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Fish and Wildlife Service
Ecological Services
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File: M19 Beaverhead-Deerlodge National Forest May 28, 2013
(06E11000-2012-F-0352 Revised Forest Plan)

David R. Myers, Forest Supervisor
Beaverhead-Deerlodge National Forest
420 Barrett Street
Helena, Montana 59725

Dear Mr. Myers:

The U.S. Fish and Wildlife Service (Service) has reviewed the supplemental biological assessment regarding the effects of the 2009 revision of the Beaverhead-Deerlodge National Forest Land and Resource Management Plan (Revised Forest Plan) on the threatened grizzly bear (*Ursus arctos horribilis*). Your supplemental biological assessment, with a determination of "likely to adversely affect grizzly bears", was received in this office on July 9, 2012.

We previously completed formal consultation on the effects of the Revised Forest Plan on grizzly bears on October 4, 2010. For the 2010 consultation, we analyzed the effects of the Revised Forest Plan on grizzly bears within the area that had been designated for the Yellowstone grizzly bear distinct population segment (DPS), where at the time, we considered the species present. This includes the Butte, Madison, and Jefferson Ranger Districts including all or portions of the following landscape areas: Gravelly, Madison, Tobacco Root, Jefferson River, and Upper Clark Fork. Since the 2010 consultation, new information indicates verified observations of grizzly bears on the Beaverhead-Deerlodge National Forest (Forest) outside of the Yellowstone analysis area (U.S. Forest Service 2012, Mace and Roberts 2012). Therefore, the Forest reinitiated consultation and prepared a supplemental biological assessment to analyze the potential effects of the Revised Forest Plan on grizzly bears that may occur throughout the Forest.

For purposes of this reinitiation of consultation, we refer to two analysis areas on the Forest: the Yellowstone analysis area and the west and north analysis area (WNAA), which includes areas of the Forest west and north of the Yellowstone analysis area. The 2010 biological opinion included an analysis of the effects of the Revised Forest Plan on grizzly bears within the Yellowstone analysis area. We reviewed the 2010 opinion and found that several sections remain up to date. Therefore, we incorporated these sections into the attached biological

opinion, by reference. This biological opinion also includes an analysis of the effects of the Revised Forest Plan in the remaining portion of the Forest, the WNAA, where grizzly bears now occur and are expected to occur more broadly during the life of the plan. The attached biological opinion on grizzly bears was prepared in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

A complete project file of this consultation is on file at the Service's Montana Field Office. If you have questions or comments related to this issue, please contact Anne Vandehey, Katrina Dixon, or me at (406) 449-5225.

Sincerely,

for Jodi L. Bush
Field Supervisor

enclosure

cc: AES, R-6, MS 60120 (Attn: Doug Laye)
Montana Department of Fish, Wildlife, and Parks, Helena, MT (Attn: Director)
File: 7759 Biological Opinions - 2013

ENDANGERED SPECIES ACT SECTION 7 CONSULTATION

SUPPLEMENT TO THE BIOLOGICAL OPINION (2010)

on the

Effects of the 2009 Revision of the Beaverhead-Deerlodge National Forest Land and Resource Management Plan on Grizzly Bears

Beaverhead-Deerlodge National Forest

Agency:	U.S. Department of Agriculture U.S. Forest Service Beaverhead-Deerlodge National Forest Dillon, Montana
Consultation Conducted by:	U.S. Fish and Wildlife Service Montana Field Office Helena, Montana
File:	M.19 Beaverhead-Deerlodge National Forest 06E11000-2012-F-0352
Date Issued:	May 28, 2013

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I. INTRODUCTION

This biological opinion was prepared by the U.S. Fish and Wildlife Service (Service) and analyzes the effects of the 2009 revision of the Beaverhead-Deerlodge National Forest Land and Resource Management Plan (Revised Forest Plan) for the Beaverhead-Deerlodge National Forest (Forest) on grizzly bears (*Ursus arctos horribilis*).

In a 2010 biological opinion (U.S. Fish and Wildlife Service 2010), we analyzed the effects of the Revised Forest Plan in the area that had been designated for the Yellowstone grizzly bear distinct population segment (DPS), which at the time was considered where grizzly bears may be, and were known to be, present. Since the October 4, 2010 consultation on grizzly bears, new information indicates verified observations or records of grizzly bears on the Forest outside of that area (U.S. Forest Service 2012, Mace and Roberts 2012), and the Forest requested reinitiation of consultation on the Revised Forest Plan. For purposes of this reinitiation of consultation, we refer to two analysis areas on the Forest: the Yellowstone analysis area (the area used for analysis in 2010 consultation) and the west and north analysis area (WNAA), which includes the areas of the Forest located west and north of the Yellowstone analysis area. The 2010 biological opinion focused on effects of the Revised Forest Plan on grizzly bears within the Yellowstone analysis area, and so where appropriate, we incorporate these analyses by reference. This biological opinion also includes an analysis of effects of the Revised Forest Plan within the remaining portion of the Forest, the WNAA. In addition, this biological opinion includes an analysis of the effects of oil and gas activities and temporary roads across both portions of the Forest, as neither was considered in our 2010 biological opinion.

Reinitiation of formal consultation on the Revised Forest Plan began on July 9, 2012, the date the Service received the supplemental biological assessment (U.S. Forest Service 2012). This biological opinion replaces the 2010 biological opinion on the Revised Forest Plan.

Section 7(b)(3)(A) of the Endangered Species Act of 1973, as amended (Act) requires that the Secretary of Interior issue biological opinions on federal agency actions that may adversely affect listed species or critical habitat. Biological opinions determine if the action proposed by the action agency is likely to jeopardize the continued existence of listed species or destroy or adversely modify critical habitat. Section 7(b)(3)(A) of the Act also requires the Secretary to suggest reasonable and prudent alternatives to any action that is found likely to result in jeopardy or adverse modification of critical habitat, if any has been designated. This biological opinion addresses only impacts to federally listed species and does not address the overall environmental acceptability of the proposed action.

Consultation History

Informal consultation for the proposed Forest Plan Revision began in 2004. Further consultation continued through email, meetings, and phone conversations with Forest staff. In addition to grizzly bears, consultation included gray wolves (*Canis lupus*), bald eagles (*Haliaeetus leucocephalus*), Canada lynx (*Lynx canadensis*), and bull trout (*Salvelinus*

confluentus). Since informal consultation began on the Forest Plan Revision, the bald eagle was delisted (August 8, 2007; 72 FR 37346), the Yellowstone Grizzly Bear Ecosystem population of grizzly bears was delisted (April 30, 2007; 72 FR 14866), and the Forest was determined to be unoccupied by Canada lynx (May 2006; U.S. Fish and Wildlife Service and U.S. Forest Service 2006 *in litt*). An effects analysis for bull trout occurred in a separate formal consultation completed on December 19, 2008 and formal consultation on gray wolves was completed on September 24, 2008. As mentioned, at that time grizzly bears were believed to be present on those portions of the Forest within the area that had been designated for the Yellowstone grizzly bear DPS; as such, the effects of the Revised Forest Plan on grizzly bears were not analyzed under section 7. The Revised Forest Plan was issued in January of 2009.

On September 21, 2009, a court order enjoined the Service from removing the Yellowstone grizzly bear DPS from the list of threatened species. The final rule designating and removing the Yellowstone DPS from the list of threatened species was vacated and remanded to the Service. Therefore, Yellowstone Grizzly Bear Ecosystem (YGBE) grizzly bears were once again listed as a threatened species. The Forest prepared another biological assessment analyzing the effects of the Revised Forest Plan on grizzly bears within the area that had been designated as the Yellowstone area (the Butte, Madison, and Jefferson Ranger Districts). This area included all or portions of the following landscape areas: Gravelly, Madison, Tobacco Root, Jefferson River, and Upper Clark Fork. The Service responded with the biological opinion on October 4, 2010 (U.S. Fish and Wildlife Service 2010). The 2010 biological opinion analyzed the effects of the Revised Forest Plan on grizzly bears, as a result of access management, including roads and snowmobile use; food and attractant storage and site development; livestock grazing; vegetation management; and fire management.

Since the October 4, 2010 consultation on grizzly bears, new information indicates verified observations or records of grizzly bears on the Forest outside of the Yellowstone analysis area considered in our 2010 biological opinion (U.S. Forest Service 2012, Mace and Roberts 2012). Therefore, the Forest reinitiated consultation on the effects of the Revised Forest Plan. The Forest prepared a supplemental biological assessment to analyze the potential effects of the Revised Forest Plan on grizzly bears, focusing on the WNAA, as well as an analysis of the effects of the oil and gas activities and temporary roads across the Forest. On July 9, 2012, we received the supplemental biological assessment and request for reinitiation of consultation on the effects of the Revised Forest Plan on grizzly bears (U.S. Forest Service 2012).

The supplemental biological assessment (U.S. Forest Service 2012), portions of our 2010 biological opinion, information in our files, as well as additional information and discussions throughout the informal and formal consultation process were used in the preparation of this biological opinion. A complete project file of this consultation is on file at our office.

II. DESCRIPTION OF THE PROPOSED ACTION

The proposed action is the 2009 Revised Beaverhead-Deerlodge Land and Resource Management Plan (Revised Forest Plan). The previous management plans for the Beaverhead and Deerlodge National Forests date from 1986 and 1987. The two plans were brought up to date in one management plan for the now combined 3.38-million-acre Beaverhead-Deerlodge National Forest. The Revised Forest Plan was issued in January of 2009. For details of the Revised Forest Plan, please see the preferred alternative, alternative 6, in the Final Environmental Impact Statement (EIS) (U.S. Forest Service 2008).

As described above, while the Revised Forest Plan applies to the entire Forest, we will refer to two analysis areas for purposes of this reinitiation of consultation: the Yellowstone analysis area and the WNAA. The 2010 biological opinion (U.S. Fish and Wildlife Service 2010) analyzed the effects of the Revised Forest Plan within the Yellowstone analysis area. This biological opinion incorporates portions of these analyses where appropriate, by reference. In this biological opinion, we also examine the effects of the Revised Forest Plan within the WNAA, portions of which are where grizzly bears are now known to occur. In addition, the effects of oil and gas activities and temporary roads were not considered in our 2010 biological opinion. Therefore, the effects of these two activities will be analyzed for the entire action area, the Forest, rather than just the WNAA.

III. STATUS OF THE SPECIES /CRITICAL HABITAT DESCRIPTION

Species/Critical Habitat Description

Grizzly bears are among the largest terrestrial mammals in North America. South of the United States - Canada border, adult females range from 250-350 pounds and adult males range from 400 to 600 pounds. Grizzly bears are relatively long-lived, living 25 years or longer in the wild. Grizzly bears are omnivorous, opportunistic feeders that require foods rich in protein or carbohydrates in excess of maintenance requirements in order to survive seasonal pre-and post-denning requirements. Grizzly bears are homeo-hypothermic hibernators, meaning their body temperature drops no more than five degrees C during winter when deep snow, low food availability, and low ambient air temperatures appear to make winter sleep essential to grizzly bears' survival (Craighead and Craighead 1972a, 1972b). Grizzly bears excavate dens and require environments well covered with a blanket of snow for up to five months, generally beginning in fall (September-November) and extending until spring (March-April) (Craighead and Craighead 1972b; Pearson 1972).

Listing history The grizzly bear was listed as a threatened species under the Act in the lower 48 states on July 28, 1975 (40 FR 31736). The Service identified the following as factors establishing the need to list: (1) present or threatened destruction, modification, or curtailment of habitat or range; (2) overutilization for commercial, sporting, scientific, or educational

purposes; and (3) other manmade factors affecting its continued existence. The two primary challenges in grizzly bear conservation are the reduction of human-caused mortality and the conservation of remaining habitat (U.S. Fish and Wildlife Service 1993).

The grizzly bear recovery plan (Recovery Plan) was completed on January 1982 and was revised in 1993 (U.S. Fish and Wildlife Service 1993). The 1993 revised Recovery Plan delineated grizzly bear recovery zones in 6 mountainous ecosystems in the U.S. The Recovery Plan details recovery objectives and strategies for the grizzly bear recovery zones in the ecosystems where grizzly bear populations still persist. These recovery zones are the Northern Continental Divide (NCDE), Yellowstone Grizzly Bear (YGBE), Cabinet-Yaak (CYE) and Selkirk (SE) Ecosystems. The Recovery Plan also includes recovery strategies for the North Cascades Ecosystem in Washington, where only a very few grizzly bears are believed to remain, and for the Selway-Bitterroot ecosystem of Idaho and Montana, where suitable grizzly bear habitat still occurs. The Recovery Plan is currently revision.

Based on the best scientific and commercial information available, the Service delisted the Yellowstone grizzly bear DPS, effective April 30, 2007. The Service had determined that the grizzly bear population in the Yellowstone Grizzly Bear Ecosystem had achieved recovered status. The Service also determined that the DPS had sufficient numbers and distribution of reproductive individuals so as to provide a high likelihood that the species will continue to exist and be well distributed throughout its range for the foreseeable future. The Service held that the State and Federal agencies' agreement to implement the extensive Conservation Strategy and State management plans would ensure that adequate regulatory mechanisms remain in place and that the Yellowstone grizzly bear population will not become an endangered species within the foreseeable future. On September 21, 2009, a court order enjoined the Service from removing the Yellowstone DPS from the list of threatened species. The final rule designating the Yellowstone DPS and removing the Yellowstone grizzly bear DPS from the list of threatened species was vacated and remanded to the Service.

Life History

Grizzly bears are large animals with great metabolic demands requiring extensive home ranges. The search for energy-rich food appears to be a driving force in grizzly bear behavior, habitat selection, and intra/inter-specific interactions. Grizzly bears historically used a wide variety of habitats across the North America, from open to forested, temperate through alpine and arctic habitats, once occurring as far south as Mexico. They are highly dependent upon learned food locations within their home ranges. Adequate nutritional quality and quantity are important factors for successful reproduction. Diverse structural stages that support wide varieties of nourishing plants and animals are necessary for meeting the high-energy demands of these large animals. Grizzly bears follow phenological vegetative, tuber or fruit development, would seek out concentrated food sources including carrion, live prey (fish, mammals, insects), and are easily attracted to human food sources including gardens, grain, compost, bird seed, livestock, hunter gut piles, bait and garbage. Bears that lose their natural fear and avoidance of humans, usually as a result of food rewards, become habituated and may become food-conditioned. Grizzly bears will defend food and have been known to charge when surprised. As a result of real or perceived threats to human safety or property, both habituation and food

conditioning increase chances of human-caused grizzly bear mortality. Nuisance grizzly bear mortalities can be a result of legal management actions, defense of human life or illegal killing.

Adult grizzly bears are normally solitary, except females with cubs or during short breeding relationships. They will tolerate other grizzly bears at closer distances when food sources are concentrated and siblings may associate for several years following weaning (Jonkel and Cowan 1971; Craighead 1976; Egbert and Stokes 1976; Glenn et al. 1976; Herrero 1978). Across their range, home range sizes vary from about 50 square miles or more for females to a few hundred square miles for males. Overlap of home ranges is common. Grizzly bears may have one of the lowest reproductive rates among terrestrial mammals, resulting primarily from the late age at first reproduction, small average litter size, and the long interval between litters. Mating occurs from late May through mid-July. Females in estrus will accept more than one adult male (Hornocker 1962), and can produce cubs from different fathers the same year (Craighead et al. 1995). Age of first reproduction and litter size may be nutritionally related (Herrero 1978; Russell et al. 1978). Average age at first reproduction in the lower 48 states for females is 5.5 years and litter size ranges from one to four cubs that stay with the mother up to two years. Males may reach physiological reproductive age at 4.5 years, but may not be behaviorally reproductive due to other dominant males preventing mating.

Natural mortality is known to occur from intra-specific predation, but the degree this occurs in natural populations is not known. Parasites and disease do not appear to be a significant cause of natural mortality (Jonkel and Cowan 1971; Kistchinskii 1972; Mundy and Flook 1973; Rogers and Rogers 1976). As animals highly dependent upon learned habitat, displacement into unknown territory (such as subadult dispersal) may lead to submarginal nutrition, reduced reproduction, or greater exposure to adult predatory bears or human food sources (which can lead to human-caused mortality). Starvation and loss in dens during food shortages have been surmised, but have not been documented as a major mortality factor. Natural mortality in rare, relatively secretive animals such as grizzlies can be extremely difficult to document or quantify.

Human-caused mortality has been slightly better quantified, but recent models speculate that reported mortality may be up to 50 percent of actual mortality (McLellan et al. 1999). Between 1800 and 1975, grizzly populations in the lower 48 states declined drastically. Fur trapping, mining, ranching, and farming pushed westward, altered habitat, and resulted in the direct killing of grizzly bears. Historically, grizzly bears were targeted in predator control programs in the 1930's. Predator control was probably responsible for extirpation in many states that no longer support grizzlies. More recent human-caused mortality in Montana includes legal hunting (canceled in 1991), management control actions, defense of life, vehicle and train collisions, defense of property, mistaken identity by black bear or other big game hunters, poaching, and malicious killing. Grizzly bears normally avoid people, possibly as a result of many generations of bear sport hunting and human-caused mortality. Avoidance of roads can lead grizzly bears to either avoid essential habitat along roads, or could put them at greater risk of exposure to human-caused mortality if they do not avoid roads.

Habitat fragmentation is significant to large carnivores requiring wide vegetative and topographic habitat diversity (Servheen 1986). Loss and fragmentation of habitat is particularly relevant to the survival of grizzly bears. Large expanses of un-fragmented habitat are important for feeding, breeding, sheltering, traveling and other essential behavioral patterns. Grizzly bears occur at low densities, have low reproductive rates, exhibit individualistic behavior, and are largely dependent on riparian habitats also used extensively by people; thus, grizzly bear populations are susceptible to human influences. Grizzly bears may avoid key habitats due to human generated disturbances, or become habituated and food conditioned, which may ultimately lead to the animal being destroyed. Historically, as human settlements, developments, and roads increased in grizzly bear habitat, grizzly bear populations became fragmented. If fragmented population segments become smaller and/or isolated, they are more vulnerable to extinction, especially when human-caused mortality pressures continue. Linkage zones, or zones of habitat connectivity within or between populations of animals, foster the genetic and demographic health of the species.

Bader (2000) displayed potential secure areas that are spatially distributed within known male and female grizzly bear dispersal distances and he believes that the available information shows that effective linkages are possible for grizzly bear use and these linkage areas would increase persistence probabilities.

Proctor et al. (2012) compiled and analyzed all known genetic and movement data for grizzly bears in ten different study areas. They assessed the current state of genetic fragmentation within and between these study areas, and also used genetic assignment testing and movement data from radio-collared animals to compile what is known about current levels of male and female movement. Although there are differences in heterozygosity values among study areas and recovery zones, there have been no detectable consequences on grizzly bear morphology, physiology, ecology, or biology related to these differences in genetic diversity as evidenced by normal litter size, little evidence of disease, an equal sex ratio, and physical characteristics such as body size and weight (Schwartz et al. 2006a; Kasworm et al. 2008).

Grizzly bears have low reproductive rates (Bunnel and Tait 1981, *In* Proctor et al. 2004), long generational times (i.e., ten years), and are slow to disperse across landscapes (Proctor et al. 2004). Thus, there can be a lag time between fragmentation and resulting changes in genetic diversity. The genetic data collected by Proctor et al. (2012) reflect fragmentation occurring on the landscape in the recent past (i.e. last 30-60 years) and may not reflect current, improved levels of connectivity and recent movement of grizzly bears between some areas. In other words, current grizzly bear populations may not be as isolated as the genetic data of this study suggest. Therefore, it is useful to supplement these genetic data with movement data to get a complete picture of current population connectivity.

Connectivity is examined in both a genetic (requires males only) and demographic (requires females) framework. Male movements can enhance genetic diversity and reduce genetic fragmentation (Miller and Waits 2003; Proctor et al. 2012), while female movements into small populations are necessary to enhance growth rate (Procter et al. 2012). This concept is relevant to grizzly bear recovery in the Northern Cascades Ecosystem (NCE), Selkirk Ecosystem

(SE), and Cabinet-Yaak Ecosystem (CYE) recovery zones, all of which contain small populations that are demographically and genetically isolated to varying degrees. Maintaining and increasing movements by females (i.e., demographic rescue) from Canadian populations into the small U.S. grizzly bear populations (NCE, SE, and CYE) is critical to the long-term conservation of these populations. Recovery could be accomplished via natural movements or translocating animals.

In general, Proctor et al. (2012) found males move more frequently and over longer distances than females. This result is expected based on what we know about female home range size and the dispersal process. Females usually establish home ranges that 1) overlap with their mother's and 2) are smaller than male home ranges (Waser and Jones 1983; Schwartz et al. 2003). In doing so, individual females generally disperse over much shorter distances than male grizzly bears (McLellan and Hovey 2001; Proctor et al. 2004).

Proctor et al. (2012) examined known habitat use by grizzly bears in intervening habitats between Service-identified recovery zones. This habitat use is relevant to understanding how and where grizzly bears in different ecosystems may be linked in the near future. Proctor et al. (2012) found four males and one female using habitat between the Selkirk and Purcell Mountains in Canada, although there was no evidence indicating any migration between these two mountain ranges. One female grizzly bear with a cub is known to regularly use habitat between the NCDE and CYE. Prior to dropping her collar in 2006, she and her offspring spent most of their summer in the Salish Mountains of Montana less than 2 miles east of the edge of the CYE while denning within the boundaries of the NCDE recovery zone (Kasworm et al. 2010). Mace and Roberts (2011; 2012) documented the distribution of grizzly bears in and adjacent to the NCDE recovery zone based on a compilation of telemetry data, mortality data, and DNA detections and found that a number of both male and female grizzly bears are occupying habitat a substantial distance from the recovery zone boundary, including areas to the south, east, and west of the recovery zone.

Currently, it is not possible to tell if movements we are observing reflect an increase in bear movements or an increase in detection effort and technology (e.g., radio-transmitter collars; genetic techniques) (Proctor et al. 2012). These promising detections of grizzly bear movements should be tempered by the idea that detected movement does not mean migrants are breeding successfully. Successful reproduction is required for genetic or demographic rescue to occur. High mortality risk seems to be associated with migrant bears (Proctor et al. 2012). However, these data are helpful when considering how to most effectively manage and conserve the remaining grizzly bear populations in the lower 48 States. For example, these data emphasize the importance of maintaining demographic connectivity with Canadian populations and the small populations of the NCASC, SE, and CYE, while highlighting the importance of recovering these small populations so that they can provide genetic and demographic rescue for the Bitterroot Ecosystem. Of relevance, the NCDE appears to be well connected to Canadian populations genetically and its large population size means female movements from Canada into the NCDE are not absolutely required for demographic health to be maintained, although such female movements are beneficial. Similarly, the YGBE has a large enough population size that demographic rescue is not required. In 2003, Miller and Waits

suggested that one to two male migrants every ten years (i.e., genetic rescue) were adequate to maintain current levels of genetic diversity in the YGBE grizzly bear population.

Population Status and Distribution

The grizzly bear originally inhabited a variety of habitats from the Great Plains to the mountains of western North America, from central Mexico to the Arctic Ocean. With the advent of Euroamerican colonization in the early nineteenth century, grizzly bear numbers were reduced from over 50,000 to less than 1,000 in North America south of the Canadian border. Today, the grizzly bear occupies less than two percent of its former range south of Canada (U.S. Fish and Wildlife Service 1993). In the conterminous 48 States, only five remaining areas have either remnant or self-perpetuating populations. These remaining populations are principally located in mountainous regions in Washington, Idaho, Wyoming and Montana and are often associated with National Parks and wilderness areas.

Status of grizzly bears in the YGBE

The 9,209 square mile YGBE recovery zone includes portions of Wyoming, Montana and Idaho, portions of six National Forests (Beaverhead-Deerlodge, Bridger-Teton, Custer, Gallatin, Shoshone, and Targhee), Yellowstone and Grand Teton National Parks, John D. Rockefeller Memorial Parkway, portions of adjacent private and state lands and lands managed by the BLM. Grizzly bears also frequently use areas outside the defined YGBE recovery zone.

Population recovery criteria are measured within the recovery zone and an adjacent 10-mile buffer. A large proportion of the Yellowstone grizzly bear population occurs within the recovery zone. A large proportion of the grizzly bears in the YGBE recovery zone occur on protected lands in Yellowstone National Park, but grizzly bears also inhabit large areas outside the park boundary. Yellowstone and Grand Teton National Parks make up 39.4 percent of the YGBE recovery zone. Private holdings and other ownership make up 2.1 percent of the recovery zone and the remaining 58.5 percent occurs on Forest Service. National Park Service and National Forest lands support roughly 89 percent of the currently known distribution of the grizzly bears in the YGBE recovery zone. Grizzly bears also frequently occur in and use areas adjacent to the recovery zone.

The YGBE recovery zone is subdivided into smaller units to facilitate both the assessment of projects and recovery objectives. Eighteen bear management units (BMU) were formally delineated throughout the YGBE. BMUs were designed to:

- Assess the effects of existing and proposed activities on grizzly bear habitat without having the effects diluted by consideration of too large an area;

- Address unique habitat characteristics and grizzly bear activity and use patterns;

- Identify contiguous complexes of habitat which meet year-long needs of the grizzly bear; and

- Establish priorities for areas where land use management needs would require cumulative effects assessments.

Three demographic criteria that were formerly in the 1993 Grizzly Bear Recovery Plan (U.S. Fish and Wildlife Service 1993) have been reevaluated and updated. The second criterion pertaining to the distribution of females with offspring remains unchanged while the first and third criteria pertaining to the minimum allowable number of females with cubs of the year and sustainable mortality limits have been revised and updated to reflect current methods based on the best available science (U.S. Fish and Wildlife Service 2007). The current demographic recovery criteria to be appended to the 1993 Recovery Plan are:

- Demographic Recovery Criterion 1 – Maintain a minimum of 48 females with cubs of the year in the Greater Yellowstone Area (GYA), as indicated by the model-averaged Chao2 estimate for that year. The number of females with cubs of the year cannot drop below 48 for any 2 consecutive years;

- Demographic Recovery Criterion 2 – Sixteen of 18 bear management units within the recovery zone must be occupied by females with young, with no two adjacent bear management units unoccupied, during a 6-year sum of observations. This criterion is important as it ensures that reproductive females occupy the majority of the recovery zone and are not concentrated in on e portion of the ecosystem;

- Demographic Recovery Criterion 3 – For independent females (at least 2 years old), the current annual mortality limit, not to be exceeded in 2 consecutive years and including all sources of mortality, is 9 percent of the total number of independent females. For independent males (at least 2 years old), the current annual mortality limit not to be exceeded in 3 consecutive years and including all sources of mortality, is 15 percent of the total number of independent males. For dependent young (less than 2 years old), the current annual mortality limit, not to be exceeded in 3 consecutive years and including only known and probable human-caused mortalities, is 9 percent of the total number of dependent young.

The first and third criteria were changed because the Service no longer considers the 1993 recovery plan criterion the best scientific method available. The Chao2 estimator is now used to calculate the total number of independent females from sightings and re-sightings of females with cubs. This then allows calculation of total population size instead of the minimum population size as used in the 1993 method. Also, we can now calculate unknown and unreported mortalities, which allows more conservative mortality management based on annually updated information rather than the estimate of unknown and unreported mortality as used in the 1993 recovery plan. Data on the reproductive performance of Yellowstone grizzly bears, survival rates of cub and yearling Yellowstone grizzly bears, the trajectory of the Yellowstone grizzly bear population under alternate survival rates, and the impacts of spatial and environmental heterogeneity on the Yellowstone grizzly bear demographics has been improved and updated. See Table 1 for recovery criteria information.

Table 1. 2012 status of the Yellowstone grizzly bear ecosystem in relation to the recovery plan criteria (Haroldson 2013).

Population Parameter	Target or *Limit*	2012 Number
Model averaged number of females w/ COY	48	58
BMUs occupied by females with young	16	16
Independent female mortality limit is 9% of total number of independent females	*23*	15
Independent male mortality limit is 15% of total number of independent males	*24*	34
Dependent young mortality limit is 9% of total number of dependent young	*17*	6

Based on verified sightings of females with cubs of the year during 2012 and using the Chao2 method, it was determined that the model averaged number of females with cubs of the year was 58 (Haroldson 2013). Using this number, the estimated Yellowstone grizzly bear population size for 2012 is 610 (*Ibid*.).

Using the revised recovery criteria, it was determined that independent female and dependent young mortality limits were met in 2012, while independent male mortality limits were exceeded (IGBST 2013). The dependent young mortality limit was met in 2011 while independent female mortality was exceeded (Haroldson and Frey 2012). Independent male mortality was only fractionally exceeded (less than one bear) in 2011. Independent female mortality and dependent young mortality limits were both met in 2010 and independent male mortality was exceeded (Haroldson and Frey 2011). Mortality limits for independent females,

males, and dependent young were all met in 2009 (Haroldson and Frey 2010). The criteria states that independent female mortality cannot be exceeded in 2 consecutive years and that independent male mortality cannot be exceeded in 3 consecutive years. Because the thresholds for dependent young has been met in each of the last three years and independent female mortality was not exceeded in 2010 or 2012 the revised demographic recovery criteria are met for dependent young and independent females. Since the thresholds for independent male mortality have been exceeded in three consecutive years (2010, 2011, and 2012), the revised demographic recovery criteria are not met for independent male grizzly bears. GYE grizzly bear demographic workshops have recently taken place to complete a demographic review of the GYE grizzly bear population. The objectives of the workshops were to revise current protocols for estimating population size of the GYE grizzly bear population; reevaluate current mortality limits as necessary based on a revised estimate of population size and updated demographic analyses; and discuss the possibility of zoning the ecosystem for mortality limits given the expanding population (IGBST 2012).

Access management has long been an important tool for conserving grizzly bears and their habitat. The BMUs in the YGBE were further divided into smaller units, termed subunits. Subunits are approximately the size of an adult female grizzly bear home range and provide the basic scale for the analysis of impacts associated with access management and vegetation management projects.

Overall, conditions for grizzly bears related to access management in the YGBE are excellent. The YGBE recovery zone, for example, contains large amounts of secure habitat and very low total and open road densities in the majority of the subunits. In 2011, for the entire YGBE recovery zone, the mean secure habitat was 86.2 percent, the mean OMARD was 11.6 percent in season one (March 1 - July 15) and 12 percent in season two (July 16 - November 30), and the mean TMARD was 5.9 percent (van Manen et al. 2012).

The YGBE grizzly bear population has increased from estimates as low as 136 individuals when listed in 1975 to more than 580 animals as of 2004; this population had been increasing since the mid-1990s and was increasing at 4 to 7 percent per year (U.S. Fish and Wildlife Service 2007a). The population growth rate for the recent period is now stable to slightly increasing (Haroldson 2012). The range of this population also has increased dramatically as evidenced by the 48 percent increase in occupied habitat since the 1970s. Yellowstone grizzly bears continue to increase their range and distribution annually and grizzly bears in the Yellowstone area now occupy habitats they have been absent from for decades. Currently, roughly 90 percent of females with cubs occupy the Primary Conservation Area (PCA) (i.e. recovery zone) and about 10 percent of females with cubs have expanded out beyond PCA within the ecosystem.

The Service determined that the YGBE supports a grizzly bear population with sufficient numbers and distribution of reproductive individuals so as to provide a high likelihood that the species will continue to exist and be well distributed throughout its range for the foreseeable future. Therefore, based on the best scientific and commercial information available, the

Service delisted the Yellowstone grizzly bear DPS, effective April 30, 2007. The Service held that the State and Federal agencies' agreement to implement the extensive Conservation Strategy and State management plans would ensure that adequate regulatory mechanisms remain in place and that the Yellowstone grizzly bear population will not become an endangered species within the foreseeable future. However, on September 21, 2009, a court order vacated the final rule designating the Yellowstone DPS and removing the Yellowstone grizzly bear DPS from the list of threatened species and remanded the rule back to the Service. Therefore, YGBE grizzly bears are once again listed as threatened.

Status of grizzly bears in the NCDE

The NCDE extends from the Rocky Mountains of northern Montana into contiguous areas in Alberta and British Columbia, Canada. The U. S. portion of the NCDE includes parts of five National Forests (Flathead, Kootenai, Helena, Lewis and Clark, and Lolo), four wilderness areas (Bob Marshall, Mission Mountains, Great Bear and Scapegoat) and one wilderness study area (Deep Creek North). National Forest System lands encompass 63 percent of the NCDE. Additionally, the NCDE recovery zone includes Glacier National Park, the Flathead Indian Reservation (Salish-Kootenai tribal land), the Blackfeet Indian Reservation, adjacent private and state lands, and lands managed by the U.S. Bureau of Land Management. Grizzly bears from this population also frequently use areas outside the defined NCDE recovery zone.

Recently, two population studies were designed with the objective to more reliably estimate the number of grizzly bears inhabiting the NCDE (U.S. Geological Survey 2004). The U.S. Geological Survey (USGS) DNA-based mark-recapture study in the greater Glacier area collected information from 1998 through 2000. The USGS also conducted an extensive DNA-based study to estimate the grizzly bear population size in 7.8 million acres of occupied grizzly bear range in and around the NCDE recovery zone. The Northern Divide Grizzly Bear Project produced a final total NCDE grizzly bear population estimate of 765 grizzly bears for 2004 (Kendall et al. 2009). The total population estimate of 765 for 2004 illustrates the conservative nature of the recovery plan minimum population estimate of 304 grizzly bears in 2004. The DNA-based estimate is scientifically robust, and is more than two times the recovery plan estimate.

Further, in 2004, Montana Fish, Wildlife and Parks (MFWP) initiated a NCDE grizzly bear trend monitoring project (Mace and Chilton 2008). The program is ongoing and its purpose is to estimate population trend by monitoring the survival and productive rates of radio-instrumented female grizzly bears. Thus far, a total of 115 individual females have been captured and monitored (Mace and Roberts 2012). Results indicate an annual positive annual population trend of three percent since 2004, also indicative of an increasing grizzly bear population in the NCDE (*Ibid*.).

The 2004 NCDE-wide grizzly bear population estimate and the recent trend information is key in assessing the status of the population and assessing the impacts of current levels of human-caused mortality. The total population estimate of 765 grizzly bears reveals the conservative nature of the 1993 Recovery Plan criteria.

With the recent DNA-based population estimate, the methodology to estimate minimum population size outlined in the 1993 recovery plan has become outdated (Servheen in litt. 2008). In an effort to apply the DNA-based population estimate for the year 2004 to the existing recovery plan criteria (U.S. Fish and Wildlife Service 1993), the Service has outlined an interim process (Servheen in litt. 2008). This interim process will remain in effect until such time as the five-year status review and the formal recovery plan revision are complete.

Because the DNA-based population estimate is for the year 2004, the interim process makes some assumptions in order to be applicable to post-2004 grizzly bear populations, with the primary assumption being that grizzly bear populations do not increase or decrease rapidly. Assuming that grizzly bear populations increase or decrease slowly under most conditions, we will continue to use the 2004 population estimate of 765 grizzly bears post-2004, rather than use the Recovery Plan's minimum population estimate based on females with cubs. Using the 2004 population estimate is conservative because it is not accounting for the three percent positive population trend that has been calculated for the NCDE.

We continue to use the 1993 Recovery Plan criteria for grizzly bear mortality limits, applying the conservative 4 percent total mortality limit and the 30 percent female mortality limit. However, we now apply the criteria to the population estimate of 765 grizzly bears. As of 2012, the 6-year average of known human-caused total mortalities in the NCDE is 21.3 (U.S. Fish and Wildlife Service 2012). Using our criteria limits applied to the population estimate, we find that total known human-caused mortality is below the sustainable mortality level of no more than 30.6 per year. The 6-year average of known human-caused female mortalities in the NCDE is 7.3, also below the sustainable mortality level of no more than 9.18 per year. This is an interim application of the DNA-based population estimate of 765 grizzly bears using the methods in the 1993 recovery plan to determine the sustainable mortality limits for the NCDE.

Table 2. Known human-caused mortality, NCDE, 2007-2012 (U.S. Fish and Wildlife Service 2012).

Year	All Bears	All Female Bears
2007	26	7
2008	11	7
2009	20	7
2010	21	5
2011	30	13
2012	22	5
Total	128	44
6-year Average	21.3/year (*compared to sustainable 30.6/year*)	7.3/year (*compared to sustainable 9.18/year*)

As noted in previous biological opinions (U.S. Fish and Wildlife Service 2005, 2006), 2004 human-caused grizzly bear mortality levels in the NCDE were unusually high. The 34 human-caused mortalities recorded included 22 females (5 adult, 5 sub-adults, 3 yearlings, 8 cubs - including those with unknown fate), 11 males (2 adults, 6 sub-adults, 1 yearling, 2 cubs), and 1 unknown (yet undetermined remains). The 2004 mortalities included 11 illegal kills – the highest in seven years (in 2003, 10 illegal kills were reported). Many of the unprecedented number of conflicts in 2004 can be attributed to a dramatic huckleberry crop failure, and resulting conflicts arising from attractants on private lands luring bears onto private property (Manley 2005). Much of the recent grizzly bear mortality continues to be associated with conflicts arising from attractants on private lands. Notable is that annual human-caused grizzly bear mortality levels have decreased since 2004. For comparison, from 2008 through 2012, the number of management removals of grizzly bears ranged from 2 to 12 (U.S. Fish and Wildlife Service 2012). Consistently, mortalities from human-related causes are occurring on private lands in the NCDE greater than any other land ownership (Mace and Waller 1998, U.S. Fish and Wildlife Service 2012).

Status of grizzly bears in the CYE and SE

The CYE in northwestern Montana and northeastern Idaho has over 1,900 square miles of forested and mountainous habitat occupied by grizzly bears. A minimum population estimate of 35 grizzly bears was made for the Cabinet-Yaak recovery zone during 2006-2011 based on captures, genetic information, mortality, and sightings of unique individuals (Kasworm et al. 2012). Grizzly bears also occur to the north of the U.S.-Canada border, and interchanges of radio-collared bears across the border have been documented (U.S. Fish and Wildlife Service 1993).

The SE of northwestern Idaho, northeastern Washington, and southeastern British Columbia includes about 1,080 square miles in the U.S. portion and about 875 square miles in the Canadian portion of the recovery zone. The Selkirk recovery zone is the only defined grizzly bear recovery zone that includes part of Canada because the habitat in the U.S. portion is not of sufficient size to support a minimum population. The habitat is contiguous across the border and radio-collared bears are known to move back and forth across the border. Therefore, the grizzly bears north and south of the border are considered one population (U.S. Fish and Wildlife Service 1993).

Neither the CYE nor the SE grizzly bear populations have attained the Recovery Plan criteria for females with cubs. With the small sample sizes available to calculate population trend, Kasworm et al. (2012) determined a 64 percent probability that the population was declining. The Service determined that the combined SE-CYE grizzly bear recovery zones were warranted endangered but precluded in 1999 and suggested that the two populations might be inter-connected (FR 26725-26733).

The most recent data indicate that population status is also below recovery goals in the CYE for number of unduplicated females and the distribution of females with young in bear management subunits (Kasworm et al. 2012). However, the 6-year average mortality in the recovery zone for total bears and female bears met sustainable mortality recovery criteria

during 2006-2011 (*Ibid*.). However, it should be noted that the recovery plan established a goal of zero human-caused grizzly bear mortality for the CYE. This goal was not met. Montana Fish, Wildlife and Parks began augmenting the grizzly bear population in the Cabinet Mountains in 2005.

Status of the Selway-Bitterroot and North Cascades Ecosystems

Grizzly bear recovery efforts in the Selway-Bitterroot Ecosystem and North Cascades Ecosystem are in the planning stages. In the North Cascades Ecosystem, most of the grizzly bear population occurs north of the Canada - U.S. border, but a few grizzly bears persist south of the border. Though suitable habitat remains, grizzly bears were extirpated from the Selway-Bitterroot Ecosystem decades ago. The Service released a final environmental impact statement and decision notice addressing the impacts of reintroducing grizzly bears into the Bitterroot Ecosystem in east central Idaho (U.S. Fish and Wildlife Service 2000).

Conservation Needs of the Species

In 1993, the Grizzly Bear Recovery Plan (U.S. Fish and Wildlife Service 1993) outlined a strategy to recover grizzly bears built on the concept of recovery zones. Recovery zones were established to identify areas necessary for the recovery of the species and are defined as the area in each grizzly bear ecosystem within which the population and habitat criteria for recovery are measured. Areas within the recovery zones are to be managed to conserve grizzly bear habitat and managed primarily for grizzly bear habitat. The recovery zones are areas adequate for managing and promoting the recovery and survival of these grizzly bear populations (USFWS 1993). The recovery zones contain large portions of federal lands, including wilderness and national park lands, which are protected from the influence of many types of human uses occurring on lands elsewhere. All federal lands within recovery zones, including multiple use lands, are managed with grizzly bear recovery as a primary factor, in accordance with the Interagency Grizzly Bear Guidelines (U.S. Forest Service 1986). As anticipated in the Recovery Plan, the YGBE and NCDE grizzly bear populations have responded favorably to these conditions, have stabilized and are increasing and/or are at or near recovered levels. In addition, grizzly bear distribution has been expanding and continues to expand in areas outside of the recovery zones, as evidenced by the verified records of grizzly bears on or near portions of the Forest (Mace and Roberts 2012; van Manen et al. 2012).

Grizzly bears outside the recovery zones probably experience a higher level of adverse impacts due to land management actions than do grizzly bears inside. The recovery plan outlined that such areas would not be managed primarily to provide or conserve grizzly bear habitat. Thus, we expect grizzly bears will occur at lower densities outside the recovery zones than within the recovery zones as a result of suboptimal habitat conditions including higher road densities, fewer areas secure from motorized access, and more human presence and activity. The recovery plan anticipated that grizzly bears can and will exist outside recovery zone lines in many areas, but that the grizzly bears residing within the recovery zone were crucial to recovery goals and hence delisting. While land management direction outside of recovery

zones may have adverse effects on some of the individual grizzly bears using those areas area now and into the future, land management within the recovery zones will continue to favor the needs of grizzly bears.

Recently, federal, state and tribal agencies managing grizzly bears in the NCDE collaborated on the development of an interagency draft Conservation Strategy for NCDE Grizzly Bears (U.S. Fish and Wildlife Service 2013a). The draft NCDE Conservation Strategy identifies a Primary Conservation Area (PCA), which is basically the area now known as the recovery zone. It also identifies three additional management zones (Zone 1, Zone 2, and Zone 3) outside the PCA, each with varying levels of habitat protections depending on their relative importance to the NCDE grizzly bear population. The strategy's objective is to maintain a recovered grizzly bear population in the NCDE area sufficient to maintain a healthy population in biologically suitable habitats within areas identified as the PCA and Zone 1.

The PCA would be managed as a source area where the objective is continual occupancy by grizzly bears and maintenance of habitat conditions that are compatible with a stable to increasing grizzly bear population. The most conservative habitat protections would apply to the PCA. Management Zone 1 is delineated around the PCA, similar to the 10-mile buffer concept described in the Recovery Plan. Demographic recovery criteria would apply in Zone 1. The objective in Zone 1 is continual occupancy by grizzly bears but at expected lower densities than inside the PCA. Habitat protections would focus on managing motorized route densities to be compatible with a stable to increasing grizzly bear population. Attractant storage rules would also be implemented. The PCA and Zone 1 together would be the area within which NCDE grizzly bear population data are collected and sustainable mortality limits will apply.

The objective in Management Zone 2 is to maintain existing resource management and recreational opportunities and allow agencies to respond to demonstrated conflicts. The strategy indicates that grizzly bear occupancy within Zone 2 is not necessary to maintain a recovered status for the NCDE but it would be beneficial to other ecosystems if grizzly bears were able to occupy the zone in low densities. Because both male and female grizzly bears are already known to occur on occasion in portions of Zone 2 without any protections specifically in place for grizzly bears, maintaining a healthy population in the PCA and Zone 1, while reducing the potential for conflicts between grizzly bears and people in Zone 2 are goals of the strategy. The strategy indicates that the objective in Zone 2 is not necessarily continual occupancy but instead, to have a few males (or females) move through this area into other ecosystems, therefore less rigorous habitat protections are appropriate. The strategy indicates that public lands in Zone 2 will be managed to provide the opportunity for grizzly bears, particularly males which are more likely to disperse long distances, to move between the NCDE and adjacent ecosystems (i.e., the greater YGBE or the Bitterroot ecosystem) under the current direction in USFS and BLM Resource Management Plans. Here, the management emphasis will be on conflict prevention and response. Attractant storage rules would be implemented on most Federal and State lands.

Management Zone 3 of the draft NCDE Conservation Strategy primarily consists of areas where grizzly bears do not have enough suitable habitat for long-term survival and occupancy. Grizzly bear occupancy will not be actively discouraged and management emphasis will be on conflict response.

In 2007, the Final Conservation Strategy for the Grizzly Bear in the Greater Yellowstone Area (Interagency Conservation Strategy Team 2007) was released to guide management and monitoring of the YGBE grizzly bear population and its habitat upon recovery and delisting. The Yellowstone Conservation Strategy identified a PCA, which is the same area as the YGBE recovery zone as identified in the 1993 Recovery Plan.

Within this strategy, management direction is described for both the PCA and adjacent areas within the greater Yellowstone area (GYA). The habitat standards identified in the Yellowstone Conservation Strategy would be maintained at identified levels inside the PCA. In addition, several other habitat factors would be monitored and evaluated. Habitat standards and habitat criteria monitoring focus on areas within the PCA. The goal is to maintain or improve habitat conditions existing as of 1998, as measured within each subunit within the PCA. The Yellowstone Conservation Strategy states that state grizzly bear management plans, forest plans, and other appropriate planning documents will provide specific management direction for the adjacent areas outside the PCA.

Recently in 2013, the Service proposed a draft revised supplement to the 1993 Recovery Plan (U.S. Fish and Wildlife Service 2013b). The supplement would revise the demographic recovery criteria for the Yellowstone ecosystem. Included within this draft revised supplement, a monitoring area is designated, within which all demographic criteria would be assessed. The areas within which mortalities are counted against the mortality limits for independent females and males and dependent young would be revised to be the same area where population size is estimated. Grizzly bear mortalities would no longer count against sustainable mortality limits in areas outside of this monitoring area. Conversely, grizzly bears observed outside of this monitoring area would not count toward the estimates of population size. Mortalities outside of the monitoring area would continue to be recorded and reported. Also, grizzly bear occupancy would not be actively discouraged outside of the monitoring area but management emphasis would be on conflict response.

We note that the documents listed above that have been developed since the 1993 Recovery Plan are draft or in various stages of implementation. However, at this time, the Service holds that the strategies described in these documents, and updates, reflect the best available science on grizzly bear recovery.

Analysis of the Species/Critical Habitat Likely to be Affected

The supplemental biological assessment determined that the Revised Forest Plan would be likely to adversely affect individual grizzly bears. Therefore, formal consultation with the Service was initiated and this biological opinion has been written to determine whether or not activities associated with this project are likely to jeopardize the continued existence of grizzly

bears or result in the destruction or adverse modification of grizzly bear critical habitat. Grizzly bears are listed as threatened under the Act. Critical habitat has not been designated for this species; therefore none would be affected by the proposed action.

IV. ENVIRONMENTAL BASELINE

Under the provisions of section 7(a)(2), when considering the "effects of the action" on listed species, the Service is required to consider the environmental baseline. Regulations implementing the Act (50 CFR 402.02) define the environmental baseline as the past and present impacts of all federal, state, or private actions and other human activities in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed federal projects in the action area that have undergone section 7 consultation, and the impacts of state and private actions which are contemporaneous with the consultation in progress. Action area, as defined by the Act, is the entire area to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action.

The action area for the analysis of effects of the Revised Forest Plan includes the entire Forest. For consideration of the environmental baseline for this action, we considered the direction in the 1986 Forest Plan that was in place prior to the Revised Forest Plan to reflect prior plan direction as well as the habitat conditions in 2009, when the Revised Forest Plan was adopted. With this information we moved forward with the analysis of effects of the Revised Forest Plan direction on grizzly bears (see the "Effects of the Action").

The action area lies mainly outside of recovery zones. The 2007 Yellowstone Conservation Strategy was incorporated into the Revised Forest Plan and provides direction related to the YGBE grizzly bear population as discussed above. A portion of the Hilgard #1 subunit within the YGBE recovery zone lies within the Forest. Furthermore, a portion of the Gravelly Landscape is within the YGBE monitoring area as proposed in the draft revised supplement to the 1993 Recovery Plan (U.S. Fish and Wildlife Service 2013b). The remaining portions of the Yellowstone analysis area are located outside of both the recovery zone and the proposed monitoring area.

All of the WNAA is located outside of the recovery zones. A small portion of the WNAA, including all or portions of the Boulder River and Jefferson River Landscapes, has been identified as part of the Zone 2 management area as described in the Draft Interagency Conservation Strategy for the NCDE. None of the action area is within the NCDE recovery zone (PCA) or management Zones 1 or 3.

As mentioned earlier, in 2010 we completed a biological opinion on the effects of the Revised Forest Plan on grizzly bears (USFWS 2010). The 2010 consultation analyzed the effects of the Revised Forest Plan on grizzly bears in those areas of the Forest where, at the time, we considered grizzly bears as being present or where grizzly bears might occur during the life of the plan. This portion of the Forest encompasses the Yellowstone analysis area which included the Madison, Gravelly, and Tobacco Root landscapes in their entirety, and a small portion of the Jefferson River and Upper Clark Fork landscapes to include the Highland Mountains. Grizzly

bears are known to occur in the Madison and Gravelly landscapes. Since the 2010 biological opinion was completed, new information indicates verified observations of grizzly bears on the Forest outside of the Yellowstone analysis area. In addition, grizzly bear populations in both the YGBE to the south and east and the NCDE to the north continue to expand their range albeit slowly in some areas, and so we expect that additional grizzly bears may inhabit more portions of the Yellowstone analysis area and the WNAA over the life of the Revised Forest Plan.

Where appropriate, we incorporate by reference those sections and pages of the 2010 biological opinion. We also include an analysis for grizzly bears for the remaining portions of the Forest (i.e. the WNAA). The WNAA includes the following eight landscapes on the western and northern portions of the Forest: Lima Tendoy, Pioneer, Big Hole, Upper Rock Creek, Clark Fork-Flints, Boulder River, Upper Clark Fork, and Jefferson River.

We note that a portion of the Elkhorn Landscape occurs on the Forest, however the majority of the landscape occurs on the Helena National Forest. Therefore, management of the Elkhorn Landscape, including the Beaverhead-Deerlodge Forest's portion, is addressed by the Helena National Forest and so is not part of this biological opinion.

Status of the Species within the Action Area

This section focuses on the status of grizzly bears occurring on the Forest. For the Yellowstone analysis area, we incorporate here by reference page 13 of the 2010 biological opinion (U.S. Fish and Wildlife Service 2010) (Appendix A, section 1). The following focuses on the status of grizzly bears within the WNAA.

Grizzly bears are now found in the WNAA on the Forest, however actual bear use of the WNAA is not well known. Reports and observations of grizzly bears on or near the northern portions of the Forest span about seven years and include three mortalities (all males) in close proximity to the Forest boundary. In the early spring of 2012, a wolverine bait station motion detector camera maintained by MFWP documented an independent grizzly bear (of unknown gender) near the divide in the headwaters of the Little Blackfoot River on the northern boundary between the Beaverhead-Deerlodge National Forest and the Helena National Forest. Approximately eight new verified observations of grizzly bears or their tracks have occurred on the Forest in the WNAA since the 2010 consultation. All DNA evidence indicates these grizzly bears came from the NCDE population (L. Roberts, MFWP, pers. comm. 2013). These observations have been north of Butte in Elk Park, in the headwaters of the Little Blackfoot River, in the headwaters of Cottonwood Creek, in the Lockhart Meadows area, in the Boulder River watershed, and north and west of Anaconda in the Philipsburg and Rock Creek drainage area (U.S. Forest Service 2012, J. Jonkel, MFWP, pers. comm. 2012).

It is unknown if these eight verified observations represent eight individual grizzly bears. It is possible that they represent less than eight unique individuals. Also, it is possible that more grizzly bears are using the Forest than are being verified. Grizzly bears have low reproductive rates (Bunnel and Tait 1981, *in* Proctor et al. 2004), long generational times (i.e., 10 years), and

are slow to disperse across landscapes (Proctor et al. 2004). While grizzly bears have not been verified as inhabiting all landscapes of the WNAA or Yellowstone analysis area, occurrence is possible in these landscapes during the life of the Revised Forest Plan (15 years).

Factors Affecting Species Environment within the Action Area

This section identifies and describes key areas of Forest management that affect the grizzly bears' environment. These factors include access management, attractant management and developed sites, livestock management, vegetation management, fire management, and oil and gas leasing. General impacts of these factors will be discussed in more detail in the '*Effects of the Action*' section below.

For specific information related to the Yellowstone analysis area, we incorporate by reference pages 13 through 19 of our 2010 biological opinion (Appendix A, section 1). These incorporated pages describe Forest management under the 1986 Forest Plan that affected grizzly bears in the Yellowstone analysis area, including: access management, attractant management and developed sites, livestock management, vegetation management, and fire management. The following describes Forest management under the 1986 Forest Plan that affected grizzly bears in the WNAA and on-the-ground conditions in 2009, when the Revised Forest Plan was signed.

Access Management

The baseline information on access management for the Yellowstone analysis area was included in the 2010 biological opinion (U.S. Fish and Wildlife Service 2010); we incorporate that information here by reference, pages 13 through 15 (Appendix A, section 1a). The following information is applicable to WNAA.

Motorized access has long been recognized as a major factor affecting grizzly bears (see section below, '*General Effects of Roads on Grizzly Bears'*). In the previous Forest Plan, the summer and fall seasons were defined as May 15 to December 1 and the winter season was defined as December 2 to May 14. Open motorized road and trail densities were calculated for the summer (5/16 to 10/14) and fall (10/15 to 12/1) seasons. Densities in the fall are reduced from those in the summer in order to increase wildlife security during the general hunting season. This fall period represents a substantial pulse of dispersed recreation related to deer and elk hunting that is unmatched at other times of the year (U.S. Forest Service 2012). Table 2 displays the existing linear motorized route density and percent secure habitat within the WNAA at the landscape scale during the summer season. Table 3 displays the existing linear motorized route density and secure areas within the WNAA at the hunting unit scale during the fall season. These tables do not include the access management baseline condition for the Yellowstone analysis area, which can be found in the 2010 biological opinion. The WNAA is highly roaded in some areas with the Boulder River and Upper Clark Fork Landscapes having the highest existing linear route density during the summer (2 miles per square mile). During the fall, hunting districts 215 and 318 have the highest existing linear route density (1.9 miles per square mile). Secure area is defined as areas larger than 10 acres that are 1/3 of a mile from a route open to motorized vehicles.

Table 2. Linear road density averages and percent secure area by landscape within the WNAA in 1986 and in 2009 (U.S. Forest Service 2012, *in litt*.).*

Landscape	Total Size (Square Miles)	Total Open Road Miles		Summer Open Motorized Road and Trail Density (miles/square mile)		Summer Secure Area (percent of landscape)	
		1986	2009	1986	2009	1986	2009
Big Hole	848	1,072	980	1.3	1.2	49%	55%
Boulder River	342	678	674	2.0	2.0	31%	32%
Clark-Fork Flints	667	1,204	1,183	1.8	1.8	36%	38%
Jefferson River	332	596	575	1.8	1.7	41%	44%
Lima-Tendoy	583	638	576	1.1	1	48%	53%
Pioneer	912	1,184	1,134	1.3	1.2	50%	53%
Upper Clark Fork	147	300	295	2.0	2	28%	29%
Upper Rock Creek	454	426	407	.9	.9	60%	62%

*The linear road densities for the 1986 Plan are provided in order to analyze the impacts of the Revised Forest Plan. However, also included in the table are the linear road densities that occurred on-the-ground at the time of the Revised Forest Plan ROD. The effects section will display the desired condition as detailed in the Revised Forest Plan.

Table 3. Fall (10/15 to 12/1) linear road density averages and percent secure area by hunting unit within the WNAA in 1986 and 2009 (U.S. Forest Service 2012, *in litt*.).*

Management Area	Total Size (Square Miles)	Total Road Miles		Fall Motorized Route Density (miles/square mile)		Fall Secure Area (percent of hunting unit)	
		1986	2009	1986	2009	1986	2009
210	138	128	128	.9	.9	56%	56%
211	304	168	162	.6	.5	72%	73%
212	276	365	360	1.3	1.3	44%	45%
213	109	160	152	1.5	1.4	38%	41%
214	109	178	178	1.6	1.6	50%	50%
215	126	234	234	1.9	1.9	29%	29%
216	110	94	83	.9	.8	59%	63%
300	120	81	81	.7	.7	66%	66%
302	111	138	124	1.2	1.1	36%	41%
311	4	0	0	0	0	93%	93%
318	224	424	424	1.9	1.9	32%	32%

319	285	198	184	.7	.6	67%	69%
321	485	547	479	1.1	1	52%	60%
328	195	193	160	1	.8	50%	58%
329	219	222	210	1	1	52%	55%
331	464	631	601	1.4	1.3	49%	53%
332	449	365	356	.8	.8	62%	63%
340	169	247	240	1.5	1.4	42%	43%
341	59	35	35	.6	.6	61%	61%
350	264	383	360	1.5	1.4	51%	55%
370	66	58	56	.9	.9	54%	55%

*The linear road densities for the 1986 Plan are provided in order to analyze the impacts of the Revised Forest Plan. However, also included in the table are the linear road densities that occurred on-the-ground at the time of the Revised Forest Plan ROD. The effects section will display the desired condition as detailed in the Revised Forest Plan.

Winter motorized use occurs on the Forest outside of designated wilderness. In the previous Forest Plan, winter motorized use was allowed between December 2 and May 14. Table 4 displays the acreage open to snowmobiling by landscape within the WNAA. Refer to the 2010 biological opinion for baseline winter motorized use information for the Yellowstone analysis area, incorporated here by reference, pages 14 through 15 (Appendix A, section 1a).

Table 4. Pre-Forest plan revision acres available to winter motorized access within the WNAA (U.S. Forest Service 2012).

Landscape	Acres in Landscape	Acres Open to Winter Motorized Use (percent of Landscape open)
Big Hole	542,823	449,583 (83%)
Boulder River	219,050	189,131 (86%)
Clark-Fork Flints	426,799	399,499 (94%)
Jefferson River	212,226	190,573 (90%)
Lima-Tendoy	372,954	291,963 (78%)
Pioneer	583,791	531,932 (91%)
Upper Clark Fork	93,940	74,276 (79%)
Upper Rock Creek	290,598	207,880 (72%)

Food and Attractant Storage and Site Development

Three different attractant management orders are currently in place on the Forest. However, none apply to the WNAA. The baseline information on food storage and site development for the Yellowstone analysis area was included in the 2010 biological opinion (U.S. Fish and Wildlife Service 2010); we incorporate that information here by reference, pages 15 and 16 (Appendix A, section 1b). The following information is applicable to WNAA.

The Forest has 108 Forest Service developed sites in the WNAA. Table 5 displays the number and type of developed sites by landscape. No conflicts between grizzly bears and humans have occurred within this area to date.

Table 5. Developed sites in the WNAA (U.S. Forest Service 2012).

Landscape	Cabins	Campgrounds or Camp Areas	Picnic Sites	Trailheads	Total # of Sites
Big Hole	5	10	1	6	22
Boulder River	0	4	5	1	10
Clark-Fork Flints	3	10	8	1	22
Jefferson River	1	3	2	1	7
Lima-Tendoy	2	4	0	0	6
Pioneer	2	16	2	6	26
Upper Clark Fork	1	1	3	1	6
Upper Rock Creek	3	6	0	0	9
TOTAL	**17**	**54**	**21**	**16**	**108**

Livestock Grazing

The baseline information on livestock grazing for the Yellowstone analysis area was included in the 2010 biological opinion (U.S. Fish and Wildlife Service 2010); we incorporate that information here by reference, pages 16 and 17 (Appendix A, section 1c). The following information is applicable to WNAA.

The Forest has 189 livestock allotments distributed across the WNAA. Of these, 187 are cattle and horse allotments which are generally stocked with cow/calf pairs with some stocked with yearling cows. The remaining two allotments are stocked with domestic sheep. These two sheep allotments are in the Lima-Tendoy Landscape, which is the southwestern corner of the Forest. No grizzly bears have been verified in this landscape to date. Table 6 displays the number and type of livestock allotments by landscape. No documented grizzly bear depredations on livestock have occurred within the WNAA.

As displayed in Table 6, about 75 percent of the land area is within an actual livestock allotment. However, not all allotments are actively grazed by livestock (U.S. Forest Service 2012). Livestock allotments are generally delineated using naturally-occurring boundaries and landscape features such as watershed divides and ridgelines. Lower allotment boundaries are often the Forest boundary at or near the valley bottom. A substantial portion of delineated livestock allotments may be physically unavailable to cattle or may be timbered and producing little forage (*Ibid*.).

Table 6. Livestock allotments within the WNAA (U.S. Forest Service 2012).

Landscape	Cattle/Horse		Sheep		Permitted numbers**
	Number of Allotments*	Acres	Number of Allotments	Acres	
Big Hole	29	324,199			5,238
Boulder River	17	203,537			2,451
Clark-Fork Flints	32	183,192			3,490
Jefferson River	16	170,645			3,040
Lima-Tendoy	41	280,884	2	11,696	7,919 cow/calf 1,203 sheep
Pioneer	27	364,351			6,070
Upper Clark Fork	19	69,448			740
Upper Rock Creek	15	197,397			1,420
TOTAL	**189 total allotments; 196 allotment parts***	**1,793,653**	**2**	**11,696**	**30,712 cow/calf 1,203 sheep**

*Some allotments have been counted more than once as they occur in more than one landscape. So, the total count is really the count of *allotment parts per landscape*. However, the acres are not double-counted.
**permitted numbers are the number of cow calf pairs permitted on the allotment

Vegetation Management

The baseline information on vegetation management for the Yellowstone analysis area was included in the 2010 biological opinion (U.S. Fish and Wildlife Service 2010); we incorporate that information here by reference, pages 17 and 18 (Appendix A, section 1d). The following information is applicable to WNAA.

Suitable timber is defined as those acres that are classified as available for timber production and are specifically managed for growth yield. Prior to the Revised Forest Plan, approximately 614,000 acres were identified as being in the suitable timber base for the WNAA. Approximately 591,000 additional acres were identified as not suitable for timber production but available for management entry for other resource benefits, such as fuel reduction, salvage, and wildlife habitat improvement. No harvest was allowed on the remaining 1,540,000 acres. Table 7 below displays suitable timber acres by landscape within the WNAA.

Table 7. Suitable timber acres within the WNAA from the 1986 Forest Plan (U.S. Forest Service 2012).*

Landscape (acres)	Timber Suitability Classification	Acres	Percent of Landscape
Big Hole (542,823)	Suitable for Timber Production	184,766	34
	Not Suitable, Timber Harvest Allowed	123,730	23
	Not Suitable, No Harvest Allowed	235,034	43
Boulder River (219,050)	Suitable for Timber Production	81,327	37
	Not Suitable, Timber Harvest Allowed	60,842	28
	Not Suitable, No Harvest Allowed	76,881	35
Clark-Fork Flints (426,799)	Suitable for Timber Production	113,777	27
	Not Suitable, Timber Harvest Allowed	88,871	21
	Not Suitable, No Harvest Allowed	224,284	53
Jefferson River (212,226)	Suitable for Timber Production	28,076	13
	Not Suitable, Timber Harvest Allowed	59,248	28
	Not Suitable, No Harvest Allowed	125,011	59
Lima-Tendoy (372,954)	Suitable for Timber Production	30,047	8
	Not Suitable, Timber Harvest Allowed	74,802	20
	Not Suitable, No Harvest Allowed	268,808	72
Pioneer (583,791)	Suitable for Timber Production	68,505	12
	Not Suitable, Timber Harvest Allowed	99,895	17
	Not Suitable, No Harvest Allowed	416,528	71
Upper Clark Fork (93,940)	Suitable for Timber Production	21,844	23
	Not Suitable, Timber Harvest Allowed	31,007	33
	Not Suitable, No Harvest Allowed	41,085	44
Upper Rock Creek (290,598)	Suitable for Timber Production	85,983	30
	Not Suitable, Timber Harvest Allowed	52,941	18
	Not Suitable, No Harvest Allowed	152,380	52

*Landscape totals do not add up exactly to the suitable/not suitable totals for that landscape primarily due to rounding differences when summarizing many small polygons that make up the landscape. When aggregating different datasets up to the landscape level, the rounding of numerous small polygon acres can result in varying totals landscape wide.

Fire Management

Wildland fire control efforts and use of prescribed burning occurs within both the WNAA and the Yellowstone analysis area. Fire is also used for resource benefit as a management tool for vegetation and fuels. The acres available and locations where such methods are used vary across the Forest. The use of wildland fire for resource benefit may also be used as a management tool across the Forest.

Oil and Gas

The effects of oil and gas exploration and development were not considered in the 2010 biological opinion. Therefore, the entire action area (i.e. the Forest) is included for the purposes of baseline information related to oil and gas. However, oil and gas exploration and development is limited to what is known as the former Beaverhead National Forest and includes the Anaconda, Beaverhead, Pioneer, Tendoy, Madison, Gravelly, and Tobacco Root Mountains. These mountain ranges occur in all or portions of the following Landscapes: Madison, Gravelly, Lima Tendoy, Tobacco Root, Jefferson River, Pioneer, and Big Hole.

The following describes the decision process for oil and gas development and was taken directly from the 2012 biological assessment (U.S. Forest Service 2012):

- First, the federal land management agency, in conjunction with the Bureau of Land Management, identifies areas that are available for leasing and establishes lease stipulations governing the use of these areas (according to the Mineral Leasing Act of 1920, The Mineral Leasing Act for Acquired Lands of 1947 and the Federal Onshore Oil and Gas Leasing Reform Act of 1987). Identifying lease areas and stipulations is conducted under NEPA and decisions related to lands open for leasing and stipulations are, most often, documented in a Record of Decision.
- Second, when interest in leasing is expressed, the BLM delineates individual lease parcels. Stipulations required by the leasing decision are applied to parcels. BLM state offices hold four or more lease sales per year. Leases are awarded to the highest bidder at the sale or, if competitive interest is lacking, on a non-competitive basis following the sale.
- Third, following award, lessees may submit an *Application for Permit to Drill* (APD) which contains the site specific plan of operations. The BLM and the federal land management agency review the APD and, using a second stage of NEPA processing, develop conditions-of-approval within the terms of the lease. The resulting Permit to Drill contains site specific requirements for ground-disturbing exploration and development.

During the 1980s, most available land on the Forest was leased. All of these 1980s era leases have since lapsed. Only three wells were drilled on the Forest. All three wells were dry and have been reclaimed. A few new leases were issued since 1996 but have also lapsed. The 1995 Beaverhead reasonable foreseeable development scenario (RFDS) predicted that 14 wells would be drilled over a 15 year period. To date, no wells have been drilled. As oil prices rose in 2007, twelve parcels were leased on the Forest. Table 8 displays the potential for oil and gas development as of the 1996 oil and gas record of decision. Refer to the biological assessment (U.S. Forest Service 2012) for more specific information displayed by mountain range from the 1995 RFDS.

Table 8. 1996 development potential on the Forest (U.S. Forest Service 2012).

Stipulation and Potential	1996 Oil and Gas ROD – acres
Legally Unavailable Mod & Low Potential	244,000
Legally Unavailable Very Low Potential	268,000
Administratively Unavailable Mod and Low potential	*
Administratively Unavailable Very Low Potential	*
No Surface Occupancy Moderate & Low Potential	329,000
No Surface Occupancy Very Low Potential	150,000
Timing Limitation Moderate & Low Potential	**
Timing Limitation Very Low Potential	**
Controlled Surface Use Moderate & Low	474,000
Controlled Surface Use Very Low Potential	268000
Total Acres	2,149,000

*legally and administratively unavailable areas combined in 1996 EIS.
** Timing limitations not included in 1996 EIS. Source: Revised FEIS P. 336-Table 79

Other Factors Affecting Grizzly Bears

During the fall hunting season (10/15 through 12/1), the Forest receives a substantial pulse of dispersed recreation activity related to deer and elk hunting. This pulse in activity is unmatched at any other time during the year. Southwestern Montana receives approximately 45 percent of the elk hunting pressure in the state and the bulk of this is focused on the hunting districts located on the Forest (USDA 2009b *in* U.S. Forest Service 2009)

The Montana legislature has created policy to direct MFWP protect, conserve, and manage grizzly bears as a rare species of Montana wildlife. With this in mind, the Fish, Wildlife & Parks Commission developed a grizzly bear policy (Section 12.9.103, ARM) to address the need to protect grizzly bear habitat, the need to pursue grizzly research, the role of sport hunting in grizzly bear management, depredations, and the appropriate department response to depredations, and requires compliance with federal regulations relating to grizzly bears (Montana Fish, Wildlife and Parks 2001). Under this direction, MFWP has implemented a conservation program to manage and enhance grizzly bear populations. In 2002, MFWP prepared the Grizzly Bear Management Plan for Southwestern Montana 2002-2012 and Final Programmatic Environmental Impact Statement with input from the Montana Grizzly Bear

Working Group and other interested parties (Montana Fish, Wildlife and Parks 2002). MFWP is currently operating under this existing but expired plan and is in the process of rewriting a new plan. The new plan will be subject to the Montana environmental policy act and public review and comment.

V. EFFECTS OF THE ACTION

Under section 7(a)(2) of the Act, "effects of the action" refers to the direct and indirect effects of an action on the species or critical habitat, with the effects of other activities interrelated or interdependent with that action. Indirect effects are those caused by the proposed action and are later in time, but still are reasonably certain to occur (50 CFR 402.02). The effects of the action are added to the environmental baseline to determine the future baseline and to form the basis for the determination in this opinion. Should the federal action result in a jeopardy situation and/or adverse modification conclusion, the Service may propose reasonable and prudent alternatives that the federal agency can take to avoid violation of section 7(a)(2). The effects discussed below are the result of direct and indirect impacts of implementing the proposed action.

Access Management

General Effects of Roads on Grizzly Bears

Research has confirmed the adverse impacts of roads on grizzly bears (Mace et al. 1996, Mace et al. 1999). Negative impacts associated with roads and excessive road densities influences grizzly bear population and habitat use patterns in numerous, widespread areas. The Grizzly Bear Compendium (IGBC 1987) summarized impacts reported in the literature including:

- Avoidance/displacement of grizzly bears away from roads and road activity;
- Changes in grizzly bear behavior, especially habituation to humans, due to ongoing contact with roads and human activities conducted along roads;
- Habitat loss, modification, and fragmentation due to roads and road construction, including vegetative and topographic disturbances; and
- Direct mortality from road kills, legal and illegal harvest, and other factors resulting from increased human-bear encounters.

Mortality is the most serious consequence of roads in grizzly bear habitat. Mortalities can occur from illegal shooting or collisions with vehicles, or indirectly through habituation to human presence.

Grizzly Bear Mortality The specific relationship between roads and the mortality risk to grizzly bears is difficult to quantify. The level of human use of roads is one of several factors influencing the mortality risk associated with any road. Research supports the premise that forest roads facilitate human access into grizzly bear habitat, which directly or indirectly increases the risk of mortality to grizzly bears. Grizzly bears were increasingly vulnerable to illegal and legal harvest as a consequence of increased road access by humans in Montana (Mace et al. 1987) and in the Yellowstone region (Mattson et al. 1992). In southeastern British Columbia, McLellan and Shackleton (1988) reported roads increased access for legal hunters and poachers, the major source of adult grizzly mortality. McLellan (1989b) reported that 7 of 13 successful legal hunters interviewed had been on a road when they harvested their grizzly bear. McLellan and Mace (1985) found that a disproportionate number of mortalities occurred near roads. In the Yellowstone ecosystem, Mattson and Knight (1991) reported that areas influenced by secondary roads and major developments were most lethal to grizzly bears. Aune and Kasworm (1989) reported 63 percent of known, human-caused grizzly bear deaths on the east front of the Rocky Mountains occurred within 1 kilometer (0.6 miles) of roads, including 10 of 11 known female grizzly bear deaths. In Montana, Dood et al. (1986) reported that 48 percent of all known, non-hunting mortalities during the period of 1967 through 1986 occurred within 1 mile of roads. Grizzly bears were also killed by vehicle collision, the most direct form of road-related mortality (Greer 1985, Knight et al. 1981, Palmisciano 1986).

The presence of roads alone does not necessarily result in direct mortality of grizzly bears, but the proximity of the roads to human population centers, resulting high numbers of people using roads, and dispersed recreation in habitat around roads can pose considerable risks to grizzly bears. Social values and attitudes also contribute to the level of mortality risk to grizzly bears. Incidental or accidental human-caused grizzly bear mortality, combined with a few individuals intent on illegally shooting grizzly bears, can collectively result in serious, detrimental effects to grizzly bear populations. Access management can be instrumental to reducing mortality risk to grizzly bears by managing the present and anticipated future road use-levels resulting from the increasing human population in western Montana.

Displacement and Security Some grizzly bears, particularly subadults, readily habituate to humans and consequently suffer increased mortality risk. However, many grizzly bears under-use or avoid otherwise preferred habitats that are frequented by people. Such under-use of preferred habitat represents modification of normal grizzly bear behavior. Negative association with roads arises from the grizzly bears' fear of vehicles, vehicle noise and other human-related noise around roads, human scent along roads and hunting and shooting along or from roads. Grizzly bears that experience such negative consequences learn to avoid the disturbance and annoyance generated by roads. Some may not change this resultant avoidance behavior for long periods after road closures. Even occasional human-related vehicle noise can result in annoying grizzly bears to the extent that they continue to avoid roads.

All factors contributing to direct links between roads and displacement from habitat have not been quantified. As with mortality risk, the level of road-use by people is likely an important factor in assessing the potential displacement caused by any road. Contemporary research, however, indicates that grizzly bears consistently were displaced from roads and habitat

surrounding roads, often despite relatively low levels of human use (Mattson et al. 1987, McLellan and Shackleton 1988, Aune and Kasworm 1989, Kasworm and Manley 1990, Mace and Manley 1993, Mace et al.1996).

Avoidance behavior is often strongest in adult grizzly bears, with males selecting for high quality habitats and absence of humans (Gibeau et al. 2002). Males that were found using high quality habitat near roads, did so during the night where hiding cover was available (ibid). However, adult females were more likely to avoid humans all together, rather than seek out the highest quality habitats. Mueller et al. (2004) reported all age and sex classes used habitats closer to high-use roads and development during the human inactive period. All bears showed a considerably greater avoidance of high-use roads and development during periods of high human activity. However, regardless of the time of day, subadult bears were found closer to high-use roads than adult bears. Gibeau et al. (2002) also demonstrated that subadults were almost always closer to human activity than adults.

In Montana, Aune and Stivers (1982) reported that grizzly bears avoided roads and adjacent corridors even when the area contained preferred habitat for breeding, feeding, shelter, and reproduction. McLellan and Shackleton (1988) found that grizzly bears used areas near roads less than expected in southeastern British Columbia and estimated that 8.7 percent of the total area was rendered incompatible for grizzly bear use because of roads. In Montana, Mace and Manley (1993) reported use of habitat by all sex and age classes of grizzly bears was less than expected in habitats where total road densities exceeded two miles per square mile. Twenty-two percent of the South Fork Study area exceeded two miles per square mile. Adult grizzly bears used habitats less than expected when open motorized access density exceeded one mile per square mile. Further, female grizzly bears in the South Fork Study area tended to use habitat more than 0.5 mile from roads or trails greater than expected. As traffic levels on roads increased, grizzly bear use of adjacent habitat decreased (Mace et al. 1996). In Yellowstone, Mattson et al. (1992) reported wary grizzly bears avoided areas within 2 kilometers (1.2 miles) of major roads and 4 kilometers (2.4 miles) of major developments or town sites.

Mace et al. (1996) and other researchers have used 500 meters as the zone of influence around roads. Waller and Servheen (2005) also demonstrated avoidance of areas within 500 meters of US-2. Benn and Herrero (2002) set zones of influence of 500 meters and 200 meters around roads and trails, respectively. They reported that all 95 human-caused grizzly bear mortalities with accurate or reasonable locations that occurred in Banff and Yoho National Parks between 1971 and 1998 occurred within these zones of influence along roads and trails or around human settlements. Gibeau and Stevens (2005) documented bears further from roads when distant from high quality habitat, indicating avoidance behavior.

Research suggests that grizzly bears benefit from road closures aimed at minimizing traffic on roads within important seasonal habitat, especially in low elevation habitats during the spring (Mace et al. 1999). When roads are located in important habitats such as riparian zones, snowchutes and shrub fields, habitat loss through avoidance behavior can be significant. Mace et al. (1996) found that most of the roads within grizzly bear seasonal ranges were either closed to vehicles or used infrequently by humans. Some grizzly bears avoided areas with a high total

road density even when the roads were closed to public travel. If human-related disturbances such as high levels of road use continue in preferred habitats for extended periods of time, grizzly bear use of the area may be lost, particularly use by female grizzly bears. In the Swan Mountain study (Mace et al. 1996), female grizzly bear home range selection of unroaded cover types was greatest and as road densities increased, selection declined. Zager (1980) reported the avoidance of roads by females with cubs. Aune and Kasworm (1989) and McLellan (1989a) found that female cubs generally established their home range within or overlapping with their mother's home range, whereas males generally dispersed from their mother's home range. Long-term displacement of a female from a portion of her home range may result in long-term under-use of that area by female grizzly bears because cubs have limited potential to learn to use the area. In this way, learned avoidance behavior could persist for more than one generation of grizzly bears before grizzly bears again utilize habitat associated with closed roads. Thus, displacement from preferred habitats may significantly modify normal grizzly bear behavioral patterns.

Grizzly bears can also become conditioned to human activity and show a high level of tolerance especially if the location and nature of human use are predictable and do not result in overtly negative impacts for grizzly bears (Mattson 1993). In Glacier National Park, Jope (1985) suggested grizzly bears in parks habituate to high human use and showed less displacement, even in open habitats. Yonge (2001) found that grizzly bears near Cooke City, Montana, were willing to consistently forage in very close proximity to high levels of human use if cover was sufficient and energetically efficient feeding opportunities were present. Both Mattson (1993) and Yonge (2001) postulated that areas with higher levels of human activity might have a positive effect for bears by serving as a kind of refugia for weaker population cohorts (subadults and females with cubs) seeking to avoid intra-specific competition (adult males). However, Mattson qualified this observation by adding that the beneficial effects vary as to whether hunting is allowed, and how closely the human population is regulated. Further, food conditioned grizzly bears were much more likely to be killed by humans.

Both Yonge (2001) and Mattson (1993) indicated that increases in human use levels can be deleterious if some human activities are unregulated, such as use of firearms, presence of attractants, nature and duration of human uses. Conversely, a level of coexistence between humans and grizzly bears can be achieved if such activities are controlled. Near Cooke City, Montana, the New World Mine reclamation project had minimal effects on grizzly bears, in part because reclamation activities were temporally and spatially predictable and people associated with the work were carefully regulated against carrying firearms or having attractants available to grizzly bears (Tyers, unpublished 2006). In the Swan Valley of Montana, raw location data from a small number of collared grizzly bears show nocturnal use of highly roaded habitat (C. Servheen, USFWS, pers. comm. 2005). The Swan Valley data have not been statistically analyzed and the study was not designed to determine the impact of roads on bears, sample size is very small, and perhaps most importantly, mortality rates for these grizzly bears are not yet known. However, these data indicate that some grizzly bears can apparently habituate to relatively high levels of human activity.

Low-elevation riparian habitats are of significant seasonal importance to grizzly bears. Grizzly bears typically use the lowest elevations possible for foraging during spring. Craighead et al. (1982) described the value of low-elevation habitats to grizzly bears. Montana Fish, Wildlife and Parks concluded that maximum numbers of grizzly bears can be maintained only if the species continues to have the opportunity to use both the temperate and subalpine climatic zones (Dood et al. 1986).

Research identified the following individual home-range selection patterns in local grizzly bear population segments: (1) some individual animals live almost exclusively (except for denning) in low elevation habitats; (2) other individuals maintain home ranges in more mountainous or remote locations; and (3) some individuals migrate elevationally on a seasonal basis (Servheen 1981, Aune and Stivers 1982).

Specific causes or factors involved in the selection or preferences for certain home ranges by grizzly bears are not well understood. Mace and Manley (1993) found that grizzly bear home ranges in the South Fork Study area included remote areas in high elevations. South Fork Study grizzly bear habitat-use data, road density analyses of the South Fork Study area, previous studies and CEM analysis (U.S. Forest Service 1994a, Mace et al. 1999) suggested that low-elevation habitats were not freely available to grizzly bears because of high road densities and associated human use in these areas. High road densities in low-elevation habitats may result in avoidance of or displacement from important spring seasonal habitat for some grizzly bears or high mortality risk for those individuals that venture into and attempt to exploit resources contained in these low-elevation areas.

Core Areas The Service considers significant declines in expected use of habitat by grizzly bears a serious consequence of high road densities. Significant declines in grizzly bear use of MS-1 habitat (habitat areas key to the survival of the grizzly where seasonal or year-long activity, under natural, free-ranging conditions is common), especially those habitat components with high seasonal values, indicate that habitat needed for survival and recovery is less available. Ideal grizzly bear habitat provides some areas isolated from excessive levels of human impact. Because grizzly bears can conflict with humans and their land uses, grizzly bear populations require a level of safety from direct human-caused mortality and competitive use of habitat such as settlement, roading, recreation, excessive logging, mining and livestock grazing.

Analysis in the South Fork Study area (Mace and Manley 1993, Mace et al. 1996) indicated the importance of unroaded habitat, especially for females with cubs. Mace and Manley (1993) reported adult females used habitat further than 0.5 mile from roads or trails more than expected; 21 percent of the composite home range had no trails or roads and 46 percent was unroaded (greater than 0.5 mile from a road). Substantive blocks of unroaded habitat were components of all adult female home ranges. Of the adult female locations within unroaded polygons, 83 percent occurred within 7 polygons that exceeded 2,260 acres in size. Based on grizzly bear habitat use data from the Yellowstone ecosystem, Mattson (1993) recommended

that micro scale security areas in that region be an absolute minimum of 6 kilometers (3.6 miles) in diameter or 28 square kilometers (10 square miles) and should be secure for a minimum period of 5, or preferably 10, years.

The IGBC Taskforce (IGBC 1994) recognized the importance of secure areas to grizzly bears. The Taskforce defined "core areas" as those areas with no motorized access (during the non-denning period) or heavily used foot/livestock trails, providing some level of secure habitat for grizzly bears. Motorized use, such as snowmobiling or that associated with timber harvest, could occur within core areas during the denning (winter) period. The Taskforce recommended the establishment of core areas in all subunits, the size of core area should depend on ecosystem-specific habitat conditions, and that a core area remain intact on the landscape for at least 10 years. In the South Fork Study area of the NCDE, approximately 68 percent of the adult female composite home range was core area (U.S. Forest Service in litt. 1994, K. Ake, U.S. Forest Service, pers. comm. 2005).

Habituation to Human Attractants Continued exposure to human presence, activity, noise, and other elements can result in habituation, which is essentially the loss of a grizzly bear's natural wariness of humans. High road densities and associated increases in human access into grizzly bear habitat can lead to the habituation of grizzly bears to humans. Habituation in turn increases the potential for conflicts between people and grizzly bears. Habituated grizzly bears often obtain human food or garbage and become involved in nuisance bear incidences, and/or threaten human life or property. Such grizzly bears generally experience high mortality rates as they are eventually destroyed or removed from the population through management actions. Habituated grizzly bears are also more vulnerable to illegal killing because of their increased exposure to people. In the Yellowstone region, humans killed habituated grizzly bears over three times as often as non-habituated grizzly bears (Mattson et al. 1992).

Subadult grizzly bears are more often vulnerable to habituation and illegal killing or they conflict with people and are removed through management action. Subadult grizzly bears frequently traverse long distances or unknown territory, increasing the likelihood of encountering roads, human residences or other developments where human food or other attractants are available, increasing the potential for habituation and/or conflicts with people. Between 1988 and 1993, six of seven grizzly bear management removals from the Flathead National Forest and surrounding area involved subadults (U.S. Forest Service 1994a, 1994b). In the Yellowstone ecosystem, roads impacted individual age and sex classes of grizzly bears differently. Subadults and females with young were most often located near roads, perhaps displaced into roaded, marginal habitat by dominant grizzly bears (Mattson et al. 1987, Mattson et al. 1992).

Grizzly bears face direct mortality risks on public land relatively infrequently in the NCDE. Management action due to human food habituation does occur. However, on Forest Service administered lands, grizzly bear mortalities more often resulted from mistaken identity during legal hunting season, illegal or malicious killing, or automobile and train collisions (K. Ake 2011 *in litt.*). Glacier National Park received an average of 1.9 million visitors a year from 2000 through 2010 with concentrated use in developed areas and dispersed in the backcountry

(National Park Service 2011). Between 2000 and 2010, only 9 grizzly bear mortalities were attributed to human-causes in Glacier Park (K. Ake 2011 *in litt.*). Four of these were related to accidental automobile and train collisions, three were related to management removals, one was related to research capture, and one was related to mistaken identification while hunting. In comparison, in 2010 alone, seven grizzly bears were removed from private lands within the NCDE because of human causes related to management removal (4), automobile collision (1), illegal shooting (1), and unknown causes (1). Approximately 114 human-caused mortalities occurred on private land from 2000 to 2010, the majority involving management removals related habituation of food attractants, garbage, and/or livestock.

Ake et al. (1998) summarized human-caused grizzly bear mortality locations for the period 1984 to 1996. An estimate of the amount of time grizzly bears spent in rural, roaded, and backcountry area (Mace and Waller 1998) was then compared with mortality locations. Although grizzly bears spent less than 5 percent of time in rural settings, 56 percent of human-caused grizzly bear mortality occurred in rural roaded areas. Grizzly bear mortality data collected since 1998 support the premise of increased risk to grizzly bears in rural roaded areas. In the NCDE, mortalities associated with roaded rural (mostly private) areas exceeded the sum of mortalities from Forest Service roaded areas and areas away from roads.

General Effects of Snowmobiles on Grizzly Bears

Available information regarding the effects of snowmobiles on grizzly bears is generally anecdotal, such as grizzly bear responses to various stimuli other than snowmobiles collected during research. Such reports typically lack information related to the timing of disturbance, type of den, winter conditions or other important factors necessary to assess the significance of disturbance to grizzly bears, if any. Some information collected on black bears or other ursids may have some relevance, but even the data on these species is incidental and largely theoretical.

In the fall of 2000, the science and resource management staff of the Biological Resources Management Division of the National Park Service and the Rocky Mountains Cooperative Ecosystem Studies Unit at the University of Montana organized an expert workshop to summarize the state-of-science on monitoring the effects of snowmobiles on wildlife in national parks and surrounding lands. Graves and Reams (2001) edited the output of this expert workshop for protocols to monitor snowmobile effects on wildlife. The participating scientists and biologists developed a flow-chart depicting possible impacts and prioritized research to address these impacts. They prioritized the need to develop techniques that would demonstrate and measure actual impacts on bear individuals and populations in the field, and addressed physiological/behavioral responses, mortality and displacement from habitat.

The group concluded that the evidence was inadequate to predict impacts on grizzly bears, but the *possible* effects were identified: den abandonment, loss of young, increased energetic costs while bears were in dens or displaced away from suitable habitat if outside dens, death, and learned displacement from suitable habitat resulting from exposure to disturbance (Graves and

Reams 2001). Several issues to monitor were identified, including the effect of presence on emerging animals and the effect of noise on hibernating bears. Impacts to emergent bears were identified as a higher concern than impacts to denning bears.

Some indications of bear species responses to human disturbance are available from the distances of dens from centers of human activity. The fact that some bear dens were documented within 1 kilometer (0.6 mile) of human activity centers (Linnell et al. 2000) indicates that bears do not totally avoid denning habitat based on its proximity to human disturbance. Caution should be used when making inferences with this information, however. Just because some bears were found denning close to human activities does not mean that all bears can or will do so. Likewise, such data usually do not include the long-term productivity or survival of the study animals. Linnell et al. (2000) summarized distances of bear dens to various centers of human activity as documented by nine studies of brown and black of bears; distances ranged from 0.1 to 6.5 km (~109 yards to 4 miles) and did not account for differences in altitude or other factors such as den characteristics, snow depth or activity levels. Harding and Nagy (1980) noted successful grizzly bear dens from 1.6 to 6.4 km (~1 to 4 miles) from active mining camps, although no dens were found within 1 km (~0.6 mile) of active drilling and staging camps. Although Schoen et al. (1987) noted that brown bears in Alaska gradually, from year-to-year, located their annual dens away from an area of increasing mining activity, the short distances to disturbance sources reported for the European brown bear dens were reportedly in proximity to long-established sources (Linnell et al. 2000), which suggests that some bears may become habituated to disturbance sources.

In the Greater Yellowstone Ecosystem, Haroldson (pers. comm. 2001 *in* U.S. Fish and Wildlife Service 2002) noted that grizzly bears captured in the Togwotee Pass area during the nondenning period did not den in the area despite the presence of denning habitat (this area receives heavy snowmobile use – but grizzly bears enter their dens prior to most snowmobile activity). Instead, these grizzly bears denned in nearby wilderness areas. It is unknown whether den site selection in this case was due to higher quality denning habitat in the wilderness or due to avoidance of heavy snowmobile use on the pass.

Regardless of any apparent den site selection/avoidance related to disturbance sources, anecdotal evidence suggests that bears may respond to external disturbance or stimuli while in the den. When considering snowmobile disturbance, such stimulus may not be present when dens are being selected, but only after denning commences. There are no systematic data available on how denning bears react to disturbance using controlled stimuli (Linnell et al. 2000). However, bear responses to denning disturbance appear to occur along a continuum (*Ibid*.). Responses range from waking, to increases in temperature or heart rate, to den abandonment; and the costs to the bear increase as responses escalate.

Heart rates and movement sensors have detected changes in grizzly bears near disturbance, but little comparable baseline information has been recorded to document the normal movement/heart rates or variability in undisturbed bears. Movement, including shivering and shifting, in denning bears is theorized to be important in maintaining the temperature of the bear within 5 degrees of normal temperatures and apparently occurs whether or not there is

obvious disturbance. The response of an individual bear to noise may vary with age, sex, experience, presence of young or not, terrain, temperament, denning season chronology, weather, and habituation tendencies of each animal. The impacts of such response have not been documented.

Linnell et al. (2000) summarized the few incidental events describing disturbance to denning bears and noted that activities within 1 km of a den were most likely to elicit response. They also noted that individual bears responded differently, and some bears indicated no response. Repeated exposure to the same stimuli without negative associations caused responses by bears to decline rapidly (*Ibid.*). Reynolds et al. (1986) documented that in three of the five cases where three brown bears were exposed to human activity (seismic shots, drilling, or vehicles driving at distances of 1 to 2 km), the bears displayed increased heart rates or increased physical activity, but noted that a snow-tractor driven within 100 meters of the den caused no observed response. Schoen et al. (1987), and Smith and Van Daele (1990) noted increased activity from denned bear "activity collars" during radio-tracking overflights, but Reynolds et al. (1986) noted no response in heart rates of two denning bears exposed to fixed wing aircraft. Reynolds et al. (1986) noted of bears with increased heart rates that "*all emerged in the spring with no observed deaths of accompanying offspring*."

Typical high-use snowmobile areas and potential den sites have a limited likelihood of substantive overlap. Grizzly bears generally den in either timbered habitat or very steep slopes, including the slopes of open basins. Most of the heavy snowmobile use occurs on trails, roads, or open basins, and meadows – although some snowmobile riders use steep open basins for "high marking", in which case there is a potential direct overlap between denning habitat and steep open slopes favored for "high marking" by snowmobiles. However, most denning habitat - except for "high-marking" areas - is less favorable for snowmobile use and as such there is a reduced chance of adverse overlap between grizzly bear den sites and snowmobile traffic.

Snow is an excellent sound barrier (Blix and Lentfer 1992) and impacts to denning bears would likely be less in deep snow conditions than in shallow snow conditions. It is likely that hibernating bears exposed to meaningless noise, with no negative consequences to the bear, habituate to this type of disturbance (Knight and Gutzweiler 1995). Reynolds et al. (1986) found that some bears, on occasion, appear to respond to noise or disturbance near the den site by waking up and moving around the den. On rare occasions, bears may abandon a den due to some disturbance (Reynolds et al. 1976, Swenson et al. 1997).

For example, den abandonment has been documented in association with industrial activity and direct approach (Reynolds et al. 1986; Schoen et al. 1987; Harding and Nagy 1980; Craighead and Craighead 1972b). Harding and Nagy (1980) found that one grizzly bear abandoned its den after having the den driven over by a seismic vehicle. Swenson et al. (1997) documented 9 percent of brown bears over 194 bear-winters abandoned or changed dens; in 12 of 18 events, human activity was noted at or within 100 meters of the abandoned den; there was no significant difference in brown bear den abandonment in a "protected area" versus areas where there was military activity and timber harvest. "*Most abandonment occurred early in the denning period, before mid winter. Bears moved up to 30 km before denning again.*"

Grizzly bears require strong parental investment and females stay with their young for several years. Abandonment of young is rare, but costly when it occurs. Den abandonment has caused cub mortality in black and brown bears (Linnell et al. 2000). Swenson et al. (1997) documented 60 percent of adult females with cubs of the year that abandoned dens during winter lost at least one cub to mortality, versus only 6 percent cub mortality in females that did not abandon dens. Cub mortality is difficult to document and causes are difficult to ascertain.

On the other hand, other events with seemingly similar levels of disturbance have not led to den abandonment (Reynolds et al. 1986; Mace and Waller 1997; Linnell et al. 2000). In fact, Mace and Waller (1997) conducted work on the Flathead National Forest and reported no abandonment of dens by grizzly bear even though snowmobiles were often seen within 2 km of den sites. Likewise, the Interagency Grizzly Bear Study Team has intensively researched grizzly bear ecology in the Yellowstone Grizzly Bear Ecosystem from the 1970's to present but this research has never documented den abandonment attributed to snowmobiles.

The noise and human activity related to snowmobile use would likely impact grizzly bears most during the early and late denning period, or when snow levels are low and the snowmobile activity is near the den site. However, the early and late denning periods are times when snow conditions would be least conducive to snowmobile activity.

Swenson et al. (1997) speculated that fall hunting, which occurs early in the denning period in Sweden, may contribute to fall disturbance and early den abandonment by European brown bears. Human activities such as hunting, survey work, shooting, fishing and dogs were thought to have a greater impact than industrial activity. If disturbance occurred early during the denning season, a bear would likely have other denning habitat available. Grizzly bears are unlikely to abandon their dens very late into the winter due to the high energetic and fitness costs of doing so (Linnell et al. 2000). Theoretically, as the costs of abandoning a den and re-locating to another den increase, grizzly bears should be expected to tolerate greater levels of activity without abandonment.

Disturbance from snowmobiles is likely most consequential shortly before or after den emergence of a female with cubs. Most emerging bears move immediately to a known, reliable spring food source, such as a big game winter range (Reinhart and Tyers 1999). Females with cubs have high energetic needs, and cubs have limited mobility for several weeks after leaving the den, therefore they remain in the den site area for several weeks after emergence from dens (Haroldson et al. 2002; Mace and Waller 1997). Researchers involved in the Delphi assessment of snowmobile impacts (Graves and Reams eds. 2001) indicated higher concerns with emergent females with cubs as they are likely the most sensitive to disturbance (Haroldson et al. 2002). Disturbance levels that cause a female to prematurely leave the den in spring or move from the den area could impair the fitness of the female and safety of the cubs. If cubs attempt to follow their mother, they would likely experience decreased fitness and the family group may be pushed to less suitable habitat. A disturbance would have to be severe for a sow to abandon her cubs (Linnell et al. 2000). In the judgment of the Service, snowmobile-related impacts on post-den emergence females with cubs are more likely to impart serious consequences than any potential impacts to denning grizzly bears. Haroldson et al. (2002)

found that the mean week of den emergence among female bears was the third week of April. However, female den emergence ranged from the third week in March to the fourth week in May. Male bears typically emerged from the first week in February to the fourth week in May, with the mean emergence being the fourth week in March (*Ibid*).

Changing snow conditions in spring may help reduce the probability grizzly bears being impacted by snowmobiles. At the time of emergence (March-April), snow conditions are changing rapidly. The same conditions that help lead to bear emergence (e.g., water infiltrating the den) (Schoen et al. 1987; Craighead and Craighead 1972a) lead to poor quality snow for snowmobiling. Snow is melting at lower elevations, making access to higher elevations more difficult for snowmobilers. In general, female grizzly bears with cubs emerge later in the season, when these snow and melt conditions are even more prevalent. Individual circumstances of access and allowable seasons are important variables.

Effects of Motorized Roads and Trails in the Action Area

The effects of the Revised Forest Plan desired motorized road and trail densities within the Yellowstone analysis area were analyzed in the 2010 biological opinion (U.S. Fish and Wildlife Service 2010); we incorporate that analysis here by reference, pages 28 through 31 (Appendix A, section 2a). The following effects analysis of the Revised Forest Plan desired motorized road and trail densities is applicable to the WNAA. Further, the following effects analysis concerning temporary roads is applicable to the entire Forest.

The entire WNAA occurs outside of the grizzly bear recovery zones, in areas where grizzly bears have only recently been verified. Eight verified occurrences of grizzly bears have occurred within the WNAA since the 2010 consultation.

The Revised Forest Plan established motorized route management objectives for each landscape and hunting district within the action area (U.S. Forest Service 2012). These objectives were designed to set achievable desired levels for capping and reducing, as appropriate, the miles of routes at the landscape and hunting district scales to maintain and improve wildlife habitat. Tables 9 and 10 display the desired linear motorized road and trail densities for the WNAA by landscape and hunting district, respectively. The desired motorized road and trail densities were intended to be ceilings, in that open motorized road and trail densities could go lower if localized conditions warranted (*Ibid*.).

Table 9. Revised Forest Plan desired motorized road and trail densities for the WNAA by landscape (U.S. Forest Service 2012).

Landscape	Revised Forest Plan Desired Open Motorized Road and Trail Density (miles per square mile)	Linear Road Density under the 1986 Forest Plan (miles per square mile)	2009 Existing Linear Road Density (miles per square mile)
Big Hole	1.2	1.3	1.2
Boulder River	1.9	2	2.0
Clark-Fork Flints	1.9	1.8	1.8
Jefferson River	1.6	1.8	1.7
Lima-Tendoy	1	1.1	1
Pioneer	1.5	1.3	1.2
Upper Clark Fork	2	2	2
Upper Rock Creek	.9	.9	.9

Table 10. Revised Forest Plan desired motorized road and trail densities for the WNAA by MFWP hunting unit (U.S. Forest Service 2012).

Hunting Unit	Revised Forest Plan Desired Open Motorized Road and Trail Density (10/15-12/1) (miles per square mile)	Linear Road Density under the 1986 Forest Plan (miles per square mile)	2009 Existing Linear Road Density (miles per square mile)
210	.9	.9	.9
211	.5	.6	.5
212	1.4	1.3	1.3
213	1.4	1.5	1.4
214	1.6	1.6	1.6
215	1.5	1.9	1.9
216	.8	.9	.8
300	.6	.7	.7
302	1	1.2	1.1
311	0	0	0
318	1.8	1.9	1.9
319	.6	.7	.6
321	1.1	1.1	1
328	.8	1	.8
329	1.1	1	1
331	1.5	1.4	1.3
332	.8	.8	.8

340	1.4	1.5	1.4
341	.5	.6	.6
350	1.3	1.5	1.4
370	1	.9	.9

Wildlife Standards 1 and 2 require that landscapes and hunting districts that exceed the open motorized road and trail objective have no net increase in designated road and trail mileage. The following are Forest Plan Wildlife Standards 1 and 2 in the Revised Forest Plan:

- Standard 1: From October 15 to December 1, Hunting Units that exceed the open motorized road and trail density objective will have no net increase in designated open motorized road and trail density mileage.

- Standard 2: landscapes that exceed the open motorized road and trail objective will have no net increase in designated open motorized road and trail mileage.

The Revised Forest Plan does not provide standards specifically for secure habitat or specify a desired condition for secure habitat. Tables 11 and 12 display the amount of secure habitat by landscape and hunting unit within the WNAA. The amount of secure habitat has either increased or remained the same as the baseline condition under the previous Forest Plan. While the Revised Forest Plan does not specify desired conditions or standards for secure habitat, the standards and desired conditions for road densities impacts to some degree the amount of secure habitat, as the absence or presence and location of roads dictates the amount of secure habitat.

Table 11. Comparison of secure habitat for the WNAA within landscapes before and after the Revised Forest Plan (U.S. Forest Service 2012 *in litt.*).

Landscape	Existing Condition under the 1986 Forest Plan (percent of area)	Existing Condition post-Revised Forest Plan (percent of area)
Big Hole	49%	55%
Boulder River	31%	32%
Clark-Fork Flints	36%	38%
Jefferson River	41%	44%
Lima-Tendoy	48%	53%
Pioneer	50%	53%
Upper Clark Fork	28%	29%
Upper Rock Creek	60%	62%

Table 12. Comparison of secure habitat for the WNAA within hunting units before and after the Revised Forest Plan (U.S. Forest Service 2012 *in litt.*).

Hunting Unit	Existing Condition under the 1986 Forest Plan (percent of area)	Existing Condition post-Revised Forest Plan (percent of area)
210	56%	56%
211	72%	73%
212	44%	45%
213	38%	41%
214	50%	50%
215	29%	29%
216	59%	63%
300	66%	66%
302	36%	41%
311	93%	93%
318	32%	32%
319	67%	69%
321	52%	60%
328	50%	58%
329	52%	55%
331	49%	53%
332	62%	63%
340	42%	43%
341	61%	61%
350	51%	55%
370	54%	55%

If a landscape or hunting unit is below (i.e. better than) the desired open motorized road and trail density displayed in the Revised Forest Plan, open linear road density could increase in that analysis area. However, linear road density could not increase beyond the density listed in the desired open road and trail columns in tables 9 and 10 above. While periodic new road construction may occur, overall a downward trend in the miles of roads has been occurring on the Forest (see Table 13 below). A reduction in system roads of 117.5 miles and unauthorized routes of 92 miles occurred throughout the Forest between 1999 and 2011. During this same period, only 1.5 miles of new construction occurred throughout the Forest. None of this new road construction has occurred since 2003. These numbers reflect construction and decommissioning across the entire Forest rather than just within the WNAA.

Table 13. Road construction and decommissioning 1999-2011 on the Forest (U.S. Forest Service 2012).

Year	New Road Construction (Miles)	Decommissioning (miles)		
		System Roads	Unauthorized Roads	Total
1999	0	26.5	9.5	36
2000	0	0	12	12
2001	1	15	14	29
2002	0	0	3	3
2003	.5	1.5	1.5	3
2004	0	.9	9.5	10.4
2005	0	3.5	0	3.5
2006	0	0	0	0
2007	0	0	.5	.5
2008	0	3.0	0	3
2009	0	0	2	2
2010	0	67	40	107
2011	0	.1	0	.1
Totals	**1.5**	**117.5**	**92**	**209.5**

Portions of the WNAA have high levels of activity along roads while other portions have low activity along roads or no roads at all. The Boulder River, Jefferson River, Clark Fork-Flints, and Upper Clark Fork landscapes and corresponding hunting districts exhibit the highest open linear motorized road and trail densities within the WNAA. These portions of the WNAA are also where grizzly bears are now being detected, likely moving south from areas of the NCDE to the north of the Forest (U.S. Forest Service 2012, Mace and Roberts 2012).

The effects of displacement and under-use of habitat are tempered by local resource availability, resource condition, seasonal use, and the number of grizzly bears using an area. Currently, the number of grizzly bears using the Forest is low and numbers will increase relatively slowly over time. This is especially true for female grizzly bears. As mentioned earlier, Proctor et al. (2012) found males move more frequently and over longer distances than females. Males have large home ranges and establish home ranges nearly three times further away from their mother's home ranges than do female offspring. Females usually establish smaller home ranges than males that overlap with their mother's home range (Waser and Jones 1983; LeFranc et al. 1987; Schwartz et al. 2003). In doing so, they generally disperse over much shorter distances than male grizzly bears (McLellan and Hovey 2001; Proctor et al. 2004). Therefore, female dispersal is a multi-generational process where females must live year-round in an area, successfully reproduce, and offspring disperse into adjacent, unoccupied habitat. Thus female grizzly bear presence on the Forest is likely to increase only slowly if and when population pressure from the NCDE, or the YGBE, grows. The earliest detections of grizzly bears from the NCDE found in the intervening area between the NCDE and the YBGE were male, and males make up most of the known occurrences in this region (Mace and Roberts 2012).

Adverse effects from high road densities in some areas of the Forest may be resulting in the displacement of individual grizzly bears, the avoidance of suitable habitat, and/or the reduction of habitat to an unsuitable condition. Under-use of habitat in proximity to Forest roads by grizzly bears does not necessarily preclude use or form a barrier to dispersal and movement across the landscape. Until numbers substantially increase, grizzly bears now occupying the Forest and moving into the Forest in the near future would not likely face significant competition for habitat and resources from other grizzly bears. Thus, displacement from quality habitat is not as likely to result in adverse effects to individuals, as they are likely to have options to move to other areas to find resources.

Male grizzly bears have larger home ranges than females, and males and subadults are independent, more mobile and do not have the same energetic needs as adult females. While displacement may affect behavioral patterns of males and subadults, such as feeding or sheltering, we do not anticipate such effects to be significant to subadult or male grizzly bears.

Displacement effects have more significant impacts on adult female grizzly bears than males or subadults because adult females have higher energetic needs to sustain fitness prior to and during gestation and lactation and when rearing cubs (see '*Life History*' section for additional detail). As such, adult females can less afford the additional energy expended to find high quality foods and shelter if displaced, especially during the early spring or late summer to fall hyperphagia season. During some years, due to poor climatic conditions and resulting food scarcity and/or high levels of forest management activity or recreational activity, displacement effects from areas with high road densities could be more frequent and intense. Some adult females may be displaced from key habitats and under certain conditions they may be displaced to levels that impair their normal ability to readily find food resources needed to sustain fitness necessary for breeding and producing cubs, and find shelter. However, based on the low number of grizzly bears using the Forest, and considering the low levels of intra-specific competition, we do not expect that adult female grizzly bears that may presently occur on the Forest would be affected to levels of injury (through displacement) by high road densities at this time. However, the effects of displacement may increase somewhat as grizzly bear numbers increase in the WNAA over the life of the Revised Plan (15 years). We anticipate that the adverse effects from road densities would affect only few adult females over the life of the Revised Forest Plan because few grizzly bears occupy the WNAA at this time, and as explained earlier, female grizzly bear numbers would grow only slowly over time. Further, we do not expect that all adult females exposed to disturbances from roads and road densities would suffer significant effects, nor would the effects persist throughout an individual female's life span. We expect that effects would vary substantially depending upon the wariness of the individual bear, the size of and habitat quality within her home range, the number of other grizzly bears using the particular area, climate conditions, annual food resources, and the nature, intensity and duration of human activity during any particular year. All of these are factors that may affect options available to adult females if displaced. Further, conditions the following year may be considerably different.

Site specific travel planning is anticipated to occur at some point in the future with the likelihood of decreased motorized access. However, those planning efforts are a year to several years out (U.S. Forest Service 2012). The completion of travel planning within the action area is expected to move the landscapes towards the desired route management objectives outlined in the Revised Forest Plan (Tables 9 and 10 above). While linear road densities could increase in those landscapes or hunting units that meet and are better than the desired motorized road and trail densities set forth in the Revised Forest Plan, they could not increase over the desired density. Based on this direction, the existing motorized linear road and trail densities (Tables 9 and 10 above), and the recent history and trends in road building and decommissioning (Table 13 above), it is reasonable to assume that the level of permanent roads in the action area will not substantively increase during the remaining life of the Revised Forest Plan. However, existing road densities in some areas and continued presence of these roads under the Revised Forest Plan may at some time over the life of the Revised Forest Plan result in adverse effects to some individual female grizzly bears attempting to establish or maintain home ranges in roaded areas.

Temporary roads built for resource extraction such as timber harvest or mining may remain on the landscape for several years and receive a substantive amount of use. The Forest has estimated that approximately 70 miles of temporary roads may be constructed across the 3.3 million acre action area (the entire Forest), over the life of the Revised Forest Plan (15 years). Depending on the site specific information regarding the temporary roads (i.e. length and duration), the Service anticipates that some level of adverse effects to female grizzly bears with home ranges impacted by temporary roads may occur in some situations. We do not expect that all temporary roads would have adverse impacts on female grizzly bears, or that all female grizzly bears would be adversely affected by temporary roads. The level of effects would depend on such things as location of the temporary road (habitat type), length of the temporary road, the frequency and intensity of temporary use, and the duration the temporary road would be on the landscape, in relation to those factors listed above for permanent roads. Not all 70 miles are likely to be constructed at once. Some of the temporary roads would be consolidated in project areas and be constructed and used at the same time, which would concentrate effects on bears into a smaller area. Other temporary roads would be separated by space and time across the Forest, which may affect more individual grizzly bears, but have less intense effects. Temporary roads would not be open to public use and would be obliterated when implementation of a project is completed, which would moderate the impacts on bears. However, if under-use of key feeding and sheltering habitat by female grizzly bears is significant, they may fail to obtain the necessary resources to breed and successfully reproduce.

In summary, the existing roads and any new roads constructed in the future within the Yellowstone analysis area and/or the WNAA, temporary or permanent, may affect grizzly bears. These affects may be insignificant in some situations or adverse in others. Adverse effects may significantly impact an adult female grizzly bears' ability to find food resources, breed and raise young, and find adequate shelter at some time over the life of the Revised Forest Plan.

Effects of Snowmobiles in the Action Area

The effects of snowmobiles within the Yellowstone analysis area were analyzed in the 2010 biological opinion (U.S. Fish and Wildlife Service 2010); we incorporate that analysis here by reference, pages 31 through 33 (Appendix A, section 2b). The following effects analysis is applicable to the WNAA.

As displayed in Table 14 below, the Revised Forest Plan established considerable changes in winter motorized access across the WNAA. The Revised Forest Plan reduces the amount of area open to winter motorized use by 27 percent (635,881 acres) within the WNAA. The dates in which winter motorized use is allowed under the Revised Forest Plan are between December 2 and May 15.

Table 14. Winter motorized access in the WNAA (U.S. Forest Service 2012).

Landscape	Total Landscape Acres	Acres Open to Winter Motorized Use Pre-Revised Forest Plan (percent open)	Acres Open to Winter Motorized Use in Revised Forest Plan (percent open)	Reduction in Acres Open to Winter Motorized Use (percent reduction)
Big Hole	542,823	449,583 (83%)	353,760 (65%)	95,823 (21%)
Boulder River	219,050	189,131 (86%)	132,455 (60%)	56,676 (30%)
Clark Fork-Flints	426,799	399,499 (94%)	306,543 (72%)	92,956 (23%)
Jefferson River	212,226	190,573 (90%)	90,193 (42%)	100,380 (53%)
Lima-Tendoy	372,954	291,963 (78%)	202,404 (54%)	89,559 (31%)
Pioneer	583,791	531,932 (91%)	424,498 (73%)	107,434 (20%)
Upper Clark Fork	93,940	74,276 (79%)	55,537 (59%)	18,739 (25%)
Upper Rock Creek	290,598	207,880 (72%)	133,566 (46%)	74,314 (36%)
Totals	**2,742,181**	**2,334,837 (85%)**	**1,698,956 (62%)**	**635,881 (27%)**

As discussed above, the primary concerns with motorized winter recreation with respect to grizzly bears are the potential effects associated with denning, den emergence, and spring habitat. Summer and fall habitats are not at issue since snowmobiling would not overlap with these seasons. As mentioned above, the third week of March is when female grizzly bears begin to emerge from their dens in the YGBE. In the NCDE, female grizzly bears begin to emerge from their dens around April 1. Winter recreation will primarily occur during the grizzly bear denning season. However, the Revised Forest Plan would allow snowmobile use until May 15 throughout the action area.

Denning Habitat

Within the WNAA, the proposed action would result in a net decrease of in areas available for winter motorized use, decreasing the acres designated as 'winter motorized' by 27 percent (635,881 acres) (U.S. Forest Service 2012). Reductions would occur in all eight landscapes. In total 1,043,225 acres would be designated as non-motorized winter use versus 1,698,956 acres designated as motorized winter use. While denning habitat does occur within the WNAA, no verified evidence of grizzly bears denning in the WNAA exists to date. Grizzly bears may den in the WNAA at some time during the life of the Revised Forest Plan.

Approximately 344,467 acres of denning habitat have been modeled for the WNAA. Of these acres, 66 percent (228,356 acres) is open to winter motorized use. Although the Revised Forest Plan reduces acres available for winter motorized use overall, it would not change the percent of area open to winter motorized use within grizzly bear denning habitat (A. Rohrbacher, BDNF, pers. comm. 2013).

As discussed in the '*General Effects of Snowmobiles on Grizzly Bears'* section above, the potential for disturbance to denning grizzly bears does exist but is probably low, especially where so few grizzly bears are known to occur. Further, the probability of a snowmobile directly encountering/running near or over a den site is also low. Even in that unlikely case, the excellent insulative properties of snow would mitigate the noise. It is more likely that impacts to grizzly bears would occur upon den emergence as discussed below. Therefore, although some grizzly bears may be affected during the denning season, the Service believes that the magnitude of impacts during this time would not reach levels that would result in any injury to grizzly bears.

Den Emergence

Female grizzly bears in the YGBE begin emerging from their dens about the third week of March, with males typically beginning to emerge several weeks earlier (Haroldson et al. 2002). In the NCDE, female grizzly bears begin emerging from their dens about April 1, with males typically beginning to emerge about two weeks earlier (Mace and Waller 1997). Grizzly bears typically spend a few days to a few weeks at or near the den before moving to other locations to begin feeding. During this time the grizzly bears were observed to be very lethargic and approachable. After leaving the den site grizzly bears usually move to lower elevation habitats such as riparian areas and avalanche chutes for much of their foraging during spring (Mace and Waller 1997). Based on the behavior of grizzly bears in response to motorized use of roads in Mace and Waller (1997), motorized disturbance such as snowmobile activity after den emergence dates could disturb and/or displace grizzly bears. The greatest probability of interactions at or near dens would obviously be expected where potential denning habitat overlaps with open snowmobile areas and the influence zones around roads or routes. As discussed in more detail below (under *Spring Habitat*), once grizzly bears move away from den sites and toward spring habitats, there will be very little potential for conflict with snowmobiles.

Snow conditions within the WNAA are often suitable for snowmobiling to continue well beyond the time when grizzly bears generally begin emerging from their dens (BA). Under the Revised Forest Plan, winter motorized use could occur in grizzly bear denning habitat until May 15. Therefore, if grizzly bears begin to den in the WNAA during the life of the Revised Forest Plan, the potential exists for interactions between snowmobilers and grizzly bears that have recently emerged from their dens.

As discussed above in the '*General Effects of Snowmobiles on Grizzly Bears'* section, disturbance from snowmobiles may be most consequential shortly before or after den emergence, particularly to females with cubs. Females with cubs have high energetic needs in the spring, and cubs have limited ability to travel for several weeks after emergence from the den. Disturbance levels that cause a female to prematurely leave the den in spring or move from the den area could impair the fitness of the female and safety of the cubs. If cubs attempt to follow their mother, they would likely experience decreased fitness and the family group may be pushed to less suitable habitat. Thus, significant disturbance during this time may reach levels that would injure grizzly bears, specifically adult females with cubs. At this time, denning of grizzly bears has not been documented in the WNAA and we would not expect significant effects to occur until female grizzly bears begin to den in this analysis area, which may occur at some point during the life of the Revised Forest Plan. As noted earlier, about 69 percent of the denning habitat in the WNAA is open to snowmobile use. Therefore, we cannot rule out some risk, albeit low (based on grizzly bear numbers and history of denning in the area), of adverse impacts to female grizzly bears with cubs related to snowmobiling over the life of the Revised Forest Plan. We anticipate that the proposed action would affect only a very few adult females over the life of the Revised Forest Plan because grizzly bears occur at low numbers in the WNAA, there are likely fewer females than males at this time, and grizzly bear numbers are likely to grow slowly over time. Grizzly bears often do not reuse den sites. We expect that females exposed to considerable disturbance by snowmobile use could select new sites for denning in subsequent years, so as to avoid future effects.

Spring Habitat

As previously mentioned, YGBE male grizzly bears begin emerging from their dens as early as the first week of February and female grizzly bears begin emerging from their dens during the third week in March (Haroldson et al. 2002). In the NCDE, female grizzly bears begin emerging from their dens about April 1, with males typically beginning to emerge about two weeks earlier (Mace and Waller 1997). Upon emergence from their dens in the spring, grizzly bears typically move to lower elevations where their dietary needs may be met. Typical spring food sources include early greening herbaceous vegetation in low elevations, riparian areas, and in melted-out avalanche chutes. Grizzly bears also feed on dead ungulates from winter kill on winter ranges and in some locations grizzly bears prey on elk calves (usually available after June 1). Females with newly born cubs tend to spend more time in the vicinity of the den (with cubs) after emergence.

The potential for disturbance or displacement of grizzly bears from spring feeding habitat in the WNAA is influenced by the variability in snowpack and the rate of spring melt. Although snowmobiling would be permitted until May 15, spring snowmobiling areas and spring grizzly bear habitat are almost mutually exclusive in that the areas that would be suitable for spring snowmobiling (i.e. more snowpack) would not typically overlap with spring grizzly bear habitats (i.e. less snowpack in areas of early green-up).

Due to the reduction in total acres available for winter motorized use, the Revised Forest Plan would not expand impacts to spring habitat beyond what was occurring under the previous Forest Plan. Also, based on the discussion above, the Service does not expect impacts to spring habitat and foraging grizzly bears to rise to the magnitude that would injure grizzly bears.

In summary, the primary concerns with motorized winter recreation with respect to grizzly bears are the potential effects associated with denning, den emergence, and spring habitat. The magnitude of impacts during the denning period in the YGBE and the WNAA would not likely reach levels that would result in any injury to grizzly bears. Similarly, the Service does not expect impacts to spring habitat and foraging grizzly bears to rise to the magnitude that would injure grizzly bears. However, we cannot rule out some risk, albeit low, of adverse impacts to female grizzly bears with cubs during den emergence.

Food and Attractant Storage and Site Development

This section focuses on analysis and discussion of the direct and indirect effects to grizzly bears related to food and attractant storage issues and site development. Also refer to the '*Habituation to Human Attractants*' subsection in the '*General Effects of Roads on Grizzly Bears'* section for further discussion on habituation.

General Effects of Food and Attractant Storage and Habituation

Improperly stored food, garbage, and/or livestock or pet foods can lure grizzly bears to areas near people and pose a significant risk of habituating bears to human presence and/or conditioning grizzly bears to seek out anthropogenic foods and attractants. Food conditioned grizzly bears enter unsecured garbage receptacles, sheds, and other buildings in search of a reward. Accessibility to human related attractants and conditioning to those rewards can lead to management removal of grizzly bears and additionally, mortality of grizzly bears by people defending their life and property.

Incidence of property damage or conflicts associated with human related foods is inversely proportional to the availability of high quality grizzly bear foods found in the wild; during periods of poor natural food production incidences of human-grizzly bear conflicts typically increase. When poor seasonal bear foods exist in part of or through the entire nondenning season in the GYE and NCDE, the incidences of bears causing property damage and obtaining anthropogenic foods increased significantly over average or good years (Gunther et al. 2004,

Manley 2005). The conflict relationship is magnified when the availability of late season natural foods such as whitebark pine seeds is insufficient to meet the high energy requirements during hyperphagia (Mattson et al. 1992).

Numerous studies in the NCDE elucidate the importance of late-season frugivory, especially globe huckleberries (*Vaccinium globulare*), by grizzly bears (Martinka and Kendall 1986, Weaver et al. 1990). Berry failure due to drought or destruction of plants by fire would force grizzly bears to range more widely than in normal periods of seasonal availability (Blanchard and Knight 1991). Therefore, grizzly bears face an increased risk of encounters with humans and ultimately human-caused mortality during the autumn season. Grizzly bears in some areas that avoided trails with human activity during part of the year changed this avoidance behavior when a favored berry resource came into season (Donelon 2004). Although grizzly bears still had a low tolerance for trails with high human activity, the tendency to approach areas of human activity when nutritional and energy needs are high could put individual bears at an increased risk of immediate conflict or condition them to the presence of people, which could lead to conflicts later in time.

Effects of Food and Attractant Storage and Habituation in the Action Area

The effects of food and attractant storage and habituation within the Yellowstone analysis area were analyzed in the 2010 biological opinion (U.S. Fish and Wildlife Service 2010); we incorporate that analysis here by reference, pages 34 and 35 (Appendix A, section 2c). The following effects analysis is applicable to the WNAA.

The Forest has 108 developed sites within the WNAA. No reductions of developed sites are proposed under the Revised Forest Plan. Developed sites include campgrounds, cabins available for public rental, picnic areas, and trailheads with facilities. Developed sites can pose risks of unsecured attractants and food left by campers, hunters, and people using the sites. Habituated grizzly bears learn to seek out developed sites for food rewards. Habituation and food conditioning of grizzly bears is a concern in all grizzly bear populations. Throughout the distribution of grizzly bears, habituation/food conditioning remains a fairly serious risk to individual grizzly bears.

Attractant management is currently not required within the WNAA. The Forest has proposed to implement a Forest-wide attractant management order in 2014 (U.S. Forest Service 2012). In preparation for the 2014 order, the Forest has developed and continues to develop attractant management infrastructure within the WNAA. To date, attractant management infrastructure has been installed at 9 campgrounds (U.S. Forest Service 2012 *in litt*.). Although not required, the Forest can and sometimes does incorporate food storage requirements into proposed project alternatives. Food storage orders substantially reduce the potential for adverse effects to bears as a result of food conditioning and habituation at developed sites as

well as dispersed human use. Until a Forest-wide order is in effect, the potential for conflicts between grizzly bears and humans remains within the WNAA, resulting in adverse effects to some individual grizzly bears.

No grizzly bear-human conflicts have been reported to date. However, the potential for conflict between grizzly bears and humans is likely to increase as the density of grizzly bears increases within the WNAA. Therefore, it is reasonable to expect that some risk, albeit low (based on grizzly bear numbers, bear numbers are likely to increase slowly over time, and history of conflicts in the area), of adverse impacts to some grizzly bears related to attractant management exists over the life of the Revised Forest Plan.

In summary, no grizzly bear mortalities associated with improper food storage or site conflicts have been reported on the Forest, both within the Yellowstone analysis area and the WNAA. Attractant management orders are in place within most of the Yellowstone analysis area with the exception of the Highland Mountains. No attractant management orders are in place for the WNAA. Improper storage of attractants and foods on lands adjacent to the Forest presents the risk of food conditioning grizzly bears using both the Forest and adjacent lands. Throughout the distribution of grizzly bears, habituation/food conditioning remains a risk to individual grizzly bears.

Livestock Grazing

General Effects of Livestock Grazing

Effects of livestock grazing on grizzly bears are generally related to depredations of livestock by grizzly bears, disposal of livestock carcasses, storage of human food and stock feed, and grizzly bear habituation, food conditioning, and mortality risk associated with these activities. Depredating bears may become food conditioned resulting in management actions that remove bears from the population. Although grizzly bear conflicts with cattle do exist, the more significant problems have been with sheep (Orme and Williams 1986). The adverse effects of domestic sheep grazing on grizzly bears are well documented (Knight and Judd 1983, Johnson and Griffel 1982). Sheep grazing in occupied grizzly bear habitat poses substantive risks to grizzly bears since bears kill sheep much more readily than other livestock and because sheep are often closely tended by herders typically armed and protective of their flock. In one study in the YGBE, of 24 grizzly bears known to use livestock allotments, 10 were known to kill livestock (Knight and Judd 1983). Of these bears, 7 killed sheep and 5 were trapped and instrumented. All but one instrumented grizzly bear cub that had the opportunity to kill sheep did so. Grizzly bears that kill livestock include a range of ages and both sexes (Johnson and Griffel 1982).

Being an opportunistic feeder, any individual grizzly bear can learn to exploit livestock as an available food source just as easily as they habituate to other human food sources (Johnson and Griffel 1982). Knight and Judd (1983) reported several differences between cattle and sheep conflicts with grizzly bears. They found that all radio-collared grizzly bears known to have come in close contact with sheep killed sheep, but most grizzly bears that encountered cattle did not

make kills. They also found that all known cattle kills were carried out by adult bears 7 years or older, while both adults and subadults from 1 to 13 years old killed sheep. Grizzly bears that killed sheep, usually took multiple sheep over several days. However in each instance when the sheep were moved out of the area the predation ended (Johnson and Griffel 1982).

Livestock carcasses may also attract grizzly bears. Grizzly bears have a strong tendency to return to a carcass for two or more feedings (Johnson and Griffel 1982). Therefore, proper treatment or disposal of livestock carcasses would greatly reduce the potential attractants for grizzly bears.

Effects of Livestock Grazing in the Action Area

We analyzed the effects of livestock grazing within the Yellowstone analysis area in our 2010 biological opinion (U.S. Fish and Wildlife Service 2010); we incorporate that analysis here by reference, page 36 (Appendix A, section 2d). The following effects analysis is applicable to the WNAA.

The Forest has several active cattle and horse allotments and two domestic sheep allotments within the WNAA (refer to Table 7 above). The cattle and horse allotments are generally stocked with cow/calf pairs, though some are stocked with yearling cows. While approximately 75 percent of the WNAA is within livestock allotments, not all of it is actively grazed by livestock. The allotments are generally delineated using naturally-occurring boundaries and landscape features such as watershed divides and ridgelines. Lower allotment boundaries are often the Forest boundary at or near the valley bottom. A substantial portion of the delineated allotments may be physically unavailable to cattle. For example, an area may be steep or timbered and/or may be producing little forage.

The Revised Forest Plan adopts the actual allotment use from 2001 through 2003 as the base level of livestock use going forward. This amount averaged 177,278 AUMs. No increase in livestock numbers is anticipated under the Revised Forest Plan. No grizzly bear depredations on livestock have been documented on the Forest within the WNAA. The two sheep allotments within the WNAA are located in the south west corner of the Forest in the Lima-Tendoy Landscape. Grizzly bear occurrence has not been verified in this landscape to date. Based on the information for livestock grazing in the WNAA (the small number of sheep allotments, low amount of grizzly bear use, and the history of no livestock depredations), the likelihood of adverse impacts to grizzly bears related to livestock grazing in this analysis area during the life of the Revised Forest Plan is low, but cannot be ruled out. The Revised Forest Plan may be in effect for 15 years, the number of grizzly bears using the Forest is expected to increase, and livestock allotments will remain a potential risk.

Documented grizzly bear mortality and/or conflicts associated with livestock depredation have occurred within Yellowstone analysis area. Livestock depredation was documented as recent as 2011 (Gunther et al. 2012). The Revised Forest Plan would maintain the existing number and

distribution of allotments within the Yellowstone analysis area and would potentially reduce the number of sheep allotments. However, the potential for conflicts to occur will remain, and may increase on the Forest as grizzly bear numbers increase.

In summary, livestock management on the Forest, especially sheep allotments, has the potential to result in adverse impacts to grizzly bears if livestock/grizzly bear conflicts occur. Grizzly bears may become food conditioned/habituated to seek out sheep as prey, which may result in the removal of grizzly bears.

Vegetation Management

General Effects of Vegetation Management

Vegetation management may impact grizzly bears in the short-term by displacing grizzly bears from important food sources and/or displacing grizzly bears to less secure habitat, if treatment units are located within or near key habitat types. Long-term effects to grizzly bears may result from vegetation alteration, impacting both grizzly bear cover and forage. A decrease in the amount of cover may result in different effects on grizzly bears and their habitat. If cover is limiting in the project area, either by the amount or distribution, timber harvesting would likely result in negative impacts (Ruediger and Mealy 1978). Reduced cover may increase the visibility of grizzly bears, which may potentially increase their vulnerability to illegal human-caused mortality and/or contribute to displacement from preferred habitats. However, if cover is not limited in a project area, timber harvesting may have either no effect or a positive effect in those situations where food abundance or distribution is improved. By removing or reducing overstory vegetation through harvesting, slashing and/or burning, sunlight reaches the forest floor or clearing and grizzly bear food production may be increased (Ruediger and Mealey 1978). This includes foods such as berries and succulent forbs.

In a study on use of harvested stands, Waller (1992) found that use of these stands increased during the berry season, due to some harvested stands having high berry production. If food production or distribution is improved but human activity is not controlled after the completion of harvest activities, negative impacts on grizzly bears may occur due to an increase in the potential for conflicts between humans and grizzly bears (Ruediger and Mealey 1978). Waller (1992) found that of the harvested stands that he studied, those with the highest grizzly bear use had limited access for people due to closed gates and/or over-grown roads. Grizzly bears within his study area that used harvested stands were found at higher elevations and spent little time in lower elevation stands where harvest was most common. Waller attributed this to human use of those lower, more accessible harvested stands. Waller also found that grizzly bears avoided stands where the vegetation had not recovered enough to provide security cover and preferred to use stands that were 30 to 40 years post-harvest.

Zager (1980) found that differences of shrub responses depended on the type of treatment that occurred post-harvest. Among the key shrub grizzly bear foods on clearcut sites where slash was bulldozer-piled before burning, Zager found a consistent decline in canopy coverage when compared to old burns. This is likely due to the extreme heat created by burning slash piles

which may kill rhizomes and root crowns and bulldozer use which may also destroy rhizomes and root crowns. In those areas where slash was either broadcast burned or not treated, key grizzly bear shrub foods were generally found throughout the sites, except on skid roads and other severely disturbed areas. On relatively mesic sites, globe huckleberry, mountain-ash and serviceberry generally increased in cover.

Timber harvest activities that would occur during the grizzly bear denning season are not likely to impact grizzly bears. Snow is an excellent sound barrier (Blix and Lentfer 1992) and impacts to denning bears would likely be less in deep snow situations than in shallow snow conditions. It is likely that hibernating bears exposed to meaningless noise, with no negative consequences to the bear, habituate to this type of disturbance (Knight and Gutzweiler 1995).

Often, temporary roads are constructed in order to access harvest units. The impacts of roads are discussed above in the '*General Effects of Roads on Grizzly Bears*' and the '*Effects of Motorized Roads and Trails in the Action Area*' sections above.

Helicopters may also be used in vegetation management projects, and in general reduce impacts to grizzly bears where they reduce or eliminate the need for new roads. Helicopter use may elicit a response in grizzly bears. Effects may range from a simple awareness of the helicopter, short-term disturbance or flight response or displacement from an area. In timbered habitats, McLellan and Shackleton (1989) found that an overt avoidance or displacement response required high intensity helicopter activity, such as carrying equipment within 200 meters of a grizzly bear. Helicopter use that is short in duration and low in frequency, would not likely result in significant affects to grizzly bears.

Extended use with multiple passes could interfere with the normal behavior patterns of grizzly bears. However, when considering long-term habitat effects, helicopter use does not use or require roads and may not pose the same chronic displacement effects or mortality risks that roads-based operations do. Helicopter use is a temporary event, whereas roads are typically chronic features on the landscape that facilitate access for people into bear habitat long after a project is complete. Consequently, while short-term helicopter activities may impact grizzly bears, they do not impart the same chronic habitat effects as roads. If repeated, low altitude flights continue into multiple seasons, the effects upon grizzly bear behavior (i.e., avoidance and more than just temporary displacement) may become more substantial.

The effects to grizzly bears of repeated, low altitude flight paths that follow open roads may be partially offset by the existing under-use of habitat in the immediate vicinity of the roads due to the "avoidance" by grizzly bears of habitat in close proximity to open roads. In many cases, the effects of helicopter logging that occurs in roaded habitat would have insignificant effects to grizzly bears as long as all roaded areas and roadless habitat effectiveness provide adequate secure habitat for grizzly bears. However, helicopter logging in areas that are not highly roaded could result in adverse effects to grizzly bears adapted to the use of more secure habitat. Thus, the effects of helicopter use on grizzly bears can vary significantly; effects will be determined through an analysis of site-specific activities and conditions in the area.

Effects of Vegetation Management in the Action Area

The effects of vegetation management within the Yellowstone analysis area were analyzed in the 2010 biological opinion (U.S. Fish and Wildlife Service 2010); we incorporate that analysis here by reference, pages 38 and 39 (Appendix A, section 2e). The following effects analysis is applicable to the WNAA.

The Revised Forest Plan would reduce the acres identified as suitable for timber production from 614,000 to 271,500 acres within the WNAA. This is approximately 11 percent of the WNAA. Site specific project analysis will determine the type and extent of harvest and potential effects to grizzly bears. The amount of areas classified as 'not suitable for timber production but timber harvest is allowed for other resource benefit' increases in the Revised Forest Plan. Every proposed vegetation management project within the WNAA would consider potential effects to grizzly bears during the site specific project analysis process. Refer to table 15 for acres suitable for timber production. Based on our history of consultation on vegetation management projects, information in our files, and the analysis under the '*General Effects of Vegetation Management*' section above, we do not anticipate that vegetation management activities by themselves would result in effects to grizzly bears that would be so significant as to impact breeding, feeding or sheltering.

Activities that occur along with vegetation management activities such as temporary road construction or helicopter use may result in additional effects to grizzly bears. Such effects could range from insignificant to significant. The effects of temporary roads are discussed in the '*General Effects of Roads on Grizzly Bears*' and the '*Effects of Motorized Roads and Trails in the Action Area*' sections above. General effects of helicopter use are discussed above in the '*General Effects of Vegetation Management*' section. Potential effects that may occur as a result of temporary roads and/or helicopter use associated with vegetation management would be considered in a site-specific analysis. We expect the number of grizzly bears significantly affected by temporary roads or helicopter use would be low. Although we anticipate more grizzly bears will inhabit the WNAA in the future, the number of bears is likely to be small relative to the size of the analysis area and numbers would increase slowly. Grizzly bears that may be affected by helicopter use or temporary roads over the life of the plan are likely to have options to move out of the area, given the low level of intra-specific competition for habitat.

In summary, with the exception of related access management or helicopter use, we do not anticipate adverse effects as a result of vegetation management on the Forest, both within the Yellowstone analysis area or the WNAA. Related access management and helicopter use may or may not result in adverse effects to grizzly bears and any effects would be considered in a site-specific analysis.

Table 15. Suitable timber under the Revised Forest Plan* within the WNAA (U.S. Forest Service 2012).

Landscape (acres)	Timber Suitability Classification	Acres	Percent of Landscape
Big Hole (542,823)	Suitable for Timber Production	83,151	15
	Not Suitable, Timber Harvest Allowed	246,904	45
	Not Suitable, No Harvest Allowed	212,512	39
Boulder River (219,050)	Suitable for Timber Production	62,571	29
	Not Suitable, Timber Harvest Allowed	115,463	53
	Not Suitable, No Harvest Allowed	40,771	19
Clark-Fork Flints (426,799)	Suitable for Timber Production	52,174	12
	Not Suitable, Timber Harvest Allowed	248,648	58
	Not Suitable, No Harvest Allowed	124,868	29
Jefferson River (212,226)	Suitable for Timber Production	20,789	10
	Not Suitable, Timber Harvest Allowed	119,490	56
	Not Suitable, No Harvest Allowed	71,781	34
Lima-Tendoy (372,954)	Suitable for Timber Production	15,918	4
	Not Suitable, Timber Harvest Allowed	141,046	38
	Not Suitable, No Harvest Allowed	215,813	58
Pioneer (583,791)	Suitable for Timber Production	26,344	5
	Not Suitable, Timber Harvest Allowed	223,714	38
	Not Suitable, No Harvest Allowed	333,614	57
Upper Clark Fork (93,940)	Suitable for Timber Production	10,565	11
	Not Suitable, Timber Harvest Allowed	62,222	66
	Not Suitable, No Harvest Allowed	20,887	22
Upper Rock Creek (290,598)	Suitable for Timber Production	0	0
	Not Suitable, Timber Harvest Allowed	135,577	47
	Not Suitable, No Harvest Allowed	154,969	53

*Landscape totals do not add up exactly to the suitable/not suitable totals for that landscape primarily due to rounding differences when summarizing many small polygons that make up the landscape. When aggregating different datasets up to the landscape level, the rounding of numerous small polygon acres can result in varying totals landscape wide.

Fire Management

General Effects of Fire Management

Fire management may result in disturbance and displacement impacts to grizzly bears. Fire suppression activities involve the presence of humans and often include the use motorized equipment. Grizzly bears generally would leave an area on their own accord in advance of an approaching fire and therefore be out of the area associated with fire suppression activities. However, if suppression activities were to take place prior to an approaching fire, grizzly bears may still be in the vicinity. Some effects from disturbance may be caused by the overall

increase in human activity in a particular area. These activities may include increased vehicular traffic, aerial support and fire camps, any of which may affect a grizzly bear prior to their leaving the area. The possibility of a direct encounter with a grizzly bear by a person or group of people involved in fire management activities is remote.

More likely, indirect, long-term effects from fire suppression activities may result from opening previously closed roads, constructing new roads or temporary roads, constructing firebreaks or constructing machine lines. These actions may contribute to the open and total road densities or may result in effects to grizzly bears similar to effect of roads on grizzly bears. Research has confirmed the adverse impacts of roads on grizzly bears (see the '*General Effects of Roads on Grizzly Bears'* section above). In addition, food and garbage storage at activity sites and camps may attract grizzly bears and contribute to risks. Such effects are also discussed above (see the '*Effects of Food and Attractant Storage and Habituation*' section above).

Wildland fires for resource benefit are typically allowed to burn where there is some degree of certainty that the fire would go out naturally or could be contained within predefined lines. These types of fires, when allowed to burn, can result in short-term negative effects and/or long-term beneficial effects depending on the vegetation species and fire severity. Some foraging habitat and/or cover may be lost in the short-term. However, natural fire often stimulates the understory and/or increases the vegetative diversity (forbs, grasses, berry-producing shrubs) in high quality grizzly bear habitat, benefitting grizzly bears in the long-term.

Fuels treatments could include prescribed fire, mechanical treatment, and/or chemical treatment. Refer to the '*General Effects of Vegetation Management'* section above for potential effects to grizzly bears.

Effects of Fire Management in the Action Area

The effects of fire management within the Yellowstone analysis area were analyzed in the 2010 biological opinion (U.S. Fish and Wildlife Service 2010) we incorporate that analysis here by reference, page 40 (Appendix A, section 2f). The following effects analysis is applicable to the WNAA.

Wildland fire control efforts and use of prescribed burning would continue under the Revised Forest Plan. The acres available for these activities and locations vary across the WNAA. Fire for resource benefit may also be used as a management tool. The Revised Forest Plan substantially expands opportunities for managing unplanned ignitions for resource benefits.

The effects on grizzly bears associated with fire suppression and/or wildland fire for resource benefit would be analyzed in emergency consultation after the suppression activities are complete. A site-specific analysis of effects on grizzly bears and grizzly bear habitat as a result of fuel treatments, including prescribed burning, would occur prior to implementation of a

project. Refer to the '*Effects of Vegetation Management in the Action Area*' section above for potential acreage such treatments could affect within the WNAA as well as potential effects to grizzly bears. As mentioned above, such treatments by themselves would not likely result in adverse impacts to grizzly bears.

In summary, with the exception of related access management or helicopter use, we do not anticipate adverse effects as a result of fire management on the Forest, both within the Yellowstone analysis area or the WNAA. Related access management and helicopter use may or may not result in adverse effects to grizzly bears and any effects would be considered in a site-specific analysis. We expect the level of adverse effects from access and helicopter use would be relatively low, as grizzly bears occur in low numbers on the Forest, numbers will increase slowly over the life of the plan, and so many acres potentially affected by fire will not be occupied by grizzly bears.

Oil and Gas Leasing

General Effects of Oil and Gas Leasing

Activities associated with oil and gas exploration and development may result in impacts to grizzly bears through three primary means: disturbance and displacement, habituation, and direct mortality.

Disturbance and displacement Unlike research related to roads and forestry, limited research has been completed regarding the specific effects of oil and gas activities on grizzly bear habitat selection (McKay and Stenhouse 2012). Publications cited in this biological opinion, and others (see McLellan 1989), report varying responses of grizzly bears to areas of intense human activity, from avoidance or underuse of habitat near areas of human activity, such as roads and oil and gas development sites, to selection for well pads and surrounding habitat and the use of habitat near towns. A number of variables are named as influencing or likely influencing grizzly bear response, including the location and availability of preferred habitat and bear foods, amount of hiding cover, age-class and gender of the bear, season of bear use in relation to human activity, and the type, intensity and predictability of the human activity.

Aune and Stivers (1983) and Aune et al. (1984) studied the effects of drilling operations on the movements, home range, and habitat use of grizzly bears on the Rocky Mountain East Front. They found that grizzly bears were not entirely displaced from their seasonal ranges by drilling operations, but appeared to be temporarily displaced from areas immediately around active drill sites. The distance of impact around active wells was a minimum of about 800 meters (0.5 mile) for most bears, but varied depending on the cover, topography of the area, and the degree of habituation of individual bears to human activity. Grizzly bears began to reuse the area around drill sites when human activity lessened. Harding and Nagy (1980) had similar results and concluded that although grizzly bears did not avoid the general area of activity, they did avoid that area within 1000 meters (0.6 mile) of drill sites, camps, and other activity. McKay and Stenhouse (2012) examined grizzly bear use of habitat containing established and ongoing

oil and gas development and activities. Over 50 percent of their study area in Alberta was conifer forest. In their large-scale analysis, they found that bears in their study did not avoid habitat with oil and gas features during the spring. This may have been due to lower levels of human activity as spring is the time of the least amount of drilling-related activities. At a smaller scale, grizzly bears selected for the well pad area. Bears were likely attracted to food (e.g. introduced grasses or clovers) growing on the well pads and along the forest edges in clearings surrounding the well sites, especially on older well sites. However, at the large scale, they also found that all grizzly bears avoided habitat containing active well sites during the fall (*Ibid.*), although reasons are not fully understood. Adult females were farther than expected from active wells and, to a lesser extent, pipelines, during the fall suggesting a spatial avoidance of oil and gas development during this period. When data were partitioned by day and night, adult females were also found farther than expected during the day and closer than expected at night for all features, suggesting a temporal avoidance of human activity. Gibeau et al. (2002) reported that adult females were the most risk-averse and found that they were closer to human features during the "human inactive" period.

Habituation and Direct Mortality of Grizzly Bears Impacts to grizzly bears may occur indirectly through habituation to human presence. Food and odors associated with activities conducted under the proposed action have the potential to provide attractants for grizzly bears and become sources of food conditioning of bears. Food conditioned grizzly bears enter unsecured garbage receptacles, sheds, and other buildings in search of a reward. Accessibility to human related attractants and conditioning to those rewards can lead to management removal by the agencies and to mortality of grizzly bears by people defending their life and property.

Even without an anthropogenic food reward, the increased presence of people and activities conducted in or near grizzly bear habitat may contribute to habituation of a grizzly bear(s) to human presence. Habituated bears may lose their natural wariness of people, and frequent road sides, private property, or well sites where they are more susceptible to illegal shooting. In a forested area in Alberta, forest clearings for well pads and roads were repopulated by a number of forbs and berry-producing shrubs that likely attracted grizzly bears to the sites (McKay and Stenhouse 2012). During oil and gas development in this study area, the mean predicted mortality risk to grizzly bears was moderate but increased steadily throughout the study period especially during a period of accelerated development of wells, pipeline and roads (*Ibid.*). The researchers predicted that without mitigation, mortality risk would continue to increase.

Effects of Oil and Gas Leasing in the Action Area

The effects of oil and gas leasing were not analyzed in the 2010 biological opinion (U.S. Fish and Wildlife Service 2010). Therefore, the following effects analysis is applicable to both the Yellowstone analysis area and the WNAA.

The Forest is currently working on a new oil and gas reasonable foreseeable development scenario (RFDS). This process is not yet complete. Based on an evaluation of the 1995 Oil and Gas record of decision RFDS, the Forest found the 1995 RFDS continues to be applicable and is a

realistic view of potential future oil and gas development on the Forest. Therefore, we will evaluate the potential effects of the 1995 RFDS. The Forest Plan, including the Oil and Gas ROD, does not authorize site specific exploration or development for oil and gas. Site-specific review under NEPA and ESA would occur for proposed drill sites.

Oil and gas exploration may occur within the Madison, Gravelly, Lima Tendoy, Tobacco Root, Jefferson River, Pioneer, and Big Hole landscapes. The potential for oil and gas development in these areas is very low to moderate (U.S. Forest Service 2012). Based on the underlying volcanic geologic strata, the potential to locate oil and gas reserves on the remaining portions of the Forest (Upper Rock Creek, Clark Fork-Flints, Upper Clark Fork, and Boulder River landscapes) is nearly nonexistent (*Ibid*.).

The RFDS describes exploration and development on only three of the landscapes where oil and gas exploration may occur. These landscapes include the Gravelly, Pioneer, and Lima-Tendoy landscapes. The RFDS estimates that 14 sites would be drilled in these three landscapes including 9 exploration wells, 3 confirmation wells, and 2 development wells. The RFDS estimates that two of the exploration wells, one in the Gravelly Mountains and one in the Tendoy Mountains, would produce oil or gas and seven other exploration wells are estimated to be dry and not capable of producing a recoverable product. The most likely scenario is that drilling of each well would require about five months from the time the site is located on the ground to well completion. Dry wells would be capped, the drilling infrastructure removed, and access route reclaimed within this five-month period. Completion of the drilling phase of production wells would be followed by drilling additional confirmation wells. The RFDS identifies three confirmation wells at the Tendoy Mountains site and two development wells at the Gravelly Mountain site. If the wells go into production, parts of the drill pad that are no longer necessary would be reclaimed. For production wells, start-up to well completion would also require about five months.

Based on the information provided on the RFDS, we conservatively assume that some level of disturbance and/or displacement of grizzly bears from well sites and roads may occur in areas if and where grizzly bear use is occurring. This is primarily based on the number of publications documenting the avoidance of grizzly bears caused by disturbance associated with roads, and others documenting displacement, at least initially, of intense human activity. Effects to grizzly bears would be dependent on whether grizzly bears are using the landscapes during oil and gas related activity.

If grizzly bears are using the area in the vicinity of a proposed well, we would expect some level of disturbance and short-term displacement of grizzly bears from areas within approximately 800 to 1000 meters of drill sites during the construction and drilling phase (approximately five months). The effects of drilling any one particular well may be considered short term and in many cases would not adversely affect bears. The combined effects of construction and drilling all 14 wells would depend on the locations of the sites, the number of sites being developed sequentially or concurrently, the timing and juxtaposition of drilling sites to each other, and the associated levels of road use. The biological assessment estimated that if all 14 wells were drilled and 25 miles of new road constructed simultaneously then grizzly bears may be

displaced from about 15,500 acres of habitat. These acres represent about 1.1 percent of Forest land in the three landscapes where exploration and development is expected to occur. If most of the wells were concentrated in a particular area, disturbance in a particular area would be more intense, although less of the Forest would be affected. If only a few sites are developed over time or spread out throughout the life of the plan, or sites are far from each other, and/or sites are not located in key grizzly bear habitat types, the intensity of impacts to individual grizzly bears would be lessened. Conversely, if several sites are constructed simultaneously or construction overlaps in time, the sites are near each other and near or in key habitats, impacts to grizzly bears would be greater. Since so few wells are anticipated over a very large area and grizzly bear use of the Forest is low, any grizzly bears that occur in the vicinity of a well site would likely have options to move to more undisturbed, available habitat.

As explained earlier in this opinion, adult female grizzly bears have higher energetic needs to support successful reproduction. If adult females occur in affected areas, the effects of displacement from limited key seasonal habitat (such as spring riparian areas or late summer/fall shrub fields) during the season of use could be significant, and impair the bear's breeding, feeding and/or sheltering. However, if project design is such that key habitat and adjacent area is avoided (i.e. if sites are greater than 1000 meters from key habitat) during construction and drilling, the intensity of impacts on grizzly bears resulting from the activity would be low and we would expect no adverse effects from the well-site development itself in many cases.

For those wells that may become commercially viable, long-term production and maintenance operations would occur on a year-round basis, lasting for the life of the well, which could last up 40 years for a gas well. The risks of displacement of grizzly bears and loss of habitat due to under-use may increase with this type of long-term development, or decrease if operations at the well site decrease in intensity and become more predictable to bears. Again, if wells and the associated roads are located in or near key habitat types, the intensity and/or duration of well site activity may result in significant under-use of key habitats by grizzly bears. If an adult female grizzly bear relies on the habitat, and grizzly bear density is such that intra-species competition for resources is a factor, such activity has the potential for displacement and significant impacts to the bear's breeding, feeding, and/or sheltering.

Existing roads may need to be upgraded to handle the heavy equipment and other vehicle traffic associated with the proposed action. The reasonably foreseeable development scenario estimates that approximately 25 additional miles of access road may be constructed. Increased use of these new and existing roads would occur, especially during the exploration and development phases. Aune and Stivers (1983) and Aune et al. (1984) considered an increase in road construction as the most serious impact of oil and gas development; McKay and Stenhouse (2012) found grizzly bear mortality increased with oil and gas development, especially during a period of accelerated construction (including roads) and drilling. Refer to the section above on the effects of roads on grizzly bears.

While grizzly bear use is relatively low within the three landscapes where oil and gas exploration is expected to occur, use by bears appears to be increasing and may continue to increase during the life of the Revised Forest Plan. The intensity of the impact of roads on grizzly bears will be associated with proximity to preferred habitat types that may be limited within the action area, the amount of dense hiding cover along or near routes, and level of use by people. If many of the estimated road miles are built as short spurs off of existing routes or are short-term in duration of use (five months), effects to bears from roads would be lessened. However, if more substantial lengths of roads are built and receive high to moderate use and are on the landscape for long-term production wells, we expect an increase in the potential for displacement and perhaps mortality of individual grizzly bears in some areas if the roads provide access to currently more remote areas. If main roads of considerable lengths are required to access well sites, effects would be greater if the new (or upgraded) road traverses or parallels preferred grizzly bear habitat. In such cases, the intensity and duration of vehicular use of roads may displace grizzly bears from adjacent habitat. Again, if an adult female grizzly bear relies on the habitat, and resources are limited by intra-specific competition by other grizzly bears, such displacement has the potential to result in significant impacts to the bear's breeding, feeding, and/or sheltering. New roads constructed in areas with few existing roads would likely have more impacts on grizzly bears than new roads constructed near existing roads, especially when located in or near key habitat. Increases in traffic on roads that currently receive low use would also have more impact on grizzly bears than increases on roads that already have high traffic levels.

However, the estimated changes on linear open road density per landscape range from .001 percent to .04 percent (U.S. Forest Service 2012). Such minor changes to the linear road density are likely insignificant to grizzly bears. In addition, temporary roads associated with dry wells would be reclaimed within five months from the beginning of activity (*Ibid.*). Seven of the 14 sites are expected to be dry. Therefore, many of the temporary roads that may be constructed for oil and gas exploration would be very short-term in duration and effects would be insignificant to grizzly bears. Each proposed well site would require a site specific analysis of effects including an analysis on newly constructed roads and use of existing roads. For those bears that do not avoid areas near roads, mortality risk may increase. Refer to the '*Habituation to Human Attractants'* subsection in the '*General Effects of Roads on Grizzly Bears*' section for further discussion on habituation.

The potential for oil and gas development on the Forest is considered to be low to moderate. Only three wells were drilled on the Forest during the 1980s. All three were dry. No wells proposed under the 1995 RFDS have been drilled to date. The Forest does not have a history of large amounts of oil and gas exploration. Based on the oil and gas exploration on the Forest over the past 30 years, it is unlikely that all 14 wells would be drilled at the same time as described as the worst case scenario above. In addition, the biological assessment relates that the Forest has determined that they cannot say that oil and gas development is reasonably certain to occur. Based on this information, it is likely that many of the effects described above are also not reasonably certain to occur. At this time, we expect the effects of oil and gas

exploration would likely be discountable or insignificant to grizzly bears. If, through a site-specific analysis, it is determined that a proposed well may have adverse effects to grizzly bears then a separate formal consultation would occur.

Effects Summary

In reviewing the effects of the Revised Forest Plan on grizzly bears across the Forest, the overwhelming majority of Forest management projects that often have potential to adversely impact grizzly bears fall within three categories: motorized access, foods and attractants storage, and livestock grazing. We do not anticipate adverse effects as a result of vegetation management, fire management, or oil and gas exploration, except for the effects of the associated access management and food and attractant storage.

As anticipated in the Recovery Plan, grizzly bears are expanding their range outside of the recovery zones. In accordance with the Recovery Plan (U.S. Fish and Wildlife Service 1993), the Final Conservation Strategy for the grizzly bear in the GYA (ICST 2007), and the Draft Conservation Strategy for the grizzly bear in the NCDE (U.S. Fish and Wildlife Service 2013a), grizzly bears are given high priority in Forest management decisions inside recovery zones; grizzly bears are not the primary management consideration in Forest land management in areas outside of recovery zones. Grizzly bears outside of recovery zones probably experience a higher level of adverse impacts due to land management actions than do grizzly bears inside. However, grizzly bears are able to live in habitat on the Forest outside of the recovery zones despite lack of mandated habitat protections or direction specific to grizzly bear management. As grizzly bear numbers increase on the Forest and expand their range, it is possible that the Forest will experience an increase in conflicts involving grizzly bears and human use of the Forest. However, we conclude that the Revised Forest Plan contains measures that minimize the potential for adverse impacts to grizzly bears from Forest management activities within the action area.

Within the YGBE Recovery Zone portion of the Forest, OMARD and TMARD are zero. Access management within the recovery zone is not likely to result in adverse effects to grizzly bears. Outside of the recovery, on the remaining portions of the Forest, linear road density was calculated by landscape both during summer and by hunting district during the fall. The Revised Forest Plan will reduce the overall open motorized routes. Secure habitat has been maintained or increased over the 1986 baseline condition. Under the Revised Forest Plan, if a landscape or hunting unit is below (i.e. better than) the desired open motorized road and trail density displayed in the Revised Forest Plan, open linear road density could increase in that analysis area. However, linear road density could not increase beyond the density listed in the desired open road and trail columns in tables 9 and 10 above as well as the two tables on page 29 of the 2010 biological opinion (Appendix A, section 3), which are displayed under the Forest Plan Wildlife Goals in the Revised Forest Plan that address travel management on the Forest. While periodic new road construction may occur, overall a downward trend in the miles of roads has been occurring (see Table 13 above). Only 1.5 miles of new roads have been

constructed across the Forest over the last 13 years while 209.5 miles of system and unauthorized roads have been decommissioned during the same period. These numbers reflect a trend on the Forest that would reduce the potential for adverse effects on grizzly bears.

Therefore, although existing and proposed road densities authorized under the Revised Forest Plan have the potential to adversely affect some grizzly bears in some areas of the Forest, we don't expect such effects to increase significantly over the life of the Revised Forest Plan. In fact, we expect that these effects will likely decrease somewhat over time as access conditions within the landscapes and hunting districts move towards the desired condition. Specific areas with higher road densities may lead to the under-use of suitable habitat by grizzly bears and may significantly impact some grizzly bears' ability to find food resources, breed and raise young, and find shelter. However, grizzly bears are now being documented in the WNAA and already occupy much of the Yellowstone area, evidently tolerating existing levels of road densities. Because the Revised Forest Plan will reduce the overall open motorized routes over time, we expect that access management under the Revised Forest Plan would be conducive to grizzly bears moving through the landscapes. Further, we expect that the number of grizzly bears will increase in these areas as well as in various regions of the Forest, and that some grizzly bears will establish home ranges.

The Revised Forest Plan will result in a net decrease of winter motorized use, decreasing the acres designated as winter motorized by 635,881 acres in the WNAA and 292,350 acres in the Yellowstone analysis area. Reductions will occur in all landscapes. Within the WNAA 1,043,225 acres are designated as non-motorized winter use versus 1,698,956 acres designated as motorized winter use and within the Yellowstone DPA analysis area, 530,416 acres are designated as non-motorized winter use versus 367,110 acres designated as motorized winter use. However, 66 percent of grizzly bear denning habitat within the WNAA (228,356 acres) and 34 percent of grizzly bear denning habitat within the Yellowstone analysis area (55,026 acres) would be designated for winter motorized use (approximately 56 percent Forest wide).

The most intense levels of winter recreation will primarily occur during the grizzly bear denning season, but some activity would extend to beyond the period when females with cubs typically begin emerging from dens. Disturbance from snowmobiles is likely most consequential shortly before or after den emergence of a female with cubs. Females with cubs have high energetic needs in the spring, and cubs have limited ability to travel for several weeks after emergence from the den. Significant disturbance at the den-site during this time may reach levels that could injure an adult female grizzly bear with cubs, or her cubs, that have recently emerged from a den or are very close to doing so. Based on the discussion in the effects section above regarding denning habitat and spring habitat, the Service does not expect impacts to denning grizzly bears (outside of the emergence period) or to spring habitat and foraging grizzly bears to rise to the magnitude that would adversely affect grizzly bears.

Human access into grizzly bear habitat can lead to the habituation of grizzly bears to humans. Habituation to human foods and attractants in turn increases the potential for conflicts between people and grizzly bears. Habituated grizzly bears often obtain human food or

garbage and become involved in nuisance bear incidences, and/or threaten human life or property. These grizzly bears are considered food conditioned and generally experience high mortality rates as they are eventually destroyed or removed from the population through management actions.

Within the Yellowstone analysis area, the Forest has taken actions to minimize the risk of habituation/food conditioning to grizzly bears through the mandatory food storage order that applies to three of the four Landscapes. Under the Revised Forest Plan, management of sanitation/food storage in the Yellowstone analysis area is likely to continue to reduce the likelihood of management removals of grizzly bears or other mortalities, such as defense of life. Currently, no food and attractant storage order is in place within the WNAA. The Forest is planning to implement a Forest-wide attractant management order in 2014. In preparation for the 2014 order, the Forest has developed and continues to develop attractant management infrastructure within portions of the WNAA, which has lessened the potential for conflict. No grizzly bear mortalities have been reported within the Yellowstone analysis area or the WNAA related to improper food storage. However, proper food and attractant storage is learned behavior, requires public cooperation and even then, people are likely to make mistakes. As grizzly bears increase in numbers and expand across the Forest, we cannot rule out the potential risk that grizzly bears may become habituated and food conditioned and be subject to potential management removal at some time during the life of the Revised Forest Plan. Therefore, it is reasonable to expect that some risk, albeit low (based on grizzly bear numbers and history of conflicts in the area), of adverse impacts to grizzly bears related to attractant management exists over the life of the Revised Forest Plan.

Conflicts arising from livestock grazing are recognized as a source of human-caused mortality of grizzly bears. Grizzly bears habituated to livestock as a food source are more likely to be destroyed or removed from the population due to management control and defense of property actions. The Revised Forest Plan would maintain the existing number and distribution of allotments within the Yellowstone analysis area and would potentially reduce the number of sheep allotments. The Revised Forest Plan would maintain the existing number and distribution of allotments within the WNAA. No increase in livestock numbers is anticipated under the Revised Forest Plan.

Documented grizzly bear mortality and/or conflicts associated with livestock depredation have occurred within the Yellowstone analysis area. Livestock depredation was documented as recent as 2011 (Gunther et al. 2012). No grizzly bear depredations on livestock have been documented on the Forest within the WNAA. Grizzly bear mortalities as a result of conflicts with livestock have occurred on lands adjacent to the Forest. Based on the information for livestock grazing, the likelihood of adverse impacts to grizzly bears related to livestock grazing during the life of the Revised Forest Plan is low. However, as grizzly bear numbers increase over the life of the plan, all potential for conflict cannot be ruled out.

Although the Forest's management of grizzly bear habitat may result in direct and indirect adverse effects on individual grizzly bears, we do not anticipate that these effects will have appreciable negative impacts on the YGBE or the NCDE grizzly bear populations. Grizzly bears

have been expanding their range into areas with higher than optimal (for grizzly bears) human use levels, mortalities and conflicts on the Forest are generally rare, and the Revised Forest Plan maintains or improves direction related to grizzly bear habitat found in the previous Plan. While a small portion of the Forest is located within the YGBE recovery zone, the majority of the Forest is located well outside of both the YGBE and NCDE recovery zones. The Recovery Plan stated that grizzly bears living within the recovery zone are crucial to recovery goals and hence to delisting. Grizzly bears inside and outside of recovery zones are listed as threatened under the Act, but only lands inside the recovery zones are considered essential to, and therefore managed primarily for, the recovery and survival of the grizzly bear as a species. In developing the recovery zones, all areas necessary for the conservation of the grizzly bear were included.

Even though the areas of the Forest outside of the recovery zones are not essential to the conservation of the species, the Forest has managed and will continue to manage the lands in such a way that has allowed grizzly bears to expand into these areas. Thus, although individual grizzly bears may be adversely affected at times over the life of the Revised Forest Plan, we anticipate that grizzly bears use will continue to increase within the Forest into the future. Grizzly bear use of the Forest may eventually result in grizzly bears moving or establishing home ranges between the YGBE and NCDE populations, reconnecting them, which would benefit both of these populations.

VI. CUMULATIVE EFFECTS

Cumulative effects include the effects of future state, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

In 2002, Montana Fish, Wildlife and Parks prepared the Grizzly Bear Management Plan for Southwestern Montana 2002-2012 and Final Programmatic Environmental Impact Statement with input from the Montana Grizzly Bear Working Group and other interested parties (Montana Fish, Wildlife and Parks 2002). This document was prepared to manage and enhance grizzly bear populations. The long-term goal of the Grizzly Bear Management Plan is to allow the populations in western Montana to reconnect by occupying currently unoccupied habitats, such as the action area. MFWP anticipates that successful implementation of the plan, along with adequate local involvement, would allow this to occur. One purpose of the plan is to minimize the potential for human-grizzly bear conflicts. In doing this, MFWP will attempt to minimize the number of grizzly bears removed from the population as a result of conflicts with people. Although the plan has officially expired, MFWP is in the process of rewriting a new plan. During this process, MFWP will continue to operate under the existing plan, which contributes to recovery of grizzly bears in Montana.

Private lands occur within and adjacent to the Forest. Some lands are being developed for residential or business use. The human population in the Yellowstone area has experienced growth during the recent decade and growth is expected to continue. However, despite the recent growth of the human population, the grizzly bear population in the ecosystem is

increasing as well (Haroldson 2010). Within the WNAA, the surrounding valley floors are primarily agricultural in nature with ranching and farming being important activities. Animals ranging from chickens to ducks, honeybees, hogs, horses, cows, and sheep occur on private land ranches. Small mining operations also occur on private land across the WNAA.

Recreation, livestock grazing, ranching and farming, and food and attractant storage issues on private land can create grizzly bear-human conflicts by providing attractants to grizzly bears. Once grizzly bears become habituated and a nuisance, they are typically removed. Human population growth could also result in additional grizzly bear attractants and further increase the potential for grizzly bear-human conflicts. As more people use private land and adjoining federal land for homes, recreation or business, the challenge to accommodate those uses in ways that continue to protect the grizzly bear population increases. The human population in the WNAA has remained relatively static during the recent decade. Conversions of agricultural lands to subdivisions cannot be projected, but given the current trends in human population such conversions are unlikely. If such trends continue, we would not expect the potential for additional attractants and/or conflicts and ultimately the removal of grizzly bears to greatly increase as a result human activities within the WNAA.

Recreation, livestock grazing, and attractant issues on private land will likely continue to create grizzly bear-human conflicts. However, large federal land ownership, large blocks of wilderness within which human access is restricted by regulation and topography, and highly regulated national park back country serve to reduce the impacts of larger residential human populations on grizzly bears. While federal land management cannot entirely compensate for such impacts on private land, management under the Revised Forest Plan would continue to provide habitat for grizzly bears on Forest land.

In addition, the MFWP bear specialist program is expected to continue to work with landowners in the action area to proactively reduce risks to grizzly bears on private and public lands (J. Jonkel, MFWP, pers. comm. 2013). Bear specialists provide information and assistance to landowners related to ways to store, fence or otherwise secure food and attractants from grizzly bears, and respond to reports of conflicts and assist the landowner with nuisance black and grizzly bears. In cooperation with other agencies, this program has made notable strides toward an informed public and reduced the availability of attractants to grizzly bears on private and public lands. Such benefits to grizzly bears are expected to continue.

VII. CONCLUSION

After reviewing the current status of grizzly bears, the environmental baseline for the action area, the effects of the action, and the cumulative effects, it is our biological opinion that the effects of the 2009 revision of the Beaverhead-Deerlodge National Forest Land and Resource Management Plan is not likely to jeopardize the continued existence of the grizzly bear. No critical habitat has been designated for this species therefore none will be affected. Implementing regulations for section 7 (50 CFR 402) define “jeopardize the continued existence of” as to “engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the

wild by reducing the reproduction, numbers, or distribution of that species." Our conclusion that the Revised Forest Plan is not likely to jeopardize the continued existence of grizzly bears is based on our project file for the 2010 consultation on the 2009 Revised Forest Plan, the information presented in the 2012 supplemental biological assessment (U.S. Forest Service 2012), correspondence during this reinitiated consultation process, information in our files, and informal discussions between the Service, the Forest, and other personnel.

Implementation of the Revised Forest plan direction may occasionally result in adverse effects to individual grizzly bears over the life of the plan, particularly as a result of access management direction, inadequate food and attractant storage, and livestock grazing. Based on the best available scientific information reviewed in this consultation, adverse effects on grizzly bears as a result of the Revised Forest Plan will not negatively impact the recovery of either the YGBE or NCDE grizzly bear populations. Further, we expect the Revised Forest Plan direction will result in conditions that support grizzly bear use of the Forest for dispersal or exploratory movements, as well as some home range establishment, albeit at densities lower than those in the recovery zones. Such use of the Forest by grizzly bears may, over time, benefit the YGBE and NCDE grizzly bear populations. It is our opinion that the proposed action would not appreciably reduce the likelihood of both the survival and recovery of the grizzly bears. Below we summarize key factors related to the effects of the Revised Forest Plan on grizzly bears as detailed and analyzed in this biological opinion. Key points of our rationale for this non-jeopardy conclusion include the following factors:

Factors related to the Revised Forest Plan:

- In 1993, the Recovery Plan articulated the conservation needs for the recovery of grizzly bears. The Recovery Plan stated that recovery zones include areas large enough and of sufficient habitat quality to support recovered grizzly bear populations, and that although grizzly bears are expected to reside in areas outside the recovery zones, only habitat within the recovery zone is needed for management primarily for grizzly bears. The Revised Forest Plan affects a small portion of the YGBE recovery zone (a portion of one subunit). The remainder of the Forest lies outside recovery zones.

- This recovery plan strategy has been successful and resulted in growth of the YGBE and NCDE grizzly bear populations. The YGBE population was estimated at 610 grizzly bears in 2012, is stable to slightly increasing (Haroldson 2012, Haroldson 2013), and has expanded into areas outside of the YGBE recovery zone. The NCDE population was estimated to be 765 grizzly bears in 2004 (Kendall et al. 2009), has been increasing since 2004 (Mace and Roberts 2011, 2012), and has also substantially expanded its range outside of the recovery zone. Based on the best available information, the Service concludes that the status of the both the YGBE and NCDE grizzly bear populations are robust and have reached or are nearing recovery.

- Within the YGBE Recovery Zone, no motorized routes occur within the Forest's portion of the Hilgard #1 subunit. Therefore, OMARD and TMARD are zero. Some roads outside of and immediately adjacent to the subunit influence secure habitat on the Forest's portion of the subunit, however, 96 percent of the Forest within the subunit is secure habitat. Access management within the recovery zone is not likely to result in adverse effects to grizzly bears.

- Roads concentrated in the remainder of the Forest (i.e., outside of the YGBE recovery zone) may result in displacement of some female grizzly bears from key habitat at some time over the life of the Revised Forest Plan. However, some grizzly bears are able to persist in areas with higher levels of human pressure, as documented by verified reports of grizzly bears, including females with cubs (indicating home range use), outside of the recovery zones. Grizzly bears are present in areas of the Forest despite no specific access management for grizzly bears. Based on the goals of the Revised Forest Plan and decisions that have occurred to date and are anticipated to occur, the overall levels of open motorized routes within the action area will likely be reduced over the life of the plan.

- Winter recreation will primarily occur during the grizzly bear denning season, but would extend to beyond the period when females with cubs typically begin emerging from dens. Females with cubs have high energetic needs in the spring, and cubs have limited ability to travel for several weeks after emergence from the den. Significant disturbance at the den-site may occur during this time. The number of adult females or females with cubs is unknown at this time, but is likely very few to date, and the amount of denning habitat is, in comparison, abundant. Thus, the likelihood of a snowmobile coursing near or over a female's den-site is very low.

- The best information indicates that grizzly bear densities are currently low on the Forest. Grizzly bears have low reproductive rates, long generational times (about 10 years), and are slow to disperse across landscapes and so sufficient habitat is likely to be available to individual bears as intra-specific competition for resources would be low.

- It is our opinion that the food storage special order as directed by the Revised Forest Plan within the YGBE recovery zone and the Madison, Gravelly, and Tobacco Root Landscapes outside of the recovery zone substantially reduces the potential for grizzly bear-human conflicts. Although food conditioning may occur on private lands adjacent to the Forest and the potential for adverse impacts to grizzly bears on the Forest does exist, the Forest has functioned very effectively under the current food storage special orders within the Yellowstone analysis area. No reported grizzly bear mortalities related to improper food or attractant storage have occurred within the Yellowstone Analysis area.

- Lack of a food storage order in the Highland Mountains Landscape within the Yellowstone analysis area and across the entire WNAA may result in grizzly bear-human conflicts and grizzly bear mortalities at some point in the future. No reported grizzly bear conflicts or mortalities related to improper food or attractant storage have occurred to date within these areas.

- Based on the number of grizzly bears now and likely to inhabit the Forest over the life of the Revised Forest Plan, we do not anticipate high levels of conflict and/or grizzly bear mortality within on the Forest over the life of the Revised Forest Plan.

- However, as grizzly bears increase in numbers and expand within the action area, we cannot rule out the potential risk that grizzly bears may become habituated and food conditioned and be subject to potential management removal at some time during the life of the Revised Forest Plan. Therefore, it is reasonable to expect that some risk, albeit low (based on grizzly bear numbers and history of conflicts in the area), of adverse impacts to grizzly bears related to attractant management exists over the life of the Revised Forest Plan, even with a food and attractant storage order in place.

- Montana Fish, Wildlife and Parks' bear specialist program is expected to continue to work with the public to reduce risks to grizzly bears on private and public lands. In cooperation with other agencies, this program has made notable strides toward an informed public and reduced the availability of attractants to grizzly bears on private and public lands.

- Livestock grazing as directed under the Revised Forest Plan may result in grizzly bear-human conflicts and grizzly bear mortalities or removals. Only one known incidence of grizzly bear mortality within the Yellowstone analysis area is tied to livestock depredation. This situation occurred in 1986. Additional conflicts related to livestock have occurred in this analysis area but have not resulted in grizzly bear mortality.

- No grizzly bear depredations on livestock have been documented on the Forest within the WNAA.

- No increase in livestock numbers is anticipated under the Revised Forest Plan. The Revised Forest Plan would maintain the existing number and distribution of allotments within the WNAA and the Yellowstone analysis area and would potentially reduce the number of sheep allotments within the Yellowstone analysis area. The Revised Forest Plan Wildlife Standard #5 states that sheep allotments within the Gravelly Landscape which become vacant will be closed to sheep grazing or the allotment may be used by an existing Gravelly Landscape sheep permittee with no increase in permitted use.

- Based on the information for livestock grazing and the number of grizzly bears now and likely to inhabit the Forest over the life of the Revised Forest Plan, we do not anticipate high levels of conflict and/or grizzly bear mortality within on the Forest over the life of the Revised Forest Plan.

- However, as grizzly bears increase in numbers and expand within the action area, we cannot rule out the potential risk that grizzly bears may be subject to potential management removal at some time during the life of the Revised Forest Plan as a result of livestock depredation and/or conflict. Therefore, it is reasonable to expect that some risk, albeit low (based on grizzly bear numbers and history of conflicts in the area), of adverse impacts to grizzly bears related to livestock grazing over the life of the Revised Forest Plan.

Although we expect grizzly bear mortalities may occur on the Forest over the life of the Revised Forest Plan, these mortalities would not negatively affect the survival and recovery of the YGBE or NCDE grizzly bear populations:

Factors related to the YGBE grizzly bear population:

- The YGBE grizzly bear population has expanded its range into areas outside the recovery zone. Female grizzly bears with young have been observed outside of the recovery zone, indicating that a number of females are able to establish home ranges and find the resources needed to survive and reproduce outside the recovery zone despite the lack of mandatory habitat protections.

- The Interagency Grizzly Bear Study Team (IGBST) is responsible for grizzly bear population monitoring in the YGBE. Using the Revised Demographic Recovery Criteria, the total grizzly bear population size for 2012 in the YGBE was 610 (Haroldson 2013). Verified observations of female grizzly bears with young occurred in 16 of 18 BMUs in 2011 and in 18 of 18 BMUs in at least 3 years of the last 6-year period (2006 through 2011) (Podruzny 2012).

- In part due to grizzly bear expansion into areas that had previously been unoccupied, the number of grizzly bear-human conflicts has increased. This is especially true for areas outside the recovery zone or on private lands. Despite the growth of the human population and the increase in the number of grizzly bear-human conflicts and grizzly bear mortalities, the IGBST 2011 report indicates a stable to slightly increasing population (Haroldson 2012).

- A Food Storage Order is in effect throughout the YGBE recovery zone on National Forest lands and Yellowstone National Park. These agencies have been fairly successfully managing attractants on federal lands under the current food storage order.

- Montana Fish, Wildlife and Parks' bear specialist program is expected to continue to work with the public to reduce risks to grizzly bears on private and public lands, both inside and outside the boundaries of the recovery zone. In cooperation with other agencies, this program has made notable strides toward an informed public and reduced the availability of attractants to grizzly bears on private and public lands.

- The YGBE encompasses about 5.9 million acres (9,209 square miles), of which 36 percent (2.1 million acres or 3,315 square miles) is comprised of National Forest designated wilderness lands and 39 percent (2.3 million acres or 3,591 square miles) is comprised of Yellowstone and Grand Teton National Parks. These areas contain the highest quality grizzly bear habitat. Considering these lands only, three-quarters of the YGBE is essentially roadless or free of motorized use (75 percent). Finally, the National Forests also provide large blocks of core area within the recovery zone. These areas likely contribute significantly to reducing the number of human bear encounters and so increase security for grizzly bears.

Factors related to the NCDE grizzly bear population:

- Kendall et al. (2009) produced a final total NCDE grizzly bear population estimate of 765 grizzly bears for2004 (Ibid.), more than double the recovery plan estimate for that year.

- Kendall et al. (2009) also indicated that in 2004 (http://www.nrmsc.usgs.gov):

    1) Female grizzly bears were present in all 23 BMUs.
    2) The number and distribution of female grizzly bears indicated good reproductive potential.
    3) The occupied range of NCDE grizzly bears now extends 2.6 million acres beyond the 1993 recovery zone.
    4) The genetic health of NCDE grizzly bears is good, with diversity approaching levels seen in undisturbed populations in Canada and Alaska.
    5) The genetic structure of the NCDE population suggests there has been population growth between 1976 and 2004.
    6) Human development is just beginning to inhibit interbreeding between bears living north and south of the U.S. Highway 2 corridor, west of the Continental Divide.

- MFWP research conducted between 2004 and 2011 indicates a positive trend for NCDE grizzly bears (Mace and Roberts 2012). The research indicates an annual growth of three percent since 2004 (Mace and Roberts 2011).

- The NCDE grizzly bear population currently meets all the demographic recovery criteria, including number of BMUs occupied by family groups and sustainable human-caused mortality levels for both total and female grizzly bears.

- The NCDE grizzly bear population is increasing, explaining the expansion of its range into areas outside the recovery zone. The USGS found that grizzly bears inhabit 2.6 million acres outside the recovery zone. Female grizzly bears with young have been observed outside of the recovery zone, indicating that a number of females are able to find the resources needed to establish home ranges and survive and reproduce outside the

recovery zone, despite the lack of specific habitat protections. In part due to grizzly bear expansion into areas that had previously been unoccupied, the number of grizzly bear-human conflicts has generally increased. However, much of the recent grizzly bear mortality is primarily associated with conflicts arising from attractants on private lands rather than conflicts on public lands.

- The NCDE Food Storage Order is in effect throughout the NCDE recovery zone and several areas outside of the recovery zone on National Forest lands and Glacier National Park. These agencies have been fairly successful at managing attractants on federal lands under the current NCDE food storage order.

- Montana Fish, Wildlife and Parks' bear specialist program is expected to continue to work with the public to reduce risks to grizzly bears on private and public lands. In cooperation with other agencies, this program has made notable strides toward an informed public and reduced the availability of attractants to grizzly bears on private and public lands.

- The NCDE encompasses 5.7 million acres, of which 1.7 million acres is wilderness and 962,000 acres is Glacier National Park, which contains highest quality grizzly bear habitat. Considering these lands only, nearly half of the NCDE is essentially roadless or free of motorized use (47 percent). Further, the Flathead National Forest, which makes up 40 percent of the NCDE recovery zone, currently contributes approximately 1.5 million acres of additional grizzly bear core area. The four other National Forests in the NCDE also provide additional substantial core areas. Considering core area and all other lands, the NCDE recovery zone encompasses a total of over 9,500 square miles.

- The majority of the NCDE is managed by the National Forest and National Park Service, whose access management outside of wilderness areas or otherwise protected area is directly based on IGBC Guidelines. The current access management conditions on Federal lands across the ecosystem have contributed to the recovery of grizzly bears in the NCDE.

- Despite the growth of the human population and the increase in the number of grizzly bear-human conflicts and grizzly bear mortalities, the preponderance of evidence suggests an increasing number of grizzly bears in the NCDE recovery zone: a total population estimate of 765 grizzly bears for the year 2004 (Kendall et al. 2009), an estimated positive population trend of three percent annually (Mace and Roberts 2011) and the current distribution of grizzly bears (Mace and Roberts 2012). Based on the best available information, the Service concludes that the status of the NCDE grizzly bear population is robust and nearing recovery.

Recovery zones were established to identify areas necessary for the recovery of a species and are defined as the area in each grizzly bear ecosystem within which the population and habitat criteria for recovery are measured. The YGBE and NCDE recovery zones are areas adequate for managing and promoting the recovery and survival of these grizzly bear populations (USFWS

1993). Areas within the recovery zones are managed to provide and conserve grizzly bear habitat. The recovery zones contain large portions of wilderness and national park lands, which are protected from the influence of many types of human uses occurring on lands elsewhere. Multiple use lands are managed with grizzly bear recovery as a primary factor. As anticipated in the Recovery Plan, the YGBE and NCDE grizzly bear populations have responded to these conditions, have stabilized and are increasing and are at or near recovered levels. In addition, the grizzly bears have been expanding and continue to expand their existing range outside of the recovery zones, as evidenced by the verified records of grizzly bears on or near portions of the Forest.

Grizzly bears outside the recovery zones probably experience a higher level of adverse impacts due to land management actions than do grizzly bears inside. Currently, the number of grizzly bears on the Forest is low. As anticipated in the recovery plan, we expect more grizzly bears will inhabit the Forest in the future. We expect grizzly bears will occur on the Forest at lower densities than within the recovery zones as a result of suboptimal habitat conditions, which include higher road densities, fewer areas secure from motorized access, and so more human presence. While the Revised Forest Plan direction may have adverse effects on some of the individual grizzly bears using the action area now and into the future, considering the large size of the YGBE and NCDE recovery zones, favorable land management within the recovery zones, and the robust status of these grizzly bear populations, adverse effects on grizzly bears as a result of implementing the Revised Forest Plan would not have negative effects on the status of either the YGBE or NCDE grizzly bear populations. These populations are robust, the recovery zones are large and management within the recovery zones favors the needs of grizzly bears; these results signal successful federal land management related to grizzly bear recovery under the strategy detailed in the 1993 Recovery Plan. Further, even a low number of grizzly bears inhabiting the region between these ecosystems may benefit both the YGBE and NCDE grizzly bear populations. Therefore, we conclude that the Revised Forest Plan is not likely to reduce the numbers, distribution, or reproduction of grizzly bears in the YGBE or the NCDE.

Because the Revised Forest Plan would not reduce the reproduction, numbers, or distribution of grizzly bears in the YGBE or NCDE, and considering the status of these grizzly bear populations, we conclude that the Revised Plan is not reasonably expected to reduce appreciably the likelihood of both the survival and recovery of grizzly bears.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act, and Federal regulations pursuant to section 4(d) of the Act, prohibit the take of endangered and threatened species, respectively without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as an intentional or negligent act or omission that creates the likelihood

of injury to listed wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity.

Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement. This incidental take statement applies to the effects of access management, sanitation/food storage, and livestock grazing under the implementation of the Revised Forest Plan.

The measures described below are non-discretionary and must be undertaken by the Forest so that they become binding conditions of any grant or permit issued, as appropriate, for the exemption in section 7(o)(2) to apply. The Forest has a continuing duty to regulate the activity that is covered by this incidental take statement. If the Forest (1) fails to assume and implement the terms and conditions or (2) fails to require an applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the Forest must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50CFR 402.14(i)(3)].

Amount or Extent of Take Anticipated

<u>Access management - summer/fall motorized use</u>

Within the YGBE Recovery Zone, no motorized routes occur within the Forest's portion of the Hilgard #1 subunit. Therefore, OMARD and TMARD are zero. Some roads outside of and immediately adjacent to the subunit influence secure habitat on the Forest's portion of the subunit, however, 96 percent of the Forest within the subunit is secure habitat. Access management within the recovery zone is not likely to result in incidental take of grizzly bears.

Based on research detailed earlier in this biological opinion, the Service has defined harm of grizzly bears in terms of adverse habitat conditions caused by high motorized route densities, which displace individuals from key habitat to the extent that significant under-use of habitat by grizzly bears occurs. A moving windows analysis of road densities has not been completed for the remainder of the Forest outside of the recovery zone. However, using the best information on the effects of roads and road densities on grizzly bears, we conclude high open motorized road and trail densities in areas of the Forest are likely to result in a level of adverse effects to some grizzly bears, primarily those that attempt to establish and maintain home ranges on the Forest during the life of the Revised Forest Plan. Future road construction, permanent or temporary, may add to or increase the likelihood of such adverse effects. These adverse effects would result from displacement of grizzly bears from essential habitat. Displacement may result in significant under-use of key habitat when high linear road densities exist on the landscape. The Service maintains that such under-use of otherwise suitable habitat

within a grizzly bear's home range may constitute incidental take of grizzly bears through "harm" as a result of significant habitat alteration that impairs breeding, feeding and/or sheltering.

The Service believes that it is reasonable to assume that the level of permanent roads in action area will not substantively increase overall in the next decade, and we expect some localized decreases. This assumption is based on the desired open motorized road and trail density as described in the Revised Forest Plan and on recent history and trends in road building and decommissioning that consistently shows fewer permanent roads on the landscape (U.S. Forest Service 2012). Some road construction may occur but would be limited by the Revised Forest Plan's desired open motorized road and trail densities. However, construction of and motorized use of roads may be required for projects and may increase the likelihood of disturbance and displacement in or near the project area. These roads may be temporary, but even so may remain on the landscape for several years and receive a substantive amount of vehicular use.

We anticipate that in a limited number of circumstances over the life of the plan, site specific conditions would result in significant displacement of adult females from key seasonal habitat, impairing their ability to find adequate food resources, breed and raise young, and/or find shelter. We do not anticipate any take of subadult or male grizzly bears. Male grizzly bears have larger home ranges than females, and males and subadults are more mobile and do not have the same energetic needs as adult females. We also do not anticipate take of grizzly bears that are transient (moving through areas outside of home range use). Such individuals are highly mobile and not restricted to finding food and shelter within a home range. Thus, while displacement may affect behavioral patterns such as feeding or sheltering, we do not anticipate such effects would cause injury to transient, subadult, or male grizzly bears.

As detailed in this biological opinion, we anticipate that existing access management and some future motorized route construction, including temporary roads, would affect only a very few adult females over the life of the Revised Forest Plan because grizzly bears occur at low densities even in the recovery zones, are lower still in the action area, and numbers of females are expected to increase only slowly over time in most of the action area. Also, substantial increases in road densities are not expected. If during the life of the Revised Forest Plan (i.e. the next 15 years), subadult females move into areas of the Forest seeking to establish home range, they would be exposed to levels of roading that would factor in to home range selection, and that level of roading would not likely significantly increase over the life of the plan. Therefore, the take we anticipate would be harm to only a very low number of female grizzly bears inhabiting the action area over the life of the plan. We expect harm would be caused by significant under-use of key habitat in areas affected by high road densities to levels that result in decreased fitness and impaired reproductive potential. In other words, infrequently and in site-specific circumstances, an adult female grizzly bear wary of humans and human-generated disturbance may not breed at its potential frequency or may fail to complete gestation due to decreased fitness. We do not expect all adult female grizzly bears affected by high linear road densities to suffer impairment of breeding, feeding, and/or sheltering, nor would we expect any female to experience permanent effects (lasting more than one reproductive cycle). Variables

such as annual climate and resulting habitat and food resource conditions, the level of roading, and the number of grizzly bears using an area may change over time and are all factors influencing the displacement within a home range.

The effects of high road densities on individual female grizzly bears are difficult to quantify in the short term and may be measurable only as long-term effects on the species' habitat and population levels. The amount of take is difficult to quantify for the following reasons:

1) The amount of take would depend on the number of adult female grizzly bears impacted by the Revised Forest Plan. We lack specific information on the precise number of adult female grizzly bears that will use the action area, but due to the location, number, and known-gender of verified grizzly bear occurrences in and near the action area, we reasonably assume very few adult females would be affected.
2) Individual grizzly bears would react differently to the disturbance. Not all adult female bears that are exposed to disturbances from high road densities would be adversely impacted to the point of take. Low numbers of grizzly bears would likely decrease intra-specific competition for habitat, allowing more options for individuals to move within home ranges, in many cases.
3) Some individual female grizzly bears that initially may be sensitive to disturbances may over time adjust to the routine disturbances generated by human activity over time.

Therefore, determining the precise amount of take, as defined by impaired reproductive potential (as affected by feeding and sheltering), is difficult. The amount of take would be also difficult to detect for the following reasons:

1) Grizzly bears are not easily detected or observed in the wild.
2) Reproductive rates of female grizzly bears vary naturally due to environmental and physiological causes.
3) A reduction in "normal" reproductive success is not discernable in the wild.
4) The reasons a grizzly bear fails to breed and/or failure to complete gestation are not discernable in the wild.

According to Service policy, as stated in the Endangered Species Consultation Handbook (March 1998) (Handbook), some detectable measure of effect should be provided, such as the relative occurrence of the species or a surrogate species in the local community, or amount of habitat used by the species, to serve as a measure for take. Take also may be expressed as a change in habitat characteristics affecting the species (Handbook, p 4-47 to 4-48). In instances where incidental take is difficult to quantify, the Service uses a surrogate measure of take. The number of grizzly bears that use the action area is unknown but grizzly bears have been verified in the Yellowstone analysis area for a number of years and verified grizzly bear observations have recently been documented over the past few years in the WNAA. Grizzly bears occur at relatively low numbers across the Forest, with likely very low numbers currently in the WNAA. The mechanism of female grizzly bear dispersal makes it likely that in most of the action area, only relatively few female grizzly bears would occupy the action area during the next 15 years. Therefore, for reasons explained above, the Service anticipates that incidental take of adult

female grizzly bears would be very low and occur only infrequently over the life of the Revised Forest Plan in the form of harm related to the displacement effects of high road densities and temporary road construction and use.

One subunit, Hilgard #1, occurs within the YGBE recovery zone on the Forest. This subunit occurs on both the Beaverhead-Deerlodge Forest and the Gallatin Forest. No motorized routes occur within this subunit on the Beaverhead-Deerlodge Forest. Therefore, OMARD and TMARD on the Forest within the recovery zone is zero. Some roads outside of and immediately adjacent to the subunit influence secure habitat on the Forest within the subunit; however, 96 percent of the Forest within the subunit is secure habitat. Access management on the Forest within the YGBE recovery zone is not likely to result in any incidental take to grizzly bears.

We use the existing levels of access management and the desired open motorized road and trail densities described in the Revised Forest Plan as our **first surrogate measure of incidental take** for the remaining portions of the Forest (the Yellowstone analysis area and the WNAA). These linear road densities include permanent open motorized roads and trails. If and when activities occur that decrease existing linear motorized road and trail densities to levels that meet the Revised Forest Plan's desired condition, the desired condition in the Revised Forest Plan becomes the final measure of incidental take we anticipate for the first surrogate measure.

In other words, the amount of incidental take we anticipate is measured by the existing access condition and we expect the amount will decrease to levels as measured by the desired condition when met. Therefore, during the interim, the linear road densities resulting from activities that decrease motorized road and trail density and move access conditions toward the desired conditions but do not meet them entirely, would represent the surrogate measure of incidental take. More specifically, once access conditions are improved by projects, those conditions must be maintained or improved, or the amount of take we anticipate over time would be exceeded.

If motorized road and trail densities in a landscape or hunting unit is below (better than) the desired open motorized road and trail density, open road density could increase in that landscape or hunting unit, however it could not increase beyond the desired open road and trail density provided in the Revised Forest Plan. In this case, if and where an adult female may occur, we anticipate that take may be occurring as a result of existing conditions, and that it would increase up to, but not beyond, that measured by the desired open road and trail density of permanent roads. Thus, if road densities increase above the desired condition, the amount of take we anticipate would be exceeded.

Table 16 displays the **first surrogate measures of incidental take for the Yellowstone analysis area**. Table 17 displays the **first surrogate measures of incidental take for the WNAA.** One column displays the existing linear road densities and the other column displays the desired open motorized road and trail densities. If permanent increases in linear road density depart from conditions we describe here as the first surrogate measure (indicated by the road densities specified in columns 2 and 3, Tables 16 and 17), over the life of the Revised Forest

Plan (15 years), then the level of incidental take we anticipated in our first surrogate measure of take would be exceeded and therefore the level of take exempted would be exceeded.

Table 16. First surrogate measures of incidental take related to access management in the Yellowstone analysis area.

Landscape	2009 Existing Linear Road Density (miles per square mile)	Revised Forest Plan Desired Open Motorized Road and Trail Density (miles per square mile)
Madison	0.0	0.0
Gravelly	0.8	0.7
Tobacco Roots	1.2	1.3
Highland	1.8	1.9
Hunting Unit	**2009 Existing Linear Road Density (miles per square mile)**	**Revised Forest Plan Desired Open Motorized Road and Trail Density (10/15-12/1) (miles per square mile)**
311	0.0	0.0
320	0.8	0.8
323	0.7	0.5
324	0.5	0.4
327	0.9	0.8
330	0.7	0.7
333	1.1	0.9
340	1.5	1.4
360	0.0	0.0
362	0.0	0.0

Table 17. First surrogate measures of incidental take related to access management in the WNAA.

Landscape	2009 Existing Linear Road Density (miles per square mile)	Revised Forest Plan Desired Open Motorized Road and Trail Density (miles per square mile)
Big Hole	1.2	1.2
Boulder River	2.0	1.9
Clark-Fork Flints	1.8	1.9
Jefferson River	1.7	1.6
Lima-Tendoy	1	1
Pioneer	1.2	1.5
Upper Clark Fork	2	2
Upper Rock Creek	.9	.9

Hunting Unit	2009 Existing Linear Road Density (miles per square mile)	Revised Forest Plan Desired Open Motorized Road and Trail Density (10/15-12/1) (miles per square mile)
210	.9	.9
211	.5	.5
212	1.3	1.4
213	1.4	1.4
214	1.6	1.6
215	1.9	1.5
216	.8	.8
300	.7	.6
302	1.1	1
311	0	0
318	1.9	1.8
319	.6	.6
321	1	1.1
328	.8	.8
329	1	1.1
331	1.3	1.5
332	.8	.8
340	1.4	1.4
341	.6	.5
350	1.4	1.3
370	.9	1

Temporary roads may result in temporary increases in linear road densities within a landscape or hunting unit. The temporary changes do not affect our first surrogate measure of take as temporary roads would not result in a net change to the overall linear road densities post-project. Further, in many cases, temporary roads have different effects on grizzly bears than those associated with permanent roads. Temporary roads are obliterated post-project and linear road densities would return to the pre-project levels, lessening the effects on grizzly bears over time. The Forest has estimated that 70 miles of temporary roads may be constructed across the Forest over the life of the Revised Forest Plan. This level of temporary roading represents our **second surrogate measure of incidental take** that we anticipate in regards to future temporary road construction. If the Forest constructs more than 70 miles of temporary motorized routes over the life of the Revised Forest Plan, then the level of incidental take we anticipated in our second surrogate measure of take would be exceeded and the level of take exempted would be exceeded.

We do not anticipate that motorized access management in all landscapes or hunting units would result in incidental take. For example, hunting units 311, 360, and 362 have an open motorized road and trail density of zero. Some additional units have relatively low open motorized road and trail densities. The Boulder River, Jefferson River, Clark Fork-Flints, and Upper Clark Fork Landscapes and corresponding hunting districts exhibit the highest open

motorized road and trail densities. Grizzly bears appear to be reoccupying these areas on the Forest, likely moving south from the NCDE population (U.S. Forest Service 2012). We anticipate that the likelihood of incidental take of females would be highest in these areas over the life of the plan. We also do not anticipate that all temporary roads constructed in the action area would result in incidental take. This would depend on such things as location and length of the temporary road and the duration it would be on the landscape.

In summary, for either analysis area, if permanent increases in linear road and trail density in either analysis area depart from conditions we describe above as the first surrogate measure, over the life of the Revised Forest Plan (15 years), then the level of incidental take we anticipated in our first surrogate measure of take would be exceeded and therefore the level of take exempted would be exceeded. If miles of temporary roading exceed the amount we describe above as the second surrogate measure of incidental take, then the level of incidental take we anticipated for our second surrogate measure of incidental take would be exceeded and therefore the level of take exempted would be exceeded. Under CFR 402.16 (1), in any one of these scenarios, reinitiation of consultation would be required.

Access management - winter motorized use

One 2,067 acre area on the Forest (the McAtee Basin) within the YGBE recovery zone is open to snowmobiling. Legal access to this area during the winter occurs on the Gallatin National Forest. The remaining areas open to winter motorized use occur outside of the recovery zone.

The Yellowstone analysis area encompasses approximately 160,301 acres of denning habitat. Of this, 55,026 acres (34 percent) are open to snowmobiling under the Revised Forest Plan. Grizzly bear occurrence in the Yellowstone analysis area is limited to the Madison and Gravelly landscapes. Grizzly bears have not yet been documented in the Tobacco Root or Highland landscapes. The WNAA encompasses approximately 344,467 acres of denning habitat. Of this, 228,356 acres (66 percent) is open to snowmobiling under the Revised Forest Plan. There is no direct evidence of grizzly bears denning in the WNAA area. Grizzly bear occurrence in this portion of the action area has just recently been documented in the past few years. Both of the analysis areas have some overlap of winter motorized use and grizzly bear denning habitat, where grizzly bears have been verified or where they may occur sometime in the future. Of approximately 504,768 acres of denning habitat across the Forest, 283,382 acres (56 percent) are open to winter motorized use.

This opinion documents that the best information available indicates that snowmobile impacts to emergent bears was a higher concern than impacts to denning bears (Graves and Ream 2001). We conclude that snowmobile-generated disturbance to grizzly bears in dens during the deep of winter is not likely to rise to the level causing significant impairment of breeding or sheltering to the point of injury or death. Spring emergence of female grizzly bears typically ranges from the third week in March to the fourth week in May. Winter motorized use is allowed until May 15. The timeframe between the third week in March and the Revised Forest Plan winter use season ending date of May 15 is the timeframe where the potential exists for interactions between snowmobiles and recently emerged female grizzly bears with cubs.

Therefore, the potential of snowmobile use impacting a female grizzly bear's normal breeding success, feeding, or sheltering to the extent that harm or harassment occurs cannot be entirely eliminated.

As grizzly bears continue to expand their range and numbers increase on the Forest, there is potential for some additional denning to occur. If and when this occurs by female grizzly bears, and they den in areas that overlap with snowmobile use, then we would anticipate some incidental take, but still only very rarely and affecting very few individuals. The number of adult females or females with cubs is unknown at this time, but is likely very few to date, and the amount of denning habitat is, in comparison, abundant. Thus, the likelihood of a snowmobile coursing near or over a female's den-site is very low. As explained previously, we expect the number of grizzly bears may increase, but only slowly, over time during the life of the Revised Forest Plan. Further, grizzly bears do not often reuse den sites, so if disturbed during one season by high levels of snowmobile use, a female will likely have options to select a den site elsewhere the following year. In addition, den emergence dates and snowmobile use varies each year due to a number of factors, including snow conditions. Human access to the back country during the spring is often limited by weather conditions. All of these variables are difficult to monitor or census. The Service concludes that the amount of incidental take of grizzly bears that would result from snowmobile use as directed by the proposed action would be very low based on the best available grizzly bear population information, the characteristics of most grizzly bear den sites, expert opinion of grizzly bear researchers, and the best available information on grizzly bear denning. For reasons explained above, we expect that incidental take would be a rare and infrequent event, and over time would affect very few individual females.

We anticipate incidental take in the form of harm or harassment to only individual adult female grizzly bears and/or their cubs caused by premature den emergence or premature displacement from the den site area, resulting in reduced fitness of females and/or their cubs, ultimately resulting in injury and possibly death. Based on naturally earlier den emergence of male bears and females without young, their independence and mobility, the Service does not anticipate the effects of disturbance caused by snowmobiles would result in take of adult male grizzly bears, adult female grizzly bears without cubs, or subadults.

The incidental take of female grizzly bears or their cubs may be indicated by:

- a female grizzly bear's premature den emergence (earlier than documented for this ecosystem, based on gender, age and reproductive status) following exposure to snowmobiles;
- the location of one or more cubs abandoned by their mother near or in a den in an area of snowmobile use;
- the location of one or more cubs accompanying a female prior to the normal (earlier than documented for this ecosystem) den emergence period in an area of snowmobile use; or
- an adult female bear that emerges in poor fitness in early spring (when other bears are in good condition) in an area of snowmobile use.

However, the Service anticipates such incidental take of grizzly bears will be difficult to detect for the following reasons:

- grizzly bears are difficult to detect in the wild;
- grizzly bears are wide-ranging and their denning habitat is remote, largely wilderness and difficult to access;
- grizzly bear den sites cannot be precisely located over large portions of the denning habitat;
- grizzly bear den sites are often not re-used, so even known den sites cannot be monitored over time for indications of early abandonment, injury or mortality;
- close monitoring of den sites may actually increase the risk of abandonment;
- the reabsorption of or loss of fetuses, or loss of cubs born in inaccessible underground den sites cannot be quantified; and
- decreased fitness, loss of young, and premature den emergence may all be related to a variety of other factors; establishing a causal relationship between snowmobiling and these effects would be difficult.
- Discovery of an individual grizzly bear injury or mortality attributed to snowmobiling is very unlikely.

As mentioned above, according to Service policy, as stated in the Endangered Species Consultation Handbook (March 1998) (Handbook), some detectable measure of effect should be provided, such as the relative occurrence of the species or a surrogate species in the local community, or amount of habitat used by the species, to serve as a measure for take. Take also may be expressed as a change in habitat characteristics affecting the species (Handbook, p 4-47 to 4-48). In instances where incidental take is difficult to quantify, the Service uses a surrogate measure of take.

The surrogate measures for the number of female grizzly bears and/or cubs harmed or harassed as a result of winter motorized use will be quantified using 1) the timeframes for the earliest potential for interactions between snowmobiles and female grizzly bears that have recently emerged from their dens may occur; and 2) the amount of acres of denning habitat open to winter motorized access during this timeframe.

The timeframe between the third week in March and the winter use season ending date of May 15 is the timeframe where the potential exists for interactions between snowmobiles and recently emerged female grizzly bears with cubs. This timeframe represents our **third surrogate measure of incidental take** that we anticipate as a result of the Revised Forest Plan.

In the Yellowstone analysis area, approximately 55,026 acres of denning habitat will be open to snowmobiling during the life of the Revised Forest Plan. In the WNAA, approximately 228,356 acres of denning habitat will be open to snowmobiling during the life of the Revised Forest Plan. These acres represent our **fourth surrogate measures of the incidental take** that we anticipate as a result of the Revised Forest Plan.

Therefore, if snowmobiling continues beyond the May 15 closure date provided in the third surrogate measure above or if the total acres of denning habitat open to snowmobiling during and after the third week in March exceeds the acres provided in the fourth surrogate measures above, then the level of incidental take we anticipated in this biological opinion for winter motorized use would be exceeded and therefore the level of take exempted would be exceeded. Under CFR 402.16 (1), in any scenario, reinitiation of consultation would be required.

Food and Attractant Storage

Human access into grizzly bear habitat can lead to the habituation of grizzly bears to humans. Developed sites can pose risks of unsecured attractants and food left by campers, hunters, and people using the sites. Habituated grizzly bears learn to seek out developed sites for food rewards. Habituation to human foods and attractants in turn increases the potential for conflicts between people and grizzly bears. Habituated grizzly bears often obtain human food or garbage and become involved in nuisance bear incidences, and/or threaten human life or property. These grizzly bears are considered food conditioned and generally experience high mortality rates as they are eventually destroyed or removed from the population through management actions.

As the number of grizzly bears increase and the number of people residing in and visiting the Forest increases, the Service assumes that the potential for grizzly bear-human conflicts related to food and attractant storage will increase as well. Therefore, habituation/food conditioning of grizzly bears may occur on the Forest over the life of the Revised Forest Plan. The potential remains for the incidental take of grizzly bears in the form of harm through uses of the Forest where grizzly bears may become habituated to people and food conditioned to anthropogenic foods. Such habituation/food conditioning results in the modification and significant impairment of natural feeding behavior. This impairment is significant in that it ultimately results in the removal or death of grizzly bears due to necessary management removal for defense of human life or property. Thus, the potential for incidental take of grizzly bears through habituation and food conditioning will remain.

Incidental take such as habituation and/or modification of natural feeding behavior is difficult to quantify or detect. As explained earlier, in such cases the Service uses a surrogate measure of take. In this case, we anticipate that **the fifth surrogate measures of incidental take** resulting from the Revised Forest Plan in the form of harm is proportional to the number of grizzly bears that are removed or killed within the each of the area analysis areas for defense of human life or property, as a result of obtaining anthropogenic food or other attractants due to inadequate storage. We base this surrogate on the fact that both the level of take through harm and grizzly bear mortalities will be related to level of bear use in an analysis area, the level of human use, and whether a food storage order is in place or not. For each analysis area, we also considered the number of past human-grizzly bear conflicts in the area, Revised Forest Plan direction, as well as the relative and expected increase in grizzly bears and in human use occurring in the area over the life of the Revised Plan.

Yellowstone analysis area

For the Yellowstone analysis area, a wildlife objective in the Revised Forest Plan specifically calls for implementing food storage and sanitation orders in areas classified as occupied grizzly bear habitat. Forest order No. 2004-D6/D7-031 and other related orders specifically direct attractant management for all occupancy and use of the Madison, Gravelly, and Tobacco Root Landscapes from March 1 through December 1. No similar order is in effect for the Highland Mountains Landscape. However, the Highland Mountains Landscape is not occupied by grizzly bears at this time. The primary goal of the special orders is to minimize grizzly bear-human encounters and provide for user safety and the protection of the grizzly bear. These food storage orders substantially reduce the potential for adverse effects to bears as a result of food conditioning and habituation.

No grizzly bear mortalities associated with improper food storage have been recorded within the Yellowstone analysis area (Haroldson 2010 *in litt*). However, at least two grizzly bear/human *conflicts* have occurred in this analysis area related to anthropogenic foods. These occurred several years ago in 1993 and 1994 (ibid). Several other conflicts related to unnatural foods and/or property damage have occurred off of the Forest but adjacent to it either on the Gallatin National Forest lands or non-National Forest lands.

The mandatory food storage order within the majority of the Yellowstone analysis area is likely significant in reducing human-bears conflicts. However, it is reasonable to expect that the order will not be adequate in every circumstance, and some level of noncompliance by some visitors may occur. The Forest will follow the Yellowstone Grizzly Bear Conservation Strategy nuisance bear standard for nuisance bear management. These standards are embedded within the Revised Forest Plan and are therefore part of the proposed action. Based on this information, we anticipate that **no more than one grizzly bear will be removed from the Yellowstone analysis area** during the life of the Revised Forest Plan for management purposes related to food and attractant storage issues. This represents our surrogate measure for incidental take of grizzly bears in the form of harm through habituation and/or modification of natural feeding behavior in the Yellowstone analysis area.

WNAA

For the WNAA, the Revised Forest Plan does not include a food and attractant storage order. In preparation for a potential attractant management order in 2014, the Forest has developed attractant management infrastructure within portions of the WNAA, likely reducing the potential for conflict. No grizzly bear-human conflicts have been reported to date in the WNAA. However, until a Forest-wide order is in effect, the potential for conflicts between grizzly bears and humans remains more elevated.

Grizzly bears occur at relatively low numbers across the Forest, with likely very low numbers currently in the WNAA. As explained previously, we expect the number of grizzly bears to increase, but only slowly, over time during the life of the Revised Forest Plan. As more grizzly bears begin to move through or frequent areas within the WNAA, we cannot rule out the

possibility of conflict between grizzly bears and people as a result of inadequate food and attractant storage. Based on this information, we anticipate that **no more than one grizzly bear will be removed from the WNAA** during the life of the Revised Forest Plan for management purposes related to food and attractant storage issues. This represents our surrogate measure for incidental take of grizzly bears in the form of harm through habituation and/or modification of natural feeding behavior in the WNAA.

Therefore, should more than one grizzly bear be killed or removed from either analysis area of the Forest at any time during for the life of the Revised Forest Plan because it has become habituated in relation to food and attractant storage, incidental take will be exceeded and the Forest must reinitiate consultation with the Service. Additionally, should the level of incidental take associated with food and attractant storage reach, but not exceed, the anticipated incidental take level for either area, the Forest should informally consult with the Service regarding the adequacy of existing mechanisms to minimize potential take.

Livestock Grazing

Effects of livestock grazing on grizzly bears are generally related to depredations of livestock by grizzly bears, disposal of livestock carcasses, storage of human food and stock feed, and grizzly bear habituation, food conditioning, and mortality risk associated with these activities. Depredating bears may become food conditioned resulting in management actions that remove bears from the population. Although grizzly bear conflicts with cattle do exist, the more significant problems have been with sheep (Orme and Williams 1986).

Livestock grazing on the Forest will continue to pose risks as grizzly bear numbers increase in these areas. The permitted livestock grazing may indirectly result in the removal or death of grizzly bears because bears are prone to prey on livestock, particularly sheep. Grizzly bears easily become habituated or food conditioned to prey on livestock and tend to continue such behavior; these bears are removed or killed in management actions or through defense of life or property.

The Service anticipates take in the form of harm to grizzly bears as a consequence of livestock grazing and the associated livestock management operation in habitats commonly used by grizzly bears. The habitat modification of adding a significant, anthropogenic food source that results in the death or injury of bears can itself be considered “take” in the form of harm. The likely depredation of some of the permitted livestock represents an impairment of natural feeding behavior that will in some cases ultimately lead to management removal or death of grizzly bears.

The level of incidental take in the form of harm is difficult to detect and quantify. Therefore, similar to take associated with food and attractant storage, in such cases the Service uses surrogate measures to gauge the level of take. In this case, we anticipate that the level of **the sixth surrogate measure of incidental take** resulting from the proposed action in the form of harm is proportional to the number of grizzly bears that are killed within the action area as a result of livestock grazing. We base this on the fact that both the level of take through harm

and grizzly bear mortalities will correlate to the level of bear use and permitted grazing use within the action area. Specifically, the Service believes this level of take in the form of harm is proportional to the management actions for nuisance bear control in compliance with the Interagency Grizzly Bear Guidelines (IGBC 1986) or from defense of life or property, when the permitted grazing or associated activities are reasonably believed to have contributed to the injury or death of the grizzly bear (e.g., direct connection to grazing, such as the management of bear depredating livestock, or indirect connection to grazing, such as a bear illegally killed while feeding on a livestock carcass, etc.).

For this analysis, we will measure the amount of incidental take by using the number of anticipated grizzly bear management removals or other mortalities related to livestock grazing operations during the life of the Revised Forest Plan. Although we are including some cases of illegal mortality of grizzly bears within our surrogate used to quantify incidental take, the illegal killing or injury of grizzly bears (including trapping or shooting by private citizens) constitutes a separate action that is not exempted by the special regulations nor this biological opinion.

Yellowstone analysis area

Within the Yellowstone analysis area, documented grizzly bear mortality and/or conflicts associated with livestock depredation have occurred. One documented grizzly bear mortality occurred in the Gravelly Landscape in 1986 that was associated with livestock depredation (Haroldson 2010 *in litt*). Livestock depredation by a grizzly bear was documented as recent as 2011 (Gunther et al. 2012) but it did not result in the mortality of a grizzly bear. Additional conflicts with grizzly bears related to livestock in the Yellowstone analysis area have occurred off the Forest but near the Forest. The Revised Forest Plan would maintain the existing number and distribution of allotments within the Yellowstone analysis area and would potentially reduce the number of sheep allotments. The Revised Forest Plan Wildlife Standard #5 states that "sheep allotments within the Gravelly Landscape which become vacant will be closed to sheep grazing or the allotment may be used by an existing Gravelly Landscape sheep permittee with no increase in permitted use." Therefore, we do not expect the potential for livestock-grizzly bear conflicts to increase within the Yellowstone analysis area due to the Revised Forest Plan.

Based on the history of conflicts and management related to livestock grazing on the Forest and the expanding grizzly bear population, **we anticipate that no more than two grizzly bears will be removed from or killed within the Yellowstone analysis area** during the life of the Revised Forest Plan related to permitted livestock grazing or associated activities authorized under the Revised Forest Plan. This represents our surrogate measure for incidental take of grizzly bears in the form of harm through habituation and/or modification of natural feeding behavior in the Yellowstone analysis area.

WNAA

Within the WNAA, no grizzly bear depredations on livestock have been documented on the Forest within the WNAA. The two sheep allotments within the WNAA are located in the south west corner of the Forest in the Lima-Tendoy Landscape. The Revised Forest Plan Wildlife standard #5 does not apply to these sheep allotments. Grizzly bear occurrence has not been verified in the Lima-Tendoy Landscape to date. The Revised Forest Plan would maintain the existing number and distribution of allotments within the WNAA. Based on the information for livestock grazing in the WNAA (the small number of sheep allotments, low amount of grizzly bear use, and the history of no livestock depredations), the likelihood of conflicts with grizzly bears related to livestock grazing in this analysis area during the life of the Revised Forest Plan is low, but cannot be ruled out. The Revised Forest Plan may be in effect for 15 years, the number of grizzly bears using the Forest is expected to increase, and livestock allotments will remain a potential risk.

Based on the history and conflicts and management related to livestock grazing in the WNAA, and the expected slow increase in grizzly bear use of this analysis area, we anticipate **no more than one grizzly bear will be removed from or killed within the WNAA** during the life of the Revised Forest Plan related to permitted livestock grazing or associated activities authorized under the Revised Forest Plan. This represents our surrogate measure for incidental take of grizzly bears in the form of harm through habituation and/or modification of natural feeding behavior in the WNAA analysis area.

Therefore, should more than two grizzly bears in the Yellowstone analysis area or one grizzly bear within the WNAA be killed or removed as a result of management action related to livestock grazing within the action area during the life of the Revised Forest Plan, incidental take will be exceeded and the Forest must reinitiate consultation with the Service. Additionally, should the level of incidental take associated with the Revised Forest Plan reach, but not exceed, the anticipated incidental take level, the Forest should informally consult with the Service regarding the adequacy of existing mechanisms to minimize potential take.

Effect of the take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species. The amount of incidental take described above is low. With the exception of a portion of one subunit (Hilgard #1) within the YGBE recovery zone, the majority of the Forest occurs outside of the grizzly bear recovery zones. As detailed in this opinion, and according to the 1993 recovery plan (U.S. Fish and Wildlife Service 1993), lands outside of the recovery zones are not considered biologically essential to recovery of the species. Further, considering the grizzly bear recovery strategies (U.S. Fish and Wildlife Service 1993, ICST 2007) and the size, status, and distribution of both the Yellowstone and NCDE grizzly bear populations, incidental take of grizzly bears in the action area would not affect the recovery of either the YGBE or NCDE grizzly bear populations. Finally, we expect that the Revised Forest Plan direction would support at least a low number of grizzly bears that

move through or live within the Forest, which may benefit these grizzly bear populations over the long term. Critical habitat has not been designated for the grizzly bear; therefore none would be affected.

Reasonable and prudent measures

Biological opinions provide reasonable and prudent measures that are expected to reduce the amount of incidental take. Reasonable and prudent measures are those measures necessary and appropriate to minimize incidental take resulting from proposed actions. Reasonable and prudent measures are nondiscretionary and must be implemented by the agency in order for the exemption in section 7(o)(2) to apply. The Service has determined that the Revised Forest Plan, with its incorporated objectives, goals and standards, adequately reduces the potential for and minimizes the effect of any incidental take that may result. Therefore, no reasonable and prudent measures are necessary

Terms and conditions

As explained above, the Revised Forest Plan will reduce the potential for or minimize the effect incidental take. No additional reasonable and prudent measures are necessary, therefore no terms and conditions are needed with the exception of the reporting requirements.

Reporting requirements

A. To demonstrate that the Revised Forest Plan is adequately reducing the potential for and minimizing the effect of any incidental take that may result, the Forest shall complete a report with the information listed below and submit it to the Service's Montana Field Office by March 1 of each year for the preceding calendar year. The report shall include:

1. An up-to-date record of location and length of new permanent and temporary roads constructed and roads decommissioned on the Forest. The Forest shall also maintain an up-to-date record of linear road densities by Landscape and Hunting Units.

2. An up-to-date record of the amount of acres of grizzly bear denning habitat open to winter motorized use and the timeframe such acres were used.

3. An up-to-date record of grizzly bear-human conflict and/or the management removal of a grizzly bear resulting from improper storage of food or attractants or livestock depredation.

B. Notify the Service's Montana Field Office, within 72 hours of any grizzly bear-human conflict resulting from improper storage of food or attractants, livestock depredation by grizzly bears, and/or the management removal or human-caused death of a grizzly bear.

C. Notify the Service's Montana Field Office if the Forest is considering a change in the status of sheep grazing on the Forest.

Closing Statement

The Service is unable to precisely quantify the number of grizzly bears that will be incidentally taken as a result of the Revised Forest Plan. Therefore, we use surrogate measures for the amount of take we anticipate and provide, in the incidental take statement, specific measures of the incidental take we anticipate. We use the existing levels of access management and the desired motorized route densities described in the Revised Forest Plan as our surrogate measure of incidental take related to road densities. We use the proposed amount of temporary roads estimated to be constructed across the Forest during the life of the Revised Forest Plan as our surrogate measure of incidental take related to temporary roads. We use the timeframe that winter motorized use is allowed beyond typical spring female grizzly bear emergence and the acres of grizzly bear denning habitat open to winter motorized use in the action area during this timeframe as our surrogate measures of incidental take related to winter motorized use. We anticipate that no more than one grizzly bear will be removed from the Yellowstone analysis area and no more than one grizzly bear will be removed from the WNAA related to food and attractant storage for the life of the Revised Forest Plan. We also anticipate that no more than two grizzly bears will be removed from the Yellowstone analysis area and no more than one grizzly bear will be removed from the WNAA for defense of human life or property related to livestock grazing for the life of the Revised Forest Plan.

We determined that the Revised Forest Plan, with its incorporated objectives, goals and standards, adequately reduces the potential for and minimizes the effect of any incidental take that may result. Therefore, reasonable and prudent measures, with their implementing terms and conditions, were not provided. However, reporting requirements were included in order to demonstrate that the Revised Forest Plan is adequately reducing the potential for and minimizing the effect of any incidental take that may result. If, during the course of the action, the level of take occurring exceeds that anticipated in this incidental take statement, such incidental take represents new information requiring reinitiation of consultation and review of the incidental take statement. The federal agency must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

Sections 7(a)(1) of the Act directs federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans or to develop information. The recommendations provided here relate only to the proposed action and do not necessarily represent complete fulfillment of the agency's section 7(a)(1) responsibility for the species.

1. We support the Forest's consideration of expanding the food storage order to a Forest-wide order. We recommend the order be in effect by 2014 as proposed by the Forest. Management of garbage, food and livestock feed storage to prevent access to bears would benefit grizzly bears as well as black bears and other carnivores. Human/carnivore interactions would also be reduced leading to a public safety benefit.

2. Participate in ongoing interagency efforts to identify, map, and manage linkage habitats essential to grizzly bear movement between ecosystems. Please contact the Service's grizzly bear recovery coordinator at (406) 243-4903 or Montana Fish, Wildlife and Parks for information.

3. Continue to manage access on the Forest to achieve lower road densities. By managing motorized access, several grizzly bear management objectives could be met including: 1) minimize human interaction and potential grizzly bear mortality; 2) minimize displacement from important habitats; 3) minimize habituation to humans; and 4) provide relatively secure habitat where energetic requirements can be met (Interagency Grizzly Bear Committee 1998). Additionally, lower road densities would also benefit other wildlife and public resources. Lower road densities may result in lower maintenance costs that free up funding for other resource needs.

4. Grizzly bears concentrate in certain areas during specific time periods to take advantage of concentrated food sources or because the area provides a high seasonal food value due to diversity in vegetation and plant phenology (e.g., important spring for fall range). Where grizzly bear use is known or likely to occur and where practicable, delay disturbing activities during the spring in spring habitats to minimize displacement of grizzly bears.

REINITIATION NOTICE

This concludes consultation on the effects of the Revised Forest Plan on grizzly bears. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Thank you for your continued assistance in the conservation of endangered, threatened, and proposed species. If you have any questions or comments on this biological opinion, please contact Anne Vandehey, Katrina Dixon, or Jodi Bush (406) 449-5225.

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Appendix A.

Excerpts from 2010 Biological Opinion (U.S. Fish and Wildlife Service 2010)

1. ENVIRONMENTAL BASELINE

Grizzly bears are now found in many areas on the Forest, including areas both inside and outside of the YGBE recovery zone. The Madison Landscape occurs both within the recovery zone and outside of the recovery zone. The Madison Landscape includes portions of the Hilgard #1 bear management subunit within the recovery zone. The Gravelly, Tobacco Roots and Highland Landscapes all occur entirely outside of the recovery zone. Outside of the recovery zone, grizzly bears are known to occur within the Madison and Gravelly Landscapes. Grizzly bears have been observed beyond the distribution line established by Schwartz et al. (2006) which displays grizzly bear distribution, including the southeastern portion of the Gravelly Landscape. Grizzly bears have been observed in the heart of the Gravelly Landscape on numerous occasions over the last decade (U.S. Forest Service 2010). The line between the Madison Range and Gravelly Range is very fluid and it appears that grizzly bears move back and forth fairly regularly (*ibid.*). In 2008, a young male grizzly bear was captured for research in the Standard Creek drainage of the Gravelly Landscape. Three other unique grizzly bears were also identified in the same drainage during the same week (U.S. Forest Service 2010). No known occurrence has been verified within the Tobacco Roots or Highland Landscapes however occurrence is possible during the life of the revised plan (10 to 15 years) and both landscapes are therefore part of the action area.

Factors Affecting Species Environment within the Action Area

1a. Access Management

In the previous Forest Plan, the summer and fall seasons were defined as May 15 to December 1 and the winter season was defined as December 2 to May 14. Access on the Forest was calculated for the summer and fall seasons. Open road densities are reduced during the general hunting season (from October 15 to December 1) to increase wildlife security. This fall period represents a huge pulse of dispersed recreation activity related to deer and elk hunting that is unmatched at other times of the year (U.S. Forest Service 2009).

As mentioned previously, one recovery zone bear management unit (BMU) subunit (Hilgard #1) occurs on the Forest within the Madison Landscape. The Hilgard #1 subunit occurs on both the Beaverhead-Deerlodge National Forest and the Gallatin National Forest. The Beaverhead-Deerlodge Forest has no open motorized routes or ongoing projects within the recovery zone. Therefore, the open and total motorized access route densities for the Beaverhead-Deerlodge Forest are zero. The 1998 baseline values for the entire subunit (including the Gallatin Forest) are as follows: open motorized access route density (OMARD) is 25.1, total motorized access route density (TMARD) is 12.5, and security core is 69.8 percent.

Outside of the recovery zone, the action area includes the remaining portion of the Madison Landscape and the Gravelly, Tobacco Roots, and Highland Mountains Landscapes. Habitat for grizzly bears within these areas is generally of lower quality compared to inside the recovery

zone due to road densities and other human activities. Open motorized road and trail densities were calculated for the summer (5/16 to 10/14) and fall (10/15 to 12/1) seasons. Densities in the fall are reduced from those in the summer in order to increase wildlife security during the general hunting season. Table 3 displays the existing landscape motorized route density and percent secure habitat on the landscape scale during the summer season. Table 4 displays the existing motorized route density and secure areas at the hunting unit scale during the fall season. Secure area is defined as areas larger than 10 acres that are 1/3 of a mile from a route open to motorized vehicles.

Table 3. Existing road densities and percent secure area by landscape (U.S. Forest Service 2009).

Landscape	Total Size (Square Miles)	Total Road Miles	Summer Open Motorized Road and Trail Density (miles/square mile)	Summer Secure Area (percent of landscape)
Gravelly	741.3	559	.8	60%
Madison	198.6	.6	0	96%
Tobacco Roots	293.0	358.6	1.2	45%
Highland	169.2	249	1.8	38%

Table 4. Existing fall (10/15 to 12/1) road densities and percent secure area by hunting unit (U.S. Forest Service 2009, 2010).

Management Area	Total Size (Square Miles)	Total Road Miles	Fall Motorized Route Density (miles/square mile)	Fall Secure Area (percent of hunting unit)
311	4.4	0	0	93
320	133.4	112	.8	57
323	155.6	102.4	.7	70
324	274.3	140.7	.5	70
327	200.0	177.5	.9	52
330	111.3	79.9	.7	60
333	159.6	179.1	1.1	46
340	169.2	249	1.5	42
360	111.8	.5	0	96
362	82.8	.1	0	97

Winter motorized use occurs on the Forest outside of designated wilderness. In the previous Forest Plan, where winter motorized use was allowed it was allowed between December 2 and May 14. One 2,067 acre area (the McAtee Basin) within the recovery zone is open to snowmobiling. This area is not included within the designated wilderness. This area is non-motorized during the summer but provides winter motorized opportunities. Legal access to this area during the winter occurs on the Gallatin National Forest. The remaining areas open to winter motorized use occur outside of the recovery zone. Table 5 displays the acreage open to snowmobiling by landscape.

Table 5. Pre Forest Plan Revision Acres Available to Winter Motorized Access (U.S. Forest Service 2010).

Landscape	Acres in Landscape	Acres Open to Winter Motorized Use (percent of Landscape open)
Highland Mountains	108,261	103,790 (95.8%)
Tobacco Root	187,523	164,604 (87.8%)
Gravelly	474,610	377,904 (79.6%)
Madison	127,132	13,162 (10.3%)
TOTAL	**897,526**	**659,460 (73.5%)**

1b. Sanitation/Food Storage and Site Development

Attractant management has been required on areas of the Beaverhead portion of the Forest since 1987. The 1987 Regional Special Order required that any nourishing substance (excluding baled hay and water) for humans, pets and livestock be acceptably stored under specified criteria. Further, the 1987 order required that harvested wildlife carcasses be managed to reduce potential human/grizzly bear interaction and camping occurred within specified distances of a known animal carcass. The 1987 special order required attractant management in the area delineated as the recovery zone. For those portions of the Madison Landscape outside of the recovery zone and not included in the 1987 order, area restrictions for attractant management were issued in the 2000 Area Restriction Order. This 2000 order identified the primary goal of the order was to "minimize grizzly bear/human encounters and thereby provide for user safety and protection of grizzly bears." In 2004, the Forest instituted mandatory attractant management to include the Gravelly and Tobacco Root Landscapes following the general principles of the earlier two orders in place on the Madison Landscape. As mentioned earlier, the Tobacco Roots Landscape is not currently occupied but the food storage order is in effect in this landscape in anticipation of occupancy. The 2004 order expanded the definition of items requiring acceptable storage to include human health care products, refined the definition of animal carcass and clarified the intent of "acceptable storage." In summary, prior to the Revised Forest Plan, the Forest had three separate attractant management orders in place with slightly different required criteria and restriction dates. The 2004 Food Storage Order encompasses the Madison, Gravelly, and Tobacco Root Landscapes. No attractant management order exists for the Highland Landscape.

The purpose of the food storage order is to minimize adverse interactions between bears and humans. The 2004 food storage order contains requirements for storage and handling of bear attractants such as human foods and garbage, livestock feed, and wildlife and livestock carcasses. The food storage order has been in effect since September 10, 2004 and is effective from March 1 through December 1.

The basic tenets of the 2004 food storage order are:

1. All food and refuse must be acceptably stored or acceptably possessed during the daytime hours.
2. All food and refuse must be acceptably stored during nighttime hours, unless it is being prepared for eating, being eaten, being transported, or being prepared for acceptable storage.
3. Any harvested animal carcass must be acceptably stored, unless the carcass is being field dressed, transported, being prepared for eating, or being prepared for acceptable storage.
4. Camping or sleeping areas must be established at least ½ mile from a known animal carcass or at least 100 yards from an acceptably stored animal carcass.

These basic tenets of the food storage order are further defined within the order itself. See the biological assessment for the entire food storage order.

The Forest has 54 Forest Service developed sites in the action area. The Gravelly Landscape has 26 sites (7 campgrounds, 6 cabins, 3 trailheads, 4 rest areas, 3 dispersed sites, 2 boat launches, and 1 picnic site), the Tobacco Roots Landscape has 9 sites (4 campgrounds, 3 dispersed sites, and 2 trailheads), the Highland Mountains Landscape has 14 sites (5 campgrounds, 3 dispersed sites, 2 trailheads, 2 fishing access sites, 1 cabin, and 1 picnic area), and the Madison Landscape has 5 sites (2 trailheads, 1 cabin, 1 bunkhouse, and 1 campground). No grizzly bear mortalities have been reported related to these sites. Two grizzly bear/human conflicts have been associated with food storage and/or sanitation on the Forest since 1994, including conflicts related to property damage and unnatural foods (Haroldson 2010 *in litt*). Some additional grizzly bear/human conflicts related to unnatural foods and/or property damage have occurred off of Forest lands but near or adjacent to the Forest.

The Forest considers its food storage order as being very effective since it has been in place. During a one year lead-in period they began extensive signing at information kiosks, campgrounds, designated hunting campsites, and public contact throughout the recreation season. Bear proof containers have been installed and are continually being installed to date. Violators of the food storage order can be cited by the Forest law enforcement and some citations have been issued to date.

1c. Livestock Grazing

The Forest has 76 livestock grazing allotments that are distributed across the action area. The Gravelly Landscape has 47 total allotments, the Madison Landscape has 8 total allotments, the Tobacco Roots Landscape has 13 total allotments and the Highland Mountains Landscape has 8 total allotments. Within the Gravelly Landscape, four allotments, encompassing 39,018 acres, have been permanently closed to all grazing since September 30, 2008. Seven sheep allotments are currently active in the Gravelly Landscape with 7,800 permitted sheep. Overall, sheep grazing occurs from July 1 to October 6 (refer to Table 6 for the sheep allotments). The

remaining 36 allotments in the Gravelly Landscape are for cattle and/or horse grazing. All allotments within the other three landscapes are for cattle and/or horse grazing. In summary, 7 active sheep allotments and 65 active cattle/horse allotments occur within the action area.

One documented grizzly bear mortality has been associated with livestock depredation within the action area (Haroldson 2010 *in litt*). This mortality occurred in the Gravelly Landscape in 1986. One additional conflict grizzly bear/human conflict related to livestock also occurred within the action area. This conflict also occurred within the Gravelly Landscape in 2001 but did not result in the mortality of a grizzly bear. Additional conflicts with grizzly bears related to livestock have occurred off the Forest but near the Forest.

Table 6. Status of Sheep Allotments in the Action Area (U.S. Forest Service 2010).

Allotment Name	Status	Permitted Season	Livestock Numbers.*
Barnet	Active	7/11-9/21	1,350 e/l 2H
Coal Creek**	Active	7/1-7/18; 9/21-10/6	1,350 e/l 2H
Fossil Hellroaring	Active	7/19-9/20	1,350 e/l 2H
Lyon Wolverine	Active	7/11-9/21	1,350 e/l 2H
Poison Basin; Upper Ruby Middlefork	Active	7/17-10/6; 7/1-7/16	1,350 e/l 4H
Black Butte	Active	7/12-9/16	1,400 e/l 2H
Cottonwood	Active	7/12-9/16	1,000 e/l 2H

* e/l=ewes/lambs; H=horses;
** this allotment is used by the Fossil Hellroaring Bands, with a total of 1,350 sheep on both allotments combined.

1d. Vegetation Management

Suitable timber is defined as those acres that are classified as available for timber production and are specifically managed for growth yield. Approximately 78,730 acres were identified in the previous Forest Plan as in the suitable timber base for the action area. Approximately 210,042 additional acres were identified as not suitable for timber production but available for management entry for other resource benefits, such as fuel reduction, salvage, and wildlife habitat improvement. No harvest was allowed in the remaining 604,842 acres. Table 7 below displays suitable timber acres by landscape.

1e. Fire Management

Wildland fire control efforts and use of prescribed burning occurs within the action area. Fire is also used for resource benefit as a management tool for vegetation and fuels. The acres available and locations where such methods are used vary across the action area. The use of wildland fire for resource benefit may also be used as a management tool across the entire action area.

Table 7. Suitable Timber Acres within the Action Area (U.S. Forest Service 2010).

Landscape	Timber Suitability Classification	Acres	Percent of Landscape
Highland Mountains	Suitable for Timber Production	16,617	15
	Not Suitable, Timber Harvest Allowed	33,554	31
	Not Suitable, No Harvest Allowed	58,040	54
Tobacco Roots	Suitable for Timber Production	20,497	11
	Not Suitable, Timber Harvest Allowed	46,617	25
	Not Suitable, No Harvest Allowed	120,364	64
Madison	Suitable for Timber Production	0	0
	Not Suitable, Timber Harvest Allowed	4,107	3
	Not Suitable, No Harvest Allowed	122,761	97
Gravelly	Suitable for Timber Production	41,616	9
	Not Suitable, Timber Harvest Allowed	125,764	27
	Not Suitable, No Harvest Allowed	303,677	64
TOTAL For Action Area	Suitable for Timber Production	78,730	9 % of action area
	Not Suitable, Timber Harvest Allowed	210,042	23 % of action area
	Not Suitable, No Harvest Allowed	604,842	68 % of action area

1f. Other Factors Affecting Grizzly Bears

During the fall hunting season (10/15 through 12/1), the Forest receives a huge pulse of dispersed recreation activity related to deer and elk hunting. This pulse in activity is unmatched at any other time during the year. Southwestern Montana receives approximately 45 percent of the elk hunting pressure in the state and the bulk of this is focused on the hunting districts located on the Forest (USDA 2009b *in* U.S. Forest Service 2009)

The Montana legislature has created policy to direct Montana Fish, Wildlife and Parks (MFWP) protect, conserve and manage grizzly bears as a rare species of Montana wildlife. With this in mind, the Fish, Wildlife & Parks Commission developed a grizzly bear policy (Section 12.9.103, ARM) to address the need to protect grizzly bear habitat, the need to pursue grizzly research, the role of sport hunting in grizzly bear management, depredations, and the appropriate department response to depredations, and requires compliance with federal regulations relating to grizzly bears (Montana Fish, Wildlife and Parks 2001). Under this direction, MFWP has implemented a conservation program to manage and enhance grizzly bear populations. In 2002, MFWP prepared the Grizzly Bear Management Plan for Southwestern Montana 2002-2012 and Final Programmatic Environmental Impact Statement with input from the Montana Grizzly Bear Working Group and other interested parties (Montana Fish, Wildlife and Parks 2002).

2. EFFECTS OF THE ACTION

2a. Effects of Roads in the Yellowstone Analysis Area

Within the recovery zone on the Forest, there is one subunit, Hilgard #1. This subunit occurs on both the Beaverhead-Deerlodge Forest and the Gallatin Forest. No motorized routes occur within this subunit on the Beaverhead-Deerlodge Forest. Therefore, OMARD and TMARD on the Forest within the recovery zone is zero. Some roads outside of and immediately adjacent to the subunit influence secure habitat on the Forest within the subunit, however, 96 percent of the Forest within the subunit is secure habitat. The Revised Forest Plan does not have any specific proposal to increase roads immediately adjacent to the Hilgard #1 subunit. Because the majority of the portion of the action area that occurs within the recovery zone is within the Lee Metcalf Wilderness and road densities are zero within the portion of the subunit on the Forest and very low road densities occur adjacent to the subunit, displacement or under-use of otherwise suitable habitat by grizzly bears using the area on the Forest within the recovery zone is not expected.

Portions of the action area outside the recovery zone have high levels of activity along roads while other portions have low activity along roads or no roads at all. Adverse effects from access management in some areas of the Forest may be resulting in the displacement of individual grizzly bears, the avoidance of suitable habitat and/or the reduction of habitat to an unsuitable condition. The effects of displacement and under-use of habitat are tempered by

local resource availability, resource condition, seasonal use, and the number of grizzly bears using an area. Under-use of habitat in proximity to Forest roads does not necessarily preclude use or form a barrier to dispersal and movement across the landscape.

Habitat loss and modification result from natural and human-caused events. Under-use of otherwise suitable habitat along roads essentially reduces the amount of habitat freely available to grizzly bears. Fire, timber harvest, silviculture treatments, drought, and high levels of human activity can also reduce the amount of suitable habitat, alter temporal or quantitative use of an area, and limit an environment's ability to support a species.

The following are Forest Plan Recreation and Travel Management standards in the Revised Forest Plan that address travel management on the Forest:

- Standard 1: Permanent road construction is not allowed in summer non-motorized allocations or in areas evaluated for wilderness potential.
- Standard 2: Motorized vehicles are not allowed in summer or winter non-motorized allocations except for permitted or administrative use.

- Standard 7: Manage summer non-motorized allocations for either a primitive or semi-primitive non-motorized setting form May 16 thru December 1.

- Standard 8: Manage winter non-motorized allocations for a primitive or semi-primitive non-motorized setting from December 2 through May 15.

- Standard 10: Manage recommended wilderness for primitive or semi-primitive non-motorized settings and protect wilderness character.

The following are Forest Plan Wildlife Goals in the Revised Forest Plan that address travel management on the Forest:

- Wildlife Security: Secure areas and connectivity for ungulates and large carnivores are provided, while recognizing the variety of recreational opportunities.

- Grizzly Bear Security: The Gravelly Landscape is maintained to achieve 60 percent or greater secure area.

- Wildlife Secure Areas and Connectivity: Manage density of open motorized roads and trails by landscape year-round, except fall rifle big game season, to achieve levels at or below the following:

Landscape	Desired Summer Open Motorized Road and Trail Density (miles per square mile)	Existing Condition (miles per square mile)
Madison	0.0	0.0
Gravelly	0.7	0.8
Tobacco Roots	1.3	1.2
Highland	1.9	1.8

- Manage open motorized road and trail density by MTFWP hunting units as of 2006 on National Forest Lands during the fall rifle big game season, to achieve levels at or below the following:

Hunting Unit	Desired Fall Open Motorized Road and Trail Density (10/15-12/1) (miles per square mile)	Existing Condition (miles per square mile)
311	0.0	0.0
320	0.8	0.8
323	0.5	0.7
324	0.4	0.5
327	0.8	0.9
330	0.7	0.7
333	0.9	1.1
340	1.4	1.5
360	0.0	0.0
362	0.0	0.0

The following are Forest Plan Wildlife standards in the Revised Forest Plan that address travel management on the Forest:

- Standard 1: From October 15 to December 1, Hunting Units that exceed the open motorized road and trail density objective will have no net increase in designated open motorized road and trail density mileage.

- Standard 2: landscapes that exceed the open motorized road and trail objective will have no net increase in designated open motorized road and trail mileage.

If a landscape or hunting unit is below the above goals, open road density could increase in that analysis area, however it could not increase beyond the numbers listed in the desired open road and trail columns above. Although the Forest Plan does not preclude additional road construction in these scenarios, total road miles have decreased across the action area. Periodic new road construction does occur, but overall there has been a downward trend in the miles of roads (see Table 8 below).

Table 8. Road construction and decommissioning 2003-2008 on the Forest (U.S. Fish and Wildlife Service 2010).

Year	New Road Construction (Miles)	Decommissioning (miles)		
		System Roads	Unauthorized Roads	Total
2003	.5	1.5	1.5	3
2004	0	.9	9.5	10.4
2005	0	3.5	0	3.5
2006	0	0	0	0

2007	0	0	.5	.5
2008	0	3.0	0	3
Totals	**.5**	**8.9**	**11.5**	**20.4**

The standards listed in the previous paragraphs are mandatory. The goals listed in the previous paragraphs are not mandatory but are desired conditions towards which to strive over the life of the plan. Site specific travel planning is anticipated to occur at some point in the future with the likelihood of decreased motorized access. For example, since the Revised Forest Plan was signed, the Forest has closed approximately 33 miles within the action area and another 61.4 miles are scheduled for closure under the preferred alternative for the Madison Ranger District travel planning effort. The Madison Ranger District travel planning decision is expected to be made before the end of the year. Other ranger district travel planning efforts would likely close additional roads in the action area, however those planning efforts are several years out. Therefore, implementation of the Revised Forest Plan would likely reduce open motorized routes across the action area and it is reasonable to assume that the level of permanent roads in the action will not substantively increase during the remaining life of the Revised Forest Plan, with some local exceptions. This assumption is based on the Revised Forest Plan direction and the recent history and trends in road building and decommissioning that consistently show fewer permanent roads on the landscape, as discussed in the biological assessment. However, open and total road densities in some areas and continued operation of these roads, as allowed by the Revised Forest Plan, may result in adverse effects to grizzly bears attempting to live in the area.

Temporary roads built for resource extraction such as timber harvest or mining may remain on the landscape for several years and receive a substantive amount of use. Such roads may also cause adverse effects to grizzly bears, such as displacement from key habitats. The Service expects that some level of temporary roading would occur on lands within the action area during the life of the Revised Forest Plan (10-15 years). The Service also anticipates some level of adverse effects to grizzly bears with home ranges impacted by these temporary roads may occur in some situations. Therefore, the existing roads and any new roads constructed in the future, temporary or permanent, may adversely impact grizzly bears' ability to find food resources, breed and raise young, and find shelter.

2b. Effects of Snowmobiles in the Yellowstone Analysis Area

As displayed in Table 9 below, the Revised Forest Plan established considerable changes in winter motorized access across the action area. The Revised Forest Plan reduces the amount of area open to winter motorized use by 292,350 acres. The dates in which winter motorized use is allowed under the Revised Forest Plan are between December 2 and May 15.

Table 9. Winter Motorized Access (U.S. Forest Service 2010).

Landscape	Total Landscape Acres	Acres Open to Winter Motorized Use Pre-Revised Forest Plan (percent open)	Acres Open to Winter Motorized Use in Revised Forest Plan (percent open)	Reduction in Acres Open to Winter Motorized Use (percent reduction)
Highland Mountains	108,261	103,790 (95.8%)	46,022 (42.5%)	57,768 (55.7%)
Tobacco Roots	187,523	164,604 (87.8%)	83,815 (44.7%)	80,789 (49.1%)
Gravelly	474,610	377,904 (79.6%)	234,576 (49.4%)	143,328 (37.9%)
Madison	127,132	13,162 (10.3%)	2,697 (2.1%)	10,465 (77.8%)
Totals	897,526	659,460 **(73.5%)**	367,110 **(40.1%)**	292,350 **(44.3%)**

As discussed above, the primary concerns with motorized winter recreation with respect to grizzly bears are the potential effects associated with denning, den emergence and spring habitat. Summer and fall habitats are not at issue since snowmobiling would not overlap with these seasons. As mentioned above, the third week of March is when female grizzly bears begin to emerge from their dens. Winter recreation will primarily occur during the grizzly bear denning season. However, the Revised Forest Plan would allow snowmobile use beyond the third week of March throughout the action area. Winter motorized use would be allowed until May 15.

Denning Habitat

Within the action area, the proposed action would result in a net decrease of winter motorized use, decreasing the acres designated as winter motorized by 292,350 acres. Reductions would occur in all four landscapes. In total 530,416 acres would be designated as non-motorized winter use versus 367,110 acres designated as motorized winter use.

The biological assessment (U.S. Forest Service 2010) describes these reductions as occurring at key areas of the landscape. In the Revised Forest Plan, winter motorized access has been restricted in those portions of the landscape that, for the most part, are high in elevation and maintain snow cover later in the year. Winter motorized recreation has been restricted in those areas that have been recognized as having wilderness character and have been recommended for inclusion in the National Wilderness Preservation System. In the Gravelly Landscape, for example, winter motorized access is restricted in the high peaks of the Snowcrest Mountains Recommended Wilderness and in the high, rugged slopes around Wolverine Basin. These are potential denning sites for grizzly bears. Therefore, reductions in acres open to winter motorized use would increase the amount of potential denning habitat within winter non-motorized use areas.

As discussed in the 'general effects of snowmobiles on grizzly bears' section above, the potential for disturbance to denning grizzly bears does exist but is probably low due to the low probability of a direct encounter of a snowmobile to a den and even in that unlikely case, the

excellent insulative properties of snow to mitigate the noise. It is more likely that impacts to denning grizzly bears would occur upon den emergence as discussed below. Therefore, although some grizzly bears may be affected during the denning season, the Service believes that the magnitude of impacts during this time would not reach levels that would injure grizzly bears, or be expected to appreciably reduce the reproduction, numbers or distribution of grizzly bears.

Den Emergence

To review, female grizzly bears begin emerging from their dens about the third week of March, with males typically beginning to emerge several weeks earlier (Haroldson et al. 2002). Grizzly bears typically spend a few days to a few weeks at or near the den before moving to other locations to begin feeding. During this time the grizzly bears were observed to be very lethargic and approachable. After leaving the den site grizzly bears usually move to lower elevation habitats such as riparian areas and avalanche chutes for much of their foraging during spring (Mace and Waller 1997). Based on the behavior of grizzly bears in response to motorized use of roads in Mace and Waller's (1997) study, snowmobile activity after den emergence dates could disturb and/or displace grizzly bears. The greatest probability of interactions at or near dens would obviously be expected where potential denning habitat overlaps with open snowmobile areas and the influence zones around roads or routes. As discussed in more detail below (under *spring habitat*), once grizzly bears move away from den sites and toward spring habitats, there will be very little potential for conflict with snowmobiles.

Snow conditions within the action area are often suitable for snowmobiling to continue well beyond the time when grizzly bears generally begin emerging from their dens. Less temporal and spatial overlap of grizzly bears and snowmobiles would occur under the Revised Forest Plan due to the decrease in winter motorized use areas and overlap of denning habitat as described above. However, under the Revised Forest Plan, winter motorized use could occur until May 15. Therefore, the potential exists for interactions between snowmobiles and grizzly bears that have recently emerged from their dens.

As discussed above in the 'general effects of snowmobiles on grizzly bears' section, disturbance from snowmobiles may be most consequential shortly before or after den emergence of a female with cubs. Females with cubs have high energetic needs in the spring, and cubs have limited ability to travel for several weeks after emergence from the den. Disturbance levels that cause a female to prematurely leave the den in spring or move from the den area could impair the fitness of the female and safety of the cubs. If cubs attempt to follow their mother, they would likely experience decreased fitness and the family group may be pushed to less suitable habitat. Significant disturbance during this time may reach levels that would injure grizzly bears, specifically adult females with cubs.

Spring Habitat

In the YGBE, Haroldson et al. (2002) reported that male grizzly bears begin emerging from their dens as early as the first week of February, with the mean week of emergence being the fourth week in March. Female grizzly bears began emerging from their dens during the third week in March, with the mean week of emergence being the third week of April. Upon emergence from their dens in the spring, grizzly bears typically move to lower elevations where their dietary needs may be met. Typical spring food sources include early greening herbaceous vegetation in low elevations, riparian areas, and in melted-out avalanche chutes. Grizzly bears also feed on dead ungulates from winter kill on winter ranges and in some locations grizzly bears prey on elk calves (usually available after June 1). Females with newly born cubs tend to spend more time in the vicinity of the den (with cubs) after emergence.

The potential for disturbance or displacement of grizzly bears from spring feeding habitat in the action area is influenced by the variability in snowpack and the rate of spring melt. Although snowmobiling would be permitted after until May 15, spring snowmobiling areas and spring grizzly bear habitat are almost mutually exclusive in that the areas that would be suitable for spring snowmobiling (i.e. more snowpack) would not typically overlap with spring grizzly bear habitats (i.e. less snowpack).

Due to the reduction in total acres available to winter motorized use, the Revised Forest Plan would not expand impacts to spring habitat beyond what was occurring under the previous Forest Plan. Also, based on the discussion above, the Service does not expect impacts to spring habitat and foraging grizzly bears to rise to the magnitude that would injure grizzly bears, or be expected to appreciably reduce the reproduction, numbers or distribution of grizzly bears.

2c. Effects Food and Attractant Storage and Habituation in the Yellowstone Analysis Area

The Forest had few developed sites with the recovery zone, McAtee Cabin, Indian Creek Cow Camp, and Shedhorn Cow Camp. In 2007, the Forest determined that two of these (Indian Creek Cow Camp and Shedhorn Cow Camp) were no longer in use or necessary for the administration of livestock. These sites were removed from the list of developed sites within the PCA reducing the number of developed sites within the recovery zone to one. No plans for additional developed sites are currently planned. As mentioned in the baseline, the Forest has 54 developed sites within the action area outside of the recovery zone. No reductions in developed sites in this portion of the action area are planned. Two additional trailheads may be constructed in the Highland Mountains during the life of the Revised Forest Plan. No additional developed sites are planned in the remaining landscapes. Developed sites can pose risks of unsecured attractants and food, left by campers, hunters, and people using day use sites. Habituated grizzly bears learn to seek out developed sites for food rewards.

The Revised Forest Plan specifically calls for implementing food storage and sanitation orders in areas classified as occupied grizzly bear habitat as a wildlife objective. Forest order No. 2004-D6/D7-031 and other related orders specifically direct attractant management for all occupancy and use of the Madison, Gravelly, and Tobacco Root Landscapes from March 1 through

December 1. No similar order is in effect for the Highland Mountains. However, the Highland Mountains is not occupied by grizzly bears at this time. The primary goal of the special order is to minimize grizzly bear-human encounters and provide for user safety and the protection of the grizzly bear. Food storage orders substantially reduce the potential for adverse effects to bears as a result of food conditioning and habituation at developed sites as well as dispersed human use.

No grizzly bear mortalities associated with improper food storage or site conflicts have been reported within the action area (Haroldson 2010 *in litt*). However, at least two grizzly bear/human conflicts have occurred on the Forest related to unnatural foods. These occurred several years ago in 1993 and 1994 (ibid). Several other conflicts related to unnatural foods and/or property damage have occurred off of the Forest but adjacent to it either on Gallatin National Forest lands or non-National Forest lands. Improper storage of attractants and foods on lands adjacent to the Forest presents the risk of food conditioning grizzly bears using both the Forest and adjacent lands. Throughout the distribution of grizzly bears, habituation/food conditioning remains a fairly serious risk to individual grizzly bears.

Habituation and food conditioning of grizzly bears is a concern in all grizzly bear populations. The Forest will follow the Conservation Strategy nuisance bear standard for nuisance bear management. These standards are embedded within the Revised Forest Plan and are therefore part of the proposed action. Information in the biological assessment indicates that there have been two grizzly bear conflicts reported and no mortality of bears as a result of food or attractants in the action area. However, as the number of grizzly bears increase and the number of people residing in and visiting the area increase, the number of grizzly bear-human conflicts related to food and attractant storage may increase as well. Therefore, it is reasonable to expect that some risk, albeit low (based on grizzly bear numbers, Forest Plan direction, and history of conflicts in the area), of adverse impacts to grizzly bears exists over the life of the Plan.

2d. Effects of Livestock Grazing in the Yellowstone Analysis Area

The Forest has several cattle allotments and a few sheep allotments within the action area. Three active cattle allotments occur within the recovery zone. The remaining allotments occur within the action area outside of the recovery zone. Of the allotments within the action area outside of the recovery zone, seven are sheep allotments, all occurring within the Gravelly Landscape.

One documented grizzly bear mortality has been associated with livestock depredation within the action area (Haroldson 2010 *in litt*). This mortality occurred in the Gravelly Landscape in 1986. One additional conflict grizzly bear/human conflict related to livestock also occurred within the action area. This conflict also occurred within the Gravelly Landscape in 2001 but did not result in the mortality of a grizzly bear. Additional conflicts with grizzly bears related to livestock have occurred off the Forest but near the Forest. The Revised Forest Plan would maintain the existing number and distribution of allotments within the action area and would potentially reduce the number of sheep allotments. The Revised Forest Plan Wildlife Standard

#5 states that “sheep allotments within the Gravelly Landscape which become vacant will be closed to sheep grazing or the allotment may be used by an existing Gravelly Landscape sheep permittee with no increase in permitted use.” Therefore, the number of allotments and likely, the number of sheep, will not increase and may decrease under the Revised Plan. However, the potential for conflicts to occur will remain, and may increase on the Forest within the action area as grizzly bear numbers increase.

The Forest will follow the Conservation Strategy nuisance bear standard for nuisance bear management. These standards are embedded within the Revised Forest Plan and are therefore part of the proposed action. As the number of grizzly bears increase in the action area outside of the recovery zone, an increase in the number of grizzly bears subject to potential management removal as a result of grizzly bear-livestock conflicts may occur. Livestock management on the Forest, especially sheep allotments, has the potential to result in adverse impacts to grizzly bears if livestock/grizzly bear conflicts occur. Grizzly bears may become food conditioned/habituated to seek out sheep as prey, which may result in the removal of grizzly bears.

2e. Effects of Vegetation Management in the Yellowstone Analysis Area

The Revised Forest Plan would reduce the acres identified as suitable for timber production from 78,730 to 28,189 acres within the action area. Timber production for growth and yield would not occur in the Gravelly Landscape. Site specific project analysis will determine the type and extent of harvest and potential effects to grizzly bears. The amount of areas classified as not suitable for timber production but timber harvest is allowed for other resource benefit increases in the Revised Forest Plan. Every proposed vegetation management project within the action area would consider potential effects to grizzly bears during the site specific project analysis process. Refer to table 10 (next page) for acres suitable for timber production. Based on our history of consultation on vegetation management projects, information in our files, and the analysis under the ‘general effects of vegetation management’ section above, we do not anticipate that vegetation management activities by themselves would result in effects to grizzly bears that would be so significant as to impact breeding, feeding or sheltering.

Activities that occur along with vegetation management activities such as temporary road construction or helicopter use may result in additional effects to grizzly bears. Such effects could range from insignificant to significant. The effects of temporary roads are discussed in the ‘general effects of roads’ and the ‘effects of roads in the action area’ sections above. General effects of helicopter use are discussed above in the ‘general effects of vegetation management’ section. Potential effects that may occur as a result of temporary roads and/or helicopter use associated with vegetation management would be considered in a site-specific analysis.

Table 10. Suitable Timber in the Revised Forest Plan (U.S. Forest Service 2010).

Landscape	Timber Suitability Classification	Acres	Percent of Landscape
Highland Mountains	Suitable for Timber Production	15,535	14
	Not Suitable, Timber Harvest Allowed	53,767	50
	Not Suitable, No Harvest Allowed	38,909	36
Tobacco Roots	Suitable for Timber Production	12,654	7
	Not Suitable, Timber Harvest Allowed	112,533	60
	Not Suitable, No Harvest Allowed	62,291	33
Madison	Suitable for Timber Production	0	0
	Not Suitable, Timber Harvest Allowed	4,433	3
	Not Suitable, No Harvest Allowed	122,435	97
Gravelly	Suitable for Timber Production	0	0
	Not Suitable, Timber Harvest Allowed	223,327	47
	Not Suitable, No Harvest Allowed	247,730	53
TOTAL for action area	**Suitable for Timber Production**	**28,189**	**3 % of action area**
	Not Suitable, Timber Harvest Allowed	**394,060**	**44 % of action area**
	Not Suitable, No Harvest Allowed	**471,365**	**53 % of action area**

2f. Effects of Fire Management in the Yellowstone Analysis Area

Wildland fire control efforts and use of prescribed burning would continue under the Revised Forest Plan. The acres available for these activities and locations vary across the action area. Wildland fire may also be used as a management tool for resource benefit.

Any potential effects associated with fire suppression and/or wildland fire for resource benefit would be analyzed in emergency consultation after the suppression activities are complete. Also, a site-specific analysis of potential effects to grizzly bears as a result of fuel treatments

would occur prior to implementation of a project. Refer to the 'vegetation management section' above for potential acreage such treatments could occur on within the action area as well as potential effects to grizzly bears. As mentioned in the effects of vegetation management above, such treatments by themselves would not likely result in significant impacts to grizzly bears.

3. Revised Forest Plan Desired Motorized Road and Trail Densities for the Yellowstone Analysis Area by Landscape and Hunting Unit

Landscape	Desired Summer Open Motorized Road and Trail Density (miles per square mile)	Existing Condition (miles per square mile)
Madison	0.0	0.0
Gravelly	0.7	0.8
Tobacco Roots	1.3	1.2
Highland	1.9	1.8

Hunting Unit	Desired Fall Open Motorized Road and Trail Density (10/15-12/1) (miles per square mile)	Existing Condition (miles per square mile)
311	0.0	0.0
320	0.8	0.8
323	0.5	0.7
324	0.4	0.5
327	0.8	0.9
330	0.7	0.7
333	0.9	1.1
340	1.4	1.5
360	0.0	0.0
362	0.0	0.0