Hunting-related deaths resulting from human-grizzly conflict remain the most significant source of known grizzly bear mortality in the GYE (Haroldson et al. 2004; USFWS 2003). In the PCA itself, analysis of the potential correlation between hunter numbers and levels of known and probable grizzly bear mortality from 1987 to 1997 indicated little relationship (USFWS 2003). This analysis did not consider the relationship between hunter numbers and grizzly bear mortality in areas outside of the PCA. While the high level of hunting-related grizzly mortality has not been directly linked to hunter numbers in the PCA, it is nonetheless primarily the result of chance encounters between bears and hunters in the field, conflicts over ungulate carcasses and conflicts in hunter camps often as a result of game meat being kept in campsites (USFWS 2003; Haroldson et al. 2004).

Status of Species Habitat within the Action Area

The following is a brief description of habitat and cover types within existing elk hunting areas/GMUs:

Within the NER, elk hunting area (77) is dominated by mixed shrub and sagebrush shrubland interspersed with grassland. Riparian woodland habitat consists primarily of narrowleaf cottonwood (*Populus angustifolia*) and willow (*Salix* spp.) stands. Aspen woodlands occur on many hillsides, often some distance from water sources. Small patches of conifer forest occur within the hunt area and consist of Douglas-fir (*Pseudotsuga menziesii*), lodgepole pine (*Pinus contorta*) and junipers. Agricultural areas and cultivated fields occur throughout the hunt area. The relatively even and open nature of terrain within the hunt area provides excellent foraging habitat for ungulates, but largely precludes grizzly-bear use and occupancy.

Within the GTNP, elk hunting areas (72, 75, 79) have quite different topographical and vegetational characteristics. Area 72 ranges from valley floor to alpine, with coniferous woodlands of lodgepole pine as well as whitebark pine, Englemann spruce (*Picea engelmannii*), sub-alpine fir (*Abies bifolia*), and Douglas-fir. Area 75 is predominately covered in sagebrush, with rolling terrain punctuated by areas of steeper relief. Small patches of grassland are located along the eastern border, with cultivated fields to the south. Patches of coniferous woodlands are located south of Ditch Creek and in the Snake River bottom. The relative lack of tree cover across most of the hunt area makes it less suitable for grizzly bears, with the exception of areas within the Snake River bottom, Blacktail Butte, and other small forested patches. Area 79 is composed of highly variable terrain predominately covered in dense coniferous woodlands composed of lodgepole pine, whitebark pine, Douglas and subalpine fir, and spruce; but it also includes some large expanses of sagebrush grasslands and willow habitats. The extensive areas of tree cover throughout the hunt area provide a large amount of suitable habitat for both elk and grizzly bear.

Within the B-TNF, elk hunting areas (70, 71, 74, 78, 80, 81, 82, 84) are highly variable in terms of terrain and are predominately forested with dense stands of conifers dominated by lodgepole pine, as well as whitebark pine, Englemann spruce, sub-alpine fir, and Douglas-fir.

Willow and quaking aspen (*Populus tremuloides*) occur in valley bottoms in association with streams, and sagebrush shrubland and grassland habitat grow in the lower elevations. The varied topography, dense woodland cover and general lack of human development offer extensive suitable habitat for grizzly bear north the Gros Ventre River and provide important transitional, and migration habitat for elk.

Factors Affecting Species Environment within the Action Area

General Factors

Past and ongoing actions within the action area and within the grizzly bear Recovery Zone are likely to affect GYE grizzly bears moving through the action area whether their home range is within or adjacent to the action area. These actions include:

- livestock grazing (which would impact grizzly bears through management actions),
- private land development,
- firewood cutting,
- road use/management/improvements,
- timber harvest,
- recreation activities that lead to human-bear conflicts,
- vegetation management,
- wild and prescribed fire, and
- loss or decline of important food sources (e.g., whitebark pine seeds due to fire suppression).

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. Direct effects are immediate effects of the proposed action on the species or its habitat. 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 project and are addressed according to the four management goals outlined in the Plan. They are broken down and discussed further according to key actions occurring under each goal.

Habitat conservation

Under the proposed action 800-2,000 acres/year (324-809 ha/yr) of cultivated land would continue to be flood irrigated, while up to 1,100 acres (445 ha) would be converted from flood to sprinkler irrigation. Restoration of native species to 4,500 acres (1,821 ha) of existing agriculture fields would occur in GTNP and exclosures would be used on the Refuge to allow recovery of willow, aspen and cottonwood stands. These actions would likely result in an overall minor decrease in total herbaceous forage available for elk and bison, but would improve the overall quality of available forage. While these actions may alter ungulate distributions and densities, and cause elk in the Jackson herd to alter their movements within and outside of the Refuge in response to the changes, it is unlikely that these factors would have any significant impact on the GYE grizzly bear population.

Sustainable populations/ Elk and bison numbers

Supplemental feeding

Under the proposed action, supplemental feeding would be reduced from current levels and replaced by greater ungulate reliance on standing forage. The reduction in food supplementation may lead to changes in ungulate distribution and mortality and would likely cause elk and bison to return to a more natural pattern of existence influenced to a greater degree by factors such as climate and availability of native forage. Supplemental feeding likely reduces the effects of density in the Jackson elk herd (Lubow and Smith 2004); therefore, density-dependent effects on seasonal juvenile survival and dispersal may become more apparent as supplemental feeding is reduced. These effects, however, along with any associated decrease in adult and juvenile elk survival rates, are likely to be negligible since the Jackson elk herd is maintained below carrying capacity (Lubow and Smith 2004). While minor increases in elk mortality as a result of reduced supplemental feeding may be beneficial to grizzly bears in the GYE due to increased availability of carcasses, the effect would not likely be significant.

Elk hunt

The Jackson elk herd comprises one of the largest concentrations of elk in North America, with an estimated 13,000 individuals whose seasonal distributions allow them to be considered as being divided into four herd segments (Grand Teton, Yellowstone, Teton Wilderness, and Gros Ventre). The elk migrate across several jurisdictional boundaries, including the NER, GTNP, JDR Memorial Parkway, YNP, B-TNF, BLM resource areas, and state and private lands. Because of its large size, wide distribution, effects on vegetation, and importance to the area's predators and scavengers, the Jackson elk herd contributes significantly to the ecology of the southern GYE.

Elk hunting has been an annual event on the NER since 1955 and is the primary management tool used to control the Jackson elk herd population both on the Refuge and throughout the

Jackson elk herd units. As part of the proposed action, there will be a short-term increase in hunter numbers on the Refuge from 733 to 1,000 and an increase from 220 to 300 elk harvested annually. In the long term, overall hunter numbers on the Refuge will likely decrease to 470-487, as will the number of elk harvested (126-146). Hunting on the Refuge currently occurs in Area 77; however, a small hunt area may potentially be added in the southern portion of the Refuge in order to force elk back into other hunt areas. Hunting will be strictly managed and the areas available to hunting frequently patrolled. Hunting permits issued for the Refuge are day-use only and do not allow hunters to camp overnight. Due to these aforementioned factors, and the fact that habitat on the Refuge is relatively open and generally lacks densely forested areas, it is unlikely that the risk of elk hunters killing grizzly bears will be greater in either the short or long term as a result of the proposed action.

Elk hunting as part of the Park's annual elk reduction, occurs on approximately 66,600 acres (26,952 ha) of the Park's backcountry, 29,100 acres (11,776.4 ha) of which is in the recovery zone. Under the proposed action, there will be a short-term increase in the number of hunters permitted and deputized to hunt in the Park from 1,600 currently, to 2,200, and an increase in the number of elk harvested from 480 to 650. In the long term, the overall number of hunters in the Park will decrease to 773-957 per year, and the number of elk harvested will decrease to 232-287. Unlike the Refuge, overnight camping is permitted in certain areas.

There are 3 elk hunting areas (Areas 72, 79, 75) located within the boundaries of the GTNP. The terrain of Area 75 is largely open and lacking densely forested areas. This open, shrubland characteristic and general absence of dense woodland cover would tend to reduce the risk of surprise encounters between elk hunters and grizzly bears in these areas that might potentially result in human-caused grizzly mortality. Exceptions include the Snake River bottom where thicker cover exists and grizzly bears are known to frequent, and Blacktail Butte where grizzly bears might be expected to occur (Steve Cain, National Park Service, person. comm. 2007). Hunters in this area may face a higher risk of grizzly conflict than in other portions of Area 75. Portions of Area 71 are located within the 23,778 acres (9,623 ha) of the JDR Memorial Parkway managed by the Park; however, hunting for elk and other wildlife is largely managed by the WGFD. Area 72 has been closed to hunting since 1967. It is the only area in the Park west of the Snake River where hunting was authorized in the Park's 1950 enabling legislation and, although the potential for it to be reopened exists, this is not expected to occur within the foreseeable future. Compared with Area 75, Area 79 contains large expanses of dense woodland that provide ideal grizzly bear cover. Portions of the hunting area are located within the Buffalo Spread Creek BMU and represent a region where human-bear conflicts have occurred in the past (Haroldson et al. 2004; Gunther et al. 2004). The short-term risk for future human-bear conflicts resulting in potential grizzly bear mortality as a result of the proposed action is considered high for this hunting area both south of Elk Ranch and north of Moran and highway 26/287. However, a later start date of the elk hunting season relative to surrounding areas, a 30 to 40 percent yearly hunter-ranger contact rate, restricted backcountry camping, required use of bear-deterrence spray and supplemental educational materials addressing hunter-grizzly conflict

provided to deputized hunters (Steve Cain, National Park Service, person. comm. 2007) may limit this potential risk. The long term risk is considered to be equivalent to current levels.

Most of the remainder of the Jackson elk herd unit is comprised of the Buffalo and Jackson ranger districts of B-TNF. Elevation ranges from about 6,300 ft. (1,920 m) to nearly 12,200 ft. (3,719 m) at the headwaters of the Yellowstone River. There is not expected to be a substantial short-term increase in the short term in either the number of elk hunters using the forest or the number of elk harvested unless hunts on the Refuge cause more elk to move into these areas. As a result of the proposed action, in the long-term it is expected that herd reductions in the Grand Teton segment will cause individuals to radiate into and be sustained in other herd segments, allowing proportionately more elk to be harvested. In the long-term, it is estimated that there will be a 29-35 percent increase in hunter numbers in the B-TNF (from 4,227 currently to 5,600-5,870) as a result of the proposed action. The number of elk harvested per year in the B-TNF is predicted to increase from 1,268 to between 1,680 and 1,761.

There are 6 hunting areas (Area 70, 71, 74, 80, 81, 82) located in the B-TNF and surrounding the Park. These areas are dotted with dense coniferous woodlands interspersed with more open woods, and sagebrush and mixed grasslands at lower elevations and in the valleys. The terrain is highly variable with elevations ranging from 6,396 to 9,676 ft. (1,950 to 2,950 m). Multiple human-bear conflicts have been recorded throughout these areas in the past including hunting-related grizzly bear mortalities (Haroldson et al. 2004; Gunther et al. 2004, USFWS 2003). Elk season start dates in these areas range from September 10 to September 26, which corresponds both with the period when bears are actively foraging and preparing for hibernation and with the time during which most known and probable hunting-related grizzly bear mortalities occur (Haroldson et al. 2004; Gunther et al. 2004). Traditional early fall elk hunts in these areas have created a reliable food source for hyperphagous bears which take advantage of ungulate remains left by hunters, and this brings them into close proximity to hunters themselves (Haroldson et al. 2004). As a result of these factors, the risk of human-bear conflict resulting in potential hunting-related grizzly bear mortality is considered high in Areas 70, 71, and 81. Hunting Areas 73, 78, 84, and 85 are considered to represent regions with low risk of human-bear conflict due to the relatively high level of human occupation and their location outside of the main fall migration routes of the Jackson herd.

Bison hunt

A bison hunt would occur under the proposed action in order to reduce the herd size on the Refuge, increase bison distribution, limit bison-elk conflict along feed lines and reduce the potential for disease transmission. A reduction in herd size would also contribute to enhancement of habitat through a decrease in the damage caused by excessive grazing and browsing of willow, aspen and cottonwood stands. Initially, the bison hunt would reduce herd size by 140-150 bison/year, of which, 90-100 would be removed on the Refuge and 50 would be removed from the B-TNF. This would involve an average of 175-190 bison hunters each year. In the long term, the Plan estimates that an average of 70 bison will be killed annually, with an

average of 90 hunters participating in the hunt. This nevertheless represents a substantial increase over recent numbers of bison being harvested and bison hunters on the Refuge. Despite the increase in the number of hunters on the NER, due to the aforementioned factors and conditions associated with hunts on Refuge, the risk of human-grizzly conflict resulting in hunting-caused grizzly bear mortality is considered to be low, both in the short and the long term. The risk of hunter-caused grizzly mortality associated with bison hunts in the B-TNF is considered to be higher than on the Refuge, especially in the northern portions of Area 81 east of Elk Ranch and between Buffalo Fork and Spread Creek.

Disease management

In order to maintain the health of elk and bison populations while continuing supplemental feeding at reduced levels, a variety of disease management techniques will be explored (e.g., vaccination, selective fertility control, age- and sex-specific harvest). Under the proposed action, WGFD personnel will be allowed to use brucellosis vaccine Strain 19 on elk and RB51 on calf and nonpregnant female bison along feedlines during feedline operations. Grizzly bears may consume elk or bison exposed to these brucellosis vaccines; however, research indicates that there are no significant adverse effects of the RB51 vaccine on nontarget species (Januszewski et al. 2001). No clinical trials have been conducted to determine if vaccine Strain 19 is safe for nontarget species; however, the vaccine has been used on WGFD feedgrounds for 17 years without any noticeable adverse clinical, histological or reproductive effects on nontarget species. Since vaccination activities will occur within the Refuge along feedlines, it is not expected that there would be a risk of disturbance to grizzly bear associated with the action.

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.

Cumulative Effects within the Action Area

Several privately owned and State of Wyoming-owned in-holdings are present in GTNP; depending upon future human activities occurring on these properties, grizzly bears could be negatively affected. For many years, GTNP has attempted to secure these in-holdings with lifetime leases and out-right purchases and has been very successful in doing so. No large-scale developments or land-based projects have been proposed for these in-holdings.

There are plans to convey the Laurance S. Rockefeller (LSR) Preserve (approximately 1,100 acres [445 ha]) in southern GTNP to the Federal government in 2007. However, the LSR Preserve is presently a private in-holding in the Park. Although the future plans include removal

of most of the development that has been present on the ranch, the current owners will develop an interpretive facility and trail system prior to the conveyance of the property.

Cumulative Effects Adjacent to the Action Area and Grizzly Bear Recovery Zone

Cumulative effects of actions outside the action area and within the grizzly bear Recovery Zone are likely to affect resident grizzly bears moving through the action area whether their home range is within or adjacent to the action area. These actions include:

- livestock grazing (which would impact grizzly bears through management actions),
- private land development,
- firewood cutting,
- road use/management/improvement,
- timber harvest,
- recreation activities that lead to human-bear conflicts,
- vegetation management,
- wild and prescribed fire, and
- loss or decline of important food sources (e.g., whitebark pine seeds due to fire suppression),

The recent Teton County, Wyoming, approval of the Snake River Associates development plan for Teton Village on private land adjacent to the Park's southern boundary could have additional cumulative, long-term impacts on grizzly bears. This development will likely result in a higher number of visitors to the Park and an increase in associated dispersed recreational use. This may be particularly true in the southwest corner of the Park, where excellent bear habitat exists. Grizzly bears will likely colonize this area, even though it is several miles outside of the PCA.

These activities would cumulatively contribute to increased mortality risks, reduce availability of secure habitat, and diminish habitat effectiveness for grizzly bears. However, the total cumulative impact of the above-listed activities, as well as other unidentified actions occurring within the grizzly bear recovery zone, do not appear to be adversely affecting population recovery, as evidenced by the expanding grizzly bear population in the GYA (Eberhardt and Knight 1996; Schwartz et al. 2002; Pyare et al. 2004).

CONCLUSION

After reviewing the current status of the threatened grizzly bear, the environmental baseline for the species in the action area, the effects of the action and the cumulative effects, it is the Service's opinion that the Final Bison and Elk Management Plan, as proposed, is not likely to jeopardize the continued existence of the grizzly bear. No critical habitat has been designated for grizzly bears, 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 proposed action is not likely to jeopardize the continued existence of grizzly bears is based primarily on the information presented in the FEIS and BE prepared for the proposed Bison and Elk Management Plan, information in our files, and informal discussions between the Service, the Park and other personnel from other agencies and groups.

Grizzly bears in the GYE have increased in numbers and expanded in range during the past two decades (Schwartz et al. 2006). Female grizzly bears with young have been observed out side of the recovery zone, leading to the assumption that females are able to establish home ranges and find the resources needed to survive and reproduce in these areas.

The Service concludes that some adverse affects may occur to grizzly bears as a result of the proposed bison and elk management plan. The existing level of hunting on the Refuge has not presented a problem of grizzly-human conflict and, though the best available information suggests the GYE grizzly bear population is stable to increasing and is expanding its range to the south, the open nature of terrain on the Refuge and high levels of human activity and visibility will limit the risk of conflicts in both the short and long terms. As on the Refuge, existing hunting within the Park has not presented a substantial problem of hunting-caused grizzly bear mortality; however, unlike on the Refuge, the variability of terrain and densely wooded areas in the Park contribute to an elevated risk of hunting-related conflicts occurring. This increased risk would be minimal in the long term as a result of the proposed action, but would be higher in the short-term, especially within Area 79. Within the B-TNF, the short term risk of increased hunting-related grizzly bear mortality would be relatively unchanged as a result of the proposed plan under current conditions. The long-term risk, however, would be considerably higher in all areas where grizzly bear occur.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to 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 when it actually kills or injures listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent act or omission which creates the likelihood of injury to listed species by annoying it 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 the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary and must be implemented by the Park and Refuge so that they become binding conditions of any permit issued by the Park or Refuge, as appropriate, in order for the exemption from prohibited taking of the species concerned, as described in section 7(o)(2), to apply. The Park and Refuge have a continuing duty to regulate the activity covered by this incidental take statement. If the Park or Refuge (1) fails to assume and implement the terms and conditions or (2) fails to require permittees to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or other documents, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Park and Refuge must report the progress of the action and its impact on the species to the Service as specified in the Incidental Take Statement [50 CFR §402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE

Considering the history of hunting-related conflicts in the GYE, differing strategies for management of hunters by the Park and the B-TNF, and differences in landscape and habitat characteristics, the risk of hunting-related grizzly bear mortality and associated incidental take are addressed separately for the Park and the B-TNF. The Service anticipates that the proposed action will exacerbate the short-term risk for hunting-related grizzly bear mortality within the Park and the long-term risk for hunting-related grizzly bear mortality in the B-TNF and JDR Memorial Parkway as a result of the Plan.

The Service anticipates 1 grizzly bear (adult or juvenile) over the 15-year implementation period of the Plan could be incidentally taken as a result of the proposed action in GTNP and 2 grizzly bears (adult or juvenile) in a 15-year period could be incidentally taken as a result of the proposed action in the B-TNF. It is expected that all grizzly bears would be lethally taken through hunting-related conflicts. In the period 1987-2001, an average of 2 human-caused grizzly bear mortalities occurred per year in the B-TNF. During the same time period the average human-caused grizzly bear mortality was less than 1 per year in the Park (USFWS 2003). The incidental take of 2 grizzly bears in the B-TNF and 1 in GTNP as a result of the proposed action is considered to be in addition to this baseline level of mortality.

EFFECT OF THE TAKE

As analyzed in this biological opinion, the Service concludes that this level of anticipated incidental take is not likely to result in jeopardy to the species. Critical habitat has not been designated for the grizzly bear; therefore none would be affected.

REASONABLE AND PRUDENT MEASURES

The Service believes the following Reasonable and Prudent Measures (RPM) are necessary and appropriate to minimize impacts of incidental take of grizzly bears:

RPM 1 Minimize the likelihood of hunting-related human/grizzly bear conflict associated with the Project through education of hunters

TERMS AND CONDITIONS

The Service believes no more than 3 grizzly bears will be incidentally taken as a result of the proposed action. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is reached, such incidental take represents new information requiring re-initiation of consultation and review of the reasonable and prudent measures provided. 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.

1. The Park and Refuge shall continue ongoing educational measures related to limiting the risk of hunter-grizzly conflict and hunting-caused grizzly bear mortality and shall adapt or modify these measures as changing circumstances and information warrant.

2. If incidental take of grizzly bears in the B-TNF above the baseline level reaches 1 grizzly bear, Service and Park representatives shall meet with representatives from the WGFD and B-TNF to discuss whether additional educational and/or preventative measures or other changes could be implemented within the action area to minimize additional take of grizzly bears within the B-TNF.

3. In the event that a grizzly bear is killed within the action area as a result of hunting-related conflict, the Park, Refuge or B-TNF shall notify the Service's Wyoming Field Office (307-772-2374) and the Service's Law Enforcement Office (307-261-6365) within 24 hours.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation Recommendations (CR) 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.

CR1. In order for the Service to be kept informed of actions minimizing or avoiding adverse effects, or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

CR2. The Refuge and Park should participate in ongoing interagency efforts to identify, map and manage linkage habitats essential to grizzly bear movement. Please contact the Service's grizzly bear recovery coordinator at (406) 243-4903 for information.

CR3. If grizzly bears are sighted on the NER during the implementation period of the project, all hunting activities on the NER should be reassessed in order to determine the potential risk of hunter-grizzly conflict.

CR4. The Park should encourage hunters to move their kills out from underneath thick tree cover or undergrowth into more open areas as quickly as possible in order to reduce the risk of surprise encounters with grizzly bears.

CR5. The Park should encourage hunters to retrieve and remove or hang their kills as quickly as possible after making a kill in order to reduce the risk of hunter-grizzly conflict over ungulate carcasses.

CR6. The Park should recommend that after making a kill or tagging a kill, any hunter that finds a grizzly bear is already on the carcass will forfeit that kill and/or tag.

CR7. The Park should place educational signs/information addressing the risks of hunter-grizzly conflict, including information on daily and seasonal periods that represent the highest risk for hunter-grizzly conflict and how to diffuse grizzly bear confrontations, in any parking area, maintained camp site and high use trail head where such signs/information are not already in place.

CR8. The Park should continue encouraging hunters to maintain at least 100m distance between any campsite and any carcass or meat that is hung in order to elevate it beyond the reach of scavenging grizzly bears.

CR9. As a non-action agency indirectly affected by the proposed project, the B-TNF should implement the abovementioned conservation measures whenever possible and appropriate.

REINITIATION REQUIREMENT

This concludes formal consultation on the action outlined in your February 7, 2007, request for formal consultation on the Final Bison and Elk Management Plan and Environmental Impact

Statement. 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 take 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 assistance in the conservation of endangered, threatened, and proposed species. If you have any questions or comments on this final biological opinion or your responsibilities under the Act, please contact Tyler Fox of our staff at the letterhead address or by phone at (307) 772-2374, extension 237.

cc: B-TNF, Forest Supervisor, Jackson, WY (K. Hamilton)
FWS, Grizzly Bear Recovery Coordinator, Montana (C. Servheen)
FWS, Planning Team Leader, Lakewood, CO (L. Shannon)
GTNP, Superintendent, Jackson, WY (M. Gibson-Scott)
GTNP, Management Assistant, Moose, WY (G. Pollock)
GTNP, Senior Wildlife Biologist, Moose, WY (S. Cain)
WGFD, Statewide Habitat Protection Coordinator, Cheyenne, WY (V. Stelter)
WGFD, Non-Game Coordinator, Lander, WY (B. Oakleaf)

Literature Cited

Bjornlie, D. and M. Haroldson. 2001. Grizzly bear use of insect aggregation sites documented from aerial telemetry and observations. Pages 44-51 *in* C. C. Schwartz and M. A. Haroldson, Eds. Yellowstone grizzly bear investigations: Annual report of the Interagency Grizzly Bear Study Team, 2000. U.S. Geological Survey, Bozeman, Montana.

Eberhardt, L. L. and R. Knight. 1996. How many grizzlies in Yellowstone? Journal of Wildlife Management 60:416-421.

Gillian, C.M., F.M. Hammond, and C.M. Peterson. 1994. "Evaluation of an aversive conditioning technique used on female grizzly bears in the Yellowstone ecosystem." Pp. 503-512 in Proceeedings and papers of the Ninth International Conference on Bear Research and Management. Bears—Their Biology and Management (Claar, J.J. and P. Schullery, eds). Missoula, MT.

Gunther, K. A., M. A. Haroldson, K. Frey, S. L. Cain, J. Copeland, and C. C. Schwartz. 2004. Grizzly bear--human conflicts in the Greater Yellowstone Ecosystem, 1992-2000. Ursus 15(1):10-22.

Gunther, K.A, M.T. Bruscino, S.L. Cain, K. Frey, L. Hanauska-Brown, M. Haroldson and C.C. Schwartz. 2004a. Grizzly Bear-Human Conflicts in the Greater Yellowstone Ecosystem. Pages 53-56 *in* C. C. Schwartz and M. A. Haroldson, Eds. Yellowstone grizzly bear investigations: Annual report of the Interagency Grizzly Bear Study Team, 2003. U.S. Geological Survey, Bozeman, Montana.

Haroldson, M.A. 2006. Grizzly bear mortalities. Pages 16-22 *in* C.C. Schwartz, M.A. Haroldson, and K. West, editors. Yellowstone grizzly bear investigations: annual report of the Interagency Grizzly Bear Study Team, 2005. U.S. Geological Survey, Bozeman, Montana.

Haroldson, M. A. and K. Frey. 2004. Grizzly bear mortalities. Pages 22-25 in C. C. Schwartz and M. A. Haroldson, eds. Yellowstone grizzly bear investigations: annual reports of the Interagency Grizzly Bear Study Team, 2003. U.S. Geological Survey, Bozeman, MT.

Haroldson, M. A. Ternant, K. A. Gunther, and C. C. Schwartz. 2002. Grizzly bear denning chronology and movements in the Greater Yellowstone Ecosystem. Ursus 13:29-37.

Hilderbrand, G. V., S. G. Jenkins, C. C. Schwartz, T. A. Hanley, and C. T. Robbins. 1999. Effect of seasonal differences in dietary meat intake on changes in body mass and composition in wild and captive bears. Canadian Journal of Zoology 77:1623-1630.

Interagency Grizzly Bear Study Team (IGBST). 2005. Reassessing methods to estimate population size and sustainable mortality limits for the Yellowstone grizzly bear. Interagency Grizzly Bear Study Team, U.S. Geological Survey, Northern Rocky Mountain Science Center, Montana State University, Bozeman, Montana, U.S.A.

IGBST. 2000. Yellowstone Grizzly Bear Investigations, Report of the Interagency Study Team 2000. U.S. Geological Survey, Wyoming Game and Fish Department, U.S. Fish and Wildlife Service, Montana Fish, Wildlife and Parks Department, U.S.D.A. Forest Service, Idaho Fish and Game Department (Charles C. Schwartz and Mark A. Haroldson, Eds).

Interagency Conservation Strategy Team (ICST). 2003. Final Conservation Strategy for the Grizzly Bear in the Greater Yellowstone Area. The Interagency Conservation Strategy Team. 174 pp.

Interagency Grizzly Bear Committee (IGBC). 1986. Interagency grizzly bear guidelines. U.S. Forest Service, Washington, D.C.

Jacoby, M. E., G. V. Hilderbrand, C. Servheen, C. C. Schwartz, S. M. Arthur, T. A. Hanley, C. C. Robbins, and R. Michner. 1999. Trophic relations of brown and black bears in several western North American ecosystems. Journal of Wildlife Management 63:921–929.

Januszewski, M.C., S.C. Olsen, R.G. McLean, L. Clark, and J.C. Rhyan. 2001. Experimental infection of nontarget species of rodents and birds with Brucella abortus strain RB51 vaccine. Journal of Wildlife Diseases 37(3):532-537.

Kasworm, W. F., and T. L. Manley. 1989. Road and trail influences on grizzly bears and black bears in northwest Montana. International Conference on Bear Research and Management 8:79-84.

Knight, R. R. and L. L. Eberhardt. 1985. Population dynamics of Yellowstone grizzly bears. Ecology 66(2):323-334.

Knight, R. R. and S. L. Judd. 1983. Grizzly bears that kill livestock. International Conference for Bear Research and Management 5:186-190.

Linnell, J. D. C., J. E. Swenson, R. Anderson, and B. Barnes. 2000. How vulnerable are denning bears to disturbance? Wildlife Society Bulletin 28(2):400-413.

Lubow, B.C., and B.L. Smith. 2004. Population dynamics of the Jackson elk herd. Journal of Wildlife Management. 68(4):810-829

Mattson, D. J. 2001. Myrmecophagy by Yellowstone grizzly bears. Canadian Journal of Zoology 79:779-793.

Mattson, D. J. and D. P. Reinhart. 1997. Excavation of red squirrel middens by grizzly bears in the whitebark pine zone. Journal of Applied Ecology 34:926-940.

Mattson, D. J. and D. P. Reinhart. 1995. Influences of cutthroat trout (*Onchorhynchus clarki*) on behavior and reproduction of Yellowstone grizzly bears (*Ursus arctos*), 1975-1989. Canadian Journal of Zoology 73:2072-2079.

Mattson, D. J. and R. R. Knight. 1991. Effects of access on human-caused mortality of Yellowstone grizzly bears. USDI National Park Service, Interagency Grizzly Bear Study Team Report 1991B.

Mattson, D. J., M. G. French, and S. P. French. 2002. Consumption of earthworms by Yellowstone grizzly bears. Ursus 13:105-110.

Mattson, D. J., B.M. Blanchard, and R.R. Knight. 1992. Yellowstone grizzly bear mortality, human habituation, and whitebark pine seed crops. Journal of Wildlife Management 56:432-442.

Mattson, D. J., B. M Blanchard, and R. R. Knight. 1991. Food habits of Yellowstone grizzly bears, 1977-1987. Canadian Journal Zoology 69:1619-1629.

Mattson, D. J., C. M. Gillin, S. A. Benson, and R. R. Knight. 1991a. Bear feeding activity at alpine insect aggregation sites in the Yellowstone ecosystem. Canadian Journal of Zoology 69:2430-2435.

Podruzny, S. 2005. Occupancy of Bear Management Units by Females with Young. Page 17 *in* C.C. Schwartz, M.A. Haroldson and S. Podruzny, editors. Yellowstone Grizzly Bear Investigations: Annual report of the Interagency Grizzly Bear Study Team, 2004. U.S. Geological Survey. Bozeman, Montana. 131 pp.

Podruzny, S. Cherry, C. C. Schwartz, and L. A. Landenburger. 2002. Grizzly Bear Denning and Potential Conflict Areas in the Greater Yellowstone Ecosystem. Ursus 13:19-28.

Podruzny, S. and K. Gunther. 2001. Spring Ungulate Availability and Use by Grizzly Bears in Yellowstone National Park. Pages 33-36 *in* C. C. Schwartz and M. A. Haroldson, editors. Yellowstone Grizzly Bear Investigations: Annual report of the Interagency Grizzly Bear Study Team, 2000. U.S. Geological Survey. Bozeman, MT.

Pyare, S., S. Cain, D. Moody, C. Schwartz, and J. Berger. 2004. Carnivore re-colonization: reality, possibility and a non-equilibrium century for grizzly bears in the Southern Yellowstone Ecosystem. Animal Conservation 7:1-7.

Reinhart, D. P., M. A. Haroldson, D. J. Mattson, and K. A. Gunther. 2001. Effects of exotic species on Yellowstone grizzly bears. Western North American Naturalist 61(3):227-288.

Robinson, H.L., C.C. Schwartz, J.D. Petty and P.F. Brussard. 2006. Assessment of pesticide residues in army cutworm moths (*Euxoa auxiliaries*) from the Greater Yellowstone Ecosystem and their potential consequences to foraging grizzly bears (*Ursos arctos horribilis*). Chemosphere 64:1704-1712

Schwartz, C.C., M.A. Haroldson, K. West, editors. 2006. Yellowstone grizzly bear investigations: annual report of the Interagency Grizzly Bear Study Team, 2005. U.S. Geological Survey, Bozeman, Montana. 90 pp.

Schwartz, C.C., M.A. Haroldson, K.A. Gunther, and D. Moody. 2002. Distribution of grizzly bears in the Greater Yellowstone Ecosystem 1990-2000. Ursus 13:203-212.

U.S. Fish and Wildlife Service (USFWS). 2005. Endangered and Threatened Wildlife and Plants; Designating the Greater Yellowstone Ecosystem Population of Grizzly Bears as a Distinct Population Segment; Removing the Yellowstone Distinct Population Segment of Grizzly Bears From the Federal List of Endangered and Threatened Wildlife; Proposed Rule. Federal Register 70 (221):69854-69884.

USFWS. 2003. Final conservation strategy for the grizzly bear in the Yellowstone ecosystem. U.S. Fish and Wildlife Service, Missoula, Montana 87 pp.

USFWS. 1993. Grizzly Bear Recovery Plan. Missoula, MT 181 pp.

USFWS. 1982. Grizzly bear recovery plan. Fish and Wildlife Reference Service. Denver, Colorado.

USFWS. 1975. Endangered and Threatened Wildlife: Amendment Listing the Grizzly Bear of the 48 Conterminous States as a Threatened Species. Federal Register 40(145):31734-31736.

U.S. Geological Survey (USGS). 2005. Website accessed January 2006. Katherine Kendall, Principal Investigator. http://nrmsc.usgs.gov/research/grizzlyb.htm

Zager, B., and J. Beecham. 2006. The role of American black bears and brown bears as predators on ungulates in North America. Ursus 17(2):95-108