowker et al. 1999). Trends for other uses that rely upon parking areas, travel routes, etc. are noted below.

Greater Yellowstone Area. Downhill skiing in the GYA is popular with at least eight ski areas within the area (three are on private lands). It is assumed that increasing uses can be accommodated by the existing facilities.

Trailhead parking for snow machining is currently estimated to be adequate except in eastern Idaho (Targhee National Forest) and on the Gallatin National Forest where managers are considering additional plowed parking and access through their travel planning process. The State of Idaho's 2000 Snowmobile User Survey found the greatest need indicated by snowmobilers was the development of new parking areas near trailheads and the enlargement of existing parking. Users indicated there is simply not enough parking at trailheads to accommodate current user loads (State of Idaho 2003). In addition, snow machine use could increase on the national forests when Yellowstone National Park managers implement new regulations for Park use. The impacts of these changes are not yet fully known.

Winter Recreation—Non-motorized, Dispersed

Cross-country skiing use is estimated to increase 31 percent by 2010 in the Rocky Mountain Region (Bowker et al. 1999).

Greater Yellowstone Area. Cross country skiing is popular in the analysis area. Current settings available for this use are plentiful and could accommodate increasing use, although if use increases as projected, then the more popular areas near GYA communities could experience some crowding. This activity would be affected indirectly by the proposed action if trailhead parking becomes limited.

Winter Recreation—Motorized

Snow machine use is estimated to increase 6 percent by 2010 in the Rocky Mountain Region (Bowker et al. 1999). Snow machine use in the GYA has increased at faster rates than the Region due to the GYA's becoming a popular destination use area.

Greater Yellowstone Area. Snow machine use on the GYA forests is expected to increase at a faster rate than the regional projections because the area is a destination winter recreation area and past trends indicate greater increases. The State of Idaho registrations for snowmobiles in eastern Idaho increased 16 percent between 2000 and 2004 (State of Idaho 2003). Additionally, Yellowstone National Park managers are taking steps to restrict and limit snow machine use and this use may shift to outlying areas around the Park. The capacity for the GYA forests to handle increased use is yet to be determined. Currently, the Gallatin National Forest acknowledges the need to provide more plowed parking. This is being evaluated in travel planning.

3.9.4 Effects on Recreation

Effects Common to All Alternatives

Recreation uses are expected to increase in the analysis area. Uses would be affected by bear use of the area, grizzly bear/human conflicts, and information and education about recreating in bear country. Grizzly bear populations are expected to be stable or increase within the PCA and increase their occupation and use of habitats outside the PCA.

A 2001 Wyoming resident survey reported that 44 percent of those surveyed said they think they would discontinue using outdoor areas where they currently recreate if those areas were occupied by grizzly bears (Duda et al. 2001). Recreation shifts are likely regardless of any alternative and are somewhat dependent on people's awareness of bear use and people's comfort while recreating

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in bear country. People may shift their uses to areas not occupied by grizzlies or rely upon uses where they have an increased sense of security such as hard-sided camping, developed campsites, day hiking on heavily used trails, or relying upon guided services. For some, recreating in bear country would be an added attraction and an allure of wild country.

As people gain the knowledge and skill of recreating in bear country, uses could increase. Information and education would remain an important component under any alternative to minimize grizzly bear/human conflicts. The 2001 Wyoming survey indicated that support for efforts to increase the grizzly bear population increased (from 42 to 61 percent favoring) when efforts to increase the grizzly bear population was coupled with the idea that groups of wildlife managers would be stationed locally to help track bears, inform and educate people, and resolve conflicts. (Duda et al. 2001).

People would adapt as recreation sites are filled to capacity. There are a variety of ways in which use can change; the effects of an alternative are not definite. Potential outcomes with restricting developed site capacity are:

- People may shift their uses to dispersed sites, e.g., camping in undesignated areas or accessing trails or waterways in other than the designated area. This kind of shift could put increased pressure on dispersed sites; more use of dispersed sites could increase the potential for grizzly bear/human interactions or less security for bear habitat. People also adapt by purchasing self-contained units such as campers and RVs that enable them to stay at a broader spectrum of sites.
- People would still use an area, but shift the timing of use to off-seasons, e.g., spring or fall.
- People may shift their uses to other areas on the six national forests or elsewhere.
- People may not be able to use the area as they desired or traditionally have used it. They are displaced.
- People may perceive the areas as crowded as developed sites are fully used. The experience could change from the feeling of a remote, outdoor experience to one that is noisier and busier.
- The national reservation system may be used to manage recreation uses once demand exceeds capacity. This ensures the opportunity to use an area but requires planning by the recreation user.
- Developed site accommodations could be created on private lands and within communities, particularly the gateway communities to the national parks.
- People may choose not to comply with restrictions and use or camp in prohibited areas.

Implementation and enforcement efforts would be an important component (similar to information and education about bears) under any alternative.

The Travel Management Final Rule (USDA Forest Service 2005e) requires each national forest to identify and designate those roads, trails, and areas that are open to motor vehicle use. The Final Rule restricts motorized use to these designated routes or specified open areas. All national forests are expected to comply with this rule within the next four years.

Effects of Alternative 1 on Recreation

Spring, Summer, and Fall Recreation

Developed. Within the PCA, developed recreation use and the existing infrastructure would continue to serve recreation users within the existing capacity for some time (perhaps a decade) (Figure 75). As some activities such as camping, picnicking, fishing access ramps, or trailhead parking increase at more popular sites, the capacity of the site could not be expanded if the site is part of MS 1. If these sites are within MS 2 or 3, then the capacity could be increased to accommodate the increased use (with evaluation under NEPA and consultation with the USFWS). When recreation uses reach capacity, refer to the potential shifts in recreation use as described in the effects common to all alternatives

New sites, including interpretive or observation sites, could be added (with additional NEPA evaluation and consultation with the USFWS) as public interest or demand occurs. Existing permitted lodges, resorts, hotels, ranches, or recreation residences would also be able to increase their capacities (with approval of operating plans or special use permits) as public demand increases.

Non-motorized dispersed. Within the PCA, hiking, backpacking, and horseback riding would continue much as they have and increases in use are likely to occur and be accommodated over the decade. Existing plan direction would not affect this use. Hunting use would continue to be a major fall activity and would not be limited or affected by Alternative 1.

Motorized. Within the PCA, motorized access routes would not be changed by this alternative. Approximately 15 percent of the motorized access routes on the six national GYA forests are within the PCA, with the largest amounts being available from the Gallatin (889 miles) and the Targhee (404 miles) National Forests. Motorized use is projected to increase about 9 percent by 2010 for the Rocky Mountain Region. Greater increases in recent years have been observed by some managers in the GYA (Klinger personal communication 2004) and this higher level of increase is also supported by ATV registrations, particularly in eastern Idaho (State of Idaho 2003). As motorized uses continue to be popular, the quality of the experience may be altered as uses increase on the lands available. Crowding and sharing backcountry motorized routes with different uses such as horse travel, hiking, or biking would occur and would negatively affect those motorized users who enjoy accessing the backcountry and viewing wildlife and scenery.

Past, present, and reasonably foreseeable actions can also affect motorized use and are considered as cumulative effects. Within the last five years, approximately 400 miles of road have been decommissioned on the Targhee National Forest to comply with the road density direction in the 1997 Revised Forest Plan. The Gallatin National Forest is currently updating a travel plan that will amend their 1987 Forest Plan, and other forests are currently revising or scheduled for revisions in the near future (Figure 3). It is likely that the revised plans will further define and possibly limit motorized access to address wildlife security needs, better manage conflicting recreation uses, and protect areas from resource damages. Motorized use within the PCA will most likely reach the capacity of the lands available for that use, and further demand will need to be accommodated outside the PCA.

Winter Recreation

Developed. The ski area on the Shoshone National Forest within the PCA would operate under its master plan and would not be limited by this alternative. Trailheads and parking areas for snow use would continue under their existing capacities or could be increased (with project level evaluation) to accommodate increasing use.

Non-motorized dispersed. Within the PCA, cross-country skiing and snowshoeing would continue much as they have and increases in use are likely to occur over the decade. This alternative would not affect this use.

Motorized. Within the PCA, motorized use by snow machines would not be affected by this alternative.

Effects of Alternative 2 on Recreation

Spring, Summer, and Fall Recreation

Developed. Within the PCA, developed recreation use and the existing infrastructure would continue to serve recreation users within the existing capacity for some time (perhaps a decade) (Figure 75). As some activities such as camping, picnicking, fishing access ramps, or trailhead parking increase at more popular sites, this increased demand would not be accommodated by increasing capacities unless capacities are reduced in other locations and shifted within a subunit, i.e., mitigation from the Application Rules. The Application Rules offer the opportunity to concentrate uses with the tradeoff of limiting developed or dispersed sites in other areas. The Application Rules also allow for flexibility in shifting recreation uses to lessen impacts to grizzly

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bear habitat and bear uses. When recreation uses reach capacity, people would be displaced and would need to shift their uses. Refer to the potential shifts in recreation use as described in the effects common to all alternatives. In addition, new sites, including interpretive or observation sites, would not be allowed unless mitigated through reductions elsewhere within the PCA on the forest or through an exception where an evaluation demonstrates no effect on the bear or bear habitat. See chapter 2 for a further description of exceptions.

Nineteen lodges, resorts, hotels, and dude ranches operate under Forest Service permits within the PCA. They would continue to operate under their current capacities but would not be able to increase accommodations as public demand increases, unless reductions of capacities are incurred elsewhere within the PCA on the forest, i.e., mitigation from the Application Rules. The limitation of current capacities could contribute to ensuring these permitted services are used fully and support the businesses economically. Fees could increase as the market warrants, providing greater economic return. Capacity increases that could serve more people would not be allowed.

Permitted recreation residences would continue their use, but no increases in capacity would be allowed unless mitigated through the Application Rules.

Non-motorized dispersed. Within the PCA, hiking, backpacking, hunting, and horseback riding would continue much as they have and increases in use are likely to occur over the decade. This alternative would affect these uses indirectly as trailhead sites reach capacity and parking is limited. Improvements to trailhead facilities, for example, could occur, but the capacity or amount of parking would be limited. Outfitting and guiding would continue much as they are now.

Motorized. Within the PCA, motorized access routes would not be changed by this alternative. Approximately 15 percent of the motorized access routes on the six national forests are within the PCA with the largest amounts being available from the Gallatin National Forest (889 miles) and the Targhee National Forest (404 miles). Motorized use is projected to increase about 9 percent by 2010 for the Rocky Mountain Region. Greater increases in recent years have been observed by some managers in the GYA (Klinger personal communication 2004). This higher level of increase is also supported by ATV registrations, particularly in eastern Idaho (State of Idaho 2003). As motorized uses continue to be popular, the quality of the experience may be altered as uses increase on the lands available. Crowding and sharing backcountry motorized routes with different uses such as horse travel, hiking, or biking would occur and would negatively affect those motorized users who enjoy accessing the backcountry and viewing wildlife and scenery.

Past, present, and reasonably foreseeable actions can also affect motorized use and are considered as cumulative effects. Within the last five years, approximately 400 miles of road have been decommissioned on the Targhee National Forest to comply with the road density direction in the 1997 Revised Forest Plan. The Gallatin National Forest is currently updating a travel plan that will amend their 1987 Forest Plan, and other forests are currently revising or scheduled for revisions in the near future (Figure 3). It is likely that the revised plans will further define and possibly limit motorized access to address wildlife security needs, better manage conflicting recreation uses, and protect areas from resource damages. Motorized use within the PCA will most likely reach the capacity of the lands available for that use, and further demand will need to be accommodated outside the PCA.

Winter Recreation

Developed. The ski area on the Shoshone National Forest that is within the PCA would continue to operate under its master plan. Changes to the existing capacity would require additional evaluation as required by Alternative 2, Standard 2. Winter capacity could increase if there were no conflicts with denning grizzly bears or bear emergence in the spring.

Trailheads and parking areas for snow use would continue under their existing capacities. Approximately three snow parks are within the PCA (one on the Targhee National Forest and two on the Gallatin National Forest), although other trailhead parking areas serve dual winter and

summer seasonal use. Increases to accommodate increasing use would not be allowed unless through the Application Rules or an evaluation under the exceptions. See chapter 2 for a further description of the Application Rules and exceptions.

Non-motorized dispersed. Within the PCA, cross-country skiing and snowshoeing would continue much as they have; increases in use are likely to occur over the decade. Alternative 2 would not affect this use except parking at trailheads may be limited to existing capacities.

Motorized. Within the PCA, snow machine use could be closed temporarily in some areas if conflicts with denning areas are identified.

Effects of Alternative 2-Modified on Recreation

Effects are basically the same as Alternative 2 with the exception of the increased emphasis on food storage and information and education under Alternative 2-Modified. This would provide additional assurances that food storage requirements stay in place and conflicts between grizzly bears and recreation users would be minimized.

Effects of Alternative 3 on Recreation

Spring, Summer, and Fall Recreation

Developed. Within the PCA, developed recreation use and the existing infrastructure would continue to serve recreation users within the existing capacity for some time (perhaps a decade) (Figure 75). As some campgrounds, picnic sites, trailheads, fishing access ramps, or other developed sites become full, capacities would not be increased to accommodate this increased demand. No flexibility would be allowed for increasing capacities in some areas while reducing capacities elsewhere on the forest. If recurring conflicts with bears at a developed site were identified, the site would be closed. This would further reduce recreation opportunities within the PCA. When recreation uses reach capacities, people would be displaced and would need to shift their uses. Refer to the potential shifts in recreation use as described in the effects common to all alternatives. In addition, new sites, including interpretive or observation sites, would not be allowed.

Nineteen lodges, resorts, hotels, and ranches operate under Forest Service permits within the PCA. They would continue to operate under their current capacities but would not be able to increase accommodations as public demands increase. The limitation of current capacities could contribute to ensuring that these permitted services are used fully and support the businesses economically. Fees could increase as the market warrants, providing greater economic return. Capacity increases that could also serve more people would not be allowed.

Permitted recreation residences would continue their use, but no increases in capacity would be allowed.

Non-motorized dispersed. Within the PCA, hiking, backpacking, hunting, and horseback riding would have greater opportunities because of motorized access closures. If these activities in particular locations or circumstances develop a trend of recurring grizzly bear/human conflicts, use would be restricted. In those cases, dispersed sites could be closed or uses limited. High bear use of some areas may warrant limiting use under this alternative. Traditional recreation uses may change and people would not be able to use areas as they have in the past. Public safety could be improved where bears and humans are conflicting over use in specific locations. Alternative 3 could also affect these uses indirectly as trailhead sites reach capacity and parking is limited. Outfitting and guiding could also be affected where camps may be closed due to bear use or conflicts. If uses are limited to any large extent, these changes could diminish the economic livelihoods of particular affected operations.

Motorized. Alternative 3 proposes that all motorized access routes in inventoried roadless areas be closed within the PCA and any additional motorized access routes in six BMU subunits be closed to achieve 70 percent secure habitat in each BMU subunit within the PCA. This would require closing nearly 500 miles of motorized routes on the six GYA national forests (except the Beaverhead National Forest). The Gallatin National Forest would be reduced the most with

approximately 350 miles closed (40 percent change within the PCA) and the Targhee National Forest with 84 miles closed (21 percent change within the PCA). The motorized access routes within the PCA would be reduced to 10 percent of the total motorized routes available for motorized use in the six GYA forests.

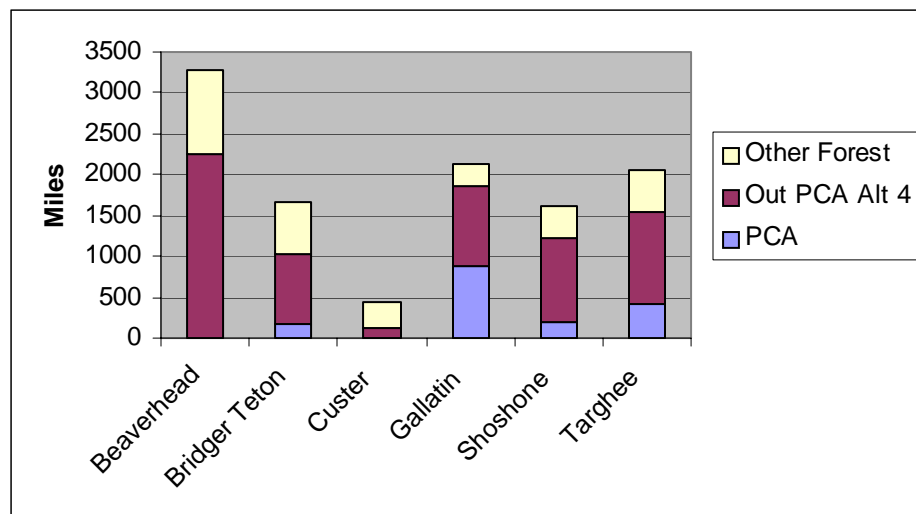
Closures would occur in areas near the communities of Gardiner and West Yellowstone in Montana and Island Park in Idaho. Idaho State Parks and Recreation mentioned several areas of concern for further impact to motorized uses, including the Madison Pitchstone, Island Park, Centennial, and Teton subunits. These areas are where some of the closures are proposed. Motorized route closures are provided in Figure 123 in appendix A. Local recreation users as well as visitors to those areas would be negatively impacted by those closures.

Motorized use is projected to increase about 9 percent by 2010 for the Rocky Mountain Region. Greater increases in recent years have been observed by some managers in the GYA (Klinger personal communication 2004). This higher level of increase is also supported by ATV registrations, particularly in eastern Idaho (State of Idaho 2003). As motorized uses continue to be popular, the quality of the experience may be altered as uses increase on the lands available. Crowding and sharing backcountry motorized routes with different uses such as horse travel, hiking, or biking would occur and would negatively affect those motorized users who enjoy accessing the backcountry and viewing wildlife and scenery.

Past, present, and reasonably foreseeable actions can also affect motorized use and are considered as cumulative effects. Within the last five years, approximately 400 miles of road have been decommissioned on the Targhee National Forest to comply with the road density direction in the 1997 Revised Forest Plan. The Gallatin National Forest is currently updating a travel plan that will amend the 1987 Forest Plan, and other forests are currently revising or scheduled for revisions in the near future (Figure 3). It is likely that the revised plans will further define and possibly limit motorized access to address wildlife security needs, better manage conflicting recreation uses, and protect areas from resource damages.

It is likely that some of the existing motorized use within the PCA would be displaced and motorized users would need to find other opportunities outside the PCA. The PCA would not accommodate increasing demand for this use. Local and regional motorized users would be concerned with the closures, particularly having been affected by closures on the Targhee National Forest in recent years. See the social and economic section for more discussion.

Figure 81. Minimum miles of open motorized access routes to be closed within the PCA (Alternative 3) and outside the PCA (Alternative 4). The Other Forest category shows what would remain open.



Winter Recreation

Developed. The ski area on the Shoshone National Forest within the PCA would continue to operate under its existing master plan and any increases in capacity would not be allowed under this alternative. Trailheads and parking areas for snow use would continue under their existing capacities. Approximately three snow parks are within the PCA (one on the Targhee National Forest and two on the Gallatin National Forest) although other trailhead parking areas serve dual winter and summer seasonal use.

Non-motorized Dispersed. Within the PCA, cross-country skiing and snowshoeing would continue much as they have and increases in use are likely to occur over the decade. Alternative 3 would not affect this use unless parking areas become full and cannot be extended.

Motorized. Within the PCA, motorized use that occurs near bear denning areas would be eliminated. While more site-specific evaluations would be needed beyond this proposal, potentially an estimated 600,000 acres of land available to snow machines (60 percent of total) could be closed, leaving approximately 400,000 acres of land available within the PCA. Snow machine use is one of the top four primary activities on the Bridger-Teton, Gallatin, and Targhee National Forests. For the Targhee, at least 26 percent of the yearly recreation visitors claim this as a primary activity. This effect would be in addition to recent changes to restrict snow machine use in Yellowstone National Park. People may be confused about the cumulative changes and traditional uses would be disrupted. Crowding and displacement of use would occur; people may continue to buy snow machines and find that they do not have the areas in which to use them. Increased law enforcement would be needed to inform people of the open routes and ensure compliance with closures.

Effects of Alternative 4 on Recreation*Spring, Summer, and Fall Recreation*

Developed. Within the PCA, effects are similar to Alternative 3.

Outside the PCA in Alternative 4, more than 450 additional developed recreation sites would be limited to their existing capacities (as of 2003) (Figure 75). These sites would continue to serve recreation users within the existing capacity for some time (perhaps a decade). With a majority of the six national forests' sites limited to existing capacity, recreation uses will not as easily shift to adjacent lands when uses increase. The Beartooth Ranger District is already experiencing campgrounds that have reached capacities and the overflow is negatively impacting dispersed sites. As the northeast entrance to Yellowstone National Park has become more popular, existing sites have not kept pace with demand. Plans are underway for improvements to a couple of existing campgrounds that may not be allowed under this alternative.

Cumulatively, Alternative 4 does not enable as much use (as the other alternatives) to shift to areas outside the PCA (given limitations there) and still be within proximity to the GYA. As some campgrounds, picnic sites, trailheads, or other developed sites become full, increasing capacities would not be allowed in order to meet this increased demand. No flexibility would be allowed for increasing capacities in some areas while reducing capacities elsewhere on the forest. If recurring conflicts with bears at a developed site were identified, the site would be closed. This would further reduce recreation opportunities within and outside the PCA. When recreation uses reach capacity, people would be turned away from these areas. Refer to the potential shifts in recreation use as described in the effects common to all alternatives. In addition, new sites, including interpretive or observation sites, would not be allowed.

Twenty-one lodges, resorts, hotels, and ranches operate under Forest Service permits outside the PCA within Alternative 4 (in addition to the 19 within the PCA). They would continue to operate under their current capacities but would not be able to increase accommodations as public demands increase. The limitation of current capacities could contribute to ensuring that these permitted services are used fully and support the businesses economically. Fees could increase as

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the market warrants, providing greater economic return. Capacity increases that could also serve more people would not be allowed.

Permitted recreation residences would continue their use, but no increases in capacity would be allowed.

Non-motorized dispersed. Within the PCA and in Alternative 4 areas, hiking, backpacking, hunting, and horseback riding would have greater opportunities because of motorized access closures. If these activities develop a trend of recurring grizzly bear/human conflicts, use would be restricted. In those cases, dispersed sites could be closed or uses limited. High bear use of some areas also may warrant limiting use. Traditional recreation uses may change and people would not be able to use areas as they have in the past. Public safety could be improved where bears and humans are conflicting over use in specific locations. Alternative 4 could also affect these uses indirectly as trailhead sites reach capacity and parking is limited. Outfitting and guiding could also be affected where camps may be closed due to bear use or conflicts. If uses are limited to any large extent, these changes could diminish the economic livelihoods of particular affected operations.

Motorized. Motorized routes would be closed to achieve 70 percent security within a BMU subunit or analysis area (outside the PCA) and routes in inventoried roadless areas would be closed to motorized use. Approximately 1,850 miles of road would be closed. This would include 564 miles on the Targhee National Forest, 278 miles on the Beaverhead National Forest, 442 miles on the Gallatin National Forest, 11 miles on the Custer National Forest, 320 miles on the Bridger-Teton National Forest, and 235 miles on the Shoshone National Forest.

Within the PCA, effects are similar to Alternative 3 except fewer opportunities would exist outside the PCA to accommodate displaced use.

Outside the PCA, Alternative 4 extends security standards to a larger area beyond the PCA and would require closure of about 1,350 additional miles of motorized routes for a total of about 1,850 miles closed within the GYA. This change would significantly affect people's current motorized recreational pursuits. The recreation setting of semi-primitive motorized amounts to approximately 16 percent of the six GYA national forests; this type of setting would be reduced further, given motorized route closures. Areas like the Teton Basin and Palisades Ranger Districts (Big Hole Mountains and Deadhorse Ridge) that receive a lot of motorized recreation from local as well as regional areas would have a reduced base to travel in the backcountry. Alternative 4 would displace this use, increasing crowding, and causing more resource impacts to areas receiving the increased uses. See Figure 131 in appendix A for a map of the units that are within or outside the 70 percent security.

Motorized use is projected to increase about 9 percent by 2010 for the Rocky Mountain Region. Greater increases in recent years have been observed by some managers in the GYA (Klinger personal communication 2004). This higher level of increase is also supported by ATV registrations, particularly in eastern Idaho (State of Idaho 2003). As motorized uses continue to be popular, the quality of the experience may be altered as uses increase on the lands available. Crowding and sharing lands with different uses such as horse travel, hiking, or biking would occur and would negatively affect those who desire motorized access for the purpose of accessing the back country and viewing wildlife and scenery.

Past, present, and reasonably foreseeable actions can also affect motorized use and are considered as cumulative effects. Within the last five years, approximately 500 miles of road have been decommissioned on the Targhee National Forest to comply with the road density direction in the 1997 Revised Forest Plan. The Gallatin National Forest is currently updating a travel plan that will amend the 1987 Forest Plan, and other forests are currently revising or scheduled for revisions in the near future (Figure 3). It is likely that the revised plans will further define and possibly limit motorized access to address wildlife security needs, better manage conflicting recreation uses, and protect areas from resource damages.

Existing motorized use within the GYA would be displaced and motorized users would need to find other opportunities outside the six GYA national forests. Finding other substitutes, especially for those who desire backcountry, may be difficult because beyond the perimeter of the GYA much of the land transitions to rangelands and is privately owned. The GYA could not accommodate increasing demand for this use. Local and regional motorized users would be concerned with the closures, particularly having been affected by closures on the Targhee National Forest in recent years.

Winter Recreation

Developed. Within the PCA, effects are similar to Alternative 3.

The ski area on the Targhee National Forest within Alternative 4 (outside the PCA) could continue to operate under existing capacity; any increases called for under the master development plan to the existing capacity or capacities of the facilities would not be allowed under this alternative. This lost opportunity would negatively affect this business and could include economic losses if the current master development plan, which has already undergone public and agency review, is not viable.

Trailheads and parking areas for snow use would continue under their existing capacities. Approximately three snow parks are outside the PCA and within Alternative 4 (one on the Targhee National Forest and two on the Gallatin National Forest), although other trailhead parking areas serve dual winter and summer seasonal use. Increases in capacities would not be allowed.

Non-motorized dispersed. Cross-country skiing and snowshoeing would continue much as they have and increases in use are likely to occur over the decade. Alternative 4 would not affect this use unless parking areas become full and could not be extended.

Motorized. Within the PCA, effects are similar to Alternative 3.

Outside the PCA within Alternative 4, motorized use that occurs in grizzly bear denning areas would be eliminated. While more site-specific evaluations would be needed beyond this proposal, potentially an estimated one million acres of land currently available to snow machines (28 percent of total) could be closed, leaving approximately 2.6 million acres of land available for snow machine use. Snow machine use is one of the top four primary activities on the Bridger-Teton, Gallatin, and Targhee National Forests. For the Targhee, at least 26 percent of the yearly recreation visitors claim this as a primary activity. This effect would be in addition to recent changes to restrict snow machine use in Yellowstone National Park. People would be concerned over the cumulative changes and traditional uses would be disrupted. Crowding and displacement of use would occur. Increased law enforcement would be needed to inform people of the open routes and ensure compliance with closures.

3.10 Transportation Management

Section 3.10 Changes between Draft and Final EIS

In this section, the following additions and updates were made:

- Correction to the number of miles of road to be closed to meet the secure habitat standard in Alternative 4

Affected Environment

In this transportation analysis, definitions of travel routes follow those described in the Interagency Grizzly Bear Committee Taskforce Report: Grizzly Bear/Motorized Access Management (IGBC 1998). It was the IGBC's intent to establish definitions and procedures that would allow for consistency among the various land management units in describing effects of human access routes on grizzly bear habitat use. The following recommended definitions were adopted in this analysis:

Roads are all created or evolved routes that are greater than 500 feet long (minimum inventory standard for the Forest Service Route Management System), which are reasonably and prudently drivable with a conventional passenger car or pickup.

Restricted roads are legally restricted roads, typically with gates. Administrative motorized use may occur on gated roads. Permanently restricted roads are roads legally restricted with barriers, typically berms or rocks, and no administrative use is permitted.

Open roads are roads open to motorized use during any portion of the active bear season

A **decommissioned road** is a route that is managed with the long-term intent for no motorized use and has been treated in such a manner to no longer function as a road. An effective means to accomplish this is through one or a combination of several means including recontouring to original slope, placement of logging or forest debris, planting of shrubs or trees, etc.

Trails are created or evolved access routes that do not qualify as roads. They are not reasonably and prudently drivable with a conventional passenger car or pickup. Some trails are open to motorized use, such as motorcycles or all-terrain vehicles, and others are legally restricted to non-motorized use.

Figure 82 displays miles of motorized access routes open to travel year round or seasonally within the six GYA national forests as of 2003.

Figure 82. Miles of motorized access routes open to travel year round or seasonally in 2003, within the six GYA national forests.

National forest	PCA	Alternative 4 area outside the PCA	Outside Alternative 4 and outside PCA	Total forest
Beaverhead	2	2,244	1,032	3,278
Bridger-Teton	160	874	629	1,663
Custer	11	121	311	443
Gallatin	889	975	264	2,128
Shoshone	202	1,022	394	1,618
Targhee	404	1,130	514	2,048
Total	1,668	6,366	3,144	11,178

Past Road Construction and Decommissioning

In the past 17 years, over 1,400 miles of road have been decommissioned in the GYA national forests, with less than 400 miles of road being constructed—a net reduction of over 1,000 miles of road. These tended to be roads that were in excess of what was needed for management or recreational activities, or were difficult or expensive to maintain, or both. Much of the road decommissioning has taken place inside the PCA with little accompanying road construction for a net reduction of 630 miles of road.

The trend for road decommissioning inside the PCA has slowed, with only 13 miles decommissioned from 2000 through 2002. Most roads that could be decommissioned have been decommissioned inside the PCA. Outside the PCA, opportunities still exist for road decommissioning. Road construction has been limited, especially with road construction and reconstruction being limited by the roadless policies in place from 2000 through 2005 coupled with concerns for controlling costs for maintenance of transportation systems.

Figure 83. Open and restricted (gated) motorized access routes on National Forest System lands.

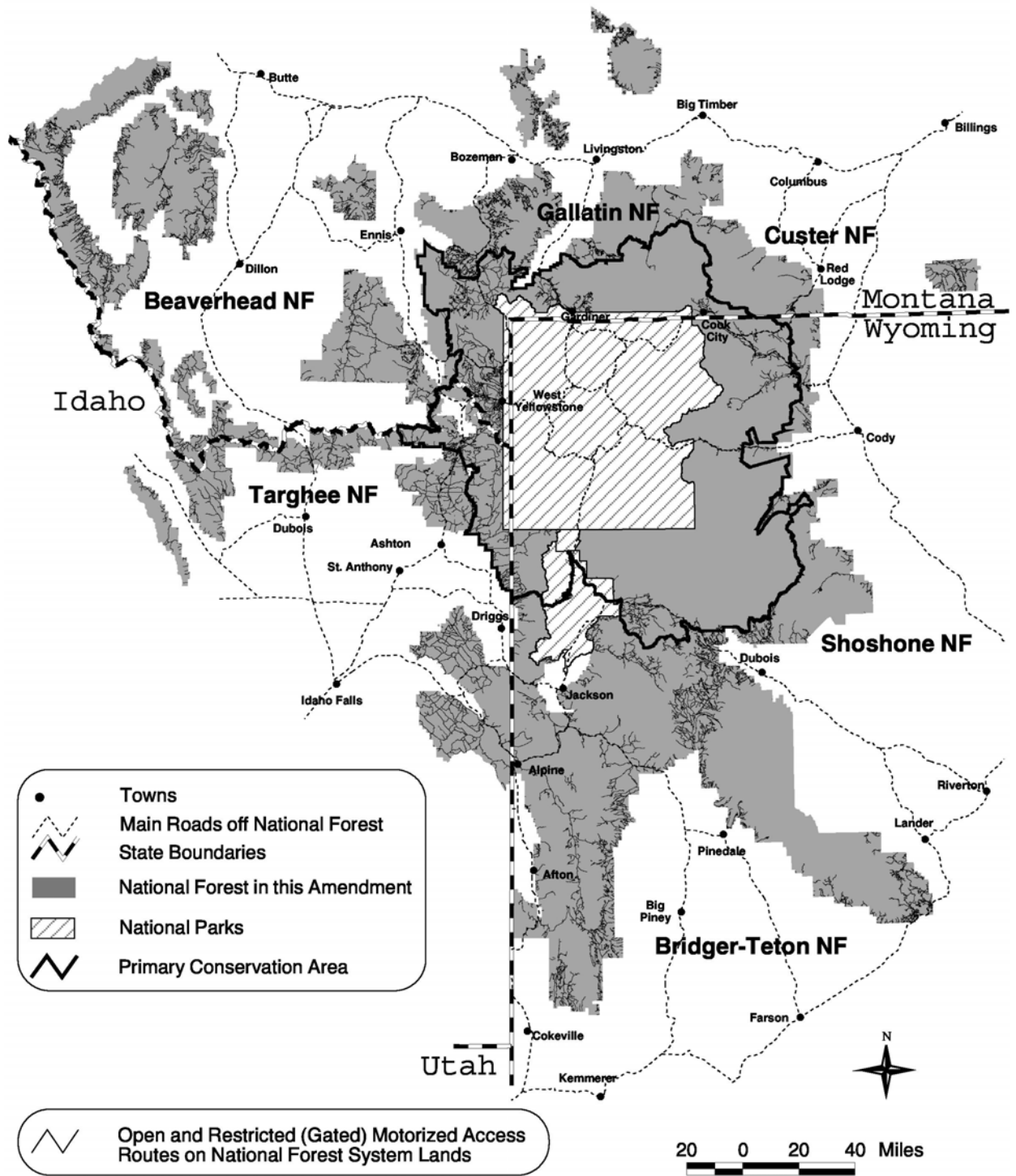


Figure 84. Summary of average miles of road constructed or decommissioned per year inside and outside the PCA for the last 17 years and from 2000 through 2002.

Road constructed	Inside PCA	Outside PCA	Total (average per year)	Total for time period
1986 through 2002	5.5	15.3	20.8	353.6
2000 through 2002	0.3	2.1	2.3	6.9
Road decommissioned				
1986 through 2002	42.7	40.5	83.2	1,414.4
2000 through 2002	4.4	61.1	65.5	196.5

Figure 85. Average miles of road constructed or decommissioned per year inside the PCA, by forest, for the last 17 years and from 2000 through 2002.

Road constructed	BNF	BTNF	CNF	GNF	SNF	TNF	Total
1986 through 2002	0	1.5	0	0.1	1.3	2.6	5.5
2000 through 2002	0	0	0	0.3	0	0	0.3
Road decommissioned							
1986 through 2002	0	0	0	7.4	2.1	33.1	42.7
2000 through 2002	0	0	0	2.3	0.7	1.4	4.4

Figure 86. Average miles of road constructed or decommissioned per year outside the PCA, by forest, for the last 17 years and from 2000 through 2002.

Road constructed	BNF	BTNF	CNF	GNF	SNF	TNF	Total
1986 through 2002	4.1	2.6	0	3.9	1.2	3.5	15.3
2000 through 2002	0.8	0	0	1.0	0.3	0	2.1
Road decommissioned							
1986 through 2002	4.9	11.1	0.2	6.1	4.3	14.0	40.6
2000 through 2002	14.7	10.0	0.9	6.1	0.7	28.8	61.2

Roads Analysis Requirements and Findings

Roads analysis requirements are described in Forest Service Manual 7700 Transportation System. These requirements, adopted in 1999, ensure that decisions to construct, reconstruct, or decommission roads incorporate science-based roads analysis. All forests in the GYA have completed a roads analysis.

Forest Plan Direction for Transportation Management in the PCA

Beaverhead National Forest. Motorized use is prohibited year-round within the PCA because nearly all the area is in designated wilderness.

Bridger-Teton National Forest. The Bridger-Teton Forest Plan does not contain a specific Forestwide or PCA access standard. Outside designated wilderness, most management prescriptions within the PCA would permit open road densities of 0.25 to 1.25 mile per square mile of standard or equivalent road. The three management prescriptions with the fewest acres within the PCA contain no road density standard.

Custer National Forest. Approximately 96 percent of the Custer National Forest within the PCA is designated wilderness. The non-wilderness portion of the PCA is allocated to management areas

that discourage road development (6,691 acres) or emphasize mineral management (1,595 acres). The mineral management area includes a standard that states, “road densities will average about two miles per square mile during initial development. Secondary and tertiary recovery could increase this mileage to a total of five to six miles per square mile.”

Gallatin National Forest. The Gallatin Forest Plan includes a Forestwide standard that states, “within Bear Management Subunits (unless allowed through consultation with the USFWS) 1) do not increase open motorized access route density from the current [1995] level, 2) do not increase total motorized access route density from the current level, and 3) do not decrease the amount of core area(s) from the current level.” Motorized access concerns identified in the Conservation Strategy in several BMU subunits will be addressed through the Forest’s travel management plan, which is being updated.

Shoshone National Forest. The Shoshone Forest Plan has a Forestwide standard for no net increase in roads. The Plan does not contain specific direction for secure habitat or motorized access within BMU subunits. A no net increase in roads would essentially mean a no net decrease in secure habitat on a Forestwide basis.

Targhee National Forest. The Targhee Forest Plan contains a Forestwide goal to increase grizzly bear security. Forestwide standards for grizzly bear habitat require that the Forest “achieve the road density standards in the Bear Management Units (BMUs) within three years of the implementation of the Record of Decision in coordination with USFWS and State Wildlife agencies.” Management area prescriptions and Forestwide direction establish standards for open road and open motorized trail access density, and total motorized access route density within the PCA. The Forest Plan identifies numerous management prescriptions within the PCA that meet the definition of core areas from the 1994 IGBC Access Task Force. The Conservation Strategy recognizes that the Targhee Forest Plan is consistent with the secure habitat standards. The Conservation Strategy states, “When fully adopted and implemented the Standards and Guidelines of the 1997 revised Targhee Forest Plan met the intent of maintaining secure habitat levels.”

Effects on Transportation Management

The proposed action and alternatives represent programmatic decisions and would have no direct effects on the transportation system. Any direct effects would occur later at the project level when site-specific decisions are made about road and trail use restrictions. Most of the effects identified in this analysis would be indirect effects in that they would occur later in time because of this programmatic decision. Changes in transportation management affect recreation opportunities, access for timber harvesting and minerals extraction, and the social environment. These effects are discussed in their respective sections in chapter 3.

The indirect effects identified in this section are the projected impacts of the project-level implementation of the proposed standards. The following section discloses the estimated mileage of road status changes expected with implementation of each alternative.

Figure 87. Miles of road decommissioned to meet Standard 1.

Miles of road decommissioned	BNF	BTNF	CNF	GNF	SNF	TNF	Total
Alternative 1	0	0	0	0	0	0	0
Alternatives 2 and 2-Modified	0	0	0	0	0	0	0
Alternative 3	0	21	1	356	25	84	487
Alternative 4	278	320	11	442	235	564	1,850

Standard 1 varies in Alternatives 2, 2-Modified, 3, and 4. Standard 1 in Alternatives 2 and 2-Modified would require that secure habitat within each BMU subunit be maintained at or above

levels that existed in 1998. Temporary and permanent changes would be allowed under specific conditions identified below. No road closures would occur in Alternatives 2 or 2-Modified.

In Alternatives 3 and 4, Standard 1 would require secure habitat within each BMU subunit to be maintained at or above levels that existed in 1998 or 2003, with no permanent or temporary changes allowed. Existing motorized routes in inventoried roadless areas would be removed within five years and secure habitat below 70 percent would be increased to 70 percent within five years through removal of existing motorized routes. Alternatives 3 and 4 would require road decommissioning to meet this standard, with more miles of road decommissioned in Alternative 4 because of the larger area to which Standard 1 applies.

Effects of Alternative 1 on Transportation Management

Alternative 1 would not require decommissioning of any roads. Because there is no standard requiring maintenance of secure habitat, some road construction could take place that would reduce secure habitat below 1998 levels. Consultation with USFWS would be required for all access decisions.

Effects of Alternatives 2 and 2- Modified on Transportation Management

Alternatives 2 and 2-Modified would not change access, current use, traffic patterns, and road standards when compared with Alternative 1. The secure habitat standard requires that secure habitat be maintained at 1998 levels, which would allow access and use to continue at those levels. Proposals to permanently increase the transportation system would not occur unless mitigation is met, as described in the Application Rules. Administrative access needed for activities such as Natural Resource Conservation Service snow surveying would not change from Alternative 1.

Effects of Alternative 3 on Transportation Management

Alternative 3 would require nearly 500 miles of road decommissioning in order to meet a minimum of 70 percent secure habitat for all BMU subunits inside the PCA and removing existing routes in inventoried roadless areas. Decommissioning can be accomplished through one or a combination of several means including recontouring to original slope, placement of logging or forest debris, planting of shrubs or trees, etc.

For the purposes of this analysis, it is assumed roads would initially be restricted by barriers, with recontouring and obliterating to occur later. Most road decommissioning would occur on the Gallatin National Forest with some additional closures on the Targhee, Bridger-Teton, and Shoshone National Forests.

On the Targhee National Forest, the majority of the road decommissioning would occur in two BMU subunits in the Henrys Lake area. Access and use would be changed in that area, which would limit recreational opportunities and access for vegetation treatment. Even if these roads were decommissioned in the Henrys Lake area, some roads would remain open, including county roads, a U.S. highway, a road to a Federal Aviation Administration site on Sawtell Peak, a road to an authorized mining claim, and roads providing access to private lands. Not enough roads can be legally decommissioned to achieve 70 percent secure habitat.

Administrative access needed for activities such as Natural Resource Conservation Service snow surveying could decrease in Alternative 3 because of road decommissioning.

Effects of Alternative 4 on Transportation Management

Alternative 4 would require about 1,850 miles of road decommissioning in order to meet a minimum of 70 percent secure habitat for all BMU subunits and also meet decommissioning of existing routes in inventoried roadless areas. This would occur within Alternative 4 boundaries. It is assumed roads would initially be restricted by barriers, with recontouring and obliterating to occur at a later date. All national forests would require road decommissioning of over 200 miles in each forest, except for the Custer National Forest, which would require only 11 miles of road decommissioning. The 1,850 miles of road decommissioning would include almost 500 miles of

road decommissioning in the PCA, as described in Alternative 3, and about 1,350 miles of road decommissioning outside the PCA within Alternative 4 boundaries.

Decommissioning of 1,850 miles of road would change access and current and projected use for nearly all the national forests in the GYA. Roads in inventoried roadless areas would be decommissioned first. Effects of decommissioning are further discussed in the timber, recreation, social, and minerals sections. Administrative access needed for activities such as Natural Resource Conservation Service snow surveying could decrease in Alternative 4 because of road decommissioning.

3.11 Landownership

Affected Environment

Landownership for the national forests in the GYA varies inside National Forest System lands boundaries and includes parcels of lands owned by private entities, states, and other federal agencies.

In the GYA, National Forest System lands are generally well connected, providing a good opportunity to maintain habitat connectivity. The national forests are adjacent to Yellowstone National Park, which is continuous public land not subject to development or exchange, adding to the ability to maintain habitat connectivity. Private lands are generally not managed for grizzly bear habitat. Recent land exchanges on the Gallatin National Forest have improved land patterns for management of grizzly bear habitat. (These exchanges occurred on Gallatin 3 and Hilgard 1 subunits.) Further improvements in secure habitat will likely result through current travel management planning efforts on the Gallatin National Forest.

For the Forest Service, landownership changes come about through land exchanges and purchases. The federal real estate program is active throughout the six GYA national forests. Its purpose is to manage and conserve the public's real property for the purposes for which it was reserved from the public domain. One of its primary goals is to consolidate landownership patterns to help manage federal lands more effectively and efficiently.

Effects of All Alternatives on Landownership

There are no objectives, standards, or guidelines in any alternative related to the lands program, and no effects are expected. Landownership adjustments would continue, but may not be a priority because of limited funding. In some areas, grizzly bear habitat may be exchanged, and in others, it may be acquired. Private lands within the PCA may be a priority for acquisition, exchange, or purchase of a conservation easement.

An active real estate program could enhance and protect grizzly bear habitat connectivity by retaining public lands and acquiring non-federal lands. Some grizzly bear habitat could be enhanced and protected by acquiring conservation easements.

3.12 Minerals and Oil and Gas

Introduction

A wide variety of mineral and energy resources occur on the six GYA national forests. The authority of the Forest Service to manage mineral activities depends on the commodity and the legal status of the lands on which they occur.

Changes between Draft and Final EIS

In this section, the following additions and updates were made:

- A discussion on the effects on phosphate leases
- A table displaying the number of active leases and estimated acres affected outside the PCA
- A table displaying the number and relative location of active oil and gas wells
- Tables describing changes in leasing stipulations between alternatives

Surface-disturbing activities associated with mineral and energy resources typically include:

Exploration is physically searching for minerals. It could include building roads, drill pads, underground workings, trenching, and reclamation. The length of time depends on the complexity and size of the project but usually takes several weeks to one year.

Development is the work required to prepare a mineral deposit for production. It may include driving underground workings, stripping the overburden from deposits that will be open pit, building waste dumps, and constructing milling and transporting facilities. Oil and gas development includes drilling a series of production wells and building access roads. Mineral development projects can last several years.

Production is removing a mineral from the ground and making it available for final processing and consumption. The production phase varies with the size and quality of the deposit, but can last a short time or a decade or more.

Reclamation is the final phase of mineral operations on federal lands. Reclamation returns sites to natural landforms and vegetation. It can take less than a year to several years depending on the complexity of the site.

Land status affects the legal authorities that apply to management and disposal of minerals. Land is in one of the following status categories:

- Lands reserved from the public domain (the majority of lands within the GYA forests are in this category of public domain lands)
- Acquired lands
- Lands with federally owned surface and outstanding or reserved mineral rights
- Privately owned surface with federally owned minerals

The combination of land status and the type of mineral resource defines the agency's management authority.

The BLM and Forest Service classify mineral resources into three categories: locatable minerals, leasable minerals, and mineral materials.

Locatable minerals. Locatable minerals such as gold, silver, copper, and other metals are subject to the 1872 General Mining Law, as amended. The Mining Law grants a statutory right to explore for and develop these minerals, unless the land has been formally withdrawn from mineral entry.

The Forest Service manages impacts to other resources related to the exploration, development, and production of locatable minerals on its land via regulations at 36 CFR 228, Subpart A. Forest Service authority is directed at using the surface of National Forest System lands (30 USC 21-54). The Forest Service may not deny proposed operations or make them impossible by imposing unreasonably restrictive management requirements or conditions. The Forest Service may require mitigation and requirements to minimize adverse effects.

Forest Service regulations (36 CFR, 228 Subpart A 228.8) state that mining operations should minimize adverse environmental impacts to surface resources. The regulations include “taking all practicable measures” to maintain and protect wildlife habitat, and to reclaim surface disturbances, including rehabilitating wildlife habitat.

Leasable hardrock minerals. Hardrock minerals, such as gold or silver, which are locatable on public domain lands, are leasable on lands acquired by the Forest Service or BLM (1917 Weeks Law). On lands where the agencies acquired mineral as well as surface rights, the BLM issues the prospecting permits and leases for hardrock minerals. On acquired National Forest System lands, the BLM must first obtain the consent of the Forest Service. On lands with private surface and federal minerals, the BLM can make decisions about the leasable minerals and does not need the consent of the Forest Service, though they often seek recommendations. There are very few leasable hardrock mineral operations on the GYA forests.

Leasable minerals. Leasable minerals are federally owned fossil fuels (oil, gas, coal, oil shale, etc.), geothermal resources, sulfur, phosphates, and uranium that are subject to exploration and development under leases, permits, or licenses issued by the Secretary of the Interior, with Forest Service input on National Forest System lands. The BLM is the agency responsible for issuing the leases. The 1920 Mineral Leasing Act, as amended, together with the 1989 Federal Onshore Oil and Gas Leasing Reform Act, provide the authority and management direction for federal leasable minerals on federal lands. In 1970, the Geothermal Steam Act added steam to the list of minerals that could be leased on National Forest System lands.

The most common leases in the six GYA national forests are oil and gas leases, which are issued for 10-year terms. Oil and gas leasing and development decisions are made in three stages:

1. The BLM receives a nomination to lease lands for a specific mineral. The BLM forwards the request to the Forest Service.
2. The Forest Service makes a lease decision about which lands will be open for leasing, based on an analysis of the potential impacts of exploration and development. This decision identifies which areas will be open to development subject to standard lease terms, which areas will be open to development subject to constraints (lease stipulations), and which will be closed to leasing. The Forest Service informs the BLM of the results. The BLM is responsible for conducting the lease sale and issuing the lease.
3. After a lease is issued, the lessee has legal rights to explore and develop, subject to the terms of the lease and other applicable state and federal laws. The lessee must obtain approval from the BLM and the Forest Service for ground disturbing activities on the lease. This is when site-specific resource protection measures developed through NEPA are applied as conditions of approval for the surface use plan of operations. Such measures must be within the scope of the rights granted under the terms of the lease.

Regulations at 36 CFR 228, Subpart E require oil and gas operators to comply with the ESA during operations. The regulations also require that roads be built and maintained to minimize or eliminate damage to other resources, including wildlife. Unless otherwise authorized, roads that are no longer needed are to be closed, bridges and culverts removed, and the roads surface shaped to a natural contour and stabilized. Operators are required to post bonds to ensure reclamation occurs. The National Energy Policy and Executive Order 13212, issued in 2001, says, “Agencies shall expedite their review of permits or take other actions as necessary to accelerate the completion of such projects, while maintaining safety, public health, and environmental protection” (Cheney et al. 2001).

Similarly to oil and gas, operators of coal, geothermal, and solid non-energy leasable materials must obtain a lease prior to any ground disturbance. The BLM issues leases for coal, geothermal, and solid non-energy leasables, taking into account the Forest Service’s consent authority and/or recommendations. Operators proposing to mine leasable minerals are obliged to post reclamation bonds to make sure reclamation takes place. Most land and resource management plans include standards and guidelines for reclaiming mining and other leasable operations.

Mineral materials/salable minerals. Mineral materials or salable minerals are common materials such as stone, sand, gravel, clay, cinders, and decorative rock. Disposal is authorized under the Materials Act of 1947. This Act provides for disposing of mineral materials on public lands through bidding, negotiated contracts, or free use.

The Forest Service may sell these mineral materials or issue free-use permits to state and county governments for public projects such as highway construction and maintenance. All contracts contain requirements for reclaiming sites to pre-mining conditions as much as possible. The Forest Service uses mineral materials from its lands for building and surfacing forest roads.

The Forest Service has full authority to make decisions about disposing of mineral materials on lands of all status categories where the surface is federally owned.

3.12.1 Locatable Minerals

Affected Environment

The six GYA national forests have a long history of locatable hardrock minerals activity. Mining activities in and around the Beaverhead and Gallatin National Forests were instrumental in the settlement of early Montana. Geology is favorable for the occurrence of mineral deposits within the six national forests for a wide variety of minerals such as gold, silver, copper, and other metals including platinum and palladium.

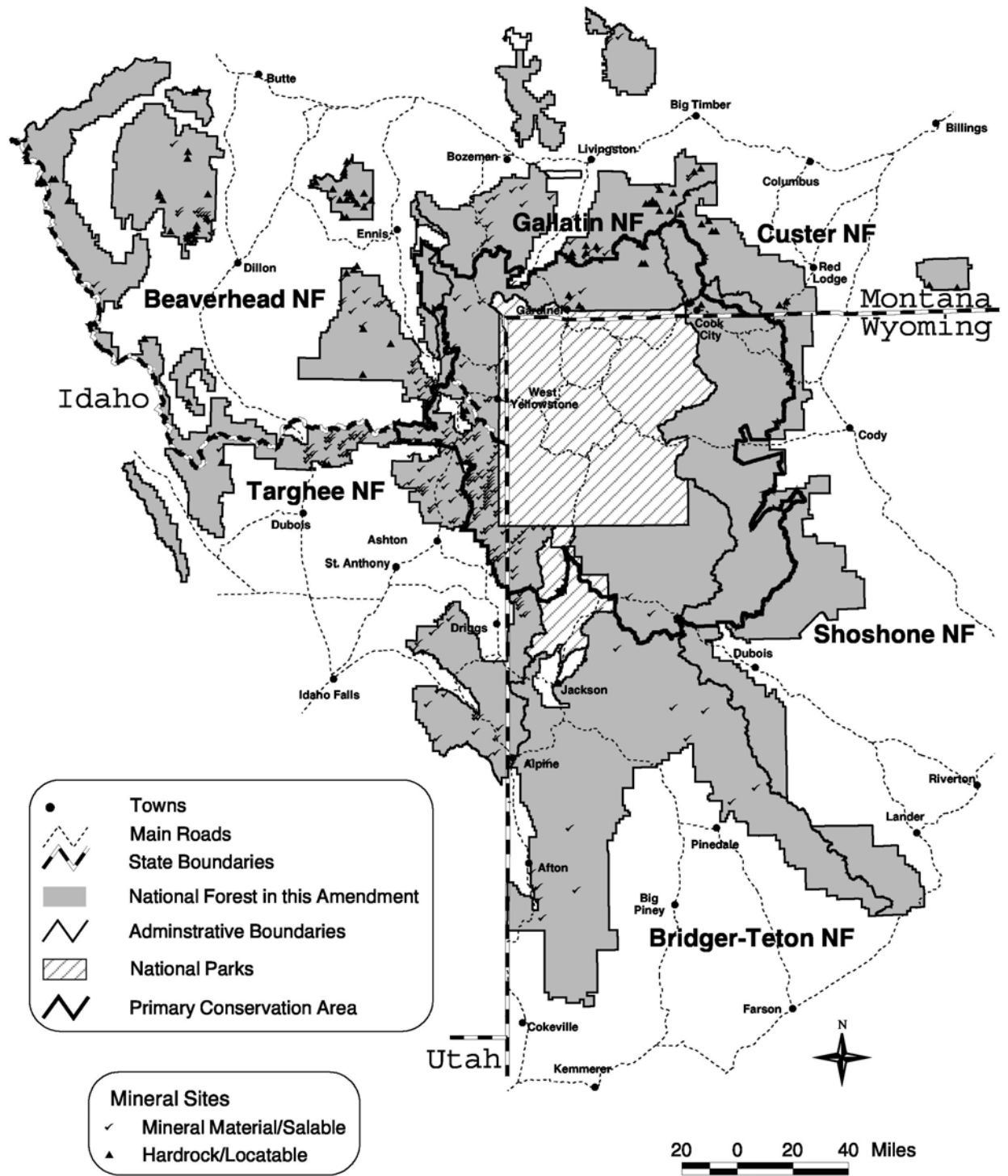
Mining has waned since the late 1800s; only a fraction of the historic sites operate today. The majority of the locatable mineral activity is on the Beaverhead and Gallatin National Forests. Current activity includes several existing operations and some new exploration and production sites. One important area of exploration and mine development is the Stillwater Complex on the Gallatin and Custer National Forests. Two mines, currently in production on this complex, are the only sources of domestically produced platinum and palladium (Figure 88 and Figure 90).

Figure 88. Hardrock/locatable minerals sites with plans of operation.

National forest	Inside the PCA	Alternative 4 area outside the PCA	Outside the Alternative 4 area and outside the PCA	Total
Beaverhead	0	31	21	52
Bridger-Teton	0	0	0	0
Custer	3	6	5	14
Gallatin	7	16	2	25
Shoshone	0	0	0	0
Targhee	1	2	0	3
Total	11	55	28	94

Future locatable mineral activity is likely to occur in or near areas of known discoveries and where the geology is favorable for economically viable mines (USDI Geological Survey 2005). Within the PCA, significant future exploration or development will most likely occur in the areas closest to the Stillwater Complex. In other PCA areas, the potential for future mineral discoveries and development is considered probable but low due to the costs associated with operating in the area.

Figure 89. Hardrock and mineral materials sites on the six GYA national forests.



Effects on Locatable Minerals

Effects of Alternative 1 on Locatable Minerals

Management direction about locatable minerals would not be changed under the no action alternative, so there would be no effect. Proposals would be permitted according to the requirements of the 1872 General Mining Law. Existing requirements for wildlife protection are provided in 36 CFR 228, Subpart A, which requires operators to comply with the ESA. Protection or mitigation measures for species are identified in project analysis before decisions are made about disturbance in a case-by-case manner.

New discoveries usually take place in historic mining areas but can occur where more recent interpretations of the geology lead to the discovery and production of economically valuable deposits. New operations have more stringent environmental protection measures than their historical predecessors. New access requires project-specific analysis and approval of designated routes.

Effects of Alternatives 2, 2-Modified, 3, and 4 on Locatable Minerals

Alternatives 2, 2-Modified, 3, and 4 add management direction outlining certain mitigations in Standards 1 and 2 per the Application Rules. Alternative 4 applies the management direction to a larger area. The direction in all four action alternatives requires minimizing effects on grizzly bear habitat during hardrock mineral exploration and development on hardrock operations large enough to require a plan of operation. The action alternatives do not preclude developing locatable minerals because the Forest Service does not have the authority to deny the development of hardrock mineral deposits. The alternatives do not affect small activities permitted under a Notice of Intention to Operate where no road is needed and minimal surface disturbance occurs. These small operations are not considered developed sites.

To the fullest extent of its regulatory authority, the Forest Service would minimize effects on grizzly bear habitat from activities based in statutory rights, such as the 1872 General Mining Law. Mitigation for Mining Law site impacts would follow standard developed site mitigation to offset any increases in human capacity, habitat loss, and increased access to surrounding habitats. Developed site mitigation should be equivalent to the type and extent of impact from the proposed operation. Impacts relating to Mining Law activities would be mitigated per the Application Rules for changes in secure habitat and developed sites. Mitigation may include decommissioning roads, closing out another developed site, combining or eliminating some dispersed uses, or reducing the capacity of a developed site. In cases where the mitigated effects would result in exceeding the 1998 baseline that cannot be compensated for within that subunit, compensation, in the PCA, to levels at or below the 1998 baseline would be accomplished in adjacent subunits where possible, or the closest subunit if this is not possible, or in areas outside the PCA adjacent to the subunit impacted.

While the above standards and Application Rules do not preclude development, they do require grizzly bear needs be considered and addressed in the prescribed manner. This would require additional mitigation and conditions to minimize effects on grizzly bears, and is likely to increase the costs of operation.

3.12.2 Leasable Minerals

Affected Environment

Coal, Geothermal, and other Leasable Mineral Potential

Coal potential exists on most of the GYA forests. Its quality and quantity have not resulted in much public demand for leases or development. There have been coal mines on the Beaverhead and Targhee National Forests and adjacent to the Gallatin and Custer National Forests over the last century. There are currently no active coal operations or requests for lease on any of the forests.

Geothermal is similar to coal—there is potential but little interest in leasing. There is a large Known Geothermal Resource Area established by the U.S. Geological Survey on the Targhee National Forest. Portions of this area are within the PCA. This area has been withdrawn from geothermal leasing due to concerns about the geothermal features and resources of Yellowstone National Park.

Three phosphate leases on the Targhee National Forest are located in and adjacent to the PCA. There has been some exploration (trenching) and minor production work done on the leases. There are no current plans for development though the right for development exists.

There have been infrequent requests to lease other hardrock minerals on acquired lands or for other leasable minerals on the GYA forests. There are no active hardrock mineral leases on any of the GYA forests.

Because of the low interest in leasable minerals other than oil and gas and, for some minerals, low potential, future proposals for development sites are expected to be few and far between. Therefore, this analysis does not provide a more detailed evaluation of the effects on leasable minerals other than oil and gas.

Oil and Gas—Current Development

There are a total of 90 active leases on the six GYA national forests but there are no active oil and gas leases or wells inside the PCA (Figure 90 and Figure 91). Outside the PCA oil and gas leasing and development varies according to occurrence potential. The highest potential for occurrence is on the Bridger-Teton National Forest. All active wells are on the Bridger-Teton National Forest in the Wyoming Range south and west of Big Piney, which is outside the Alternative 4 area and the area that is biologically suitable and socially acceptable for the grizzly bear in Wyoming.

Figure 90. Active oil and gas leases inside the PCA, in the Alternative 4 area outside the PCA, and outside the Alternative 4 area¹.

National forest	# of leases	Estimated acres	# of active leases	Estimated acres	# of active leases	Estimated acres ²
Beaverhead	0	0	0	0	1	0
Bridger-Teton	0	0	0	0	69	62,000
Custer	0	0	2	2,000	4	4,000
Gallatin	0 ¹	0	0	0	0	0
Shoshone	0	0	6	5,000	8	7,000
Targhee	0	0	0	0	0	0
Total	0	0	8	7,000	82	73,000

¹ There are eight inactive leases on the Gallatin National Forest inside the PCA.

² Based on an estimate average of 900 acres per lease.

Figure 91. Active oil and gas wells on the six GYA national forests.

National forest	Inside the PCA	Alternative 4 areas outside the PCA	Outside the Alternative 4 area and outside the PCA	Total
Beaverhead	0	0	0	0
Bridger-Teton	0	0	14	14
Custer	0	0	0	0
Gallatin	0	0	0	0
Shoshone	0	0	0	0
Targhee	0	0	0	0
Total	0	0	14	14

Oil and Gas Occurrence Potential

Occurrence potential is a predictor of whether the parameters that govern the potential accumulation of oil and gas are present in a certain area. Those parameters include 1) potential source rock, 2) thermal history suitable for the formation of oil or gas, 3) potential for porous and permeable reservoir rock, 4) geologic structures or stratigraphy (arrangement of rock layers) present that would trap accumulations of petroleum, and 5) geologic seals for the traps. The six national forests include a spectrum of oil and gas potential occurrence ranging from high on the south end of the Bridger-Teton National Forest where large volume gas wells exist, to low potential on the Targhee National Forest. The oil and gas occurrence potential varies across the area due to very distinct geologic histories (Interagency Reference Guide 2002).

The following information about oil and gas potential for occurrence in the GYA national forests is based on Reasonable Foreseeable Development (RFD) scenarios prepared for the forests’ oil and gas leasing decisions and assessments by the U.S. Geological Survey (USDI Geological Survey 1996). It is also based on assessments of the oil and gas potential in southern and southwestern Montana by the BLM, Montana State Office (Long 1990).

Beaverhead and Targhee National Forests

To the west of Yellowstone National Park, the Beaverhead and Targhee National Forests have primarily moderate to very low occurrence potential. The area contains the leading edge of the Northern Disturbed (overthrust) Belt. The overthrust belt has been the source of world class petroleum production in Canada and Wyoming. The areas on the Beaverhead and Targhee National Forests have been lightly explored.

The Oil and Gas Potential Report in the FEIS for the Targhee National Forest’s Oil and Gas Leasing Analysis (USDA Forest Service and USDI BLM 2000) found that the area north of Alpine, Wyoming and within the Palisades Ranger District east of the Snake River has high oil and gas potential because the area possesses geologic characteristics similar to producing areas in southwestern Wyoming and northern Utah. Wells drilled on the Targhee National Forest in this area have found shows of oil, possible reservoir rock, and possible trapping structures. No productive wells have been discovered. Flanking areas to the northwest and south of the Palisades are rated as having moderate potential. A few wells have been drilled. There is coal under the area northwest of Palisades and west of Driggs, Idaho, and there may be some potential for gas from the coal. The rest of the Targhee National Forest ranks as low or very low due to formations from igneous intrusions or unfavorable thermal history, which may have degraded potential oil and gas.

The RFD for the Beaverhead National Forest’s Oil and Gas Leasing FEIS (USDA Forest Service and USDI BLM 1995a) documented that at least one non-productive well drilled in the southern

portion of the Forest to explore the overthrust belt near the Tendoy Mountains had shows of oil and gas and found prospective thicknesses of sedimentary formations. This area has been assigned a moderate occurrence potential. The central portion of the Gravelly/Snowcrest Range was assigned a moderate potential because of the thickness of the sedimentary rocks. Only a couple of wells have been drilled in this area. Possible source rocks and possible reservoir rocks were found in the wells. The majority of the Forest ranks low or very low occurrence potential because of igneous intrusions or lack of sedimentary rock sequences greater than 2,500 feet.

Bridger-Teton National Forest

The majority of the Bridger-Teton National Forest is rated as high potential for occurrence. The Bridger-Teton includes portions of the Wyoming Thrust Belt, the northern portion of the Hoback Basin, and the Mt. Leidy Highlands area. These areas contain thousands of feet thicknesses of sedimentary formations with the potential to contain petroleum resources.

The southern and central portions of the Forest are located on the Thrust Belt. Gas production has been discovered on the southern portion of the Forest in the Riley Ridge Field. The complex geology makes exploration difficult but provides the potential for many different types of traps and accumulations. Approximately 150 wells have been drilled on the Forest. The majority of wells have explored the Thrust Belt. Fourteen wells have been commercial discoveries. The potential in the northern and central portion of the Bridger-Teton has had fewer wells drilled. There are some areas of high potential and there have been some non-commercial discoveries. Other areas, while having promise for oil or gas accumulations, have been lightly explored and not enough is known to rank the area as high potential (USDA Forest Service 2000).

Custer National Forest

The occurrence potential on the Beartooth Ranger District runs the gamut from very low in the southwest to high along the eastern edge. The western and southwestern portions of the Beartooth Ranger District are highly mineralized Precambrian igneous and metamorphic rocks, resulting in very low potential for oil and gas occurrence.

The Forest's eastern edge is an overthrust area with limestone, sandstone, and shale sedimentary units. Very few wells have been drilled on the Forest to explore the overthrust potential, but there have been producing wells drilled adjacent to the Forest at the Dean Dome Field. Areas near production or near off-Forest wells that had shows have been assigned a high potential for oil and gas occurrence. The majority of the Beartooth Ranger District outside of wilderness has been assigned moderate potential based on the sedimentary layers, the overthrust layers, and the offsetting production (USDA Forest Service and USDI BLM 1993).

Gallatin National Forest

To the northwest and north of Yellowstone National Park, the Gallatin National Forest has low to very low potential. Rocks of volcanic origin, tectonic activity especially around Hebgen Lake, layers of sedimentary rocks less than 3,000 feet thick and sedimentary rocks that have been metamorphosed all contribute to the low and very low rankings.

The area has been very lightly explored. Less than 10 wells have been drilled near the Gallatin National Forest. Those wells have primarily explored the areas of valley fill that have the potential for thicker layers of sedimentary rock. Two wells were drilled in the Paradise Valley, neither encountering shows of oil or gas.

More sedimentary sequences occur around the Crazy Mountains and the eastern portion of the Bridger Mountains. Two wells in this area, but off-Forest, did encounter shows of gas; therefore, portions of the Bridger and Crazy Mountains are classified as moderate occurrence potential. There is also a potential for coal bed natural gas in the coal seams that occur in the Bozeman Pass area (Long 1990).

Shoshone National Forest

To the east of Yellowstone National Park, the Shoshone National Forest borders on some of the major producing basins in Wyoming. The majority (55 percent) of the Forest outside of legally unavailable lands such as wilderness is classified as high or moderate potential for the occurrence of oil and gas. The U.S. Geological Survey identified three known oil and gas plays that extended under the Shoshone National Forest: the Basin-Margin Anticlinal Play, the Basin-Margin Subthrust Play, and the Sub-Absaroka Play (USDI Geological Survey 1996).

The Basin-Margin Subthrust Play is a continuation of the overthrust potential described for the southeast corner of the Beartooth Ranger District on the Custer National Forest. Very few wells have been drilled, so the extent of this play is inferred. No production has been discovered on the Forest in this play.

A major portion of the northern half of the Shoshone National Forest is over the Sub-Absaroka Play. Very few wells have been drilled to test this play because the potential targets in the play are covered by thick layers of volcanic rock. A few discoveries have been made off-Forest.

The major play of interest is the Basin-Margin Anticlinal Play. This play was formed along the margins of the Big Horn and Wind River Basins and includes the Big Horn Basin. Over 50 fields that have the ability to produce over a million barrels of oil have been discovered in this play area. This play includes most of the Big Horn Basin. The western portion of this play is under the Shoshone National Forest.

Twenty oil and gas fields have been discovered within 10 miles of the Forest boundary on the northeast portion of the Shoshone. Twenty-eight wells have been drilled in the northeast Shoshone between 1956 and 1986. One field (Line Creek) was discovered on the Forest but has since been abandoned. Exploratory drilling is occurring off-Forest and seismic activity is proposed on the Shoshone National Forest near Clark, Wyoming. Eleven wells have been drilled on the southern portion of the Shoshone National Forest. None of these wells has discovered producing amounts of oil or gas (Ogaard 1992).

The northwest portion of the Forest has low to very low potential where the Forest sits on the volcanic rocks associated with the Absaroka Plateau and Beartooth Mountains. The very southeast portion of the Forest has low potential where the Precambrian igneous formations exist.

Oil and Gas Development Potential of the GYA National Forests

The potential for occurrence is the first indicator used to predict potential activity. The second is the potential for development. The prediction for the development potential takes into account factors such as legal status (wilderness withdrawals), economic (price predictions for oil and gas), proximity to markets (pipelines), cost of development, and technology needed to develop possible oil and gas resources. The unconstrained development potential does not take into account management decisions affecting access to federal minerals. The unconstrained development potential is predicted using the assumption that all legally available lands are open for development with standard lease terms. It is a baseline against which various management proposals are weighed.

The potential for occurrence and the potential for development may be different. For example, an area may have a high potential for occurrence but a low potential for development because the prospective oil and gas reservoirs have complex geology and are deep. The development potential could be low because the wells would be expensive and technologically complex to drill and produce.

The six GYA national forests contain oil and gas development occurrences ranging from high on the south end of the Bridger-Teton National Forest to very low on portions of the other forests. The various RFDs predicted that some drilling would be likely under the unconstrained scenario (Figure 92).

The level of wells predicted in the unconstrained RFDs has not been realized. The unconstrained well predictions were primarily made during the late 1980s and early 1990s. Since then, some

forest leasing decisions made conservative leasing decisions that would preclude a portion of the predicted wells. The price of oil fell during the 1990s to a level that much of the drilling in the United States was curtailed (U.S. Department of Energy Energy Information Administration 2004 and 2005). The level of controversy that accompanies wells proposed in the GYA may have also reduced the number of well permits submitted.

Figure 92. Number of predicted oil and gas wells for the six GYA national forests¹.

	Beaverhead	Bridger-Teton	Custer	Gallatin	Shoshone	Targhee
Unconstrained number of RFD wells	14	50	4	Not analyzed	27	15

¹ Based only on the potential for occurrence and not considering constraints associated with development of these resources.

Existing Leasing Decisions and Leases

Much of the land in the PCA (62 percent) is legally not available for oil and gas leasing, i.e., wilderness areas. Four forests in the analysis area have leasing decisions that decided additional lands (13 percent of the PCA) are not available or not authorized for lease. The Gallatin and portions of the Bridger-Teton and Custer National Forests do not have current leasing decisions and cannot issue leases until the appropriate NEPA analysis is completed (13 percent of the PCA). Most of the PCA lands on the Custer and Targhee National Forests are in wilderness, which has no leasing. The Custer National Forest made a decision not to offer the area around Cooke City for lease. The PCA land on the Targhee National Forest outside of wilderness has a decision not to lease. Four percent of the PCA has private lands or minerals or falls into miscellaneous categories.

Several forests have made lease-availability decisions for oil and gas. There is limited availability for oil and gas leasing with occupancy in the PCA on the Bridger-Teton and Shoshone National Forests (3 percent). Some PCA lands are authorized for lease but surface occupancy is not allowed (5 percent) on the Beaverhead, Bridger-Teton, Custer, and Shoshone National Forests. The Gallatin National Forest has suspended leases that cannot be developed until the Forest completes an environmental impact statement.

Currently, there are about eight suspended leases for oil and gas on the Gallatin National Forest. There are no leases in the PCA for the other national forests (Figure 90 and Figure 93).

All leases specify that before any disturbance may occur, surveys or studies may be needed to determine the extent of impacts on resources and whether mitigation would be required. If threatened or endangered species are observed during operations, an additional evaluation would be conducted to assess the effects of ongoing or proposed activities on such species. Additional restrictions or prohibitions may be imposed as necessary to protect the species.

Effects on Oil and Gas Leasing and Development and other Leasable Minerals

Effects Common to All Alternatives

The Forest Service does not have leasing authority on two types of land. First, the Forest Service cannot make leasing decisions on lands legally withdrawn from leasing such as wilderness and some wilderness study areas. Second, the Forest Service cannot preclude leasing and subsequent development on minerals not owned by the United States. These areas will not change between the various alternatives.

If there were any active oil and gas leases in the PCA, all leases would be honored. (There are only suspended leases on the Gallatin National Forest; all other leases inside the PCA have expired.)

All alternatives would honor the three existing phosphate leases in and adjacent to the PCA on the Targhee National Forest. If development were proposed on these leases, the Forest Service would strive to meet Standards 1 and 2 to the extent consistent with the rights granted in these leases.

Effects of Alternative 1 on Oil and Gas Leasing and Development

Management direction about leasable minerals would not be changed under the no action alternative, so there would be no added effects. Requirements for wildlife protection are provided in 36 CFR 228.108(f), which requires operators to comply with the ESA. Impacts to and protection or mitigation measures for species are identified in project analyses before decisions are made about disturbances. In addition to protections provided in the standard lease terms, leasing decisions on several forests have required extra stipulations that would minimize the effects on grizzly bears. Some of the stipulations directly address the bear or its habitat. Other stipulations, while addressing other resources, result in constraints on the oil industry that reduce the effects on the bear.

Under Alternative 1, oil and gas development could occur on limited Forest Service managed lands (about 3 percent) in the PCA (Figure 95 and Figure 96). A portion of the Shoshone National Forest is available for leasing and development. Leasing decisions have yet to be made for the Gallatin and portions of the Bridger-Teton and Custer National Forests for lands in the PCA. The Beaverhead, Custer, and Targhee National Forests' oil and gas leasing decisions identified not available, no lease, or no surface occupancy for lands in the PCA. The Shoshone National Forest's leasing decision includes not available, no lease, or no surface occupancy for lands in the PCA in MS 1. An array of oil and gas developments is possible on areas outside the PCA (Figure 95 and Figure 96), as guided by existing forest plan direction; the Guidelines do not apply to this area. While there are lands open for leasing, the trend over the last 10 years indicates that several wells may be proposed and drilled over the next 10 years inside and outside the PCA.

Figure 93. Oil and gas leases on the six GYA national forests.

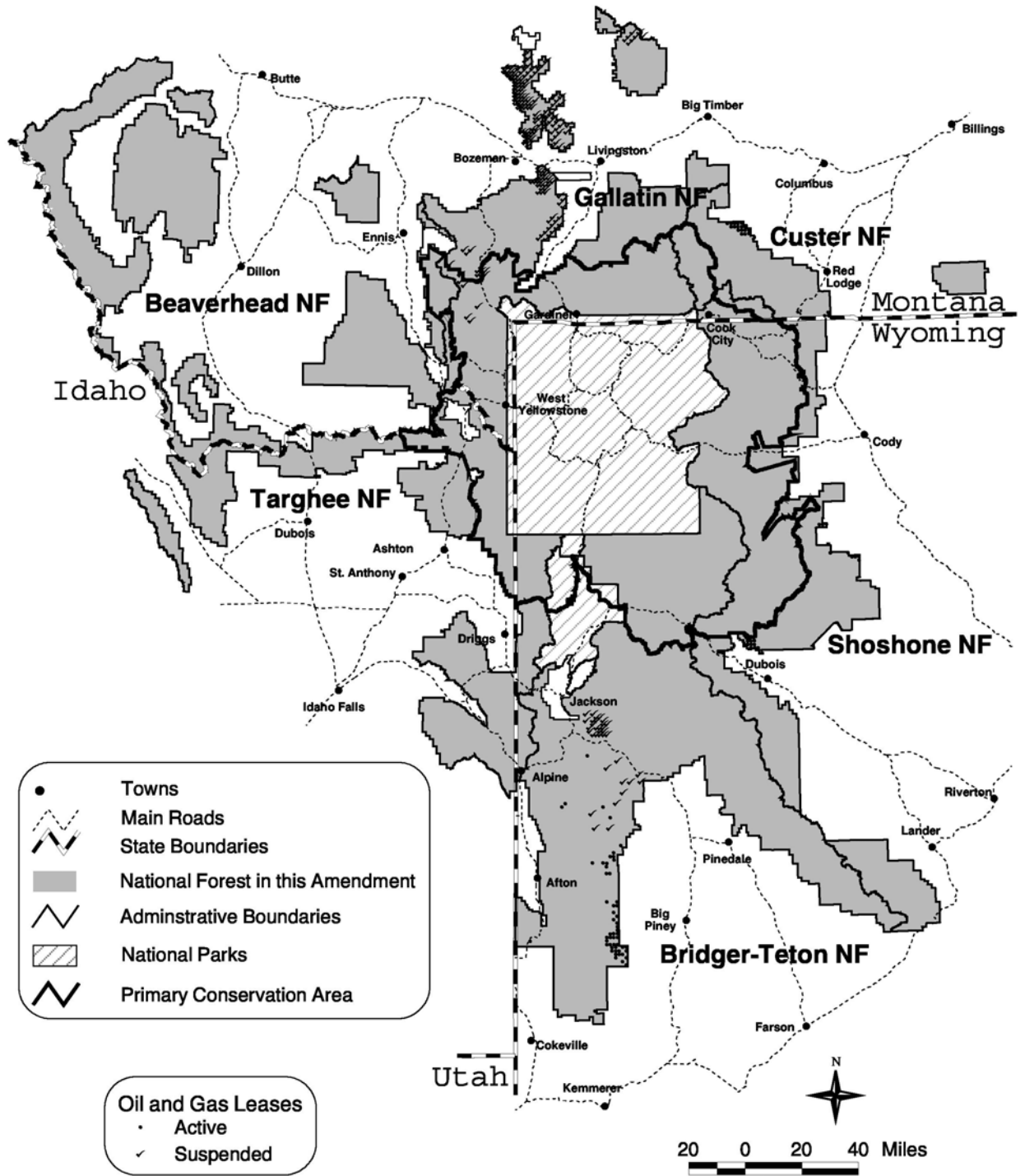


Figure 94. Areas available for oil and gas surface occupancy on the six GYA national forests.

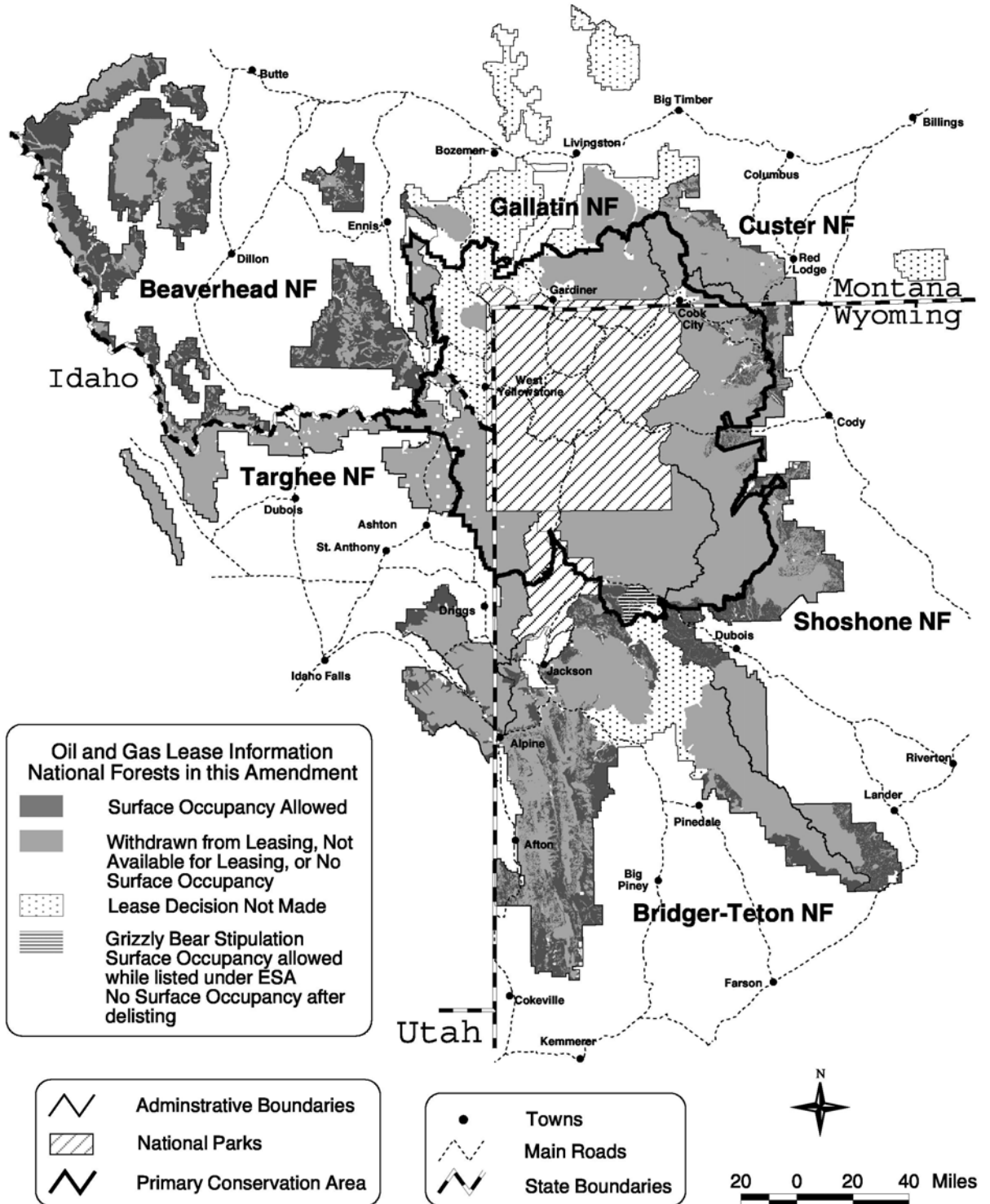


Figure 95. Current leasing status (Alternative 1) for lands not open to oil and gas leasing, lands open with no surface occupancy, and lands open with occupancy allowed. Shown by PCA, Alternative 4, and outside Alternative 4 areas (thousands of acres).

National forest		Lands legally withdrawn from leasing	Not available or not authorized for leasing	Leasing allowed - no surface occupancy	Leasing allowed occupancy allowed¹	Decision not made²	Private, state, or other lands³
Beaverhead	Inside PCA	66	0	1	1	0	2
	Alternative 4 acres outside the PCA	108	254	366	822	0	26
	Outside Alternative 4 and outside PCA	0	86	113	335	0	12
	Forest total	175	340	479	1158	0	40
Bridger-Teton	Inside PCA	617	5	18	24	16	3
	Alternative 4 acres outside the PCA	710	23	142	141	264	14
	Outside Alternative 4 and outside PCA	45	75	641	567	107	13
	Forest total	1,372	102	800	732	386	30
Custer	Inside PCA	106	6	2	0	0	1
	Alternative 4 acres outside the PCA	227	53	48	12	0	3
	Outside Alternative 4 and outside PCA	0	0	38	20	74	8
	Forest total	333	59	88	32	74	11
Gallatin	Inside PCA	411	0	0	0	436	62
	Alternative 4 acres outside the PCA	305	0	0	0	555	144
	Outside Alternative 4 and outside PCA	2	0	0	0	141	71

Minerals and Oil and Gas

National forest		Lands legally withdrawn from leasing	Not available or not authorized for leasing	Leasing allowed - no surface occupancy	Leasing allowed occupancy allowed ¹	Decision not made ²	Private, state, or other lands ³
	Forest total	717	0	0	0	1,131	277
Shoshone	Inside PCA	933	47	166	77	0	9
	Alternative 4 acres outside the PCA	480	4	247	350	0	18
	Outside Alternative 4 and outside PCA	0	2	25	105	0	6
	Forest Total	1,414	53	438	531	0	32
Targhee	Inside PCA	85	390	0	0	0	46
	Alternative 4 acres outside the PCA	187	463	253	51	0	32
	Outside Alternative 4 and outside PCA	85	204	43	54	0	10
	Forest total	357	1,058	295	105	0	88
All forests total	Inside PCA	2,218	448	186	101	451	122
	Alternative 4 acres outside the PCA	2,017	797	1,055	1,375	818	237
	Outside Alternative 4 and outside PCA	132	367	859	1,081	322	119
	Forest total	4,368	1612	2,100	2,557	1,591	478

¹Standard lease terms are applied to these lands and timing or controlled surface use stipulations may apply.

²Appropriate NEPA analysis has not been completed.

³ Lands on which the Forest Service does not make the leasing or development decisions.

Effects of Alternatives 2 and 2-Modified on Oil and Gas Leasing and Development

Alternatives 2 and 2-Modified, while not directly prohibiting the development of oil and gas in the PCA, would increase the amount of mitigation needed. If operations were proposed in secure habitat other sites and roads would have to be closed so that the level of secure habitat or the number of sites does not change from 1998 levels. New proposals in non-secure habitat inside the PCA would have to be mitigated by closing out other types of developed sites so that the total number of sites in a BMU remained at or below the number and capacity of developed sites in 1998. Since there were no active oil and gas operations in the PCA in 1998, new operations would have to close out and reclaim some other site, such as another mineral operation or a recreation site. Depending on what type of site would be closed, the cost of the oil and gas operation could be greatly increased. Figure 96 shows the number of acres in secure and non-secure habitat that would have these additional mitigations added.

At the time that leases are proposed on the Shoshone National Forest, the Forest may have to re-evaluate the leasing decision to ensure the potential mitigations to meet Standards 1 and 2 are available in the BMU subunit. The Gallatin and the Bridger-Teton National Forests' future oil and gas decisions would be constrained by the direction included in these alternatives.

The level of potential development is already low for oil and gas in the PCA per the reasons cited in Alternative 1. Alternatives 2 and 2-Modified could reduce that level by increasing costs and may preclude forests from allowing leasing in areas where there may be limited mitigation opportunities.

The Energy Policy and Conservation Act Amendments of 2000 require the Secretary of the Interior, in consultation with the Secretaries of Agriculture and Energy, to conduct an inventory of all onshore federal lands. The inventory shall identify reserve estimates and “the extent and nature of any restrictions or impediments to the development of such (oil and gas) resources.” Alternatives 2 and 2-Modified would add additional mitigation to the development of oil and gas resources inside the PCA. It could also add restrictions to development if mitigation opportunities are not available (Figure 96). Outside the PCA, existing forest plan direction would guide oil and gas leasing and development.

Effects of Alternative 3 on Oil and Gas Leasing and Development

Alternative 3 would not allow new developed sites in the PCA and no increase in capacity above 1998 levels. There would be no new oil and gas leasing. The current leasing decisions would have to be changed inside the PCA. Approximately 1.6 million acres of nonwilderness lands both inside and outside the PCA are not open for lease under Alternative 1 (Figure 95). Under Alternative 3, approximately 2.4 million acres would not be available for lease, an increase of 739,000 acres inside the PCA (Figure 97). Currently there are no active leases inside the PCA. Figure 97 and Figure 99 display the reduction in acres available for surface occupancy and acres available for leasing. The eight suspended leases on the Gallatin National Forest would remain. If the status of these leases was resolved and APDs were proposed, the Forest Service would strive to meet Standards 1 and 2 to the extent consistent with the rights granted in the lease.

The level of potential development is already low for oil and gas in the PCA per the reasons cited in Alternative 1. Alternative 3 would reduce that level by precluding forests from leasing in the PCA. This would result in no new leases or subsequent wells being proposed or allowed in the PCA.

In response to analysis required by the Energy Policy and Conservation Act Amendments of 2000, Alternative 3 would restrict the development of oil and gas resources inside the PCA boundary. Outside the PCA, existing forest plan direction would guide oil and gas leasing and development.

Figure 96. Acres of secure and non-secure habitat available for surface occupancy for oil and gas development inside the PCA for Alternatives 2 and 2-Modified (thousands of acres)¹.

National forest		Surface occupancy may be affected ²	Future decision may be limited ³
Beaverhead	Secure habitat	1	0
	Non-secure habitat	0	0
Bridger-Teton	Secure habitat	5	12
	Non-secure habitat	18	3
Custer	Secure habitat	0	0
	Non-secure habitat	0	0
Gallatin	Secure habitat	0	196
	Non-secure habitat	0	239
Shoshone	Secure habitat	54	0
	Non-secure habitat	23	0
Targhee	Secure habitat	0	0
	Non-secure habitat	0	0
All forests total	Secure habitat	60	208
	Non-secure habitat	41	243
	Total	101	451

¹ Any proposed development in secure habitat would require adherence to both the secure habitat standard and the developed site standard. Only the developed site standard applies in non-secure habitat.

² Acres where leasing decisions have been made and surface occupancy is currently allowed.

³ Acres where leasing decision is yet to be made.

Figure 97. Total acres (in thousands) not available or not authorized for leasing for oil and gas development from Alternative 1 for each of the six GYA national forests¹.

Forest	Alternatives 1, 2, and 2-Modified	Alternative 3 ²	Alternative 4 ³
Beaverhead	340	342	1,529
Bridger-Teton	102	159	705
Custer	59	61	120
Gallatin	0	0	0
Shoshone	53	296	893
Targhee	1,058	1,058	1,361
Total	1,612	2,351	4,608

¹ Legally withdrawn lands and private, state, and other lands are not included in this table because they do not change by alternative.

² All increases in acres not available for leasing are inside the PCA.

³ All increases in acres not available for leasing are outside the Alternative 4 area outside the PCA.

Figure 98. Total acres (in thousands) available for surface occupancy for oil and gas development and the percent reduction from Alternative 1 for each of the six GYA national forests.

National forest	Alternatives 1, 2, and 2-Modified	Alternative 3 ¹		Alternative 4 ²	
	Total acres available for surface occupancy	Total acres available for surface occupancy	Percent reduction	Total acres available for surface occupancy	Percent reduction
Beaverhead	1,158	1,156	0.2	335	71.1
Bridger-Teton	732	708	3.3	567	22.5
Custer	32	32	0	20	37.5
Gallatin	0	0	0	0	0
Shoshone	531	455	14.3	105	80.2
Targhee	105	105	0	54	48.6
Total	2,557	2,456	3.9	1,081	57.7

¹ All acres available for surface occupancy are outside the PCA.

² All acres available for surface occupancy are outside the Alternative 4 area outside the PCA.

Figure 99. Total acres (in thousands) available for leasing for oil and gas development and the percent reduction from Alternative 1 for each of the six GYA national forests.

National forest	Alternatives 1, 2, and 2-Modified	Alternative 3 ¹		Alternative 4 ²	
	Total acres available for leasing	Total acres available for leasing	Percent reduction from Alternative 1	Total acres available for leasing	Percent reduction from Alternative 1
Beaverhead	1,637	1,634	0.2	448	72.6
Bridger-Teton	1,532	1,491	2.7	1,208	21.1
Custer	120	118	1.7	58	51.7
Gallatin	0	0	0	0	0
Shoshone	969	727	25.0	130	86.6
Targhee	400	400	0	151	62.3
Total	4,657	4,371	6.1	1,975	57.6

¹ All acres available for leasing are outside the PCA.

² All acres available for leasing are outside the PCA and outside the Alternative 4 area outside the PCA.

Effects of Alternative 4 on Oil and Gas Leasing and Development

Alternative 4 is similar to Alternative 3 but for a larger area of land. Alternative 4 covers approximately 10 million acres of land. Approximately 43 percent of these lands are legally withdrawn from oil and gas leasing. The current forest leasing decisions designate 1.6 million acres (13 percent) of nonwilderness lands both inside and outside the PCA as lands not available for leasing (Figure 97). Under Alternative 4 there would be no new leasing; current leasing decisions would have to be changed, resulting in approximately 4.6 million acres to be put off limits to leasing (Figure 97). Existing leases would remain in effect. If APDs were proposed on these leases, the Forest Service would strive to meet the standards to the extent consistent with the rights granted in the lease.

This would result in no new leases or subsequent wells being proposed or allowed in the Alternative 4 area. Alternative 4 represents approximately 77 percent of the National Forest System lands in the GYA. This alternative would almost triple the amount of land not available for leasing in the six forests in this analysis (Figure 97).

Development would be precluded on high occurrence potential lands on the Custer, Shoshone, Bridger-Teton, and Targhee National Forests. The Shoshone and the Targhee National Forests would be most affected because all or almost all of the high potential for occurrence lands could not be leased and subsequent wells drilled. While the Beaverhead and Gallatin National Forests do not have lands in Alternative 4 ranked as high occurrence potential, they would be affected because their moderate potential lands would be put off limits. While it is difficult to predict the number of wells that would be drilled with and without the added grizzly bear protections, the trend would be a significantly reduced number of wells under Alternative 4. For example, 12 of the 14 wells predicted in the Beaverhead National Forest's RFD could not be drilled under restrictions in Alternative 4. Figure 97 and Figure 99 display the reduction in acres available for surface occupancy and acres available for leasing.

According to analysis required by the Energy Policy and Conservation Act Amendments of 2000, Alternative 4 would restrict the development on oil and gas resources inside the Alternative 4 boundary.

3.12.3 Mineral Materials

Affected Environment

The source and availability of mineral materials on the six GYA forests vary widely (Figure 88 and Figure 100). The sites and sales range from commercial pits to sales to individuals of a pickup load of decorative rock or a landscaping boulder. Small sales or free use permits for decorative rock, boulders, or aggregate may not result in any apparent disturbance in the landscape since the rocks are taken from existing talus areas or other rocky areas. The highest number of sites is on the Targhee National Forest and includes numerous small aggregate or gravel pits used for both local private use and forest road use. Typically, sites are small, less than five acres. Most are near or next to roads and do not require significant amounts of new road. Use of the pits is sporadic. No facilities are associated with these smaller rock source sites.

Larger sites require excavation, temporary storage, and access for transport associated with removing mineral materials. Facilities or equipment for sorting or loading the mineral materials may be located on the site. Reclamation plans are required for commercial and Forest Service use pits.

Figure 100 gives an overview of the number of sites and sales on the six GYA forests. It also shows how many sites and sales are within the PCA versus outside the PCA. Since this table includes small sales, which do not always result in a site being created, and small gravel or aggregate pits, which by definition are not counted as a developed site, the number shown in the table is greater than the number listed in the developed site listing (appendix A).

Figure 100. Mineral material sites and sales¹.

National forest	Inside the PCA	Alternative 4 area outside the PCA	Outside the Alternative 4 area and outside the PCA	Total
Beaverhead	3	49	44	96
Bridger-Teton	3	5	11	19
Custer	3	6	0	9
Gallatin	13	22	2	37
Shoshone	1	0	0	1
Targhee	96	70	15	181
Total	119	152	72	343

¹Table includes both sales with a plan of operation and small sales.

Effects on Mineral Materials

Effects of Alternative 1 on Mineral Materials

Management direction for mineral materials would not be changed under the no action alternative, so there would be no effects on current mineral material and salable mineral programs on the forests.

Effects of Alternatives 2 and 2- Modified on Mineral Materials

The effects of Alternatives 2 and 2-Modified would be minimal on small-scale sales or pits. Permits for use of small gravel pits or small sales are not considered developed sites; they would not be limited under the developed site standard. Since almost all of these small operations are adjacent to or near roads, secure habitat should not change because of their use.

The effects of Alternatives 2 and 2-Modified on larger mineral material proposals are similar to effects on oil and gas. While not directly prohibiting the development of mineral materials in the PCA, Alternatives 2 and 2-Modified would increase the amount of mitigation needed for new developments. New proposals would have to close and reclaim some other site, such as another mineral operation or recreation site. If operations were proposed in secure habitat, other sites and roads would have to be closed so that the level of secure habitat does not change from 1998 levels. Depending on what type of site would be closed, the cost of the mineral material operation could be increased.

The complexity of permitting would increase. There may be more controversy over permitting if other popular developed sites are proposed for closure in order to mitigate the proposed mineral material site. Closing out another developed site could add to the cost of the operation. The permitting complexity and controversy, delays in permitting, and the actual cost of site mitigation would increase the cost of the operations.

The incremental cost and delay in starting operations while mitigations took place would make the PCA a less favorable area to develop mineral material sites. The Forest Service, NPS, state, or local residents may have to acquire gravel or aggregate from more distant sources, increasing the costs of maintaining roads and facilities.

Effects of Alternative 3 on Mineral Materials

Alternative 3 would allow no new developed sites in the PCA and no increase in capacity above 1998 levels. The alternative would not allow new mineral material sites that are large enough to be defined as developed sites on PCA lands. Existing sites could remain in place until reclamation occurs.

Based on the assumption that future sources of mineral materials are most likely to be in the areas where current operations exist, Alternative 3 could preclude a significant portion of a forest's

future mineral material development. Currently, approximately 35 percent of the sites and sales are in the PCA.

The Forest Service and other users, state or local, would have to acquire gravel or aggregate from distant locations, increasing the costs of road or construction projects. The Forest Service may be forced to buy gravel or aggregate, adding additional costs.

Effects of Alternative 4 on Mineral Materials

Alternative 4 is similar to Alternative 3 but precludes development on a larger area. Because the location of many sales and operations are on Alternative 4 lands, this alternative could preclude the majority of future proposed sites on the forests. Currently, approximately 79 percent of the sites and sales are within the Alternative 4 boundary.

Effects would be similar to Alternative 3 but for a larger area. The larger area would increase the potential that road maintenance costs for the Forest Service would increase on the Targhee and Bridger-Teton National Forests.

3.12.4 Lands with Outstanding or Reserved Rights

Affected Environment

Private parties own some of the minerals on National Forest System lands. Most of the National Forest System lands in the Northern Rockies were reserved from the public domain under the Forest Reserve Act of 1891. Since then, other lands have been acquired.

The titles to some of these lands are encumbered with reservations (sometimes the previous owner reserved the mineral rights). In other cases, mineral rights were separated from the surface estate before the federal government acquired the surface; these mineral rights are outstanding to third parties. A very small percentage of lands on the six GYA national forests has reserved or outstanding rights.

These reserved and outstanding rights represent property interests in the land. Although the federal government owns and administers the surface, the mineral owner has certain rights as well. The most important of these is the right to access and develop the minerals. Other rights may be spelled out in individual deeds. The Forest Service must consider these property interests during planning and implementation.

Effects on Lands with Outstanding or Reserved Rights

Effects of Alternative 1 on Lands with Outstanding or Reserved Rights

Management direction about lands with outstanding or reserved rights would not be changed under the no action alternative, so there would be no effects.

Effects of Alternatives 2, 2-Modified, 3, and 4 on Lands with Outstanding or Reserved Rights

Alternatives 2, 2-Modified, 3, and 4 may add reasonable mitigations. This direction requires considering grizzly bear habitat needs during mineral exploration and development, subject to existing rights.

The Forest Service is limited in its authority to deny developing outstanding and reserved rights. Resource protection measures must be reasonable and cannot foreclose exploration or development. Court cases have determined that mitigation measures cannot unreasonably increase costs or delay operations. Direction in this proposal may or may not be applied to the outstanding reserved mineral rights depending on the cost and reasonableness of the mitigation.

3.13 Social Environment

Introduction

The GYA is a common geographic reference that also includes the human residents, their communities, and the 20 counties of Idaho, Montana, and Wyoming that encompass this area. Studies recognize the relationship between these communities, their economies and social well

being, and the natural environment of the Greater Yellowstone Ecosystem (Johnson 1998, Hansen et al. 2002, Rasker and Alexander 2003).

This social and economic analysis focuses on 20 counties that encompass the GYA and one additional county affected by Alternative 4 (Figure 105). It is recognized that social and economic effects may extend beyond the analysis area. Regional and national attachments to the GYA are also considered in this discussion.

Grizzly bears and bear management affect people's lifestyles, livelihoods, and values. Lifestyles are affected by the presence of the grizzly bear and the precautions that must be taken to secure foods and be prepared for chance encounters. Agricultural and ranching activities are altered to ensure removal of unnatural food sources and greater monitoring and management of livestock to prevent predation by bears. Livelihoods reliant upon tourism can benefit from grizzly bears, an attribute of the wildness and attraction to the area. With grizzly bears as an integral part of the GYA, most residents have some opinion about the bear, ranging from embracing the wildness and unpredictability of living with grizzlies to disdain over the bears' impacts upon human lives.

Public uses of national forests for recreation, grazing, minerals, timber harvest, and other uses are discussed in other sections of this FEIS.

This social and economic environment section is organized as follows:

Social Setting

- Landownership, land settlement, and land uses
- Population trends

Government Coordination

- Coordination for GYA and bear management
- Tribal governments

Attitudes, Beliefs, and Values

- Perceptions of grizzly bears and bear management
- Environmental and grizzly bear interests
- Multiple use interests

Lifestyles

- Rural lifestyles
- Ranching

Environmental Justice (Executive Order 12898)

3.13.1 Social Setting

Twenty-one counties in Idaho, Montana, and Wyoming comprise the social and economic analysis area (Figure 105). These counties include more than 39 million acres, and approximately 32 percent are private lands (Figure 101 and Figure 105). Beaverhead County, Montana is considered in this analysis because Alternative 4 examines expanding direction to cover additional lands on the Beaverhead National Forest.

The GYA, as commonly referred to by studies, lies within the 21-county area and encompasses about 18 million acres of mostly public ownership (Hansen et al. 2002). Public lands account for approximately 76 percent of the area. The PCA designated for grizzly bear recovery is a smaller area within the GYA and includes 92 percent in public ownership. As grizzly bears extend their range beyond the PCA and the GYA, increasingly more private lands may be affected (Figure 101). These action alternatives apply direction for only National Forest System lands.

Landownership Patterns

Grand Teton and Yellowstone National Parks are relatively high in elevation and center on the Yellowstone Plateau. The headwaters of the Missouri-Mississippi, Snake-Columbia, and Green-Colorado river systems drain from the Plateau. Six national forests skirt the flanks of the Plateau,

including 14 mountain ranges. As the mountain ranges give way to the plains and lower elevations, these mountain valleys and lowlands are generally where human settlements are found today (Hansen et al. 2002).

Within these broader basins and valleys, farms and ranches and small rural communities reflect the historical settlement since Europeans moved westward after Lewis and Clark explored in the early 1800s. Some remnants of logging and mining and associated settlements are also interspersed throughout the area. Mining is still active in a few places. Many rural towns got their starts and are still supported to some extent by the traditional uses of ranching, logging, mining, and western culture. Since Yellowstone National Park has a long history as a national treasure, large numbers of summer visitors brought tourism as an early economic base to many communities including the gateway towns such as West Yellowstone, Gardiner, Red Lodge, and Silver Gate/Cooke City in Montana; and Cody and Jackson in Wyoming. More recently, winter recreation, with snow machines and skiing, has become increasingly popular in Yellowstone National Park and the surrounding national forests.

Treaties and Tribal Uses

Many tribes used and inhabited areas in the GYA. These tribes—Shoshone-Bannock, Shoshone, Crow, Salish, and Northern Cheyenne—have treaty rights to use the GYA national forests for hunting and gathering. These tribes settled on reservations in the late 1870s and four reservations—Fort Hall, Wind River, Crow, and Northern Cheyenne—lie within or on the periphery of the GYA.

Community Land Uses under Forest Service Permits

The proposed action and action alternatives would affect some community facilities that are currently under permit from national forests. The proposed action and other action alternatives include Standard 2 that requires that developed sites stay at their capacities as of 1998 or 2003 levels. This means that proposals to increase a water treatment site, a dam's storage capacity, or increase a government facility, as examples, would not be allowed unless under an exception, i.e., an analysis shows that the changes or indirect increases in human presence do not to affect the bear or its habitat, or through mitigation as described in the Application Rules. The affected areas are in the Island Park area, e.g. Mack's Inn on the Targhee National Forest, the Cooke City area on the Gallatin National Forest, and the Crandall area on the Shoshone National Forest. In Alternative 4, the Grand Targhee sewer system could be affected.

Population Trends and Changing Land Settlement and Land Uses

Currently, more than 375,000 people reside within the 21-county area. The population in the analysis area has increased 37 percent over a 30-year period, 1970 to 2000. The largest increase of more than 67,000 people occurred between 1970 and 1980. By 2010, the population is projected to increase from 6 percent (Wyoming analysis area counties) to 17 percent (Idaho analysis area counties).

Population changes vary by county, as shown in Figure 104. Similar to the Rocky Mountains and inland west region, people have been migrating to this area for its amenities (scenic beauty, outdoor recreational pursuits, and less crowding/congestion). The area has diversified from a historical dependency upon agriculture, mining, and logging to increases in service and other occupations. Greater economic and employment opportunities have allowed youth in the area to remain rather than migrating to jobs elsewhere, and these opportunities have also attracted newcomers. The residents of a rural subdivision might include recent arrivals from big east coast cities, midwestern farms, and the nearest small town. Among the in-migrants are retirees, wealthy young adults, and other professionals in computer technology, real estate, and other service industries (Nelson 1999 cited in Hansen et al. 2002, Hansen et al. 2002).

Many new residents desire to live in rural areas such as subdivisions or locations near forests, rivers, or streams. As the population grows and the rural settlement trend continues, the fragmenting of landscapes by human development are concerns to federal governments, county planning, and non-governmental organizations. In part, these private lands are also important to

many wildlife species (Johnson 1998, Rasker and Hansen 2000, Hansen et al. 2002, Pyare et al. 2004). Although some ranchlands are being subdivided for residential use, others are kept intact (or even enlarged) when purchased by non-traditional owners often more interested in their amenity values rather than livestock production or subdividing (see section 3.16).

The kinds of settlement and land uses that occur on private lands affect grizzly bears. Managing sanitation (bear resistant garbage containers) and bear attractants (domestic animal foods, bird feeders) has become common practice in rural areas and towns. The security of the bear and the bear's use of natural food sources can be compromised as rural lands are developed and even sparsely settled. These changes in land use are impacts on the bear regardless of this proposed action and are considered as cumulative impacts.

Figure 102 provides the population counts and predictions for the 40-year period, 1970 to 2010.

Figure 101. Landownership, in percent, for three increasingly larger land areas: PCA, GYA (GYE), and the social/economic analysis area (21 counties).

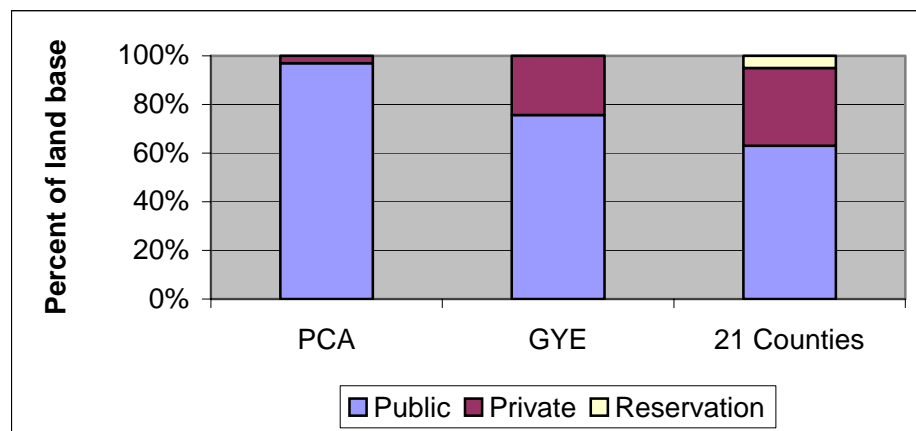


Figure 102. Population counts and projections for analysis area counties (summarized by state).

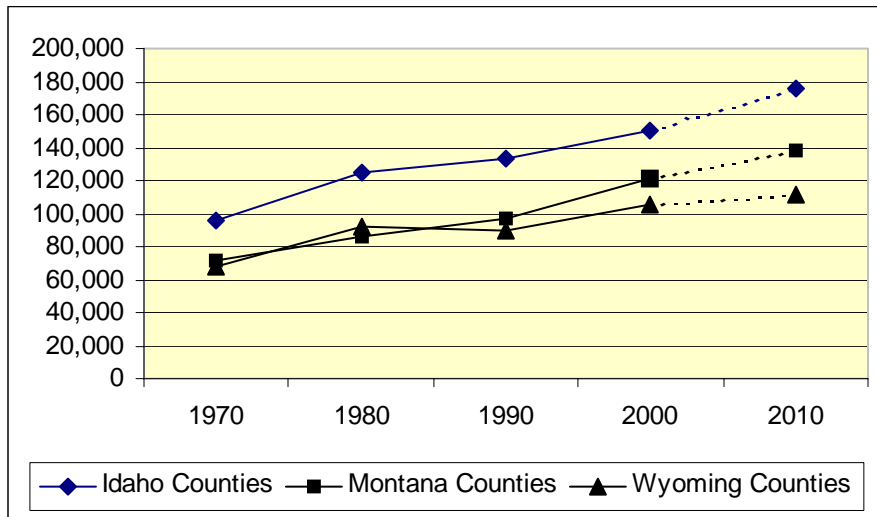


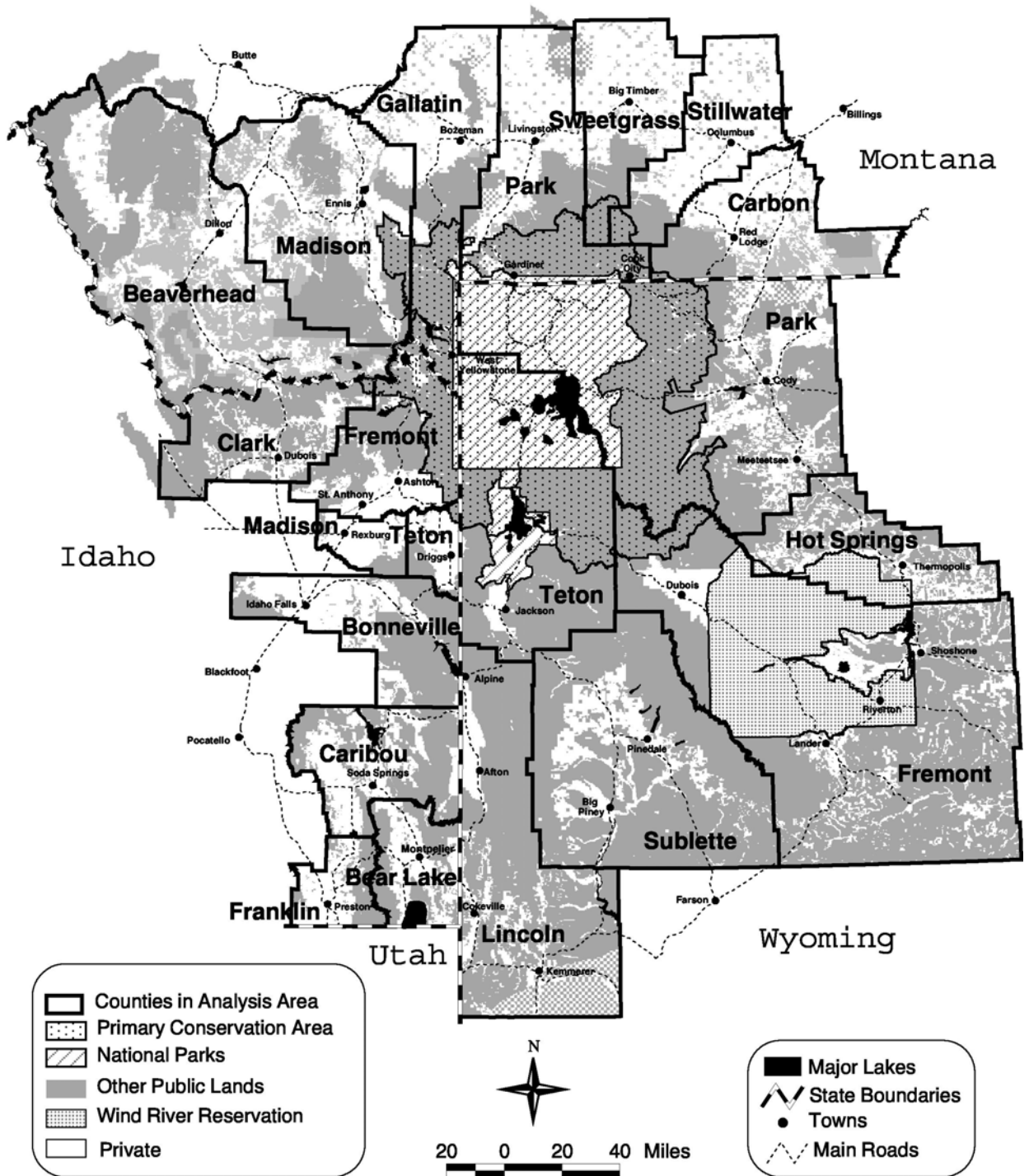
Figure 103. Community infrastructure developed sites within the PCA and in the Alternative 4 area outside the PCA (shown in parentheses).

National forest	Water treatment sites	Substations	Dumps, burn piles, waste transfer sites, sewer systems	City, county, state facilities	Dams
Beaverhead	0	0	0	0	0
Bridger-Teton	0	0	0	0	0
Custer	0	0	0	0	0
Gallatin	0	0	3	0	1
Shoshone	0	0	1	1	0
Targhee	1	2	(1)	2	4
Total	1	2	4 (1)	3	5

Figure 104. Population trends by county.

State/county	1990	2000	% Change 1990-2000	Projected 2010	% Change 2000-2010
Idaho					
Bear Lake	6,084	6,530	7%	7,190	10%
Bonneville	72,207	81,820	13%	97,268	19%
Caribou	6,963	7,251	4%	7,843	8%
Clark	762	887	16%	993	12%
Franklin	9,232	11,416	24%	12,750	12%
Fremont	10,937	11,806	8%	13,736	16%
Madison	23,674	24,842	5%	29,320	18%
Teton	3,439	5,793	68%	6,576	14%
Idaho analysis area	133,298	150,344	13%	175,676	17%
Idaho total	1,006,749	1,273,855	27%	1,497,548	18%
Montana					
Beaverhead	8,424	9,202	9%	9,530	4%
Carbon	8,080	9,552	18%	10,540	10%
Gallatin	50,463	67,831	34%	79,780	18%
Madison	5,989	6,851	14%	7,560	10%
Park	14,562	15,694	8%	17,120	9%
Stillwater	6,536	8,195	25%	9,690	18%
Sweet Grass	3,154	3,609	14%	3,810	6%
Montana analysis area	97,208	120,934	24%	138,030	12%
Montana total	799,065	902,195	13%	984,430	9%
Wyoming					
Fremont	33,662	35,804	6%	37,370	4%
Hot Springs	4,809	4,882	2%	4,840	-1%
Lincoln	12,625	14,573	15%	15,520	6%
Park	23,178	25,786	11%	26,970	5%
Sublette	4,843	5,920	22%	6,690	13%
Teton	11,172	18,251	63%	20,570	13%
Wyoming analysis area	90,289	105,216	17%	111,960	6%
Wyoming total	453,589	493,782	9%	513,930	4%
Analysis area total	365,689	429,105	17%	498,636	13%

Figure 105. Counties and states within the analysis area.



Government Coordination

How people govern themselves is an aspect of the social and economic environment that is important to mention in this FEIS since there are numerous federal and state agencies with particular responsibilities for grizzly bear management. Other governments such as counties, towns, and tribes also have a role in helping with grizzly bear recovery and with public understanding and acceptance of grizzly bears. The governments' active engagement and positive working relationships with citizens and non-governmental organizations can enhance the transition of living with grizzly bears and use of protective measures for the bear and human property and safety.

In contrast, unresolved conflicts among governments can make it difficult to execute policies, manage for the bear, and ensure public safety. Some county governments have expressed concerns over federal management for the bear or bear habitat. As an example, Fremont County, Wyoming, passed a resolution where they "oppose and prohibit the US Forest Service from implementing the proposed Occupancy and Use Restrictions of March 1, 2003 within the boundaries of Fremont County" (Fremont County Commission 2003). This opposition was with regard to a Food Storage and Sanitation Order that the Forest Service issued for the Shoshone and Bridger-Teton National Forests' lands within Fremont, Park, Sublette, and Teton Counties in Wyoming (USDA Forest Service 2003b). The Order was to ensure that unnatural bear attractants were unavailable to grizzly bears. The effort reflects concern about the expanding range of bears in these national forests and counties and the associated threats to human safety. Disagreements over grizzly bear occupation of lands and the management for the bears stress the importance of finding solutions that people can live with, while still providing for bear conservation. This proposal and alternatives to it can be evaluated as to their adherence to interagency agreements, e.g. the Conservation Strategy, as well as the rate and degree of change imposed upon local communities and counties.

Agency Coordination

In 1986, the NPS and the Forest Service formed the GYCC to provide a higher level of public service than they could offer separately. Interagency groups bring together park, forest, and state employees to discuss resources of mutual interest such as recreation use, trumpeter swans, or grizzly bears. This group meets periodically, provides supplemental funding and action items to address common needs and issues, and supports an executive coordinator who tracks the issues and coordinates initiatives.

The IGBC, established in 1983, coordinates grizzly bear management among state wildlife agencies and national parks and forests. Interagency cooperation has helped to bring about widespread use of bear-resistant receptacles, better opportunities to relocate nuisance bears away from livestock grazing allotments, and more consistent public information and regulations. Much of what has been learned about Yellowstone grizzly bears since 1974 has come from research conducted or coordinated by the IGBST. In cooperation with park, forest, and state wildlife managers in Idaho, Montana, and Wyoming, the IGBST has monitored bears throughout the PCA, estimated their population size and trends, and enhanced an understanding of grizzly life history, ecology, and behavior in relation to humans and to other wildlife species. Monitoring of the bear and its habitat is ongoing.

A subcommittee of the IGBC, the YES, focuses on Yellowstone grizzly bear issues, research, and monitoring. Membership includes federal and state agencies as well as county representatives. Semi-annual meetings are held to coordinate among the governments, and these meetings are open to the public.

Through the development of the Conservation Strategy, the Governors of Idaho, Montana, and Wyoming appointed a 15-member citizen roundtable to review the Conservation Strategy (Governors' Roundtable 2000). The group provided unanimous recommendations to the

governors for use in responding to the draft Conservation Strategy. These included support for the PCA, the development of state plans, funding, citizen involvement, education, plan and process clarity, and clarifying the nuisance bear policy.

Tribal Governments

Federal agencies have trust responsibilities to tribes under treaty and under law. The forests are required to consult with all federally recognized tribes that had or continue to have traditional uses within the forests' boundaries. Consultations with the tribes listed in Figure 106 (and the Nez Perce Tribe) have been initiated by the forests and are ongoing.

Historically, many tribes used the GYA. Indian people moved through and inhabited the GYA, often following buffalo and other game that provided the resources for their survival. Prior to 1600, the Tukuariaka, a Shoshone band, lived in the areas west of Yellowstone and into the Lemhi Valley. Southwest Montana was a crossroads for multiple tribes, including the Nez Perce and the Sioux, who pursued bison and other game in the valleys and nearby mountain meadows. By the early 1700s, the Shoshone acquired horses that gave them greater mobility and allowed them to push their Flathead and Salish neighbors north and thereby expand their territory well into what is now central Montana (Northern Economics Inc. 2002). In the eastern part of the GYA, evidence indicates that the Shoshone Indians inhabited the area 6,000 to 7,000 years ago. Crow Indians used the area for their winter hunting camps and by the mid-1600s, Shoshone Indians again migrated into the area. As Arapahoe Indians acquired horses in the mid 1700s, they too migrated into the area.

Today, tribal members continue to use the GYA for traditional cultural practices, hunting, fishing, and gathering.

Figure 106. Treaty and trust responsibilities of the six GYA national forests.

National forest	Tribe and Reservation	Treaty and Treaty Rights
Beaverhead	Shoshone-Bannock Fort Hall Reservation, Idaho	Treaty with the Eastern Band Shoshoni and Bannock, 1868 – Fort Bridger Treaty Hunt...so long as game may be found
	(West of Continental Divide) Confederated Salish and Kootenai Tribes Flathead Reservation, Montana	Hellgate Treaty of 1855
Bridger-Teton	Shoshone Wind River Reservation, Wyoming Shoshone-Bannock Fort Hall Reservation, Idaho	Treaty with the Eastern Band Shoshoni and Bannock, 1868 – Fort Bridger Treaty Hunt...so long as game may be found. Includes right to fish (State v. Tinno 1972) “Court agreed that the Indian peoples expected rights to harvest food on the unsettled lands as a means of subsistence and an integral part of their way of life” (Targhee Forest Plan pg. III-87 refers to Hanes 1995).
Custer (Beartooth Ranger District) And Shoshone	Crow Crow Reservation, Montana	Treaty with the Crows, 1868 - Fort Laramie Hunting (gathering implied)
	Arapaho Wind River Reservation, Wyoming	Treaty with the Northern Cheyenne and Northern Arapaho, 1868 - Fort Laramie Roam and hunt
	Northern Cheyenne Northern Cheyenne Reservation, Montana	Treaty with the Northern Cheyenne and Northern Arapaho, 1868 - Fort Laramie Roam and hunt
	Shoshone-Bannock Fort Hall Reservation, Idaho	Treaty with the Eastern Band Shoshoni and Bannock, 1868 – Fort Bridger Treaty Hunt...so long as game may be found
Gallatin	Crow Crow Reservation, Montana	Treaty with the Crows, 1868 - Fort Laramie Hunting (gathering implied)
Targhee	Shoshone-Bannock Fort Hall Reservation, Idaho	Treaty with the Eastern Band Shoshoni and Bannock, 1868 – Fort Bridger Treaty Hunt...so long as game may be found. Includes right to fish (State v. Tinno 1972) “Court agreed that the Indian peoples expected rights to harvest food on the unsettled lands as a means of subsistence and an integral part of their way of life” (Targhee Forest Plan pg. III-87 refers to Hanes 1995).

3.13.2 Attitudes, Beliefs, and Values

Perceptions of Grizzly Bears and Bear Management

People's acceptance of changing bear demographics and bear management contributes to the ultimate success in perpetuating the bear's recovery, public safety, and ease to which agencies can effectively manage for the bear. Public views regarding the grizzly bear and grizzly bear management have been expressed through the development of the grizzly bear Conservation Strategy, the state grizzly bear management plans, scoping on this proposal, and many other local and GYA efforts. In general, public comments on grizzly bear management efforts diverge in their tolerance for increasing and expanding bear populations and with their acceptance of protection measures. These divergent views are further discussed as environmental views and as multiple use views later in this section. It is recognized that the broader segment of the public may be more moderate in its views; opinion surveys conducted with statistical reliability help with understanding overall public sentiment or with particular segments of the population.

Opinion surveys. Opinion surveys offer the opportunity to gauge the broader populace views. A survey of Wyoming residents, conducted for the Wyoming Game and Fish Department, examined attitudes toward grizzly bears and opinions on the possible removal of the grizzly bear from listing under the ESA (Duda et al. 2001). Several findings were:

- Large majorities of Wyoming residents felt that grizzly bears are a benefit to Wyoming and are an important component of the ecosystems that they occupy.
 - 74% of Wyoming residents agreed that grizzly bears are a benefit to Wyoming
 - 11% disagreed
 - 12% did not know if grizzly bears benefited Wyoming
- Opinions on efforts to increase the populations of grizzly bears in Wyoming were divided between support and opposition. Slightly more (42 percent) Wyoming residents supported efforts to increase the grizzly bear population than opposed (39 percent) such efforts. Support for efforts to increase the grizzly bear population increased considerably (from 42 to 61 percent) when efforts to increase the grizzly bear population were coupled with the idea that groups of wildlife managers would be stationed locally to help track bears, inform and educate people, and resolve conflicts.
- Two of the top three reasons given for opposing efforts to increase the grizzly bear population dealt with the danger grizzly bears can pose to humans (36 percent) and livestock (18 percent).
- There is almost an equal division between Wyoming residents who think they would continue to use (48 percent) and those residents who would discontinue using (44 percent) the outdoor areas where they currently recreate if those areas were occupied by grizzly bears.

Another survey conducted to examine the political and social viability of predator compensation programs in the west offers insights from ranchers and the public in Idaho, Montana, and Wyoming (Montag et al. 2003). Several findings are:

- With regard to views that grizzly bears “are an important part of the ecosystems they occupy”:
 - Nineteen percent, 45 percent, and 25 percent of the livestock owners sampled from 12 community zones in Idaho, Montana, and Wyoming, respectively, agreed with the statement.
 - Fifty-one percent, 63 percent, and 65 percent of the public randomly sampled from Idaho, Montana, and Wyoming, respectively, agreed with the statement.
- With regard to the statement, “I would like to see populations of grizzly bears increase in my area”:

- Ninety-two percent, 81 percent, and 91 percent of the livestock owners sampled from 12 community zones in Idaho, Montana, and Wyoming, respectively, resoundingly disagreed with the statement.
- Sixty-six percent, 57 percent, and 60 percent of the public randomly sampled across Idaho, Montana, and Wyoming, respectively, disagreed with the statement.

The division between support of efforts to increase grizzly bear populations and opposition (as shown in the opinion polls) is also reflected in the differing viewpoints expressed in public involvement in this proposal. Key differences are summarized into two major groups. Again, it is recognized that the broader segment of the public may be more moderate in its views, i.e., supportive of grizzly bear populations and supportive of the human communities and residents affected by increasing grizzly bear populations. The purpose of this analysis is to provide an understanding of the opposing points of view with regard to grizzly bears and grizzly bear management.

Environmental Views

During the scoping process for this proposal, approximately 13 wildlife or ecology-based interest groups expressed their concern for the grizzly bear and future management. Several groups commented on the concept of no net loss. “While the aim of maintaining habitat conditions at 1998 levels is laudable, we do not believe the approach is workable, nor is it based on a complete assessment of grizzly habitat needs, current trends in human population or disease in key native foods” (Natural Resource Defense Council scoping comment). Most groups also requested that the agency consider grizzly bear management direction outside the PCA. “We have consistently asked land managers to ‘think beyond the line,’ and protect bear habitat where bears are.... With mounting pressures on bear habitat related to loss of key food sources, accelerating private land development on the Forest boundary and resource issues like large-scale oil and gas development, it is critical that the agencies take a hard look at protecting sufficient bear habitat while there is still time to do so” (Greater Yellowstone Coalition scoping comment).

Many individuals expressed their concern that removal of the bear from the endangered species list would be to the detriment of the bear and continued strong federal protection is needed. “I am troubled to hear that the Yellowstone grizzly bear may be removed from the endangered species list and that its habitat may be opened to development.” Although delisting is the responsibility of the USFWS (and not a decision in this proposal), some interest groups view this effort as part of the delisting process and voice objections to the proposal.

Multiple Use Views

During scoping, many individuals and several recreation and agricultural state agencies and organizations conveyed concern that recreational uses or economic reliance upon the national forests would be adversely affected by the proposed action and action alternatives. Some people view the proposed direction as increasing regulation and control over human uses and increased governmental costs for implementation. As one person expressed, “This sounds like it is going to be another attempt to close off any remaining roads in our national forests. All in the name of the grizzly bear. The grizzly bear has always been around even when all the logging and mining and cattle grazing was going on. Why should we now have to shut down all these resources and lock up entire forests? I think things should be left alone for awhile just to see how things work out. The grizzly bear will survive and the citizens should be allowed to use our ‘Public Lands.’” As the Idaho State Snowmobile Association expressed, “We value our freedoms highly and every regulation removes a freedom to choose for ourselves. Sometimes regulations are the only choice, but they should always be the last choice.”

Lifestyles

Lifestyles can be described as the activities, values, meanings, preferences, and ways of living in a particular place and time.

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Rural Lifestyles

Numerous small towns and communities support the rural lifestyles that many residents highlight as a desired quality of their lives (Figure 107). A rural lifestyle can be described as including the attributes or values of low crime rates, high levels of interpersonal trust, slower pace of life, volunteerism rather than government as a basis for solving community problems, opportunities for community involvement, a sense of belonging, and a high value placed on the quality of nearby surroundings (Northern Economics Inc. 2002). Economically, most of these communities rely upon the national forests or national parks, primarily through the recreation and tourism. Livestock grazing on forest lands during the summer months has been a long, traditional relationship, particularly on the Bridger-Teton, Targhee, and Beaverhead National Forests. For more discussion, see the grazing section at 3.7.

Figure 107. Communities in the GYA.

Idaho	Montana	Wyoming
Ashton	Big Sky	Afton
Dayton	Big Timber	Alpine
Driggs	Bozeman	Big Piney
Dubois	Columbus	Buffalo Valley/Moran
Idaho Falls	Cooke City-Silver Gate	Cody
Island Park	Ennis	Crowheart
Kilgore	Gardiner	Dubois
Marysville	Joliet	Jackson
Montpelier	Livingston	Kemmerer
Rexburg	Red Lodge	Lander
Roberts	Sheridan	Meeteetse
Soda Springs	West Yellowstone	Opal
Spencer		Pinedale
Swan Valley		Riverton
Teton		Thermopolis
Tetonia		Wapiti
Victor		

In addition to economic reliance, most of these communities and residents have a close relationship with the forests through recreational pursuits, reliance upon products such as firewood and wild game, or as a part of living in a scenic, rural landscape. Many residents tend to use National Forest System lands in a variety of ways and support the multiple use concept of the forests. From a series of focus group meetings throughout rural communities near the Gallatin National Forest, people felt that there was the possibility for everyone to use the forest, even though not all users should or could use the same resources (Millikin and Walker 1999). Residents also value the small town nature in the sense of knowing everyone and the mutual support and community commitment that often provides a sense of belonging (Northern Economics Inc. 2002). Communities generally describe themselves as accepting people with a live-and-let-live approach. In light of this value, they are concerned about federal government policies and outside interest groups' influences over forest management that, to them, seems extreme and not open to compromise or tolerant of multiple uses (Northern Economics Inc. 2002, Millikin and Walker 1999). While many residents of local communities value their small town atmosphere and values, they are also aware of the pressures of change. Community and county

planning have been more on the forefront in recent years although community members desire to maintain local control.

Ranching

Ranching is an important part of the history and culture of the lands in GYA and 21-county area. Ranching contributes to rural lifestyles. National Forest System lands have generally served as summer pastures (higher elevation lands) for cattle or sheep while ranchers grow grain or hay on their ranch lands in order to feed their livestock through winter. The ranching life tends to be all encompassing—all family members contribute long hours to year-round tasks. This way of life has often been a difficult one financially as livestock markets fluctuate. An intimate connection between history, family, and land instills a sense of belonging to the country that is not easily deterred by the hard work and financial difficulties (Northern Economics Inc. 2002). The family ranching life, while having been a mainstay to many of the rural areas in the GYA, is also one that is changing. Some ranches are able to transition from one generation to the next or to sell to other similar ranching operations. Studies indicate that a smaller portion of these ranchlands is turning over to new owners such as amenity buyers, corporations, developers, and conservation organizations (Travis et al. 2002).

Approximately 70 cattle and seven sheep allotments were actively used in 2003 within the PCA (Figure 53.). Outside the PCA but within Alternative 4, approximately 280 cattle and 74 sheep allotments were actively used (Figure 54). Commenting on this proposed action, the Wyoming Farm Bureau, which represents agricultural producers throughout the state, expressed, “There are many producers who have been increasingly impacted by grizzly bears on their allotments. Some of these producers have incurred significant economic impacts from grizzly bears.” They also added, “Producers find that many of the management techniques advocated to prevent grizzly bear depredations are ineffective, and are too expensive or both. Increasingly these producers have had to vacate their permits or underutilize them in order to avoid significant economic impacts.” The Wyoming Department of Agriculture also stated, “This project will definitely impact livestock grazing permittees, agriculture producers, landowners, and other citizens” and noted that “Grazing also represents an irreplaceable environmental and social value, contributing to the preservation of open spaces, the visual beauty of the area, and the traditional image of Wyoming and the West.”

3.13.3 Effects to the Social Environment

Effects Common to All Alternatives

The human population in the analysis area will continue to grow and recreational uses of the forests will increase. All alternatives have some provisions to protect the bear and could limit human uses. Increasing rural settlement and subdivisions on private lands could impact the bear’s use of habitat and movement between habitats. Regardless of this proposal, expanding bear populations will require public knowledge of how to recreate and live in bear-occupied areas. Bear habituation to humans could become more prevalent with increasing human settlement; habituation poses risks to the bear and to public safety. Alternative 4 establishes security for the bear outside the PCA and ensures provisions for the bear on public lands as populations expand.

Landownership

As recreation visits increase and overnight stays are not accommodated through public campgrounds or permitted hotels or resorts, development of private lands for motels, campgrounds, and other services would be indirectly influenced to meet the public demands. This would be the case for all alternatives given the increasing use trends compared to the current trend of not increasing public campgrounds and the proposed provisions in the action alternatives to limit further development.

While there are many factors such as market conditions and land values that affect ranchlands, all alternatives require livestock owners with Forest Service permits to make accommodations for

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the grizzly bear. These efforts increase the costs of operations and may be one other factor that influences a change from ranchland to another land use.

Government Coordination

Government coordination would continue under all alternatives. The level of coordination between agencies and with the public is currently well organized at the federal and state levels. Information and education programs about living with grizzly bears would continue under all alternatives. Additional partnerships and county involvement could complement those efforts. Consultation with the tribes and consideration of impacts on tribal members would occur under all alternatives. Road access restrictions would impact tribal members who use roads for gathering, hunting, and visiting traditional sites.

Effects of Alternative 1 on the Social Environment

Social Setting

Community land uses under Forest Service permits. Alternative 1 would not affect developments that are under permit on National Forest System lands (Figure 103).

Government Coordination

Alternative 1 does not implement the Conservation Strategy. Federal and state agencies would not be assured that the Conservation Strategy would be implemented, and confusion may result from outdated direction in the forest plans. County governments may vary in how they are affected by this alternative because each forest may handle additional management requirements for the grizzly bear differently. Under this alternative, the bear would remain listed under the ESA and require more government coordination.

Tribal members who use roads for gathering, hunting, and visiting traditional sites would maintain the current level of use.

Attitudes, Beliefs, and Values

Environmental views. Some interests would be negatively impacted because the current standards are viewed as not addressing expanding bear population needs and not providing an adequate area in case major bear foods diminish. These interests would be supported with the continued listing of the bear under the ESA.

Multiple use views. Alternative 1 reflects the existing situation and moderately supports multiple use interests. As grizzly bear/human conflicts occur, bears may be removed from areas not in MS 1, supporting the continuance of existing human uses. These interests would like to see the bear delisted and allow direct state management of bear populations.

Lifestyles

Rural lifestyles. Alternative 1 would not affect the rural way of life in that many outdoor pursuits on National Forest System lands would continue as they currently do. Existing regulations with MS 1, 2, and 3 are already being accommodated.

Ranching. Alternative 1 would continue to require grazing operations under existing allotments within the PCA to make accommodations for the grizzly bear. These accommodations include working with governmental agencies to adhere to the Guidelines, reporting conflicts, complying with paperwork and coordination to receive compensation where depredations are proven, removal of unnatural attractants, and increased herd monitoring and maintenance.

Effects of Alternatives 2 and 2-Modified on the Social Environment

Social Setting

Community land uses under Forest Service permits. Alternative 2 and Alternative 2-Modified would maintain the capacity of permitted uses on National Forest System lands (Figure 103); these alternatives require that developed sites stay at their capacities as of 1998 levels. Proposals to increase a water treatment site, a dam's storage capacity, or increase a government facility, as examples, would not be allowed unless under an exception, i.e., an analysis shows that the

changes or indirect increases in human presence do not affect the bear or its habitat, or mitigated according to the Application Rules. The affected areas are in the Island Park area, e.g. Mack's Inn on the Targhee National Forest, the Cooke City area on the Gallatin National Forest, and the Crandall area on the Shoshone National Forest. Communities or other permittees would have to look to private lands, perhaps, to meet their increasing needs. This may be difficult in some cases because the affected areas are largely public lands, and private lands are relatively scarce for the purposes needed. An indirect outcome could also be that land development would be curtailed if analysis showed that water treatment sites, dumps, or waste transfer sites could not expand or be mitigated.

Government Coordination

These alternatives fully meet the intent of the Conservation Strategy by incorporating interagency agreed-upon direction into forest plans. Federal and state governments responsible for managing the bear would be assured that this direction is an integral part of the management of national forests, and the direction would be consistent across forests. The direction would also be clear for county governments within the GYA. Government relations with particular counties and towns that have permitted facilities on national forests could become strained if a community needs to increase capacity within the PCA and is unable to do so. See the discussion on community-related developments.

Alternative 2-Modified, by including some additional direction for keeping human attractants unavailable to bears, maintaining food sources, and resolving grizzly bear/livestock conflicts both inside and outside the PCA, facilitates government coordination by addressing bear movement and occupation outside the PCA. Some county governments may be opposed to additional direction outside the PCA.

Tribal members who use roads for gathering, hunting, and visiting traditional sites would maintain the current level of use.

Attitudes, Beliefs, and Values

Environmental views. These alternatives address some environmental interests by ensuring consistent forest plan direction across the six GYA national forests. Environmental interests would feel that Alternative 2 does not fully address their concerns because the alternative allows for some flexibility in applying the standards (through the Application Rules). They would feel that Alternative 2 does not meet expanding bear population needs outside the PCA. Alternative 2-Modified addresses and supports some environmental interests by providing additional guidance for expanding bear populations outside the PCA in areas that are biologically suitable and socially acceptable for grizzly bear occupancy.

Multiple use views. These alternatives alter the existing situation with further requirements and could impact multiple use interests in the long term when uses exceed the capacity of the developed site. Shifts among developed and dispersed sites would be allowed under these alternatives and this flexibility could allow meeting multiple use needs. Since the direction applies to only the PCA, multiple uses would continue as they have outside the PCA. Alternative 2-Modified would affect multiple uses outside the PCA through additional direction for keeping human attractants unavailable to bears. Otherwise, multiple uses are not additionally restricted through motorized closures under these alternatives.

Lifestyles

Rural lifestyles. Under Alternatives 2 and 2-Modified, the rural way of life could continue, but in the long term as human uses of the national forests increase beyond the capacities of trailheads, campgrounds, boat launches, etc., uses would be restricted to 1998 levels. Uses could be accommodated outside the PCA and still be within the proximity of the GYA. Some adjustments and projects within the PCA could be allowed under the 1 percent rule or mitigation and thus provide some flexibility to meet needs.

Social Environment

Ranching. Alternatives 2 and 2-Modified would continue to require grazing operations under existing allotments to make accommodations for the grizzly bear. These accommodations include working with governmental agencies to report conflicts, complying with paperwork and coordination to receive compensation where livestock depredations are proven, removal of unnatural attractants, and increased herd monitoring and maintenance. Alternative 2-Modified would allow for the retirement of livestock allotments with recurring conflicts inside and outside the PCA with willing permittees. Permittees with allotments with recurring conflicts would be given the opportunity to place livestock in a vacant allotment outside the PCA where there is less likelihood for conflicts with grizzly bears as these allotments become available.

Effects of Alternative 3 on the Social Environment

Social Setting

Community land uses under Forest Service permits. Alternative 3 would maintain the capacity of permitted uses on National Forest System lands (Figure 103); this alternative requires that developed sites stay at their capacities as of 1998 levels. Proposals to increase a water treatment site, a dam's storage capacity, or increase a government facility, as examples, would not be allowed. The affected areas are in the Island Park area, e.g. Mack's Inn on the Targhee National Forest, the Cooke City area on the Gallatin National Forest, and the Crandall area on the Shoshone National Forest. Communities or other permittees would have to look to private lands, perhaps, to meet their increasing needs. This may be difficult in some cases because the affected areas are largely public lands, and private lands are relatively scarce for the purposes needed. An indirect outcome could also be that land development is curtailed because the water treatment sites, dumps, or waste transfer sites cannot expand.

Government Coordination

Alternative 3 proposes stricter standards within the PCA. Federal and state governments responsible for managing the bear would be assured that this direction is an integral part of the management of national forests by inclusion into forest plans and that the direction is consistent across forests. The direction would also be clear for county governments within the GYA, although more conflict could occur without some flexibility in shifting or accommodating some uses. As an example, government relations with particular counties and towns that have permitted facilities on national forests could become strained if a community needs to alter the capacities of within the PCA and is unable to do so. See Figure 103 and the previous discussion on community-related developments.

Tribal members who use roads for gathering, hunting, and visiting traditional sites would be impacted by the lack of access to traditional sites.

Attitudes, Beliefs, and Values

Environmental views. Alternative 3 addresses some environmental interests by making no accommodations for additional human uses and projects, and would ensure no loss of bear habitat. Alternative 3 does not fully address the environmental interests because they feel the alternative does not meet expanding bear population needs outside the PCA and does not provide an adequate area in case major bear foods diminish.

Multiple use views. Alternative 3 is more restrictive within the PCA and could impact multiple use interests in the long term when use exceeds the capacity of the developed site under Standard 2. A more immediate effect would be the closure of almost 500 miles of motorized routes on five national forests. Current uses would be displaced. There would be no flexibility to make adjustments for projects under Standard 1. Since the direction applies only to the PCA, multiple uses would continue on lands outside the PCA.

Lifestyles

Rural lifestyles. Under Alternative 3, the rural way of life could continue. In the long term, as human uses of the national forests increase beyond the capacity of trailheads, campgrounds, boat launches, etc., uses would be restricted to 1998 capacities. Particular community areas and uses

would be impacted by the closure of almost 500 miles of motorized routes on five national forests. Alternative 3 allows for no adjustments or projects within the PCA and does not provide flexibility to respond to community needs for expansion of infrastructure.

Rural communities and local governments in the areas where road closures are proposed, and within the GYA in general, may further question federal government controls and the validity of such closures. In some cases, this would negatively impact motorized users and in other cases, new opportunities for backpacking, horse packing, hiking, etc. would be created.

Ranching. Alternative 3 would continue to require grazing operations under existing allotments to make accommodations for the grizzly bear. These accommodations include working with governmental agencies to report conflicts, complying with paperwork and coordination to receive compensation where livestock depredations are proven, removal of unnatural attractants, and increased herd monitoring and maintenance. Four sheep allotments would be closed out and this would adversely affect the sheep operations relying upon these permitted lands. Cattle allotments with recurring conflicts would be closed and this would adversely affect the ranching operations that use those permits.

Effects of Alternative 4 on the Social Environment

Social Setting

Community land uses under Forest Service permits. Alternative 4 would maintain the capacity of permitted uses on National Forest System lands (Figure 103); this alternative requires that developed sites stay at their capacities as 1998 levels inside the PCA and 2003 levels outside the PCA in the area identified for Alternative 4. Proposals to increase a water treatment site, a dam's storage capacity, or increase a government facility, as examples, would not be allowed. The affected areas are in the Island Park area, e.g. Mack's Inn on the Targhee National Forest, the Cooke City area on the Gallatin National Forest, and the Crandall area on the Shoshone National Forest, and the Grand Targhee sewer system on the Targhee National Forest. Communities or other permittees would have to look to private lands, perhaps, to meet their increasing need. This may be difficult in some cases because the affected areas are largely public lands, and private lands are relatively scarce for the purposes needed. An indirect outcome could be that land development is curtailed because the water treatment sites, dumps, or waste transfer sites cannot expand.

Government Coordination

Alternative 4 proposes stricter standards and increases the geographic area to which the standards and guidelines apply. Federal and state governments responsible for managing the bear would be assured that this direction is an integral part of the management of national forests by inclusion into forest plans and that the direction is consistent across forests. The direction would also be clear for county governments within the GYA, although more conflict could occur without some flexibility in shifting or accommodating some uses. Effects of restrictions within the PCA would be similar to Alternative 3, but in addition, local communities and counties would be increasingly concerned about additional restrictions covering the public lands in their counties. Government relations with particular counties and towns that have permitted facilities on national forests could become strained if a community needs to alter the capacities of permitted structures within the PCA and is unable to do so.

Impacts would be the greatest in this alternative to tribal members who use roads for gathering, hunting, and visiting traditional sites.

Attitudes, Beliefs and Values

Environmental views. Alternative 4 would support environmental and wildlife interests because the direction is extended to include lands that have been suggested as important bear habitats. Within the PCA, no accommodations would be made for additional human uses and projects, and this would support environmental interests that want no loss of any habitat.

Multiple use views. Alternative 4 establishes habitat standards for a large share of the six national forests and would impact multiple use interests in the long term when use exceeds the capacity of the developed site. A more immediate effect would be the closure of approximately 1,850 miles of motorized routes on the six national forests. Current uses would be displaced. There would be no flexibility to make adjustments for projects under Standard 1. Uses would be affected on a large share of the six national forest area.

Lifestyles

Rural lifestyles. Under Alternative 4 the rural way of life would be largely impacted in the short term as motorized routes and snow machine areas are closed. Alternative 4 does not allow for adjustments or projects within the area and does not provide any flexibility to meet needs.

The actions by this alternative to close more roads and to include closures on a majority of the six national forests would be controversial. Rural communities and local governments within the GYA would question federal government controls and the validity of such closures. In some cases, this would negatively impact motorized users and in other cases, new opportunities for backpacking, horse packing, hiking, etc. would be created.

Ranching. Alternative 4 would increase the affected allotments to include approximately 77 sheep allotments and about 350 cattle allotments. While this alternative acknowledges bear movement outside the PCA, management direction would require that more livestock operations accommodate the bear. These accommodations include working with governmental agencies to report conflicts, complying with paperwork and coordination to receive compensation where livestock depredations are proven, removal of unnatural attractants, and increased herd monitoring and maintenance. Seventy-seven sheep allotments would be closed out and this would adversely affect the sheep operations relying upon these permits. Economically, these operators and associated communities would be adversely affected to the extent that some permittees would need to sell their private lands or convert the land use to something other than livestock. As lands are sold to larger corporations or subdivided for amenity purposes, the rural ranching lifestyle and custom and culture of some of these western communities would be lost. See the economic section for more discussion. Cattle allotments with recurring conflicts would be closed and this would adversely affect the ranching operations that use these allotments. Similar effects to the closing of sheep allotments could occur. This alternative also addresses coordinating closure of bear baiting outside the PCA where conflicts could occur. This type of direction could ensure that fewer attractants are near allotments where conflicts between bear and livestock could potentially develop.

3.14 Economic Environment

Section 3.14 Changes between Draft and Final EIS

In this section, the following additions and updates were made:

- The budget to implement
- Clarification on use of county level of data as the basis for economic effects

Affected Environment

Economic analyses are conducted by the Forest Service to determine what effect the agency's management decisions might have on the local economic environment. Rural areas surrounding forests are often dependent upon forest resources for much of their economic well-being. This dependency can affect local economies, lifestyles, population, and the quality of life of the area. Some sectors of the economy for the 21 counties in the GYA (Figure 105) are dependent upon the natural resources of the national forests. This study considers potential effects of the alternatives on economic variables such as local employment, income, and federal payments to the counties. The 21-county area provides the basis for describing the GYA economy and analyzing the changes in income and employment. Budget to implement is used to measure cost differences between alternatives.

Commodity and amenity benefits from National Forest System lands within the GYA have contributed to the social and economic bases of neighboring communities. Economic dependency is an important feature that can assist managers in measuring the general health of the economy. The effects of change on economic dependency and other important variables are discussed in this section. Getting Ahead in Greater Yellowstone (Rasker and Alexander 2003) discussed the following trends:

Employment

- The economy in the GYA is growing rapidly, outpacing the states of Idaho, Montana, and Wyoming, as well as the nation as a whole. From 1970 to 2000, more than 143,000 new jobs were created.
- Employment growth in the GYA is concentrated in some industries over others. The largest industries are in the service and professional fields, which account for more than 71 percent of the new jobs.
- The largest employment sectors in 2000 were services (30 percent), retail trade (18 percent), government (12 percent), and construction (9 percent).
- Not all sectors of the regional economy are doing well. Mining grew 0.5 percent from 1970 to 2000 and accounted for 2 percent of all employment in 2000. Farming and ranching lost more than 1,300 jobs in the same period and accounted for 6 percent of employment in 2000.

Income

- Total personal income has grown in recent years in the GYA, with more than \$5,140 million in new income earned between 1970 and 2000.
- Non-labor income is a combination of dividends, interest and rent, and transfer payments. Growth in this category can be attributed to several factors, among them an increasing number of retirees. It was the fastest growing source of personal income.
- Service and professional industries grew by 39 percent and amounted to 37 percent of all income earned in 2000.
- Services alone accounted for 24 percent of all new income in the last 30 years; government accounted for 12 percent, construction 7 percent, and retail trade 6 percent.
- Growth in traditional industries (agriculture, mining, forestry, and oil and gas development) has been sluggish. In 2000, less than 10 percent of total income in the area was derived from these industries—less than half of what these same industries accounted for in 1970. Farm and ranch income fell by 67 percent since 1970.

Economic Dependency

Figure 108 displays total industry output, number of jobs, and average employee compensation generated by major industries in 2001 in the GYA. The industries listed in the table are composed of many sectors. The sum of components may not equal the total due to independent rounding. Jobs in Figure 108 are annual average jobs that include part-time, temporary, and full-time employment. Employee compensation is the value of both wages and benefits.

Economic dependency can be measured by various indices and techniques. Income and employment (jobs) by economic sector are the usual units of measure. Economic dependency allows a manager to look at the relative magnitude of the industries affected by changes in national forest management. Economic dependency refers to the degree to which an economy might depend on a limited number of industries. The larger a particular industry's role, the more dependent the economy is on the industry. Economic dependency is estimated by determining the approximate percentage of the total economy of each county that can be attributed to a particular industry. Counties are used because the most reliable and accurate long-term data on the economy is reported at the county level. The findings for each county were then aggregated to the GYA in terms of income and employment.

Agriculture, forestry, cattle ranching, mining, and wood products directly account for about 8 percent of the employment in the GYA. Mining has some of the highest paying jobs in the GYA.

Economic Environment

Agriculture and forestry jobs offered comparatively low employee compensation. All of these industries have some degree of dependency on the GYA national forests. Employment from recreation and tourism related to the GYA national forests, which is also an important component of the regional economy, is much more difficult to estimate, as food services, accommodations, arts, and retail trade all have employment resulting from recreation and tourism.

Effects on communities below the county level are also difficult to estimate. Economic effects for income and employment were developed at the county level because that is the lowest level where economic data, such as income and employment, are available; community level impacts cannot be determined. Numbers simply are not available to quantitatively describe effects below the county level. Communities are recognized in section 3.13.2 and economic reliance is discussed there.

The export of goods and services stimulates economic activity that would not otherwise exist because it cannot be supported by the local economy. In order to produce these extra goods and services, there is more employment and more purchases of local goods and services as inputs into the production process. In turn, the jobs in the exporting industry, and the jobs in the sectors providing the increased inputs, represent an increase in disposable income, which may be spent locally, stimulating more economic activity. These effects of economic activity are defined as:

Direct effects are the effects felt by the original industry providing goods and services outside the area.

Indirect effects are the effects felt by the local sectors/industries providing inputs of goods and services to the directly affected industry in order to fulfill export demand.

An **induced effect** is the effect of an increase in local income from export-related jobs in the directly and indirectly affected industries.

Livestock Grazing

Some jobs and income in the GYA are either directly or indirectly attributable to livestock grazing on the national forests. Total employment for livestock varies between cattle grazing and sheep grazing. Income varies from \$850,000 to \$957,000 in labor income per 100,000 AMs. Jobs in the sheep grazing sector may include part-time jobs. Figure 109 displays income and employment per 100,000 AMs for the GYA.

Figure 108. Total industry output, total employee compensation, total number of jobs, and average annual employee compensation by major industry for the 21 counties in the GYA²⁷.

Industry	Industry output (million dollars)	Employee compensation (million dollars)	Number of jobs	Average employee compensation
Agriculture, forestry, fishing, and hunting	686.674	81.753	10,044	8,140
Cattle ranching and farming	605.916	53.964	6,336	8,517
Wood products	124.072	22.150	787	28,160
Mining	1,163.286	229.092	4,508	50,821
Utilities	360.075	41.341	1,165	35,473
Construction	2,288.411	673.485	28,845	23,348
Manufacturing	2,138.515	337.060	11,701	28,806
Wholesale trade	703.222	244.786	7,780	31,464
Transportation and warehousing	561.702	181.932	5,203	34,970
Retail trade	1,180.163	438.277	27,134	16,152
Food and beverage stores	218.064	81.816	4,486	18,238
Information	426.765	94.436	3,472	27,202
Finance and insurance	811.915	180.203	7,649	23,559
Real estate and rental	1,066.918	69.590	10,048	6,926
Professional- scientific and tech services	1,034.211	512.461	17,543	29,212
Management of companies	32.930	19.263	376	51,185
Administrative and waste services	350.484	113.867	7,463	15,257
Educational services	147.951	73.992	3,520	21,022
Health and social services	1,053.492	422.761	17,338	24,383
Arts- entertainment and recreation	159.258	22.220	4,127	5,384
Other amusement- gambling- and recreation industries	213.883	56.784	3,363	16,883
Accommodation and food services	1,094.451	282.772	25,003	11,310
Other services	940.845	207.117	14,222	14,563
Government	2,420.619	1,254.307	35,785	35,051
Totals	19,783.819	5,695.431	257,898	22,084

²⁷ Base economic data for the study area were estimated using IMPLAN Professional Version 2.0, Minnesota IMPLAN Group, Inc. The economic impact area was defined to include 21 counties in Idaho, Montana, and Wyoming. Based on 2003 data.

Figure 109. Jobs and income per 100,000 AMs for the GYA²⁸.

Employment (jobs per 100,000 AMs)				
Sector	Direct	Indirect	Induced	Total
Cattle	25	21	8	54
Sheep	19	5	1	28
Labor income (dollars per 100,000 AMs)				
Sector	Direct	Indirect	Induced	Total
Cattle	400,800	388,000	168,600	957,400
Sheep	81,260	58,200	29,960	169,540

About 414,000 AMs of sheep and 422,000 AMs of cattle were grazed on the six GYA national forests in 2003. This resulted in about 350 jobs and \$4.7 million of labor income that is associated with grazing on the GYA national forests either directly or indirectly (including induced jobs). Relative to direct jobs in the cattle ranching and farming industries in Figure 108, about 183 jobs of the 6,336 jobs, or 3 percent, are attributed to livestock grazing on these national forests.

Wood Products

Some jobs and income are attributable to timber harvesting from the GYA national forests, which provides employment in the logging and sawmill sectors. About 24 jobs and over \$700,000 of personal income are directly or indirectly generated for every million board feet of timber harvest through the logging and sawmill industries. These are averages for the 21-county area in the GYA.

Figure 110. Jobs and income per million board feet of timber harvest in the GYA²⁹.

Employment (jobs per MMBF)				
Sector	Direct	Indirect	Induced	Total
Logging	10	1	1	12
Sawmills	9	2	1	12
Labor income (dollars per MMBF)				
Sector	Direct	Indirect	Induced	Total
Logging	270,000	23,400	19,700	313,100
Sawmills	300,000	76,400	30,300	406,700

About 13 million board feet were harvested, on average, between 2000 to 2003 for the six GYA national forests. This resulted in about 310 jobs and \$9.5 million of labor income that is associated with timber harvesting on the GYA national forests either directly or indirectly (including induced jobs). Relative to direct jobs in the wood product industries in Figure 108, about 240 jobs of the 787 jobs, or 30 percent, are attributed to timber harvesting on these national forests.

²⁸ Impacts were estimated using IMPLAN Professional Version 2.0, Minnesota IMPLAN Group, Inc. County level inventory, marketing, and income information were collected from the National Agricultural Statistical Service state Web sites at <http://www.usda.gov/nass/>; USDA Forest Service 2003c (for grazing statistical survey).

²⁹ Impacts were estimated using IMPLAN Professional Version 2.0, Minnesota IMPLAN Group, Inc. Direct response coefficients obtained from a primary data survey of the Rocky Mountain west done for the 2000 Strategic Plan (Alward et al. 2003). Indirect and induced effects were estimated using IMPLAN.

Oil, Gas, and Minerals

Jobs and income are also attributable to oil and gas leasing and mineral development. As noted previously, mining provides some of the highest paying jobs in the GYA. Figure 111 shows the income and employment resulting from a drilled oil and gas well in the GYA.

Figure 111. Jobs and income for a drilled well in the GYA³⁰.

	Direct	Indirect	Induced	Total
Jobs (number) per drilled well	6	3	3	12
Labor income (dollars) per drilled well	232,800	92,700	65,300	390,800

As of 2005, there are no active oil and gas developments inside the PCA or within the Alternative 4 area, which is the best estimate of the area that is biologically suitable for the grizzly bear. Fourteen oil and gas wells are active on the GYA national forests, with all wells located in the Wyoming Range on the southern end of the Bridger-Teton National Forest outside the Alternative 4 area. On average, these active wells contribute about 168 jobs and \$5.5 million of labor income associated with oil and gas production. Recent national energy needs have resulted in an increase in oil and gas development on BLM lands adjacent to the Bridger-Teton National Forest.

Recreation and Tourism

The national forests in the GYA provide a variety of recreational experiences, ranging from day visits to destination recreational trips. Lodging, food, services, outfitting and guiding, and retail trade all are dependent to varying degrees on people visiting and recreating on the national forests. Figure 112 describes employment response to 1,000 recreation visits for both wildlife and non-wildlife related activities. Overnight off-forest use in the 21-county area generates nearly double the number of total jobs when compared with overnight on-forest use.

Changes in recreation and tourism are difficult to estimate in relation to grizzly bear presence or absence. No data or studies are available that indicate recreation and tourism would decline or increase because bears are present in an area. According to a survey of Wyoming residents conducted by Wyoming Game and Fish, there is an almost equal division between Wyoming residents who think they would continue to use (48 percent) and those residents who would discontinue using (44 percent) the outdoor areas where they currently recreate in those areas occupied by grizzly bears (see section 3.13.2).

Payments to Counties from Forest Programs

Counties containing National Forest System lands receive payments from the federal government to compensate for critical services they provide to both county residents and visitors to these federal lands. In 1908, Congress enacted the Twenty-Five Percent Fund Act that requires 25 percent of the revenues derived from National Forest System lands be paid to states for use by the counties in which the lands are situated for the benefit of public schools and roads. Since 1908, the affected counties have received these payments.

The Secure Rural Schools and Community Self-Determination Act was enacted in October 2000. The purpose of this act was to stabilize payments to counties. Under this law, for fiscal years 2001 through 2006, counties have the choice of receiving either 1) the 25 percent payment as under the Act of 1908, or 2) an amount equal to their proportion of the average of the state's three highest 25 percent payments from fiscal year 1986 through fiscal year 1999.

A reduction in timber harvest volume or livestock grazing under any of the alternatives would not have an effect on the 25 percent payments to counties. All counties in the study area have chosen to receive payment under the Secure Rural School and Community Self-Determination Act of

³⁰ Impacts were estimated using IMPLAN Professional Version 2.0, Minnesota IMPLAN Group, Inc., and were based upon the 2001 U.S. average cost of drilling an oil and gas well of \$943,200. Source: U.S. Department of Energy, Energy Information Administration, "Table 4.7 Costs of Crude Oil and Natural Gas Wells Drilled, 1960-2001" (<http://www.eia.doe.gov/emeu/aer/resource.html>) accessed April 27, 2004.

2000, which has locked in these payments for six years. Payments in lieu of taxes would not be affected.

Payments to States

Twelve and a half percent of the value of the oil and gas produced from federal lands is collected as royalties and paid to the respective state. Lease rental and lease bonus bids also provide income to the respective state. Of the money collected for oil and gas rent and for royalty or bonus payments for public domain lands, 50 percent is returned to the U.S. Treasury and 50 percent is given to the state in which the oil and gas is produced. States or counties usually receive ad valorem and severance taxes from oil and gas activities.

Effects on the Economic Environment

Many factors influence and affect the local social and economic environment. Population growth, economic growth, and economic diversity of individual counties and communities all affect local economies, as well as management of National Forest System lands within the counties. The figures below summarize employment and income changes for each alternative for livestock grazing and timber harvesting. Changes in employment and income related to oil and gas leasing, minerals, and recreation and tourism are discussed in a narrative.

Figure 112. Employment resulting from wildlife and non-wildlife related visits for 1,000 recreation trips on GYA national forests³¹.

Wildlife related trips (hunting, fishing, viewing)					
Type of visitor	Type of visit	Direct jobs	Indirect jobs	Induced jobs	Total
Local	Day use	0.3	0	0	0.4
	Overnight off-forest	1.1	0.1	0.2	1.3
	Overnight on-forest	1.4	0.1	0.2	1.7
Non-local	Day use	0.4	0	0.1	0.5
	Overnight off-forest	3.2	0.3	0.5	4.0
	Overnight on-forest	2.1	0.2	0.3	2.6
Non-wildlife related visits (camping, hiking, etc.)					
Type of visitor	Type of visit	Direct jobs	Indirect jobs	Induced jobs	Total
Local	Day use	0.3	0	0	0.3
	Overnight off-forest	1.5	0.1	0.2	1.9
	Overnight on-forest	1.0	0.1	0.2	1.3
Non-local	Day use	0.5	0.1	0.1	0.7
	Overnight off-forest	3.2	0.3	0.5	4.0
	Overnight on-forest	1.8	0.2	0.3	2.2

³¹ Impacts were estimated using IMPLAN Professional Version 2.0, Minnesota IMPLAN Group, Inc. and were based on recreation visitor expenditure profiles from the National Visitor Use Monitoring Survey (NVUM). Impact estimates were generated on a per million local (resident) and non-local recreation visits (Stynes and White 2005). Expenditure profiles in the NVUM documentation are on a per party per trip basis. Average party size was used to convert the impact results into a per person (visits) basis.

Figure 113. Reduction in employment and income due to changes in livestock grazing for each alternative by forest.

National forest	Employment (numbers of jobs)				Income (millions of dollars)			
	Alt 1	Alt 2, Alt 2-Mod	Alt 3	Alt 4	Alt 1	Alt 2, Alt 2-Mod	Alt 3	Alt 4
Beaverhead	0	0	0	7	0	0	0	0.04
Bridger-Teton	0	0	0	33	0	0	0	0.31
Custer	0	0	0	0	0	0	0	0
Gallatin	1	1	1	1	0.01	0.01	0.01	0.01
Shoshone	0	0	1	1	0	0	0.01	0.01
Targhee	1	1	1	33	0.01	0.01	0.01	0.21
Total	2	2	3	75	0.01	0.01	0.03	0.57

Figure 114. Reduction in employment and income due to changes in timber harvesting for each alternative by forest.

National forest	Employment (jobs)				Income (millions of dollars)			
	Alt 1	Alt 2, Alt 2-Mod	Alt 3	Alt 4	Alt 1	Alt 2, Alt 2-Mod	Alt 3	Alt 4
Beaverhead	0	0	0	12 to 70	0	0	0	0.4 to 2.1
Bridger-Teton	0	0	1 to 8	7 to 42	0	0	0	0.2 to 1.3
Custer	0	0	0	1 to 3	0	0	0	0 to 0.1
Gallatin	0	0	4 to 25	16 to 96	0	0	0.1 to 0.8	0.5 to 2.9
Shoshone	0	0	7 to 40	9 to 56	0	0	0.2 to 1.2	0.3 to 1.7
Targhee	0	0	21 to 126	52 to 308	0	0	0.7 to 3.9	1.6 to 9.4
Total	0	0	34 to 200	98 to 575	0	0	1.0 to 6.1	3.0 to 17.6

Figure 115. Total reduction in employment and income due to changes in livestock grazing and timber harvesting for each alternative by forest.

National forest	Employment (jobs)				Income (millions of dollars)			
	Alt 1	Alt 2, Alt 2-Mod	Alt 3	Alt 4	Alt 1	Alt 2, Alt 2-Mod	Alt 3	Alt 4
Beaverhead	0	0	0	19 to 77	0	0	0	0.44 to 2.14
Bridger-Teton	0	0	1 to 8	40 to 75	0	0	0	0.51 to 1.61
Custer	0	0	0	1 to 3	0	0	0	0 to 0.1
Gallatin	1	1	5 to 26	17 to 97	0.01	0.01	0.11 to 0.81	0.51 to 2.91
Shoshone	0	0	8 to 41	10 to 57	0	0	0.21 to 1.21	0.31 to 1.71
Targhee	1	1	22 to 127	85 to 341	0.01	0.01	0.71 to 3.91	1.81 to 9.61
Total	2	2	37 to 204	173 to 650	0.01	0.01	1.03 to 5.93	3.58 to 23.2

Effects of Alternatives 1, 2, and 2-Modified on the Economic Environment

The overall economic effects of Alternatives 1, 2, and 2-Modified are expected to be similar.

Related to sheep grazing, Alternatives 1, 2, and 2-Modified would phase out four remaining sheep allotments inside the PCA on the Targhee and Gallatin National Forests, resulting in the reduction of about two jobs in those alternatives. This phase out of sheep grazing is not mandatory but based on willing permittees. Even with willing permittees, it is possible that sheep grazing on these allotments would be phased out by the end of the decade. Options include substitute pastures for the permittee or buy-out or waiver of the permit. Removal of the entire sheep grazing permit may affect overall ranch viability and may result in the additional reduction of AMs if substitute grazing areas were not available.

Related to cattle grazing, no change would be expected to income and employment in Alternatives 1 and 2. Under Alternative 2-Modified, allotments with recurring conflicts that cannot be resolved through modification of grazing practices could have some additional effects on livestock grazing income and employment if they are retired, as described in Guideline 2. This applies to cattle allotments inside the PCA and both sheep and cattle outside the PCA. Retirement of grazing allotments would be with willing permittees only. It is difficult to predict whether these allotments would be closed because the direction recommends the retirement of the allotment if the permittee is willing, and does not recommend a mandatory closure. If the permittee is unwilling to retire the allotment, grazing would continue. Five cattle allotments have recurring conflicts with grizzly bears, with three of those allotments located inside the PCA. If those three allotments (or the portions with recurring conflicts) were retired (with about 1,600 AMs), a reduction of about one job and \$20,000 in labor income would result. Only one existing sheep allotment outside the PCA has been documented with recurring conflicts. The retirement of this 3,000 plus AMs allotment would result in a reduction of about one job and \$5,000 in labor income.

Employment and income related to timber harvesting would likely be nearly the same in Alternatives 1, 2, and 2-Modified. Alternatives 2 and 2-Modified may affect the ability to accomplish two or more projects in a subunit and may limit the size of projects.

Because of the protections by statutory rights and the 1872 General Mining Law, employment and income resulting from hardrock minerals programs are not expected to change, although Alternatives 2 and 2-Modified would add additional costs for mitigation. The additional costs may preclude some small miners from developing their claims.

Because the only leases in the PCA are suspended, no change is expected between Alternatives 1, 2, and 2-Modified in relation to income and employment associated with oil and gas leasing within the next decade. There would be no change in gas leasing rental or bonus income within the next decade. Alternatives 2 and 2-Modified would likely result in reduced income and employment because of restrictions on full field development. If leasing would occur and full field development were requested, standards on developed site and secure habitat would apply. Permanent mitigation would be needed for full field development. If permanent mitigation were not available to meet the secure habitat and developed sites standards, full field development would be delayed until mitigation could occur. Seismic and exploratory wells could still occur because of the temporary nature of those activities, although exploratory wells would require mitigation if secure habitat were reduced.

Effects on employment and income related to recreation and tourism may vary between Alternatives 1 and Alternatives 2 and 2-Modified. For Alternative 1, very little or no site development has occurred in the past decade within the recovery zone, even though site development could occur in MS 2 and MS 3. This would represent a trend for assuming that site development or expansion would be nearly the same in Alternative 1 as for Alternative 2, which would maintain the number and capacity of developed sites at or below 1998 levels. With no increase in developed sites allowed in Alternatives 2 and 2-Modified without mitigation and, based on past trends, little or no site expansion in Alternative 1, the effects of these

alternatives would be the nearly the same on income and employment related to recreation and tourism.

For Alternatives 2 and 2-Modified, increased demand for recreation in developed sites would not be accommodated by increasing capacity unless capacity is reduced in other locations and shifted within a subunit. Private lands may be developed in response to increasing demand. Development on private land to support recreation and tourism activities would result in greater income and employment than if the development occurred on National Forest System lands. Currently, non-local overnight use results in nearly double the income and employment when compared with that same type of use on-forest (Figure 112).

Effects of Alternative 3 on the Economic Environment

Effects on income and employment are greater in Alternative 3 than in Alternatives 1, 2, and 2-Modified, especially related to timber harvesting and oil and gas leasing activities.

Alternative 3 would have a direct and immediate impact to the existing sheep operators holding grazing permits within the PCA for four allotments, and the cattle operators that graze on allotments with historic recurring livestock/grizzly bear conflicts within the PCA (portions of three allotments). Alternative 3 would eliminate the four remaining sheep allotments and portions of three cattle allotments within three years, resulting in the loss of about three jobs and the associated incomes. Any loss of grazing AMs in excess of 10 percent could have a significant economic impact to the livestock operator, to the point of making use of the allotment or even the total operation unprofitable. Entire removal of the cattle grazing permit may affect overall ranch viability and may result in the additional reduction of AMs if substitute grazing areas were not available.

Income and employment related to timber harvesting would be reduced anywhere from 34 to 200 jobs due to about a 10 percent reduction in access to suitable acres for timber harvesting throughout all six GYA national forests. The economic effects from timber harvesting would be greatly affected by how much timber harvest substitution occurs on both National Forest System lands and corporate/private lands, and by what roadless policy is in place. Timber harvesting from 2000 to 2002 has been low relative to the past 15 years; those jobs may have been lost possibly due to roadless policies, use of imported lumber, and other factors that have resulted in less timber harvesting in the last few years, as evidenced by mill closures in areas adjacent to the GYA. The low end of effects could result in the loss of over 30 jobs; at the high end, up to 200 jobs could be lost or not created in Alternative 3.

Because of the protections by statutory rights and the 1872 General Mining Law, employment and income resulting from hardrock minerals programs are not expected to change. Alternative 3 may add some costs for mitigation, similar to Alternative 2.

Because Alternative 3 would preclude any new oil and gas leasing, any economic benefits from the new oil and gas leasing would be foregone. This includes rent from oil and gas leasing and income, employment, and returns to the U.S. Treasury if field development would occur. Existing leases would continue. Development proposed on existing leases may be delayed while mitigations were put in place. Because the only leases in the PCA are suspended, there would be no immediate economic effects; economic effects would occur through foregone oil and gas leasing and development opportunities.

Increased demand for recreation in developed sites would not be accommodated by increased capacity. Private lands may be developed in response to increasing demand. Development on private land to support recreation and tourism activities would result in greater income and employment than if the development occurred on National Forest System lands. Currently, non-local overnight use results in nearly double the income and employment when compared with that same type of use on-forest (Figure 112).

Effects of Alternative 4 on the Economic Environment

Effects on income and employment are the greatest in Alternative 4 for livestock, timber harvesting, oil and gas, and recreation activities.

For effects on livestock grazing, the difference between Alternative 4 and Alternative 3 is the extent of the impact. Alternative 3 applies only to those allotments or parts of allotments within the PCA. Alternative 4 would apply to an expanded area and would have a direct and immediate impact to the 77 existing allotments and associated sheep operators holding grazing permits within Alternative 4 and at least the five cattle allotments and operators that graze on allotments with historic recurring grizzly bear/livestock conflicts within Alternative 4. Alternative 4 would require the removal of cattle from those allotments with recurring grizzly bear/livestock conflicts. This removal would result in a reduction in either livestock numbers or season of use, equivalent to the capacity of the affected pasture. The loss of this grazing capacity may require that the remainder of an affected allotment be combined with an adjacent allotment to maintain an economically viable livestock operation. Closure of the allotment could result if the remainder of an affected allotment is not large enough to be economically viable and it is not possible to combine it with an adjacent allotment. Any loss of grazing AMs in excess of 10 percent could have a significant economic impact to the livestock operator, to the point of making use of the allotment or even the total operation unprofitable.

Related to all grazing, Alternative 4 would reduce employment by approximately 75 jobs due to closure of sheep allotments and elimination of cattle grazing allotments that have recurring conflicts. Entire removal of these allotments may affect overall ranch viability and may result in the additional reduction of AMs if substitute grazing areas were not available.

The implementation of the food storage orders forestwide may slightly increase livestock operation costs. Because this alternative allows for greater opportunity for grizzly bears to occupy habitats outside the PCA, operators may incur increased costs due to livestock depredation.

Income and employment related to timber harvesting would be reduced anywhere from 98 to 575 jobs due to about a one-third reduction in access to suitable acres for timber harvesting throughout all six GYA national forests. The economic effects from timber harvesting would be greatly affected by how much timber harvest substitution occurs on both National Forest System land and corporate/private land, by what roadless policies were in place, housing starts, the exchange rate on the dollar, e.g., lumber imported from Canada accounted for one-third of the U.S. lumber market in 2002 (Buckles et al. 2002), and other factors. Timber harvesting from 2000 to 2002 has been low relative to the past 15 years; those jobs may have been lost possibly due to roadless policies and other factors that have resulted in less timber harvesting in the last few years, as evidenced by six mill closures in areas adjacent to the GYA, such as in Belgrade, MT, Newcastle and Saratoga, WY, and Rexburg, ID (Spelter 2002). The low end of effects could result in the loss of nearly 100 jobs; at the high end, up to 575 jobs could be lost or not created in Alternative 4.

Because of the protections by statutory rights and the 1872 General Mining Law, employment and income resulting from hardrock minerals programs are not expected to change. Alternative 4 may add some costs for mitigation, similar to Alternative 2.

Because Alternative 4 would preclude any oil and gas leases in a larger area, additional economic benefits from oil and gas leasing would be foregone, including rent from oil and gas leasing and income, employment, and returns to the U.S. Treasury if field development would occur. Development would be precluded on approximately 1.5 million additional acres. While there are no full production oil and gas developments within Alternative 4, Alternative 4 does encompass some areas that have a high potential for oil and gas development. It is difficult to estimate a number of wells eliminated by Alternative 4 since a low number of wells has been drilled in the GYA, but several wells could be precluded by this alternative. This could be anywhere from no effects to up to several wells foregone, resulting in about 12 jobs and \$390,841 in annual income per well.

For Alternative 4, increased demand for recreation in developed sites would not be accommodated by increasing capacity. This is a similar effect in Alternative 3, but Alternative 4 would affect a larger area. Private land may be developed to respond to the increased demand. Development on private land to support recreation and tourism activities may result in greater income and employment than if the development would occur on National Forest System lands. Currently, non-local overnight use results in nearly double the income and employment when compared with that same type of use on-forest (Figure 112). Lack of development to increase recreation capacity over a larger area than Alternatives 2 and 3 may result in reduced visitation in the next decade because the national forests could not accommodate the increased use projected for the GYA (section 3.9.3). Developed recreation sites unique to national forests, such as downhill skiing areas, would not expand and likely could not be replaced by developments on private land. This lost opportunity for expansion would result in foregone opportunities for future income and employment.

Employment and income associated with dispersed recreation use may be affected if limits on parking and other developed sites used to support dispersed recreation are limited. These limits would not allow any increase in use if these areas were at capacity.

Overall, Alternative 4 would have the most economic impact of any alternative, either through the loss of jobs and income associated with the reduction in current production of outputs, or through the jobs and income foregone by precluding oil and gas development and limits on recreational site capacity. Anywhere from 38 to 204 jobs and from \$8.6 million to \$23.2 million in labor income would be reduced by reductions in the livestock grazing and timber harvesting programs. Jobs and income foregone from oil and gas leasing could be significant. Effects on recreation and tourism would vary.

Budget to Implement

Costs were developed for monitoring, implementation, restricting road access, law enforcement, and sanitation.

Additional implementation costs would occur for Alternatives 3 and 4, where roads are either permanently restricted or decommissioned to increase secure habitat to 70 percent and to improve secure habitat in inventoried roadless areas. Permanent road restrictions are less expensive to implement than road decommissioning. Complete road decommissioning, which includes recontouring and obliteration, costs \$1,000 to \$5,000 per mile. A permanent road closure costs \$200 to \$1,400 for installation of a barrier at the entrance to the road. For the purposes of this analysis, it is assumed that only barriers would be installed in order to meet the objective of road closures implemented within five years to increase secure habitat. Road recontouring and obliteration could occur later; it should be noted that these actions would cause some temporary increases in sedimentation due to culvert removal and recontouring of roads. Costs would be much higher than installing a barrier, but maintenance costs would be reduced over time.

For road restrictions, the average segment length of road to be closed is estimated to be five miles. One barrier would be needed for each segment, with a one-time cost of \$800 per barrier. The 487 miles of road to be closed in Alternative 3 would result in about 97 barriers; the 1,850 miles of road to be closed in Alternative 4 would result in 380 barriers.

Sanitation costs include installation and maintenance of such items as bear boxes, bear poles, and bear resistant dumpsters.

Monitoring costs are the nearly the same for Alternatives 1, 2, and 3, slightly higher for Alternative 2-Modified, and much higher for Alternative 4. Alternative 2-Modified has added monitoring items that require monitoring changes in secure habitat, recurring conflicts on livestock grazing allotments, and whitebark pine occurrence, productivity, and health. All these added monitoring items would occur both inside and outside the PCA in areas that are biologically suitable and socially acceptable for grizzly bear occupancy. Alternative 4 would require additional costs for monitoring changes in motorized access route density and habitat

effectiveness outside the PCA within the boundary for Alternative 4. GIS databases would have to be created to evaluate these criteria outside the PCA.

For Alternatives 2, 2-Modified, 3, and 4, cost saving would be achieved through reduced consultation and less preparation and analysis time for biological assessments, although analysis of effects and biological evaluations would still occur because the grizzly bear would be a sensitive species. Figure 116 displays costs by alternative. Alternatives 1 and 2 would have the lowest annual cost and no initial cost of implementation; Alternative 4 would have the highest annual cost and cost of implementation due to the increased area of application of habitat standards and sanitation requirements.

Figure 116. Annual Forest Service monitoring costs and cost saving by alternative (thousands of dollars).

	Alternative 1	Alternative 2	Alternative 2-Modified	Alternative 3	Alternative 4
Total for modeling (includes secure habitat, motorized access route and habitat effectiveness monitoring)	96.5	96.5	126.5	96.5	300.0
Monitoring livestock conflicts and developed sites	10.0	10.0	15.0	15.0	23.0
Spring carcass surveys	4.0	4.0	4.0	4.0	4.0
Whitebark pine cone transects and other whitebark pine monitoring	10.0	10.0	30.0	10.0	10.0
Annual monitoring report	1.0	5.0	5.0	5.0	5.0
Food storage infrastructure	98.0	98.0	98.0	98.0	98.0
Human/bear conflict mgmt/sanitation	215.0	215.0	215.0	215.0	330.0
Outreach and education	125.0	125.0	125.0	125.0	125.0
Average annual budget	559.5	563.5	618.5	568.5	895.0
Annual savings	0.0	60.0	60.0	60.0	60.0
Annual net costs	559.5	503.5	558.5	508.5	835.0

Figure 117. One-time implementation Forest Service costs by alternative (thousands of dollars).

	Alternative 1	Alternative 2	Alternative 2 - Modified	Alternative 3	Alternative 4
Road restriction ¹ (part of decommissioning)	0.0	0.0	0.0	78.0	304.0
Sanitation (installation of poles, containers, bear boxes, signage, and garbage facilities)	362.5	362.5	362.5	362.5	600.0
Update of Access and CEM models and associated databases	355.0	355.0	445.0	355.0	750.0
Total	717.5	717.5	807.5	795.5	1,654.0

¹It is assumed road recontouring and obliteration could occur later. Total costs for Alternatives 3 and 4 to complete road recontouring and obliteration would range from \$1.46 million in Alternative 3 to \$5.55 million in Alternative 4, assuming a cost of \$3,000 per mile. It is also assumed the one-time costs could take place over a one- to five-year period.

Under all alternatives, the Forest Service would continue to work cooperatively with other agencies in the management of the grizzly bear and grizzly bear habitat. Total costs for implementing Alternative 2 are described in the Conservation Strategy, as the three states incur costs and benefits for state management of the grizzly bear.

All action alternatives incorporate this adaptive management process to ensure continued coordination in sustaining the recovered grizzly bear population. Alternative 2-Modified goes beyond the direction in the Conservation Strategy by providing guidance for coordination with states in implementing state management plans for grizzly bear occupancy outside the PCA.

Participation in YGCC activities would include identifying management, research, and financial needs to successfully implement the Conservation Strategy

3.15 Civil Rights and Environmental Justice (Executive Order 12898)

Affected Environment

Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies (Executive Order 12898). Fair treatment means that no group of people, including a racial, ethnic, or socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies. Meaningful involvement means that potentially affected community residents have an appropriate opportunity to participate in decisions about a proposed activity and that the concerns of the participants will be considered in the decision making process.

In particular, this analysis examines:

- Consultation with tribes with treaty rights within the analysis area and the impacts of this proposal upon tribal members
- Low-income populations and minority populations in the analysis area

See the discussions on treaty and trust responsibilities in section 3.13. Tribes were notified of this proposal during the scoping process and the DEIS comment period.

The 2000 census for the 21-county analysis area was used to identify minority populations and populations below the poverty level (Environmental Justice Enviromapping). Most counties have less than 20 percent of their populations at or below the poverty level. Madison County, Idaho (Rexburg) is the exception with 30 to 40 percent of the population below the poverty level. Most counties have less than 10 percent as a minority population. Fremont and Hot Springs Counties in Wyoming have 10 to 30 percent of their population as a minority (these counties include the Wind River Reservation). In Idaho, Butte, Fremont, and Teton Counties are composed of 10 to 30 percent minorities with Clark County (less than 1,000 in population) showing a 30 to 40 percent minority population.

Effects on Civil Rights and Environmental Justice

Minority and low-income populations would not be disproportionately impacted under any alternative. The forest plans, inclusive of this proposal, would continue to honor treaty rights such as hunting, fishing, and gathering. Low-income populations would have the same access and opportunities for using the GYA national forests as other populations. Notice of this proposal was provided to local county populations through the 45-day scoping period in 2003 and in 2004 during the 90-day comment period on the DEIS. Tribes were provided with notice of the proposal, and consultation was conducted by the national forests.

No civil rights effects associated with age, race, creed, color, national origin, or gender have been identified. Public input from all persons and groups, regardless of age, race, income status or other social and economic characteristics has been considered.

3.16 Cumulative Effects

Introduction

The following discussion of cumulative effects is a synopsis and continuation of the analysis of effects previously presented in this chapter. Cumulative effects are those effects that, when viewed with past, other present, and reasonably foreseeable actions, may have cumulative impacts and should be discussed in the same environmental analysis.

Section 3.16 Changes between Draft and Final EIS

In this section, the following additions and updates were made:

- Evaluation of the cumulative effects related to private land development on grizzly bears
- Evaluation of the cumulative effects of commercial livestock grazing on grizzly bears
- Evaluation of the cumulative effects on grizzly bears from land management activities, including recreation, logging, and oil and gas development
- Cumulative effects on grizzly bears from wolves
- Evaluation of the cumulative effects on grizzly bears as related to the uncertainty of the science of grizzly bear habitat, population, global warming, and genetics

3.16.1 Cumulative Effects on the Grizzly Bear

Cumulative Effects on Grizzly Bears from Hunting

Limited hunting of grizzly bears under the jurisdiction of state wildlife management agencies may occur when the bear is delisted. Harvest levels would follow state management plans and would adhere to mortality limits identified in the Conservation Strategy, which are designed to sustain the recovered grizzly bear population.

Hunting is the primary method for regulating wild ungulate numbers in the GYA. Since elk calves and winter-killed elk and other ungulates are one of the four major foods for grizzly bears (section 3.3.1), hunting can reduce the availability of this food source. With few exceptions, all GYA elk herds are above population objectives (Daryl Meints personal communication, Tom

Lemke personal communication, Doug Brimeyer, USDA Forest Service 2005c). Primarily due to drought, populations in several herd units have been on a downward trend. On the other hand, hunting of ungulates can have the indirect but cumulative effect of providing additional attractants and foods to the bear, particularly during the time of year that bears are actively searching for food stores before hibernation. Risks to bears and hunters would continue as they use the same habitats. Restrictions on hunting in grizzly bear habitat would have both favorable and detrimental effects to the bear. Restrictions could result in fewer hunter-related grizzly bear mortalities, but also could reduce the availability of carcasses and gut piles for grizzly bears (Haroldson et al. 2004).

Bear baiting for black bear hunting outside the PCA could have detrimental impacts to grizzly bears, particularly as populations increase and expand outside the PCA. Grizzly bears attracted to black bear bait sites could be mistakenly killed. Depending on the bait used, some grizzly bears could learn to associate humans with food and become human food-conditioned. Human food-conditioned bears have a higher potential for conflicts with humans, often resulting in mortality for those bears. Alternative 4 would increase efforts to eliminate black bear baiting in areas occupied by grizzly bears.

Cumulative Effects on Grizzly Bears from Wolves

When gray wolves were reintroduced into the GYA from 1995 to 1996 it was predicted that wolves could reduce the number of winter-killed ungulate carcasses available to bears, that adult grizzly bears would likely usurp wolf-killed ungulate carcasses from wolves, and that wolves may kill grizzly bear cubs. To date there have been only two documented incidents of wolves killing grizzly bear cubs (Gunther and Smith 2005). The only other grizzly bear mortality related to wolves was a yearling female grizzly bear that was accidentally killed in a trapping operation for wolves (Haroldson and Frey 2003). Smith (2005) reported numerous instances of grizzly bears taking over wolf-killed ungulate carcasses and suggests that wolves are beneficial to bears as they provide carcasses for them to scavenge. There is little evidence that wolves are reducing the availability of winter-killed ungulates for grizzly bears.

A study in progress of the Yellowstone northern range elk herd and the survival of elk calves (Barber et al. 2005) determined that wolves were having less of an impact on elk calf survival than bears. Bears accounted for approximately 55 to 60 percent of all deaths for all tagged elk calves during the first 30 days of life, while coyotes and wolves each accounted for approximately 10 to 15 percent of tagged calf deaths. Wolves might be expected to be a significant factor in limiting recruitment of elk calves into the Yellowstone population if much of wolf predation is added to other mortality sources (Barber et al. 2005).

Cumulative Effects on Grizzly Bears Related to other Planning and Rule Making Efforts

Cumulatively, the lynx amendment, Gallatin National Forest travel planning effort, Yellowstone National Park snowmobile study, and other related efforts described in section 1.5 would generally improve habitat conditions for the grizzly bear.

The Travel Management Final Rule announced in November 2005 (USDA Forest Service 2005e) requires each national forest to identify and designate those roads, trails, and areas that are open to motor vehicle use. Four of the six GYA national forests already restrict motorized travel to designated routes. Moving to designated routes would have no effect or a beneficial effect if existing routes remain or are reduced. If the few remaining open motorized areas are limited to designated routes, this could increase secure habitat for the bear.

Based on direction in the National Fire Plan, the Healthy Forests Initiative, and the Healthy Forests Restoration Act of 2003, the Forest Service has initiated proposals for maintaining or restoring healthy forests and lands by reducing heavy fuel loading and insect and disease risks. Management of vegetation and reduction of fuel loadings is generally emphasized around structures, called the wildland urban interface. This initiative has the potential to increase timber harvest over past levels in some areas. All projects would be subject to the habitat standards identified for each alternative. Because most harvest activities occur near structures, which is not

considered important grizzly bear habitat, impacts to the bear are minimal. Further, standards for grizzly bear cover were not developed for the Conservation Strategy or for this proposal because changes in the distribution and quantity and quality of cover are not necessarily detrimental to grizzly bears.

The National Elk Refuge and Grand Teton National Park draft EIS and Elk Management Plan (USDI FWS NPS 2005) described in section 1.5 could result in a reduction in the numbers of elk and bison available to grizzly bears. In Yellowstone National Park from March through May, ungulate carrion (mostly elk and bison) is an important food source (Mattson 1997). This is not currently the case in Grand Teton National Park. Elk and bison in the Jackson herds have a low winter mortality rate due to the supplemental feeding program on the National Elk Refuge and in the Gros Ventre Range. Grizzly bears in Grand Teton National Park do not appear to depend as heavily on meat in the early spring compared to grizzlies to the north in Yellowstone National Park. Similarly, grizzly bears have not been documented preying on elk calves in Grand Teton National Park, although it likely occurs (State of Montana 2000).

Since 2000, the Forest Service has had various roadless management policies in place. In 2005, the Department of Agriculture announced the adoption of a Final Rule that established a process for governors to propose locally supported regulations for conserving inventoried roadless areas within their states (USDA Forest Service 2005f). These areas contain a high percentage of secure grizzly bear habitat. Involvement by the governors in this process could affect secure habitat outside the PCA.

The Forest Service Roads Analysis process (USDA Forest Service 1999a) requires that the Forest Service examine the road network and give priority to reconstructing and maintaining needed roads and decommissioning unneeded roads. This policy is complementary to access management objectives in grizzly bear habitat and will be a tool for implementing access management decisions.

Cumulative Effects on Grizzly Bears Related to Private Land Development

Private lands inside and outside the PCA have generally not been managed for grizzly bear occupancy, although bears have occupied some areas. Management of human foods and other attractants on private lands is an ongoing problem. Approximately 45 percent of the recorded grizzly bear/human and grizzly bear/livestock conflicts from 1992 through 2004 occurred on private lands (Figure 7). Only about 2 percent of the PCA is in private ownership, but 20 percent of all known and human-caused mortality between 1983 and 2002 occurred on private lands inside the PCA. Outside the PCA, 62 percent of the mortality occurred on private lands. Private land outside the PCA constitutes about 23 percent of the current grizzly bear distribution (Schwartz et al. 2005c). Even with this level of conflict and mortality on private lands, the grizzly bear population has continued to grow and reach recovery levels. Grizzly bear mortalities occurring on private lands would be monitored by the respective state wildlife management agencies and applied toward the total allowable mortality limits.

Increasing rural settlement and subdivisions on private lands would occur under any alternative. These changes could adversely affect grizzly bear use of habitat and movement between habitats. New developments would increase the availability of attractants and the potential for grizzly bear/human conflicts and mortality. Bear habituation to humans could become more prevalent with increasing development on private lands; habituation poses risks to bears and to public safety. Private land development could also be influenced by national forest activities and conservation efforts on public lands. Proper management of attractants on private lands adjacent to public lands managed for the grizzly bear occupancy is key to the long-term persistence of the grizzly bear in the GYA.

Management practices on state, corporate, and small private lands may present barriers or pose risks to grizzly bear movements between the GYA and northern ecosystems. Changes in land settlement and increased highway developments will continue to affect the bear. The IGBC has

established formal technical groups to address connectivity issues throughout the Northern Rockies.

The Conservation Strategy recognizes that “federal land management and state wildlife management agencies have no direct management authority over private lands and do not have the ability to respond to all private land development by management actions on public lands. As private lands are developed and as secure habitat on private lands declines, state and federal agencies will work together to explore options that address impacts from private land development.” The Conservation Strategy includes direction to monitor private land status and condition. The states have agreed to assist private non-profits and other entities to categorize and prioritize potential lands suitable for permanent conservation. One county commissioner from Montana, one from Wyoming, and one from Idaho represent GYA counties on the YES and the YGCC that would coordinate grizzly bear management under the Conservation Strategy. Sanitation working groups have been formed for each state that include a county commissioner, committee members from the state wildlife management agencies, and the Forest Service, primarily to develop programs for resolving grizzly bear/human conflicts in the private/public land interface.

Although some ranchlands are being subdivided for residential use, others are kept intact (or even enlarged) when purchased by non-traditional owners often more interested in their amenity values rather than livestock production or subdividing. Not all private lands are a detriment to bears. Some private lands provide a significant contribution by accommodating bear movements and presence.

According to a study on ranchland dynamics in the GYA, ranchland is in an unprecedented state of flux (Travis et al. 2002). Large sections of GYA ranchlands are already or soon will be in the hands of relatively new owners and many of these new owners place a higher value on amenities and investment than on livestock production. Amenity ranch sales over the last decade have affected the broader ranchland market, with prices well above agricultural value. More than 500,000 acres changed hands in five GYA counties that were studied between 1990 and 2001, with the vast majority of the sales going to two classes of buyers: traditional ranchers (34 percent of the acreage) and amenity buyers (27 percent of the acreage). Both ranch subdivision and agglomeration are underway in the GYA. The study concludes that unless ranchlands are placed under some form of conservation easements, the current transition probably implies a long period of instability in ranchland status and uncertainty over the role ranches play in preserving habitat in the future.

Several non-governmental organizations have emphasized the GYA in their efforts to protect land. Conservation easements, land acquisition, stewardship agreements, and grassbanks have been used in a science-based, non-confrontational approach with landowners to protect important lands in the GYA. As of July 2004, over 450,000 acres of private lands in the GYA (about 5 percent of the private lands in the GYA) have been conserved with easements through such organizations as The Nature Conservancy, The Trust for Public Lands, The Conservation Fund, Rocky Mountain Elk Foundation, Montana Land Reliance, Vital Ground, Teton Regional Land Trust, Jackson Hole Land Trust, and Gallatin Valley Land Trust (Copeland 2004). These organizations continue to actively work in the GYA and are protecting private lands with conservation easements at the rate of 25,000 to 45,000 acres per year.

Cumulative Effects on Grizzly Bears from Commercial Livestock Grazing

All alternatives provide various mechanisms for retirement or closure of allotments that experience recurring conflicts between grizzly bears and livestock, as discussed in section 3.3.5. Minimizing grizzly bear/livestock conflicts is integral to all alternatives. Under all alternatives, commercial livestock grazing would continue at some level on all the GYA national forests.

Livestock grazing could impact bison and elk populations and the availability of these wild ungulates to foraging grizzly bears. Ungulates (primarily elk calves and winter-killed elk, bison, and other ungulates) are one of the four major foods for grizzly bears in the GYA (section 3.3.1).

Livestock grazing on National Forest System lands and particularly on private lands has the potential to impact bison populations. Almost the entire Yellowstone bison population's summer range is in Grand Teton and Yellowstone National Parks. A few bison summer on the North Fork of the Shoshone River on the Shoshone National Forest in the absence of cattle grazing. Bison leaving Yellowstone National Park, primarily in winter, are subject to hazing and removal to avoid brucellosis transmission to domestic livestock grazing on private and public lands (State of Montana 2000). Brucellosis is a bacterial-caused disease of the reproductive tract that is common in elk and bison in the GYA. The Interagency Bison Management Plan FEIS (State of Montana 2000) determined that the bison population would likely be maintained at about 3,000 animals, which is the number above where bison are most likely to respond to heavy snow or ice by attempting to migrate to the lower elevation lands outside the Park in the western and northern boundary areas. Severe winters could result in more bison leaving the Park and subject to removal. Grizzly bears that den in the Pelican and Hayden Valleys in the Park depend on bison carrion and are most likely to be affected by changes in bison populations.

Elk also have the potential to transmit brucellosis to domestic livestock. Concerns are primarily associated with elk and livestock mingling on cattle and elk winter range on private lands. Wyoming lost its brucellosis-free status in 2004 where cattle in close proximity to an elk feeding ground contracted brucellosis. A pilot project is underway to trap and remove brucellosis infected female elk at a feeding ground in Sublette County, Wyoming. This could result in reduced elk numbers for grizzly bears if the program proves successful and is expanded to other feed grounds. Montana and Idaho do not have winter feed grounds for elk.

There is a potential for brucellosis transmission from elk to cattle on Forest Service and BLM summer grazing allotments where elk parturition and cattle turnout dates overlap. Mingling of elk and cattle on identified allotments on National Forest System lands in Wyoming has not been documented (Dean et al. 2004).

Livestock grazing on National Forest System lands also could negatively influence elk populations in the GYA through direct competition for forage and space. Dietary overlap and feeding habitat overlap between domestic livestock and elk has been studied extensively in many areas throughout the Rocky Mountains (Tortenson et al. 2006, Stewart K.M. 2002, Sheehy and Vavra 1996, Yeo et al. 1993, Clark et al 2000, Skovlin 1983). In general, elk and cattle share similar preferences for forage, but habitat overlap both in time and space varies depending on many factors such as timing, location, pattern and intensity of livestock grazing, livestock stocking rates, slope, elevation, tree cover, winter severity, snow depths, and human activity associated with livestock grazing. Whether foraging relationships between elk and cattle are complementary, competitive, or benign depends on site-specific conditions. Summer range and forage for elk in the GYA are not limited and livestock grazing would not significantly affect summer forage availability for elk. A large portion of the elk population in the GYA summers on NPS or National Forest System lands in the absence of domestic livestock grazing.

The greatest potential for impacts to elk populations from cattle grazing in the GYA likely occurs on elk winter ranges grazed by cattle during the summer and fall. Current research suggests that cattle grazing on elk winter range should be managed carefully to avoid negative impacts to wintering elk populations (Yeo et al. 1993, Clark et al. 2000, Skovlin 1983). In their study in Wyoming, Tortenson et al. (2006) noted that cattle use likely benefits elk when forage utilization by cattle on elk winter range does not exceed moderate levels. While competition for space and forage between elk and cattle has been well researched and documented, researchers have not been able to extrapolate the direct effects to local elk numbers due to the complex interactions affecting elk population levels.

Wildlife forage needs are considered in all decisions regarding domestic livestock grazing on National Forest System lands. Goals and/or objectives are included in forest plans or through other mechanisms such as a memorandum of understanding to cooperate with state wildlife agencies in meeting their wildlife population objectives. Total ungulate use, by both wildlife and

livestock, must be kept within the carrying capacity of the suitable available habitat. In most instances, forage allocation for domestic livestock is consistent with the need to meet the population objectives established by the state wildlife agencies. Allotment management plans, required for all domestic livestock allotments on National Forest System lands, recognize the importance of winter range to elk and other ungulates. With few exceptions, elk populations in the GYA in Idaho, Montana, and Wyoming are at or above objectives set by the respective state wildlife management agencies (Daryl Meints personal communication, Tom Lemke personal communication, Doug Brimeyer, USDA Forest Service 2005c). Primarily due to drought, populations in several herd units have been on a downward trend.

National forests in the GYA are moving toward an adaptive management process for livestock management decisions on National Forest System lands. The approach is to make better use of monitoring information to determine if management changes are needed and how to make those changes. Resource objectives are established and allowable use standards (including riparian stubble height and riparian shrub allowable use standards) are developed and monitored. If monitoring determines that the desired condition is not being met then management changes are considered (Quimby 2001). Allowable use standards and stubble height requirements are becoming standard practice to maintain riparian and winter range conditions.

Yeo et al. (1993) noted that elk grazed in close proximity to cattle when humans were not present and that human activities associated with cattle grazing caused shifts in habitat use by elk. The secure habitat and developed site standards under all action alternatives have the potential to restrict or reduce human uses in habitats used by elk, reducing the potential for disturbance or displacement caused by human presence and associated activities. The livestock standard under all action alternatives and the livestock grazing guideline under Alternative 2-Modified reduce or eliminate some domestic livestock grazing, reducing competition and disturbance from domestic livestock and associated human activities during the grazing season on National Forest System lands. The standard for maintaining critical food sources under Alternatives 3 and 4 and the guideline for maintaining the productivity of the four key foods for grizzly bears under Alternative 2-Modified have the potential to improve some elk and other big game winter habitats.

Domestic livestock may also compete directly for forage with grizzly bears. Succulent vegetation is the preferred diet of domestic sheep and also important to grizzly bears. The greatest potential for food competition between bears and domestic sheep is in the spring and early summer when few other foods are available to grizzly bears. Interactions between sheep and bears usually result in conflicts, which is a more serious problem than food competition (Jorgensen 1983). There is also likely some competition for succulent forage between cattle and grizzly bears. As with domestic sheep, the bigger issue is associated with grizzly bears that kill cattle. Grizzly bears that kill domestic livestock are often removed by state wildlife management agencies. Inside the PCA, all sheep allotments would either be phased out or closed in all action alternatives. Alternative 2-Modified and Alternative 4 provide for the retirement or closure of allotments outside the PCA that experience recurring conflicts with grizzly bears. Alternative 2-Modified provides for the retirement under the condition of willing permittees as opportunities arise.

While grizzly bear/livestock conflicts are a major issue in long-term conservation of the grizzly bear, the Yellowstone grizzly bear population has increased and expanded its range with existing levels of livestock grazing on National Forest System and private lands. Forest plan direction and state best management practices provide the framework for proper grazing practices to minimize impacts on forage and sustain other resource values, including wild ungulates. State and federal coordination will continue to address concerns related to brucellosis transmission between domestic and wild ungulates.

Cumulative Effects on Grizzly Bears from Land Management Activities, including Recreation, Logging, and Oil and Gas Development

Under Alternatives 2 and 2-Modified, all management activities inside the PCA are guided by the habitat standards that limit changes to developed sites and secure habitat. Logging and recreation activities would continue at 1998 levels. Oil and gas development is unlikely inside the PCA due to the low amount of availability and the mitigation required under the habitat standards.

Alternatives 3 and 4 would reduce levels of recreation and logging below 1998 levels and oil and gas development would be prohibited. Under Alternative 1 logging and oil and gas development and the number of developed sites inside the PCA could increase above 1998 levels, primarily in Management Situations 2 and 3.

Under Alternatives 1, 2, 2-Modified, and 3, existing management area direction in the Alternative 4 area outside the PCA would be the same way these areas have been managed for the last 17 years. Under Alternative 1, with the bear as a listed species, there are no direct requirements in forest plans for habitat protection outside the PCA. Project consultation with USFWS could result in some habitat mitigation or protections of individual bears. In most instances, habitats outside the PCA would be managed similarly under these alternatives. Approximately 72 percent (4.3 million acres) of the almost six million acre area is secure habitat. Seventy-one percent of that secure habitat is long-term secure. Generally, new motorized access routes would not be constructed in areas defined as long-term secure habitat. The other 29 percent (1.2 million acres) of the secure habitat would be approximately three million acres more secure habitat and over two million acres more long-term secure habitat than that being used by bears outside the PCA from 1990 through 2004.

Under Alternatives 1, 2, 2-Modified, and 3, most of the 1.2 million acres of short-term secure habitat in this area outside the PCA would likely remain secure. Some secure habitat may be lost, but if past trends are any indication, road miles are expected to decline and secure habitat to increase. In the past 17 years, over 1,400 miles of road have been decommissioned in the GYA national forests, with less than 400 miles of road being constructed, a net reduction of over 1,000 miles of road. In all areas outside the PCA the net reduction in miles of road has contributed almost 3 percent to the current level of secure habitat. Similarly, the average acres treated per year by timber harvest outside the PCA have been on a downward trend. Road construction and associated timber harvest have been limited in recent years in part due to the roadless policies in place from 2000 through 2005. Most of the short-term secure habitat is managed under direction in existing forest plans that limits the development of new motorized access routes. This direction will continue. Approximately 37 percent of the short-term secure habitat is open to leasing for oil and gas where surface occupancy is allowed. Much of this area has a very low to moderate potential for occurrence. There are only eight active leases on approximately 7,000 acres in the Alternative 4 area outside the PCA (section 3.12.2 and Figure 80). Under these alternatives, the several million acres of secure habitat in the Alternative 4 area outside the PCA that is not yet occupied by grizzly bears could allow for range expansion to help maintain grizzly numbers if carrying capacity declines in other areas of the GYA.

Outside the PCA in the Alternative 4 area these management activities under Alternative 4 would be reduced below current levels and the amount of long-term secure habitat increased. Alternative 4 would provide protection and enhancement direction to more habitats for bears, increasing connectivity options between important habitats inside the GYA and possibly increasing the potential for connectivity to other ecosystems. Should the long-term availability of important foods be reduced, the carrying capacity of the GYA for grizzly bears would decline. The additional secure habitat under Alternative 4 might allow the GYA to support bears throughout a larger area than the other alternatives. Under all alternatives, there are wilderness areas, other management prescriptions, and inventoried roadless areas that would provide additional secure habitat outside the PCA. Existing food storage regulations would remain under all alternatives and be expanded forestwide under Alternative 4.

As discussed in section 3.13, large-scale changes in land management such as the closure of 1,900 miles of motorized routes in Alternative 4 would have significant impacts upon rural communities and motorized users. These changes can stress the public's tolerance for accommodating grizzly bear expansion and occupation. Some of these management changes have the potential to trigger a backlash effect. The alternatives that result in the greatest restriction of public access may result in a higher risk of illegal shooting mortalities. Similarly, management of grizzly bears under the ESA generates a similar perception of "locking up public lands." Whether the increased risk of backlash outweighs the potential benefits to bears from the various alternatives is unknown, because this relationship has not been scientifically documented.

Fuels treatments, under the National Fire Plan, could benefit grizzly bear habitat by creating young stands that could potentially provide spring foraging areas for grizzly bears. Treatments near developed areas could draw bears into these areas and increase the potential for grizzly bear/human conflicts.

Off-road vehicle use has been restricted to designated routes in the Montana GYA national forests (USDI BLM and USDA Forest Service 2001); all other forests in the GYA restrict use to designated routes, with a few exceptions. The few areas within the GYA on the Bridger-Teton and Caribou-Targhee National Forests that are not restricted to motorized travel routes will need to comply with the Travel Management Final Rule (USDA Forest Service 2005e) that governs off-highway vehicles and other motor vehicle use on national forests. This Final Rule requires each national forest to identify and designate those roads, trails, and areas that are open to motor vehicle use. All national forests are expected to comply with the Final Rule within the next four years.

Under all alternatives, Yellowstone and Grand Teton National Park provide additional relatively undisturbed habitat for grizzly bears (39 percent of the PCA). The national parks do not allow hunting or livestock grazing and vegetation management activities are limited to occasional tree removal along major roads. Most grizzly bear mortality in the national parks is due to management removals of habituated or human food-conditioned bears and road kills.

Cumulative Effects on Grizzly Bears as Related to Uncertainty of the Science of Grizzly Bear Habitat, Population, Genetics, and Climate Change

Grizzly Bear Habitat and Population

The Conservation Strategy and the information presented in this FEIS are based on the best available science. Grizzly bears are difficult to study and monitor due to many factors. There is some level of uncertainty associated with the results of all studies of grizzly bears and their habitat in the GYA. Uncertainty is inherent to science (Schwartz 2001). Assumptions and methods vary between studies; conclusions on a specific topic by different authors may vary. While most studies have determined that the grizzly bear population has been increasing between 3 percent and 7 percent annually since the early 1980s, Pease and Mattson (1999) suggested that the population had changed very little. Eberhardt and Cherry (2000) reviewed Pease and Mattson (1999) and concluded that the real differences they postulated (i.e., that the population had changed very little) are not nearly as profound as claimed once the statistical uncertainties are acknowledged.

Boyce et al. (2001) completed a critical review of population viability analyses. They noted that previous population viability analyses on the GYA grizzly population have varied in numbers of bears determined to be necessary to ensure persistence, with some analyses predicting extinction. Results vary based primarily on assumptions and objectives. The population viability analysis conducted by Boyce et al. (2001), based on recent data, suggests a very optimistic probability that the GYA grizzly population will persist for 500 years. They caution that optimistic projection is uncertain without the completion of a habitat-based population viability analyses. A habitat-based population viability analysis has not been attempted. Although there are a number of studies linking the demographic performance of the GYA grizzly bear population to components of habitat, particularly the foods, it is difficult to estimate precisely how many bears are needed to

maintain a recovered grizzly bear population and how much and what kind of habitat is required to support that population. This is especially difficult in relationship to potential changes in habitat due to climate change, fluctuations in annual food availability, and associated dynamics of grizzly bear social structure at various bear densities.

Recognizing that grizzly bears are opportunistic omnivores and that a landscape's ability to support grizzly bears is a function of overall habitat productivity, the distribution and abundance of major food sources, the levels and type of human activities, grizzly bear social systems, bear densities, and stochasticity (random variation), there is no known way to deductively calculate minimum habitat values (USDI FWS 2005a). The CEM was originally assumed to be a tool that could be used to determine a minimum habitat effectiveness threshold for each BMU and subunit in the GYA. Efforts have not been successful in determining the threshold values. The IGBST currently has a contract with Montana State University to evaluate the model's content, and a funded project to link components of demographics (reproduction and survival) to output from CEM in an effort to determine if links exists.

The Recovery Plan and the Conservation Strategy identify the recovery zone and the PCA, respectively, as the areas necessary to sustain the recovered grizzly bear population. The PCA has been the focus of habitat management for grizzly bears for the last three decades and all action alternatives have identified this as the minimum area that will be maintained at the 1998 baseline to support the recovered grizzly bear population. The 1998 baseline was chosen because it was known that the habitat values inside the PCA at that time had adequately supported an increasing grizzly bear population. As of 2004, approximately 10 to 14 percent of the grizzly bears live outside the PCA. Habitats managed under current forest plan direction that would continue under Alternatives 2, 2-Modified, and 3 have and would continue to allow for grizzly bear occupancy in many areas outside the PCA. Many respondents have commented that more area is needed to support the grizzly bear population in the GYA. Alternative 4 proposes increased habitat protection outside the PCA; there is no known way to deductively calculate the amount of habitat and the quality of that habitat needed to support a specific number of grizzly bears. Doak (1995) argued that habitat degradation could result in severe population declines that are not likely to be identified by simply monitoring the population. There is a time lag in the response of the population to loss or degradation of habitat. Even though the amount of wilderness, NPS lands, and other long-term secure habitat in the GYA serve to limit the possibility of severe habitat degradation, monitoring the adherence to habitat standards is integral to all the action alternatives. There is also a level of uncertainty associated with the persistence of the four major foods for the bear. Reduction in the availability of these foods, particularly whitebark pine, army cutworm moths, ungulates (primarily elk and bison), and spawning cutthroat trout could have negative effects on the grizzly bear population. Each of these food sources is limited in distribution and subject to natural annual fluctuations in abundance and availability. Because of this natural variability, threshold values of abundance for each food have not been established (USDI FWS 2005a).

These four food items will be monitored either directly or indirectly on an annual basis, as outlined in the Conservation Strategy. Alternative 2-Modified proposes additional monitoring for whitebark pine. Monitoring these important foods provides managers with some ability to predict annual seasonal bear habitat use, and estimate, prepare for, and avoid grizzly bear/human conflicts due to a shortage of one or more foods (USDI FWS 2005a).

The long-term persistence of whitebark pine is threatened from the white pine blister rust and the mountain pine beetle. Blister rust has been in the GYA since the 1940s and no major die-offs of whitebark pine due to blister rust have been noted. Mountain pine beetle, on the other hand, is currently causing considerable mortality of mature whitebark pine in the GYA. Several interagency efforts are underway to monitor the health of whitebark pine within the GYA. See section 3.6 for a more in depth discussion on the status of whitebark pine in the GYA.

Cumulative Effects

Several factors have the potential to impact cutthroat trout populations in Yellowstone Lake (USDI FWS 2005a):

- In 1994, nonnative lake trout were discovered in Yellowstone Lake. Lake trout are efficient predators of juvenile cutthroat trout and, on average, consume 41 cutthroat trout per year.
- In 1998, the parasite that causes whirling disease was found in juvenile and adult cutthroat trout collected from Yellowstone Lake.
- The intermountain west has experienced drought conditions for the past six years, which has resulted in increased water temperatures, lowered lake levels, and a reduction in peak stream flows, all of which negatively affect cutthroat trout spawning success.

This combination of lake trout, whirling disease, and drought conditions in Yellowstone Lake poses a threat to cutthroat trout populations. Recent research has suggested that female grizzly bears feed little on cutthroat trout and the potential effect of the loss of this major food may not be significant demographically (Felicetti et al. 2004, USDI FWS 2005a).

Numbers of army cutworm moths could be affected by pesticide use in agricultural lands. Robison et al. (submitted) evaluated chemical levels in army cutworm moths in the GYA in 1999 and 2001 and determined that grizzly bears are not at risk from pesticides transported by moths. They did note that if there are future changes in chemical control of army cutworm moths, the moths at bear foraging sites should be collected and tested again. There are no data to support the notion that moth numbers will decline in future years.

The availability of elk and bison for grizzly bears is influenced by a number of factors, including population management strategies, predation, habitat and weather conditions, disease, and other factors. (See previous sections on the cumulative effects of livestock grazing, wolves, and hunting on grizzly bears.) Models by Schwartz et al. (2005b) suggested cub and yearling survival improved following severe winters, likely due to increased abundance of spring carrion. Mattson (1997) found females that ate ungulate carcasses lost more cubs than females not using this food.

While these four foods are the most important to bears, the actual impacts to grizzly bears from declines in these foods are debatable. Annual availability fluctuates widely and bears have learned to utilize alternative foods during times when these foods are in short supply. During years of low availability of whitebark pine and army cutworm moths, bears often spend more time at lower elevations and have more conflicts with humans and experience a higher level of mortality. Recent studies (Haroldson et al. 2005, Schwartz et al. 2005c) support this relationship, but indicate that changes in the abundance of whitebark pine nuts had the least impact on female survival and population growth for independent females living inside Yellowstone National Park, followed by those living outside Yellowstone National Park but within the PCA. Changes in the abundance of whitebark pine nuts had the greatest effect on the survival of female grizzly bears living outside the PCA, with most mortality on or near private lands.

Weather conditions play a key role in the yearly availability of foods for bears, which in turn affects female fecundity and cub survival (Schwartz et al. 2005b). Regardless of the amount of habitat protection, weather conditions would still influence the basic productivity of the land and the foods available to bears and ultimately the carrying capacity of the landscape for grizzly bears.

Genetics

Most of the current science and three decades of monitoring by the IGBST suggest that the GYA grizzly bear population has been increasing in both numbers and distribution and the prognosis for long-term persistence is optimistic. The effects of inbreeding in small, isolated populations must also be considered. Metzgar and Bader (1992) suggested that corridors or linkage areas be maintained between existing grizzly populations and that managers set 2,000 as the minimum population target for grizzly bears in the Northern Rockies. This number has been used frequently in the press and by conservation groups as the number of bears needed in the GYA to ensure persistence. Miller and Waits (2003) also discuss concerns regarding the number of bears needed

to maintain genetic diversity and demonstrate that the GYA grizzly bear population has relatively low levels of genetic variability. They found that the Yellowstone grizzly bear population is not in the troubling genetic condition it was once thought to be and no immediate action is necessary. The GYA grizzly bear population is much larger now than it was 30 years ago, but long-term maintenance of genetic variability in an isolated population requires gene flow. Miller and Waits (2003) demonstrate that there has been only a slight decline in genetic diversity of the Yellowstone grizzlies since the early 1900s, and that the Yellowstone population was not as genetically diverse as that in the NCDE grizzly bear population even as far back as 1910. It appears that linkage between Yellowstone and areas to the north has always been limited. Miller and Waits noted, "...it is likely that gene flow into the Yellowstone ecosystem from the north was historically restricted." This suggests that transfer of genetic material between the GYA and other grizzly bear populations was not a regularly occurring event, even before there was much development. No movement of grizzly bears in or out of the GYA has been documented.

Maintaining or creating linkage zones between grizzly bear ecosystems is a multifaceted issue. Human developments, towns, and highways would preclude grizzly bear occupancy, limit movements in many areas, and provide a significant potential source of conflicts and bear mortality. Ensuring occupancy by female grizzly bears between existing bear populations would require significant changes in human uses and developments, primarily on private lands. Only one or two effective migrants per generation from other grizzly bear populations are adequate to maintain or increase the level of genetic diversity in the Yellowstone grizzly bear population. It does not matter how bears get into the ecosystem but rather that they effectively integrate their genes into the population. If immigration does not occur within several decades, then translocation of bears into the GYA should be conducted. The Conservation Strategy has adopted this approach. The Conservation Strategy states, "If no genetic material is found and no movements detected by 2020, then plans will be prepared to translocate two or more grizzly bears from other populations beginning in 2022."

Climate Change and Vegetation

The potential effect of global warming or climate change on grizzly bears and their habitat in the GYA is a key concern, particularly how warming may affect the abundance of the four key foods. The average temperature of the earth has increased by 0.6° C over the past 100 years (Walther et al. 2002). Consequences of this warming are varied. Global warming may result in a warmer and drier climate in the GYA. The certainty that the GYA will receive less precipitation has a moderately low degree of certainty. Some computer models project a warmer and wetter climate, but the trend over the 20th century was toward warm and dry (Cross 2006). Global warming will likely result in changes to community and trophic (relating to nutrition) structure, with increases in some plant species and communities and declines in others. The consequences of such changes will likely result in shifts in species abundance and distribution (Walther et al. 2002). The progression of such change is unknown. Adaptive management programs, such as those proposed in the Conservation Strategy, will consider such changes as they occur.

Although the prevailing thought is that in the GYA temperatures will increase and precipitation will decrease, there is a low degree of certainty involved in predicting changes in precipitation, since regionally, rainfall may increase, decrease, or stay the same (Cross 2006). Several other impacts associated with changing climate further complicate the picture and decrease the level of certainty when making projections. For instance, CO₂ has a beneficial fertilization effect on plants and also enables plants to use water more efficiently. These effects might enable some species to resist the adverse effects of warmer temperatures or drier soils. Further decreasing the certainty of making projections are the effects of disturbance agents. Forest fires are likely to become more frequent and severe if soils become drier. Changes in insect populations would further increase stress on forests (Cross 2006).

Although there is moderate certainty that temperatures will increase, there is low certainty in projecting how much they will increase over time. With that in mind, a projected 2°C (3.6°F)

warming could shift the ideal range for many North American forest species by about 300 km (200 miles) to the north (Cross 2006).

Whitebark pine, a high elevation, five-needle pine, has a thick phloem (complex tissue in the vascular system of higher plants) and is a preferred host of mountain pine beetle. One of whitebark pines natural defense mechanisms against beetles is that it is able to survive at high elevations where the growing season is normally too short for beetles to reproduce in a single season. Warmer temperatures and prolonged growing seasons could improve the ability of bark beetles to maintain high population levels at elevations where whitebark pine exists (Cross 2006). Mountain pine beetle is currently causing considerable mortality of mature whitebark pine in the GYA. Epidemic infestations of mountain pine beetle have occurred periodically during the last century in many areas of the Rocky Mountains (Tomback et al. 2001 and Walsh 2005).

Whitebark pine populations in the GYA are threatened by the presence of white pine blister rust. Blister rust has been in the GYA since the 1940s and no major die-offs of whitebark pine due to blister rust have been noted.

Increasing temperatures associated with climate change could eventually lead to decreases in range availability for whitebark pine (Romme and Turner 1991) and increases in large, stand replacing fires. It is generally assumed that fire, especially low to mixed intensity fire, favors whitebark pine over other tree species and the exclusion of fire results in the successional replacement of whitebark by shade tolerant species (Tomback et al. 2001). Recent work by Walsh (2005) suggests that fire suppression is not a major concern for many whitebark pine forests in the GYA and that stand structure is well within the historic range of variability. Walsh (2005) also notes, "At landscape scales mountain pine beetle infestations may have similar ecological consequences as spatially extensive mixed-severity fires, as beetles rarely kill all trees in a stand."

The impact of this mortality is difficult to discern and depends on the values under consideration. This type and level of mortality of whitebark pine has been previously observed and would not be considered outside of historical precedence. Other factors, such as white pine blister rust and warming temperatures, may influence the occurrence and abundance of whitebark pine in different ways than past bark beetle epidemics (DeNitto 2006).

Climate Change and Aquatic Systems

For many of the same reasons discussed with projecting changes in vegetation, the certainty of the changes in aquatics is low (Cross 2006).

Some projected changes include (Cross 2006):

- Changes in the depth of mountain snowpacks and glaciers, and changes in their seasonal melting, can have powerful impacts on areas that rely on freshwater runoff from mountains. Rising temperatures may cause snow to melt earlier and faster in the spring, shifting the timing and distribution of runoff. These changes could affect the availability of freshwater for natural systems.
- Changes in stream flow and higher water temperatures could affect insects and other invertebrates that live in streams and rivers, with repercussions up the food chain for fish, amphibians, and waterfowl.
- Increased temperatures will have considerable impact on total runoff and the timing of runoff in arid and semiarid lowland regions. A warming climate will also result in the shrinking or loss of mountain glaciers at the higher elevations. With increasing temperatures, winter flows will increase and summer flows will drop.
- Water temperatures will rise. Cold-water species of plants and animals have varying abilities to adapt to changes in water temperature and decreases in dissolved oxygen and other dissolved gases. Algae, for instance, would benefit from increased water temperatures but the proliferation of algae would further upset the balance of dissolved gases, stressing fish and other animals.

- Due to their glacial history, the Rocky Mountains and the Yellowstone area feature many lakes. Due to topography and precipitation, the Yellowstone area features many low-order streams. Warming and attendant changes in the water cycle will affect lake levels, water temperature, and stratification regimes. Timing of runoff will likely occur earlier in the year, which will have consequences on stream biota (flora and fauna) (especially salmonids [salmon and trout]), including blow outs and down cutting (during the spring), loss of spawning beds, and loss of riparian vegetation.

In addition to the potential threats to Yellowstone cutthroat trout discussed previously, global warming may further impact these populations due to changes in timing of runoff and increasing water temperatures. Again, the certainty of these changes' occurring is low.

Summary of Cumulative Effects on the Grizzly Bear

Alternatives 2-Modified, 3, and 4 include direction and guidance for maintenance and enhancement of important foods for bears. Any long-term reductions in the availability of these foods could reduce the number of bears the habitat in the GYA could support. The preferred alternative, based on the Conservation Strategy, incorporates an adaptive approach that is designed to monitor and respond to changing conditions. The potential loss of major foods is a concern and the abundance of these foods would also be monitored as part of the Conservation Strategy. If problems should occur, management strategies would be modified through appropriate interagency cooperative efforts.

Although there is no guarantee how the Yellowstone grizzly bear population will respond to decreases in whitebark pine crops or cutthroat trout, should they occur, it is anticipated that bears would compensate by shifting their foraging strategies to other foods such as forbs, fungi, ungulates, and small mammals. If there are reductions in any of these foods, there will likely be gradual reductions over decades and spanning generations of grizzly bears, thereby making adjustments to other foods gradual (USDI FWS 2005a).

In other areas such as the NCDE, where grizzly bears historically relied heavily on whitebark pine seeds, distributions and sighting records on the periphery of this ecosystem indicate that the population, at least in those areas, has continued to increase and thrive since the 1980s despite severe declines in whitebark pine communities in the last 50 years (USDI FWS 2005a).

Grizzly bear use of cutthroat trout has varied dramatically in the last three decades, most likely corresponding to fluctuations in the trout population, but the Yellowstone grizzly bear population has continued to increase and expand (USDI FWS 2005a).

The GYA grizzly bear population is the most studied population of grizzly bears anywhere in the world. Even with this level of scrutiny, there is some level of uncertainty associated with the future of the bear. Social and political interests tend to use uncertainty to promote personal or political agendas (Schwartz 2001), yet social and political support is critical to the long-term persistence of the grizzly bear in the GYA. The best approach to ensure a healthy grizzly bear population is to monitor both population and habitat parameters closely and respond with adaptive management. The Conservation Strategy outlines the adaptive management process and the standards for population monitoring and management. All the action alternatives in this FEIS include habitat standards and monitoring that provide various degrees of protection to grizzly bear habitat. Habitat management is dynamic and new information is constantly being developed. As such, all action alternatives embrace this adaptive management approach—as conditions change, so will management direction. Future changes, based on monitoring and evaluation, will involve public collaboration.

3.16.2 Cumulative Effects on Timber Management

The effects of the secure habitat standard on timber harvesting are discussed in section 3.6.1. The lynx amendment is considering alternatives that would defer precommercial thinning. This would have an effect on areas with lodgepole pine less than 40 years old in the suitable timber base and

in lynx habitat. All of the PCA is potential lynx habitat, but only 12 percent of the area is suitable timber. The Targhee National Forest would be most affected by this standard, which may reduce timber yields on lodgepole pine stands in the future.

Other tools, such as prescribed fire, would be used to meet resource objectives in these areas. The proposed action and alternatives to the proposed action would have a limited cumulative effect on the timber program.

3.16.3 Cumulative Effects on Grazing

Effects of all the action alternatives on livestock grazing are discussed in section 3.7. The lynx amendment may further restrict how grazing occurs if utilization guidelines were not being met in willow and aspen communities. Management of livestock within the PCA does have guidelines for grazing in these habitat types, so the lynx amendment is not expected to have any additional impacts on grazing.

Livestock operations are affected by wolves and wolf management as well as by grizzly bears and bear management. Generally, some conservation measures can work for both species, but each may pose added impacts on ranching operations.

Other events may impact grazing, including the transmission of wildlife diseases, such as brucellosis, to domestic cattle. Wyoming currently does not have brucellosis-free status and the costs of livestock operations would be expected to increase due to increased testing and monitoring of livestock herds.

3.16.4 Cumulative Effects on Recreation

Within the last five years, approximately 400 miles of road have been decommissioned on the Targhee National Forest to comply with the road density direction in the 1997 Revised Forest Plan. The Gallatin National Forest is currently updating a travel plan that will amend their 1987 Forest Plan, and other forests are currently revising or scheduled for revisions in the near future (Figure 3). It is likely that the revised plans will further define and possibly limit motorized access to address wildlife security needs, better manage conflicting recreation uses, and protect areas from resource damages. Motorized use within the PCA will most likely reach the capacity of the lands available for that use, and further demand will need to be accommodated outside the PCA.

The few areas within the GYA on the Bridger-Teton and Caribou-Targhee National Forests that are not restricted to motorized travel routes will need to comply with the Travel Management Final Rule (USDA Forest Service 2005e) that governs off-highway vehicles and other motor vehicle use on national forests. This Final Rule requires each national forest to identify and designate those roads, trails, and areas that are open to motor vehicle use. All national forests are expected to comply with the Final Rule within the next four years.

The lynx amendment to forest plans may have additional effects on winter recreation such as limiting activity in lynx habitat. These habitats may also be near bear denning areas and would provide greater security to the bear as well.

Yellowstone National Park is implementing changes to winter use—National Forest System lands could be affected if snow machine use shifts outside the Park.

3.16.5 Cumulative Effects on Minerals

Cumulatively, Alternatives 2, 2-Modified, 3, and 4 could add more environmental protections through mitigation requirements that would maintain secure habitat and limit developed sites, potentially increasing costs to mineral developers. For oil and gas leasing, these measures may prohibit full field development inside the PCA if mitigation is not possible. For areas of the GYA

west of the continental divide, costs have likely increased due to the environmental protections required under INFISH and PACFISH³².

Processing of mineral operations under the 1872 General Mining Law is not discretionary. If the numbers of developed sites are below the 1998 levels per bear subunit, mitigation needed for the proposed hardrock mineral operations may have to be permitted before discretionary projects proposed by the Forest Service. If the number of developed sites is at the limit, companies proposing hardrock mineral exploration or development would have to be given the chance to remove other types of developed sites or remove access routes in order to mitigate their proposed operations. Mitigation can be requested but operators cannot be precluded from exercising their right to mineral exploration and development on their claim(s) under the 1872 General Mining Law. Hardrock mineral development could still occur as a statutory right.

3.16.6 Cumulative Effects on the Economic and Social Environment

Rural communities and economies are changing regardless of this proposal; changes in population, public land uses, and land settlement all have an impact upon public lands and the bears' use of habitat. Alternative 4 would have the largest cumulative effect on the social and economic environment due to the reductions in income and employment associated with livestock grazing, timber harvesting, and mineral development.

Some people felt that any further restrictions on grazing may affect the viability of livestock operations. If livestock operations were not economically viable, ranch owners may be forced to sell their ranches. Several factors beyond just the challenges of grazing permitted livestock on public lands could cumulatively affect agricultural operations. Sale of ranches may be more linked to efforts to stay competitive in a global market. The national livestock industry continues to consolidate operations—a trend that adds up to diminishing returns for remote, marginal, independent operations like those in the GYA (Travis et al. 2002). Some ranchlands are being subdivided for residential use, while others are kept intact (or even enlarged) when purchased by non-traditional owners often more interested in their amenity values than livestock production.

A University of Wyoming study notes that the aging of agricultural operators and the lack of young people entering the industry could also affect retention of lands for agricultural purposes. Agricultural profitability and the decline of profitability is another factor noted. Finally, agricultural land prices are increasing as open spaces, the amenities, and potential development profits of other land uses attract buyers other than those in the agricultural industry (Taylor 2003).

3.17 Resource Commitments

3.17.1 Relationship between Short-term Uses of the Environment and Long-term Productivity

Short-term uses are those expected to occur on the forests over the next ten years. These uses include but are not limited to recreation use, grazing, mineral development, timber harvest, and prescribed burning. Long-term productivity refers to the capability of the land to provide resource outputs for a period of time beyond the next ten years. The minimum management requirement established by regulation (36 CFR 219.27) provides for the maintenance of long-term productivity of the land.

³² INFISH is management direction to protect habitat and populations of resident native fish outside of anadromous fish habitat in eastern Oregon, eastern Washington, Idaho, western Montana, and portions of Nevada (USDA Forest Service 1995a). (Anadromous fish ascend rivers to the sea for breeding.) PACFISH is management direction to protect habitat and populations of anadromous fish habitat in anadromous fish producing watersheds on federal lands in eastern Oregon and Washington, Idaho, and portions of California (USDA Forest Service USDI BLM 1995b).

Other Required Disclosures

Management requirements prescribed by forestwide standards and guidelines would be met under all alternatives. Minimum requirements ensure that long-term productivity of the land would not be impaired by short-term uses.

All action alternatives propose protective measures for habitat for the grizzly bear through adoption of standards and guidelines. Because of this, no impairment of long-term productivity would be expected.

Monitoring applies to all alternatives. If monitoring and subsequent evaluation indicate that standards and guidelines are insufficient to protect long-term productivity, the plans will be amended. Although all alternatives were designed to maintain long-term productivity, there are differences between alternatives in the long-term availability or condition of resources. There may also be differences between alternatives in long-term expenditures necessary to maintain desired conditions. These types of differences between the alternatives are described in chapters 2 and 3.

3.17.2 Irreversible and Irrecoverable Commitment of Resources

Irreversible and irretrievable commitment of resources is defined in Forest Service Handbook 1909.15 Environmental Policy and Procedures.

The irreversible commitment of resources means that nonrenewable resources are consumed or destroyed. Examples include mineral extraction, which removes nonrenewable minerals, and potential destruction of such things as heritage resources by other management activities.

The irretrievable commitment of resources is opportunities foregone—trade-offs in the use and management of forest resources. The irretrievable commitment of resources can include the expenditure of funds, loss of production, or restrictions on resource use. Decisions made in a forest plan do not represent actual irreversible or irretrievable commitment of resources. A forest plan determines what kinds and levels of activities are appropriate on the forest; it does not make site-specific or project decisions. The decision to irreversibly or irretrievably commit resources occurs

- When the Forest Service makes a project or site-specific decision
- When Congress acts on a recommendation to establish a new wilderness or to include a river in the Wild and Scenic River System

All action alternatives propose protective measures for habitat for the grizzly bear through adoption of standards and guidelines. No changes are made in suitability decisions, management area allocations, or recommendations for wilderness or other special areas. Because of this, no irreversible or irretrievable commitment of resources are anticipated in any of the alternatives.

3.18 Other Required Disclosures

The NEPA at 40 CFR 1502.25(a) directs “to the fullest extent possible, agencies shall prepare draft environmental impact statements concurrently with and integrated with ...other environmental review laws and executive orders.”

The alternatives are programmatic in nature, consisting of direction and guidance that would be applied to future management activities. They do not prescribe site-specific activities on the ground. Standards in the alternatives do not allow more actions that could affect the environment than do existing plans.

American Indian Religious Freedom Act and Tribal Treaty Rights

No effects on American Indian social, economic, or subsistence rights are anticipated.

Prime Farmland, Rangeland, or Forestland

None of the alternatives would adversely affect prime farmland or rangeland. National Forest System lands are not considered prime farmland.

Effects on Floodplains or Wetlands

None of the alternatives would adversely affect floodplains or wetlands. Existing management direction for these resources would be maintained.

Effects on Heritage Resources

The alternatives do not propose management direction that affects heritage resources. When site-specific projects are proposed, a cultural inventory of some degree would be conducted to prevent damage, mitigate unforeseen damage, or prevent impacts to sites in compliance with applicable requirements.

Effects on Water Quality

Section 303(d) of the Clean Water Act requires states to evaluate water quality in light of state water quality standards, report those stream segments that are impaired, and require development of total maximum daily load of pollutants. The states of Idaho, Montana, and Wyoming have identified impaired stream segments on National Forest System lands and are working with the agencies to determine how to reduce pollutants' impacts and meet total maximum daily load requirements.

The alternatives could result in either the same or fewer ground-disturbing activities, such as less timber harvesting or commercial grazing. Therefore, the alternatives would not indirectly result in further degradation of 303(d) listed waters.

Effects on Special Areas

Special areas include designated wilderness areas, proposed wilderness, special interest areas, research natural areas, and wild, scenic, and recreational river corridors. These areas are generally to be managed to maintain their existing character. The alternatives do not change the overall management direction of these areas.

3.19 Analysis of Significance under the NFMA

The purpose of this proposed action is to incorporate management direction into plans to ensure conservation of habitat to support continued recovery of the grizzly bear population in the GYA. The NFMA significance determination is based on a review of the degree to which management direction for the area covered by a forest plan is being changed. The NFMA provides that forest plans may be amended in any manner, but if the amendment results in a significant change in the plan, additional procedures must be followed. Forest Service Handbook 1909.12 Land and Resource Management Planning, section 5.32, identifies four factors to consider in determining whether an amendment is significant.

Factor 1: Timing

Identify when the change is to take place. Determine whether the change is necessary during or after the plan period or whether the change is to take place after the next scheduled revision of the forest plan.

NFMA requires that forest and grassland plans be revised every 15 years. All but one of the plans has been in place since 1987. The Targhee National Forest completed its plan revision in 1997, and the remaining plans are scheduled to be revised in the next few years—for most plans, it is late in the current planning period (Figure 3).

As stated in Forest Service Handbook 1909.12 Land and Resource Management Planning, “the later the change, the less likely it is to be significant for the current forest plan.” During revision, units may revisit the management direction added by this amendment, and incorporate local information. Timing is not considered to be a significant factor for any of the alternatives.

Factor 2: Location and size

Determine the location and size of the area involved. Define the relationship of the affected area to the overall planning area.

There are approximately 10.5 million acres within the six GYA national forests. Most of the management direction proposed in the alternatives would modify the direction in land allocations that allow for development such as road construction. Of the 10.5 million acres of National Forest System land, approximately 3.4 million acres (PCA) are affected by the proposed action. Seventy-eight percent of the current management of the area is fully consistent with the proposed action because of wilderness or backcountry allocations. This means about 6 percent of the 10.5 million acres would be most affected by new management direction. Location and size are not considered to be significant factors except for Alternative 4, which would affect 77 percent of the GYA national forests.

Factor 3: Goals, objectives, and output

Determine whether the change alters long-term relationships between the levels of goods and services projected by the forest plan. Consider whether an increase in one type of output would trigger an increase or decrease in another. Determine whether there is a demand for goods and services not discussed in the forest plan.

The proposed action would add one goal to forest plans: conservation of habitat to support the continued recovery of the grizzly bear. This goal is consistent with other goals in existing plans and other legal requirements to provide habitat needs for threatened and endangered species. The proposed action would add several standards requiring consideration of secure habitat for the grizzly bear. The additional standards provide more guidance in relation to secure habitat, developed sites, and grazing but are consistent with current standards in management of the grizzly bear.

Alternatives 1, 2, and 2-Modified would not substantially alter outputs for grazing, timber, minerals, transportation systems, and developed recreation areas. These activities would not be prohibited but would need to be mitigated appropriately as described in either the Guidelines or the habitat standards, depending on which alternative is selected. In general, none of these alternatives would significantly change the status quo. Alternatives 3 and 4 would alter outputs for grazing, timber, and minerals, as summarized in Figure 10. For Alternative 4, these changes may be considered substantial.

Factor 4: Management prescriptions

Determine whether the change in a management prescription is only for a specific situation or it would apply to future decisions throughout the planning area. Determine whether or not the change alters the desired future condition of the land and resources or the anticipated goods and services to be produced.

None of the alternatives would change the management area designations in existing forest plans; to varying degrees, the alternatives would change the levels at which certain management activities occur. Changes in activity levels for Alternatives 1, 2, and 2-Modified are not likely to notably change. Activity levels for Alternatives 3 and 4 would result in considerable change.

Summary

Considering the four factors, adopting Alternatives 1, 2, or 2-Modified would not result in significant changes under the NFMA to the six forest plans. None of the alternatives would result in significant changes under the NFMA because relatively minor changes in plan direction on a small proportion of the national forests would occur. The new direction under Alternatives 2 and 2-Modified would be a refinement of existing direction to maintain habitat for the grizzly bear, and would not alter management area designations or expected outputs. Alternatives 3 and 4 could alter long-term outputs. Alternative 4 may substantially alter the level of goods and services projected by the forest plan.