APPENDIX E: BIOLOGICAL OPINION

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
5353 Yellowstone Road, Suite 308A
Cheyenne, Wyoming 82009

In Reply Refer To:
ES-61411/W.25/WY07FA0209
ES-6-WY-07-F014

Memorandum

To: Barry Reiswig, Refuge Manager, U.S. Fish and Wildlife Service, National Elk Refuge, Jackson, Wyoming

From: Brian T. Kelly, Field Supervisor, U.S. Fish and Wildlife Service, Wyoming Field Office, Cheyenne, Wyoming

Subject: Final Biological Opinion for the Bison and Elk Management Plan (Formal Consultation No. ES-6-WY-07-F014)

This memorandum transmits the U.S. Fish and Wildlife Service's (Service) final biological opinion based on our review of the January 2007 Bison and Elk Management Plan (Plan or Project) and Final Environmental Impact Statement (FEIS) and the Project's effects on endangered, threatened, proposed and experimental non-essential species.

This final biological opinion addresses the effects of the Project on the threatened grizzly bear (*Ursus arctos horribilis*) in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act; 50 CFR § 402.14). Your February 07, 2007 letter requesting formal consultation, and including the Intra-Service Section 7 Biological Evaluation (BE) form, was received on February 7, 2007.

The National Elk Refuge (NER or Refuge) and Grand Teton National Park (GTNP or Park)/John D. Rockefeller, Jr., (JDR) Memorial Parkway are proposing to implement a bison and elk management plan that will address adaptive management of the Jackson bison and elk herds and their habitat on the Refuge and in the Park with an emphasis on improving range quality, and insuring long term sustainability of biotic integrity and environmental health. The Plan includes development and implementation of a dynamic framework for decreasing the need for supplemental feeding on the Refuge based on existing conditions, trends, new research findings, and other changing circumstances. The Park and NER will work in close cooperation with the Wyoming Game and Fish Department (WGFD) during both development and implementation of

this framework which will include population management through methods including implementation of special, organized elk and bison hunts, vegetation restoration, ongoing monitoring, and public education as integral components.

The Service concurs with the Refuge's assessment that the Project is likely to have "no affect/no adverse modification" for Canada lynx (*Lynx canadensis*), "may affect, not likely to adversely affect species/adversely modify critical habitat" for the gray wolf (*Canis lupus)* and bald eagle (*Haliaeetus leucocephalus*), and "no effect" for the yellow-billed cuckoo (*Coccyzus americanus*).

This final biological opinion is based on information provided in the FEIS, BE, telephone conversations with Laurie Shannon, Project Manager, of the Service's Mountain-Prairie Region Lakewood, Colorado office, Steve Cain, Senior Wildlife Biologist for GTNP, and other sources of information. A complete administrative record of this consultation is on file in the Cheyenne Field Office.

CONSULTATION HISTORY

Initial discussions regarding the Bison and Elk Management Plan/EIS began several years ago. A summary of pertinent sections of the draft EIS dealing with threatened and endangered species was received by the Service's Wyoming Field Office on July 14, 2004. A full copy of the Draft Bison and Elk Management Plan/EIS was received on July 20, 2005; however, consultation was delayed pending completion of a BE for the Project. The Final Bison and Elk Management Plan/EIS was received on February 2, 2007, and both the BE and the request for initiation of formal consultation were received on February 7, 2007. The consultation was assigned log number ES-6-WY-07-F014. Since January 2007, numerous telephone conversations regarding the Project have taken place between all involved parties.

BIOLOGICAL OPINION
Grizzly Bear and Gray Wolf

DESCRIPTION OF THE PROPOSED ACTION

The Final Bison and Elk Management Plan and EIS for the NER and GTNP addresses adaptive management of the Jackson bison and elk herds and their habitat on the Refuge and in the Park with an emphasis on improving range quality and insuring long term sustainability of biotic integrity and environmental health. It includes development and implementation of a dynamic framework for decreasing the need for supplemental feeding on the refuge based on existing conditions, trends, new research findings, and other changing circumstances. The Park and NER will work in close cooperation with the WGFD during both development and implementation of this framework which will include population management through methods including implementation of special, organized elk and bison hunts, vegetation restoration, ongoing monitoring, and public education as integral components.

Chronic Wasting Disease/Brucellosis

Efforts would be made to coordinate with the WGFD to increase surveillance in elk for chronic wasting disease (CWD), a fatal transmissible disease of white-tailed deer, mule deer, and elk. The objective of surveillance would be to provide a 95 percent confidence level of discovering infection at 1 percent prevalence in the Jackson elk herd. If infection was found, strategies from the state's *Chronic Wasting Disease Management Plan* (WGFD 2006) would be implemented to reduce transmission. These strategies include removing clinically consistent elk, removing 50 animals within 5 miles of the index case, and another 50 within 10 miles if an additional positive animal is found during collection of the first 50; enforcing carcass movement and disposal restrictions; decreasing duration of feeding and expanding the distribution of feeding to the extent possible; and potentially decreasing elk densities through hunting or other management strategies. Any difference from this general approach is detailed under the alternative strategies. Plans to follow the state's *Chronic Wasting Disease Management Plan* have been made in deference to the State and could change if the National Park Service and/or the Service adopted management requirements that differed from what is currently being done. Potential changes would be communicated to the State.

The NER and GTNP/ John D. Rockefeller, Jr., Memorial Parkway will work cooperatively with the state of Wyoming and others to reduce the prevalence of brucellosis in the elk and bison populations in order to protect the economic interests and viability of the livestock industry, and reduce the risk of adverse effects for other non-endemic diseases not currently present in the Jackson elk and bison populations.

Strategies for Hunting/Reduction Programs

The Service and the NPS would work cooperatively with the WGFD to achieve population objectives (including herd ratios and elk herd segment sizes), to develop hunting seasons, and to evaluate hunting or elk reduction areas. The WGFD would formally establish objectives and strategies after public review and approval by the Wyoming Game and Fish Commission.

In the long term, elk hunting opportunities on the Refuge would decline from an average of 733 hunters per year to 420–487. In the Park it is estimated that the number of deputized hunters would decline from an average of 1,600 hunters per year to 773–957. The number of elk hunters in the Bridger-Teton National Forest (B-TNF) and other areas outside the Refuge and Park would increase to an estimated 5,600–5,870 hunters per year, an increase of 29–35 percent. For the herd unit as a whole, the number of elk hunters could range from an estimated 6,793 to 7,314 per year, which is an increase of 2–10 percent compared to average baseline conditions.

In the short term an estimated 140–150 bison would be harvested each year to reduce bison numbers to a herd of approximately 500 animals. An average of about 50 bison would continue to be harvested in the national forest and the remaining 90–100 bison on the Refuge. This would allow an average of about 175–190 bison hunters in Jackson Hole each year.

In the long term the number of bison harvested each year would decline to about 70 bison. The number of bison harvested on the Refuge and the national forest could be equally split, or up to 50 bison could be harvested in the national forest. This would allow an average of about 90 bison hunters in Jackson Hole each year.

Adaptive Management of Habitat and Populations

Under the proposed action, the NER will provide secure, sustainable ungulate grazing habitat characterized primarily by native composition that is healthy, productive and sustained for the benefit of elk, bison and other native species. Actions included under the proposed plan would be implemented in concert with restoring and perpetuating natural ecosystem functions of native habitats used by bison and elk in GTNP and the JDR. The proposed action would contribute to maintaining sustainable population of elk and bison that are healthy, at a reduced risk of contracting non-endemic diseases, and able to adapt to changing environmental conditions.

Four goals outlined in the Plan and developed based upon the desired conditions and purposes of the NER and GTNP, the missions of the National Wildlife Refuge System and the National Park System, and other legal and policy directives include:

i. Habitat Conservation
ii. Maintaining Sustainable Populations
iii. Managing Numbers of Elk and Bison
iv. Disease Management

The aforementioned goals laid out under the proposed action would be accomplished through the following objectives:

- Initiate habitat restoration projects to improve native and cultivated forage and achieve desired conditions and goals.
- Protect woody vegetation on the refuge by rotating small exclosures until habitats have recovered. Prescribed fire could be used and logging allowed on the refuge inside exclosures.
- Initiate restoration of about 4,500 acres (1,821 ha) of previously cultivated areas in the Park to native plant communities.
- Work with private and agency partners to minimize bison/elk conflicts with adjacent landowners (e.g., by providing human and/or financial resources to manage co-mingling and reduce crop depredation by elk and bison on private lands).
- Initiate a public education effort to build understanding of natural elk and bison behavior, ecology, distribution, disease implications, and effects to other species.
- Identify criteria for beginning and ending feeding each year in consultation with the WGFD.
- In collaboration with the WGFD, develop a structured framework of adaptive management actions that include established criteria for progressively transitioning from intensive supplemental winter feeding to greater reliance on free-standing forage, based on some or all of the following considerations:
    1. level of forage production and availability on the NER
    2. desired herd sizes and sex and age ratios
    3. effective mitigation of bison and elk co-mingling with livestock on private lands
    4. winter distribution patterns of elk and bison
    5. prevalence of brucellosis, chronic wasting disease, and other wildlife diseases
    6. public support
- Work in collaboration with the WGFD to maintain the Jackson elk herd objective of 11,000 (after the initial phased approach, approximately 5,000 elk would be expected to winter on the refuge). As herd sizes and habitat objectives are achieved, further reduce feeding or elk numbers, based on established criteria and changing social, political, or biological conditions. Use hunting on the Refuge, and when necessary, the elk herd reduction program in the Park, to assist the State in managing herd sizes, sex and age ratios, and summer distributions.
- Recommend that the WGFD establish a genetically viable bison herd of approximately 500 animals, with as close to an even sex ratio as possible to maximize maintenance of genetic variation over time. Initiate a WGFD-administered bison hunt on the Refuge.
- Allow the WGFD to vaccinate elk and bison for brucellosis on the Refuge as long as logistically feasible.

Other Wildlife-dependent Recreation

- Over time wildlife viewing opportunities would be concentrated during some winters and would be more natural and sporadic during milder winters.
- Build public understanding and support for bison and elk management actions.

STATUS OF THE SPECIES

Grizzly Bear

Life History

Home range and dispersal. Much of the following information is summarized from the Grizzly Bear Recovery Plan (U.S. Fish and Wildlife Service 1993); additional information including species description can be obtained in that document. Grizzly bears require large areas to fulfill all their basic biological needs, as well as dense forest cover for hiding and security. In the Greater Yellowstone Ecosystem (GYE), defined as an area of relative ecological intactness covering some 19 million acres (7,689,027 ha), lodgepole pine (*Pinus contorta*) forests are a large and dynamic part of grizzly bear habitat. Grizzly bears generally do not use areas with human-caused habitat disturbances, and often, the lack of security cover and overstory cover are believed to be major causes of this (Gillian et al. 1994). Grizzly bear home range size averages 50 to 500 mi^2 (130 to 1,300 km^2). Within these home ranges the grizzly bear uses a diverse mixture of forests, moist meadows, grasslands, and riparian habitats to complete its life cycle. Grizzly bears generally prefer large, remote areas of habitat that are isolated from human development for feeding, denning, and reproduction (USFWS 1993). Long distance travel habits of some grizzly bears increase the risk of contact with highway crossings, hunters, recreationists, and a variety of other human congregations. Isolation from human activities is extremely important for bear survival, as grizzly bears habituate to human foods quickly. Food-conditioned bears often must be eliminated or removed from developed areas. Avoiding human-caused bear mortality is a goal of the Grizzly Bear Recovery Plan (USFWS 1993) and is essential to maintaining a viable grizzly bear population.

Diet. The grizzly bear is an opportunistic omnivore that uses a wide variety of plant and animal food sources. Grizzly bears in the Yellowstone Grizzly Bear Ecosystem (YGBE), a 9,500 sq. mi. (23,300 km^2) area consisting of Yellowstone National Park (YNP), GTNP, JDR Memorial Parkway, the Gallatin, Shoshone, Bridger-Teton, Targhee, Beaverhead, and Custer national forests, as well as state, private and Bureau of Land Management (BLM) lands, have the highest percentage of meat consumption in their diet of any inland grizzly bear population (Hilderbrand *et al.* 1999). Meat constitutes as much as 79 percent of the diet of male, and 45 percent of the diet of female grizzly bears in the YGBE (Jacoby et al. 1999). Ungulates, both adult and neonate, are an especially important food source for bears in the spring and fall (Zager and Beecham, 2006), and use of these carcasses in the YGBE is well documented (Podruzny and

Gunther 2001). Grizzly bears also eat small mammals such as pika and marmots; however, these mammals form a relatively minor portion of the bear's diet. Spawning cutthroat trout in streams surrounding Yellowstone Lake in YNP have been documented as an important food source for grizzly bears there (Mattson and Reinhart 1995). Army cutworm moths (*Euxoa auxiliaries*, ACMs) are also an important food source for bears in the YGBE (Mattson *et al.* 1991a). ACMs congregate in remote, high altitude alpine talus areas and feed on alpine flowers. These moths provide important dietary fat in the fall, when grizzly bears are preparing for hibernation, and are also positively correlated with bear reproductive success (Bjornlie and Haroldson 2001). During times of great moth abundance, grizzly bears may eat up to 40,000 moths per day totaling 20,000 kcal/day (USGS 2005). Surviving moths migrate back to lower elevations to deposit their eggs, leaving the alpine areas between August and October. ACM congregation sites are in remote areas, and therefore potentially reduce human-bear conflicts by isolating the bears. Grizzly bears will also eat ants (Mattson 2001) and earthworms (Mattson *et al.* 2002).

The grizzly bear also makes use of a variety of vegetative food sources. Whitebark pine (*Pinus albicaulis*) seeds are an important fall source of food for grizzly bears in the YGBE (Mattson and Reinhard 1997), and bears are known to consume whitebark pine seeds contained in red squirrel cone caches (Mattson and Reinhard 1997). In addition to supplying a food source high in fat, whitebark pine seed crops also serve grizzly bears by keeping them occupied at high elevations far from intense human use. Studies show that in years when high quality bear foods are low, there is an increase in human-bear conflicts (Gunther et al. 2004) as well as human-caused grizzly bear mortality (Mattson et al. 1992). Other vegetative food sources such as exotic clover species, yampa (*Perideridiea gairdneri*), biscuit root (*Lomatium cous*), and sweet cicily (*Osmorhiza chilensis*) are eaten almost exclusively in some years and seasons (Mattson et al. 1991). Other grizzly bear seasonal forage may include graminoids, horsetail, forbs, and fruits (whortleberry and huckleberry) and fungi (Mattson and Knight 1991).

Den site selection. Grizzly bears generally construct dens in areas far from human disturbance at an elevation of about 6,500 to 10,000 ft. (2,000 to 3,050 m). Grizzly bears in the GYE den from the end of September to the last week in April or early May, with entrance and emergence dates affected by the gender and reproductive status of the bears. Denning bears can be disturbed by winter sport activities such as snowmobiling as well as by human den encroachment, and late season hunting, and current studies are focused on minimizing disturbance by controlling access to important denning areas (Haroldson *et al.* 2002, Podruzny *et al.* 2002). If pregnant female bears are disturbed in their dens and this disturbance causes them to relocate to a new den prior to parturition, negative consequences can occur in the form of reduced cub fitness and survival (Linnell *et al.* 2000, Swenson *et al.* 1997).

Population Dynamic/Status and Distribution

Grizzly bear numbers have greatly declined during the past two centuries. It is believed that the grizzly bear population numbered over 50,000 individuals prior to the 18th century (USFWS 1993). More recently, the estimated total population of grizzly bears as of 1993 stood at 800 to

1,000 individuals (USFWS 1993). The exact size of the grizzly bear population in the YGBE is currently unknown, as the very nature of the grizzly bear and the rugged terrain it inhabits makes any census efforts extremely difficult. Eberhardt and Knight (1996) used several different estimates of population parameters to determine a minimum total population size of 245 grizzly bears, an estimated population size of 390 grizzly bears using marked females, and an estimated population size of 344 grizzly bears using distinct family groups. In 2003, the Interagency Conservation Strategy team identified the minimum population estimate for the grizzly bear population in the YGBE as of 2001 as 365 grizzly bears with a total population estimate of 531. Haroldson and Frey (2004) determined a minimum population estimate of 416 in both 2002 and 2003. The Interagency Grizzly Bear Study Team more recently estimated the population at 580 bears (USFWS 2005).

The grizzly bear was listed as a threatened species on July 28, 1975 (USFWS 1975). Historically, the grizzly bear ranged from the Great Plains to the Pacific Coast, and from the northern U.S. border with Canada to the southern border with Mexico. Currently in the contiguous United States, the grizzly population has been reduced to roughly two percent of its former range. It presently occupies portions of Canadian British Columbia and Alberta, and portions of Montana, Idaho, Wyoming, Washington, and Alaska in the United States. The grizzly bear population in the YGBE and surrounding area was proposed for delisting from the list of endangered and threatened species in November 2005 (USFWS 2005).

Conservation

In an effort to facilitate consistency in the management of grizzly bear habitat within and across ecosystems, the Interagency Grizzly Bear Guidelines were developed by the Interagency Grizzly Bear Committee (IGBC)(51 FR 42863; November 26, 1986) for use by land managers. The IGBC developed specific land management guidelines for use in each of the five ecosystems including the YGBE.

Recovery zones also have been established for the grizzly bear and include areas large enough and of sufficient habitat quality to support a recovered bear population. According to the Grizzly Bear Recovery Plan (USFWS 1993), a recovery zone is defined as that area in each grizzly bear ecosystem within which the population and habitat criteria for achievement of recovery will be measured. Areas outside of recovery zones may provide habitat that grizzly bears will use, but are not considered necessary for the survival and recovery of this species. The area outside the recovery zone but within the 10-mile buffer area is managed to consider and protect grizzlies and their habitat whenever possible, recognizing that population and mortality data within this zone are collected and pertinent to recovery criteria. Beyond the 10-mile buffer, grizzly bear mortalities or populations are not considered when determining whether recovery goals have been met, although protection is still accorded to the grizzly bear under the Act.

The Yellowstone Grizzly Bear Recovery Zone (Recovery Zone) covers approximately 5,438,000 acres (2,200,729 ha) of primarily NPS and National Forest Service (NFS) lands, roughly 89

percent of the currently known distribution of the grizzly bears in the YGBE. 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 lands managed by the NFS (ICST 2003).

Areas within the Recovery Zone are stratified into Management Situation Zones 1, 2, or 3; each having a specific management direction according to the Interagency Grizzly Bear Guidelines (IGBC 1986).

> **Management Situation 1** (MS1): lands contain population centers of grizzlies, are key to the survival of the species, and are where management decisions will favor the needs of the bear even when other land use values compete.
>
> **Management Situation 2** (MS2): lands are those areas that lack distinct population centers and the need for this habitat for survival of the grizzly bear is more uncertain. The status of such lands is subject to review. Here, management will at least maintain those habitat conditions that resulted in the area being classified as MS2.
>
> **Management Situation 3** (MS3): designation is intended for lands where grizzly bears may occur infrequently. There is high probability that Federal activities here may affect the species survival and recovery. Management focus is on human-bear conflict minimization, rather than habitat maintenance and protection.

Recovery zones are divided into smaller areas called Bear Management Units (BMUs) for the purpose of habitat evaluation and monitoring. BMUs were designed to:

(1) assess the effects of existing and proposed activities on grizzly bear habitat without having the effects diluted by consideration of too large an area;

(2) address unique habitat characteristics and bear activity and use patterns;

(3) identify contiguous complexes of habitat which meet year-long needs of the grizzly bear; and,

(4) establish priorities for areas where land use management needs would require cumulative effects assessments.

The low survival of adult females was identified as the single most important factor in causing the decline in the Yellowstone population prior to the mid-1980s (Knight and Eberhardt 1985). The current Grizzly Bear Recovery Plan (USFWS 1993) outlines demographic goals to objectively measure and monitor the recovery of the Yellowstone grizzly bear population. That plan defines a recovered population as one that can sustain the existing level of known and

unknown human-caused mortality that exists in the ecosystem and is well-distributed throughout the recovery zone. Demographic recovery criteria outlined for the Yellowstone recovery zone include:

(1) observation of 15 females with cubs of the year annually (unduplicated sightings) over a 6-year running average;

(2) occupation of 16 of the 18 BMUs by females with young from a running 6-year sum of verified observations, and no 2 adjacent BMUs unoccupied with a study to be initiated in the Plateau and Henry's Lake BMUs to determine the capability of these units to support females with cubs;

(3) known, human-caused mortality not to exceed 4 percent of the current population estimate (based on most recent 3-year sum of females with young); with no more than 30 percent of this total mortality limit incurred by females; and,

(4) these mortality limits cannot be exceeded during any 2 consecutive years.

In addition, the existence of adequate regulatory mechanisms for population and habitat management through the development of a conservation strategy must be demonstrated.

In 1994, all population recovery parameters were achieved for the first time, and since 1997 these recovery criteria have not been exceeded in 2 consecutive years. In 2005, a revised method for calculating total population size and sustainable mortality levels for the YGBE was established (IGBST 2005). The revised method was appended to the Recovery Plan and included in the Conservation Strategy. By the end of 2005, the number of unduplicated females with cubs-of-the-year stood at 31 within the recovery zone and 10-mile perimeter (Haroldson 2006), resulting in a 6-year running average of 40 unduplicated females with cubs – more than double the recovery target of 15 females identified in the Recovery Plan (USFWS 1993). Sixteen of 18 BMUs had verified observations of female grizzly bears with young during 2003, 17 of 18 BMUs during 2004 (Podruzny 2005) and 18 of 18 BMUs in 2005 (Schwartz et al. 2006).

Threats

Isolation from human activities is extremely important for bear survival, due to the tendency of grizzly bears to rapidly habituate to human foods. Food-conditioned bears often must be eliminated or removed from developed areas. Avoiding human-caused bear mortality is a goal of the Recovery Plan and is essential to maintaining a viable grizzly bear population (USFWS 1993).

Primary threats to grizzly bears are associated with motorized and dispersed recreational use and forest management activities, including timber harvest. Recreation use includes hunting, fishing, camping, horseback riding, hiking, biking, off-road vehicle (ORV) use, and snowmobiling. Direct human-caused mortality is the most obvious threat to the grizzly bear. This kind of mortality can occur in several ways: (1) defense of human life or property, (2) management removals, (3) mistaken identification by big game hunters, or (4) malicious killing. Nuisance bears are removed to defend human life or property, usually because they have become dangerously bold as a result of food conditioning and habituation at campsites, lodges, resorts, and private residences or they become habituated predators of livestock (Knight and Judd 1983).

Human-grizzly bear interactions have been increasing in the YGBE due, in part, to increasing human use and development, increasing bear numbers, and bears and people both expanding their range of occupancy, increasing the chances of adverse encounters. The frequency of grizzly bear-human conflicts is inversely associated with the abundance of natural bear foods (Gunther *et al.* 2004). Most grizzly bear mortalities are directly related to grizzly bear-human conflicts. The Interagency Conservation Strategy Team (2000, pp. 1-2) reported known human-caused mortalities from 1992-98. Of 58 human-caused mortalities, 43 percent were hunting-related, 10 percent were poaching, 28 percent were food-conditioned bears, 7 percent were related to livestock and 12 percent were accidental deaths. The greatest increase in recent years is self-defense in fall by big game hunters. According to a study by Gunther *et al.* (2004a), three areas were identified as having 71 percent of the 136 conflicts in the GYE in 2003. These were (1) the headwaters region of the Green, Snake, and Wind Rivers, (2) the Crandall Creek/Sunlight Basin area, and (3) the north and south forks of the Shoshone River.

There are a number of naturally or semi-naturally occurring factors that also may influence Yellowstone grizzly bear population levels. Whitebark pine provides an important food source for grizzly bears. Blister rust, which has severe consequences on whitebark pine in the Northern Continental Divide Ecosystem, has been observed in the Yellowstone area. The Yellowstone cutthroat trout, which is an important food source for grizzly bears in the area, has been negatively influenced by introduced lake trout, which are less available to bears due to their deeper water habits (Reinhart *et al.* 2001). Winter-killed ungulates are an important food supply, but ungulate populations vary widely in numbers and are influenced by weather conditions. The reintroduction of wolves has increased competition for ungulate prey and winter-killed carrion. Recent fires may have impacts on available food and cover over the short term, particularly to individual bears with heavily burned home ranges. Fire, in general, over time stimulates many forage species and berries preferred by bears, provided alternate food supplies and cover is available to maintain bears through the immediate aftermath of the fire.

Army cutworm moths in some areas could be affected by agricultural pesticide use, and due to their reliance on this food resource, there has been concern that certain pesticides may bioaccumulate in bears. Recent investigation into this possibility indicates that, while pesticides are present in ACMs in trace quantities, they are most likely not sufficient to cause direct adverse effects on, or biomagnify in bears (Robinson et al. 2006). This study cautions, however, that

pesticide use is a relevant concern when addressing bear conservation issues. Due to their unique physiology including hyperphagia, brown fat accumulation and torpor, bears may assimilate and excrete certain chemicals in unique ways. Further research is recommended including sampling and analysis of blood, hair and fat samples in order to monitor this potential threat as available pesticides and their listed uses change.

Grizzly bears have also experienced displacement from available habitat (loss of habitat effectiveness due to human disturbance) due to increased human uses from (1) expanding road access in wilderness areas (Kasworm and Manley 1989), (2) ORV use and (3) recreation use. They have also experienced loss of existing available habitat due to (1) increased development on private land related primarily to residential housing, and (2) potential for increased development on public land related primarily to oil/gas and recreation development. The grizzly bear also faces a decrease in value of available habitat due to (1) a loss of biodiversity (especially early-succession related vegetative types), and (2) sub-optimal composition, structure, and juxtaposition of vegetation as a result of fire suppression, management strategies, and advancing succession. Finally the bear faces isolation due to fragmentation of available habitat due to (1) major development of private land, (2) construction of major highways that block or restrict movement, (3) inadequate provision for linkage on minor roads and highways, and (4) large blocks of clearcuts.

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, the anticipated impacts of all proposed State or Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation process.

The action area is defined at 50 CFR 402 as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." While the proposed action directly affects the areas located within the NER, GTNP and JDR Memorial Parkway, it will indirectly affect other areas outside of the Refuge and within the B-TNF.

The action area/decision area defined in the EIS includes the NER, GTNP, and the JDR Memorial Parkway.

- The NER is a 24,700 acre (9,996 hectare) unit of the National Wildlife Refuge System administered by the Service. The GTNP is 309,995 acres (125,453 ha), and JDR Memorial Parkway is an additional 23,777 acres (9,622 ha), for a total of 333,772 (135,076 ha) acres administered by them NPS.

- The GTNP is 22.5 miles (36 kilometers) wide and 41 miles (66 km) long from north to south. Elevations range from 6,420 feet (1,957 m) on the valley floor to 13,766 ft. (4,196 m) (the summit of Grand Teton). The Park is bordered to the northwest, west, and southwest by Targhee National Forest. On the south the Park surrounds a wedge of private land and a small section of Bridger-Teton National Forest (B-TNF). The Teton Wilderness in the B-TNF borders the Park to the northeast.

- The JDR Memorial Parkway extends for 82 miles (132 km) from West Thumb in YNP to the north entrance of GTNP. The management area between the two parks includes 7.5 miles (12 km) of parkway and 23,778 acres (9,623 ha).

Ecologically, the NER, GTNP, JDR Memorial Parkway, and YNP are part of a larger area referred to as the GYE.

For the purposes of this biological opinion, we will also consider portions of surrounding lands in the B-TNF and other areas outside of the Refuge as part of the action area due to the projected long-term increase in the number of hunters as a result of the proposed action. The action area will be discussed in terms of Game Management Units (GMU) or Existing Elk Hunting Areas (Area). The following is a brief description of their general locations within the action area:

NER GMUs

Area 77. National Elk Refuge. Beginning where U.S. Highway 26 crosses the Gros Ventre River; easterly up said river to the B-TNF boundary; southerly along said boundary to Flat Creek; westerly along said creek approximately 3.5 miles to the second road crossing; southerly along said road .8 mile to a trail junction; westerly along a marked boundary to the NER fence; northerly along said fence to the Gros Ventre River.

GTNP GMUs

Area 72. Webb Canyon/Moose Creek. All of the drainages of Berry Creek, Owl Creek and Webb Canyon Creek and that area north of Berry Creek to the GTNP boundary.
Area 75. Snake River. Beginning at the junction of the Gros Ventre-Kelly Road and U.S. Highway 26-89-191; northerly along said highway to Ditch Creek; westerly along said creek to the Snake River proper; northerly along the easternmost bank of the main channel of the Snake river to the northernmost channel of Spread Creek; easterly along said creek to U.S. Highway 26-89-191; southwesterly along said highway to U.S.F.S. Road 30310 at the Cunningham Cabin; southerly along said road to the GTNP boundary; southerly along said boundary to the intersection with the Shadow Mountain-Kelly Road (U.S.F.S. Road 30340); southwesterly along said road to the junction of the Teton Science School road; northeasterly along said road one and one-quarter (1¼) miles to a marked boundary; easterly one (1) mile to the GTNP boundary; southerly along the GTNP boundary to the Gros Ventre-Kelly Road; southwesterly along said road to U.S. Highway 26-89-191.

Area 79. Teton Park. Beginning where the U.S. Forest Service access road (U.S.F.S. Road 30310) near Cunningham Cabin intersects U.S. Highway 26-89-191; northerly along said highway to the junction of U.S. Highway 89-287 at Moran; northwesterly along said highway to the Grand Teton National Park boundary easterly and southerly along said boundary to the U.S. Forest Service access road (U.S. F.S. Road 30310) near Cunningham Cabin; westerly along said road to U.S. Highway 26-89-191.

B-TNF GMUs

Area 70. Buffalo Fork. Beginning where U.S. Highway 26-287 intersects the GTNP boundary; northerly along said boundary to Pacific Creek; northeasterly up said creek to Gravel Creek; northerly up said creek to the Snake River Trail; northerly along said trail to the south boundary of YNP; easterly along said boundary to the Continental Divide; southerly and easterly along said divide to U.S. Highway 26-287 at Togwotee Pass; westerly along said highway to the east boundary of GTNP.

Area 71. Pacific Creek. Beginning where Pacific Creek crosses the GTNP boundary; northerly along said boundary to the Targhee National Forest boundary; northerly along said boundary to the southern boundary of YNP; easterly along said boundary to the Snake River Trail at Fox Park; southwesterly along said trail over Big Game Ridge to Gravel Creek; southerly along said creek to Pacific Creek; southerly down said creek to the GTNP boundary.

Area 74. Ditch Creek. Beginning where Ditch Creek crosses the GTNP boundary; northeasterly along said boundary to Brush Creek; southerly up said creek to the divide between Brush Creek and Ditch Creek; southerly along a posted boundary to Ditch Creek; southerly down said creek to the GTNP boundary.

Area 78. Wilson. Beginning at the junction of Wyoming Highway 22 and Wyoming Highway 390; northerly along Wyoming Highway 390 to the GTNP boundary; northerly and southerly along said boundary to U.S. Highway 26-89-191; southerly along said highway to its junction with Wyoming Highway 22; westerly along said highway to its junction with Wyoming Highway 390.

Area 80. Sheep Creek. All of the drainages of Flat Creek, Sheep Creek and Nowlin Creek east of the NER.

Area 81. Spread Creek. Beginning where the GTNP boundary crosses the Gros Ventre River; northerly along said boundary to Ditch Creek; up said creek to a posted boundary; straight north along the posted boundary to the divide between Brush Creek and Ditch Creek; northerly down Brush Creek to the GTNP boundary; northerly along said boundary to U.S. Highway 26-287; easterly along said highway to Togwotee Pass and the Continental Divide; southerly along said divide to the Moccasin Basin Road (U.S.F.S. Road 30750); southerly down said road to the North Fork of Fish Creek at Calf Creek; southerly down said creek to Fish Creek; southeasterly down said creek to the Gros Ventre River; westerly down said river to the GTNP Park boundary.

Area 82. Crystal Peak. Beginning where the Gros Ventre River crosses the NER boundary near the town of Kelly; easterly up said river to Kinky Creek; easterly up said creek to the Darwin Ranch Road (U.S.F.S. Road 620); easterly along said road to the divide between the Green River and Gros Ventre River; southwesterly along said divide to the divide between the Green River

and Hoback River at Hodges Peak; westerly along the divide between Flat Creek and the Gros Ventre River; northerly along said divide to the NER boundary; northerly along said boundary to the Gros Ventre River.

Area 84. Lower Hoback. Beginning where U.S. Highway 191 crosses Flat Creek at the north edge of the town of Jackson; due east to the NER boundary; easterly along said boundary to the B-TNF boundary and the ridge between Twin Creeks and Cache Creek; easterly along said ridge to Jackson Peak; southerly along the divide between Flat Creek and Cache Creek to Cache Peak; easterly along the divide between Flat Creek and Granite Creek to Pyramid Peak; southerly along the divide between the Gros Ventre River and the Hoback River to Steamboat Peak; southerly and westerly along the divide between Shoal Creek and Dell Creek; westerly along said divide to the Riling Draw Road; southerly along said road to the Dell Creek Road; westerly along said road to the Hoback River; westerly down said river to Cliff Creek; southerly up Cliff Creek to the divide between the Greys River and the Hoback River; northwesterly along said divide to the divide between the Greys River and Willow Creek; northerly along said divide to the divide between the Bailey Creek and Willow Creek (Greyback Ridge); northerly along said divide to Dry Wash Draw; westerly down said draw to Bailey Creek; northwesterly down said creek to the Snake River; northerly up said river to Wyoming Highway 22; easterly along said highway to U.S. Highway 191; easterly along said highway to Flat Creek at the north edge of the town of Jackson.

Past projects, their effects on grizzly bears, and the level of incidental take have also been considered in the environmental baseline. Previous formal consultation in the vicinity of the action area addressed transportation projects and grazing permits. The projects are: (1) the Grand Teton National Park Transportation Plan (WY003, February 9, 2007); (2) domestic livestock grazing in Grand Teton National Park (WY9351, May 2, 2006); (3) the Federal Highway Administration's Highway 287/26 Reconstruction project, a.k.a. Togwotee Pass Highway (WY5998, August 22, 2003); and (4) the Forest Services' issuance of commercial grazing permits on the Bridger-Teton National Forest (WY4715, December 3, 2002). These projects, their effects to the grizzly bears, and the level of incidental take have been considered in the environmental baseline for this biological opinion.

Status of the Species within the Action Area

Portions of the action area are within the Yellowstone Recovery Zone and Primary Conservation Area (PCA) for grizzly bears identified in the Conservation Strategy for the Grizzly Bears in the GYE (USFWS 2003). The PCA, or grizzly bear recovery zone as it was initially described (USFWS 1982), was delineated to define an area within which to focus grizzly bear recovery efforts after the species was listed in 1975. At the time the boundary was delineated, grizzly bears were uncommon in GTNP and surrounding areas. Currently, however, grizzly bears are established in large areas outside of the PCA in GTNP (Schwartz et al. 2002), and the line does not represent grizzly bear distribution in the GTNP area.

Grizzly bears are relatively common in the southern GYE, including the Gros Ventre Mountains southeast of GTNP, and are regularly observed in the Teton Mountain Range north of Paintbrush Canyon and the Badger Creek drainage. Grizzly bears have been observed on the valley floor south of Triangle X Ranch, at Jackson Lake, in Death Canyon, and south of GTNP in the vicinity of Teton Village and along the Snake River south of Jackson (Schwartz et al. 2002). In addition, a young male radio-collared grizzly bear used the Bradley-Taggart Lakes and White Grass areas for several weeks in 2005, providing empirical evidence for the continued southward movement of grizzly bears in the Teton Range.

There have been no grizzly bears sighted on the NER since 1994; however, bears occupy areas immediately north and east of the Refuge. As the GYE bear population continues to expand southward into presently unoccupied areas, and with continued habituation of bears to human presence and activity, the potential for the occurrence of bears on the Refuge will likely increase.

Management of grizzly bears and their habitat in the Park follows IGBC guidelines (1986) and the Park's Human-Bear Management Plan (NPS 1989). These guidelines were developed to provide effective direction for the conservation of grizzly bears and their habitat to Federal agencies responsible for managing land within the recovery zone. The objectives for managing grizzly bears in the Park under the 1989 NPS plan are to: (1) restore and maintain the natural integrity, distribution, and behavior of grizzly bears, (2) provide opportunities for visitors to understand, observe, and appreciate grizzly bears, and (3) provide for visitor safety by minimizing bear/human conflicts, by reducing human-generated food sources, and by regulating visitor distribution.

The Park has been highly successful in promoting grizzly bear recovery and reducing bear-human conflicts (e.g., property damages, incidents of bears obtaining human food, bear-inflicted human injuries) and human-caused bear mortalities in the Park. Recreational and administrative facilities, human activities, and human waste (garbage and sewage) in GTNP are managed in a manner that minimizes the potential for human-caused grizzly bear mortalities. Management actions also include implementation of backcountry food storage requirements. Bears that are typically wary of humans will often tolerate people at close distances when carcasses or other high quality foods are available.

Shifts in grizzly bear seasonal distribution within the GYE appear to be directly related to resource availability. Recent research indicates that bears in YNP are 2 times more likely to be found outside of the park during the early hunting season. This movement occurred regardless of the relative yearly production and abundance of whitebark pine seed production (Haroldson et al. 2004). Elk hunting seasons in the GYE begin as early as September 10 and run through December 3. This period coincides with late hyperphagia in GYE grizzly bears, as well as the time period (September-October) during which the majority of hunting-related grizzly bear mortalities have occurred (Haroldson et al. 2004)