

DESCRIPTION OF THE PROPOSED ACTION SPECIFIC TO GRIZZLY BEARS

The Forest developed and revised a mitigation plan for grizzly bears during the consultation processes to incorporate concerns of the Service. A revised mitigation plan was incorporated into the FEIS (MDEQ and USDA 2001). During consultation in 2002, the mitigation plan was again revised or clarified (USDA 2002a) to incorporate substantive portions of the reasonable and prudent alternative found in the original biological opinion issued by the Service (USDI 2000c). The mitigation plan was revised and clarified once again during consultation in 2005 and 2006, to address the concerns raised by the court in March, 2005 and the new information regarding the status of the CYE population. This biological opinion analyzed the effects of the proposed Rock Creek Mine based on the 2006 mitigation plan (Appendix B) as an integral part of the proposal. The 2006 mitigation plan as will be referred to as the “mitigation plan” throughout the rest of this document. Any changes to the mitigation plan, or other contingency plans that change the assumptions or conclusions in the BA may be the basis for reinitiation of consultation. The following sections *summarize* the main provisions of the revised mitigation plan. The mitigation plan is included in its entirety in Appendix B.

In March, 2006, the Service issued guidance on recovery units and jeopardy determinations under section 7 of the ESA (USDI in litt. 2006). Jeopardy analyses, conducted as part of a section 7 consultation, must always consider the impacts of a proposed action on the survival and recovery of the species. A proposed federal action may have significant adverse impacts on a recovery unit, and this would result in a jeopardy determination if these adverse impacts appreciably diminished the likelihood of both the survival and recovery of the listed entity. When an action appreciably impairs or precludes the capacity of a recovery unit from providing both the survival and recovery function assigned to it, that action may represent jeopardy to the species. Therefore, our analysis of jeopardy for this proposed action focused primarily on the effects of the action on the CYE grizzly bear population, and then on the consequences of those effects on the CYE population on the listed entity.

Grizzly Bear Conservation Measures In The Proposed Action

The Forest designed conservation measures to reduce adverse effects to fish, wildlife, water and air quality, reduce noise associated with the project and improve human safety. Conservation measures most relevant to reducing effects on grizzly bears include managing human access, providing seasonally important habitats, and education/law enforcement to reduce mortality risks to grizzly bears. Mortality risk would be reduced by minimizing the potential to attract bears to areas by:

- avoiding the use of salt when sanding during winter plowing operations on Forest road (FR) 150;
- avoiding the use of preferred vegetative forage like clover (*Trifolium spp.*) to reclaim sites disturbed by construction facilities and roads;
- using bear-resistant containers for human food/waste; and
- removing the remains of road-killed carcasses along roads.

The Forest's Grizzly Bear Mitigation Plan

In 2005 and 2006, the Forest added additional conservation measures to the mitigation plan (USDA 2006b), which is found in its entirety in Appendix B of this opinion. The following list summarizes the mitigation plan measures; a **(2006)** denotes measures added in 2005 and 2006.

Measures to reduce mortality risk to grizzly bears were included in the mitigation plan to reduce or minimize human/bear confrontations. The following measures would be complete or in place *prior* to construction of the evaluation adit:

- Revett would fund, for the life of the mine, a Montana Fish, Wildlife, and Parks grizzly bear management specialist position to educate people about bears, bear behavior and how to reduce the potential for grizzly bear conflicts, as well as to respond and resolve conflicts that may occur.
- Revett would fund, for the life of the mine, a Montana Fish, Wildlife, and Parks law enforcement position (in addition to the grizzly bear specialist position) to conduct law enforcement investigations of human-induced bear mortality and to deter illegal behavior.
- Revett would develop a transportation plan to minimize vehicular traffic associated with the mine.
- Revett would fund, for the life of the mine, monitoring and research efforts aimed at the Cabinet Mountains grizzly bear population, including the monitoring of grizzly bears augmented into the region over time.
- In coordination with the Forest and Montana Fish, Wildlife and Parks, Revett would fund and/or conduct an enhanced outreach and education program to increase public awareness and support for conservation of CYE grizzly bear population. **(2006)**
- Revett would prohibit employees from feeding wildlife.
- Revett would prohibit employees from carrying firearms on the permit area to minimize illegal or accidental mortality.
- The Forest would manage motorized access in the affected bear management units (BMUs) to offset increases in access densities associated with the Rock Creek Mine.
- The Forest would implement a mandatory food storage order in BMUs 4, 5, and 6.
- Revett would fund the purchase of grizzly bear-resistant garbage containers for all mine employees living in or near grizzly bear habitat, for their personal use at home. **(2006)**
- Revett would fund bear-resistant garbage containers for all Forest sites in the Cabinet Mountains portion of the CYE where garbage containers are provided. **(2006)**
- Revett would fund the needed measures to make the Sanders County garbage transfer station near the mine entrance grizzly bear-resistant.

Prior to the beginning of construction on the mine, the following measures would be implemented:

- Revett would ensure funds, for the life of the mine, for a second Montana Fish, Wildlife, and Parks grizzly bear management specialist position to work in the northern Cabinets and Yaak portions of the CYE. **(2006)**
- Revett would fund the needed measures to make additional county garbage transfer stations in the CYE grizzly bear-resistant. **(2006)**

- Revett would fund the purchase of grizzly bear-resistant garbage containers for all additional mine employees living in or near grizzly bear habitat, for their personal use at home. **(2006)**
- Revett would fund the purchase of an additional 100 containers and 20 containers/year for distribution to the public by the grizzly bear management specialists. **(2006)**
- Revett would fund the purchase of 10 electric fencing kits, and 2 replacements/year, for use by the bear specialists at bear attractant sites. **(2006)**
- Revett would fund bear-resistant garbage containers for all Forest sites where garbage containers are provided. **(2006)**
- Construction of the mine would begin only after at least six female grizzly bears were augmented into the Cabinet Mountains and monitored (two of the six females have been augmented to date). **(2006)**

Within 5 years of the start of evaluation adit construction:

- The Forest would implement a mandatory food storage order throughout Forest lands within the CYE. **(2006)**

Habitat protection and enhancement measures that would be implemented *prior* to the evaluation adit are:

- Revett would fund the acquisition of fee title or conservation easement on a total of at least 153 acres to specifically improve grizzly bear habitat security and maintain or improve habitat connectivity between the northern and southern portions of the Cabinet Mountains (Revett has recently acquired 270 acres in the north south corridor).
- The Forest would manage motorized access in the affected BMUs to offset increased effects of access densities associated with the Rock Creek Mine.
- Revett would fund a grizzly bear monitoring and research effort in the southern Cabinet Mountains during the life of the mine, including funds to monitor augmented grizzly bears.
- Revett would contribute funding to continue the existing bear research and monitoring effort to identify bear movement patterns across Highway 2 between the Cabinet Mountains and the Yaak. **(2006)**
- In coordination with the Service, the Forest would prioritize lands for conservation easement or acquisition in key linkage areas along Highway 2, as identified by research and monitoring. **(2006)**
- Revett would establish a trust fund for the mitigation plan prior to the evaluation adit.
- The Forest would organize and lead meetings that included the participating agencies (Forest, Montana Fish, Wildlife and Parks, DEQ, and the Service), Revett, and the public to regularly meet to review implementation of the mitigation plan and new information. **(2006)**

Prior to beginning construction on the mine, the following additional measures must be accomplished:

- Revett would fund the acquisition of fee title or conservation easement for preservation of an additional 1731 acres of grizzly bear habitat prior to construction, and an additional 566 acres prior to operation of the mine, for a total of 2450 acres (Table A3).
- Revett would fund habitat enhancement measures on 484 acres in the affected BMUs.

As described above, a number of mitigation measures are required to be completed or in place prior to construction of the evaluation adit. These include the Noxon-area bear specialist and law enforcement officer, bear-resistant upgrades to the county garbage transfer station near the mine entrance, acquisition or easement on 153 acres of property within the north-south corridor. Additional measures are required prior to construction of the mine, including acquisition or easement on additional mitigation property and a minimum of six female grizzly bears having been augmented into the Cabinet Mountains and other measures.

The mine would include direct surface disturbance of 483 acres, of which 342 acres are private land and 141 acres are national forest, including 115 acres of Management Situation 1 (MS 1) habitat (see IGBC 1986). Some of the disturbance would occur in Management Situation 3 habitat on the Forest, which is not considered suitable for grizzly bears due to existing permanent human development.

The BA identifies a maximum of 7,044 acres, the 483 acres and surrounding influence zone, in which grizzly bears would be directly or indirectly influenced by the mine or its activities at some time during the mine's development and operation. This larger area was developed based on the assumption that an area 0.25 to 0.50 mile surrounding physically disturbed sites and human travel routes would be under-used by grizzly bears. Upon re-examination of the net effects of displacement, we found it important to note that grizzly bears already under-use 5656 acres of this 7044 acre area because of the influence of existing human development or activity, primarily existing roads. Of the 7044 acre area, new disturbance caused by the mine would result in under-use of habitat by grizzly bears on an area of about 1400 acres that is not already influenced by existing roads or development.

The proposed mitigation plan requires a minimum of 2,350 acres of replacement habitat to replace the 483 acres directly lost through mine development, and account for displacement effects around these acres (Appendix 4 in BA 1998) (see also discussion in *Effects of the Action* section of this opinion). The mitigation plan requires at least 53 of the 2350 acres be located in a north south corridor along the Cabinet Divide. Furthermore, the mitigation plan also requires an additional 100 acres be protected within the north south corridor along the Cabinet Divide to avoid fragmentation of habitat. The total acreage would be acquired per the schedule in Table A3. The replacement habitat requirement would transfer currently private lands to public ownership or obtain perpetual conservation easements to mitigate for the 35-year disturbance. The Forest required these acres to compensate for the effects upon grizzly bears and their habitat from noise, disturbance and physical alteration on the 483 acres and the influence zone surrounding the developments and roads.

Acquisition of or easement on a total of at least 2450 acres would reduce or prevent displacement of bears and mortality risk on *more* than 2450 acres by (a) preventing development on properties that would cause impacts (e.g. substantive human activities, building, roading, or unsecured attractants) on adjacent lands, and (b) allowing the Forest to restrict existing or potential motorized access to acquired parcels that do or would have affected adjacent parcels. The exact amount of habitat that would be conserved or improved can be determined only after the lands are acquired.

Table A3. Mitigation acres (from MDEQ and USDA 2001)		
Activity Area	Replacement Acres	Timing
<i>Phase 1</i>		
Exploration Adit	153 (53 + 100)	Prior to Adit Construction
<i>Phase 2</i>		
Tailings & Associated Features	806	Prior to Construction
Mill & Associated Features	248	Prior to Construction
Ventilation Adit	10	Prior to Construction
New Roads	102	Prior to Construction
Existing Roads (reconstruction)	565	Prior to Reconstruction
Existing Roads (increased influence)	566	Prior to Operations
Total	2450	Prior to Operations

Specific parcels totaling over 8,000 acres of potential replacement mitigation habitat have been identified, but since acquisition is dependent upon willing sellers or successful conservation easements, the exact mitigation properties that could and eventually would be acquired are not currently known. However, these parcels have been ranked according to a priority scheme developed by the Forest and the Service based upon location, risk of development, and habitat quality. Although this priority ranking has been developed and would be used by the Forest and the Service in identifying required mitigation properties, the ranking will not be publicly disclosed prior to acquisition of those properties due to the effect such disclosure would have on property values, and consequently, the feasibility of the mitigation plan (see discussion under *Effects of the Action* section).

The habitat replacement program would require the 2,350 acres to be “in kind” acres (based on methods in the BA:Appendix 4) and provide an average of 2.11 habitat units/acre secured prior to the beginning of operations. “In kind” mitigation is based upon a required minimum amount of early season habitat units and late season habitat units to ensure that mitigation habitat compensates for the quality of habitat lost.

To ensure that adequate habitat quality and quantity would be secured to minimize the effects of the Rock Creek Mine during construction, operation, and reclamation, approximately 1,784 acres would be secured prior to the construction period and the remaining acreage would be acquired prior to the production phase of the mine operation. The revised mitigation plan requires mitigation acres be protected through acquisition, which would be transferred to the U.S. Forest Service, or through perpetual conservation easement. Table A3 shows the mitigation habitat acquisition schedule. This schedule would require all replacement habitat (except for a wilderness ventilation adit, which may not be necessary) be acquired prior to starting full operations at the end of year five, assuming no delays in construction phase.

“On-site habitat” was described as lands within “bear analysis areas” (BAAs) directly affected by the proposed action, that are to mitigate for the direct surface disturbance that would occur. “Off-site habitat” would be other lands within the southern Cabinet Mountains, including bear management units (BMUs) 4, 5, 6, 7 and 8. First choice for replacement habitat would be on-site habitat of suitable quality. If adequate replacement acres are not available in those BAAs, then acres would be acquired off-site, within BMUs 4, 5, 6, 7 or 8 in the southern Cabinet portion of the CYE recovery zone. This on- or off-site priority scheme for replacement habitat is intended to ensure the maintenance of adequate amounts of grizzly bear habitat within BMUs affected by the mine.

In addition to the 2350 acres of mitigation habitat, an additional 100 acres was required to reduce grizzly bear habitat fragmentation within the north to south movement corridor in the Cabinet Mountains (see USDA 1998, page 23) within the BMUs 4, 5 and 6. This on-site habitat was defined as that occurring within the north to south movement corridor. The Forest and Service collaborated to identify parcels of land that were important to maintaining grizzly bear habitat connectivity within the corridor. This identification of properties will not be publicly disclosed due to the effect such disclosure would have on property values and, consequently, the feasibility of the mitigation plan (see discussion under *Analysis of Displacement Effects on Grizzly Bears: Additional mitigation plan effects on grizzly bear displacement and habitat loss.*).

The mitigation plan was revised in 2002 (USDA 2002a) and addressed the Service’s concerns that non-perpetual easements on replacement habitat parcels could result in a mortality sink for bears if habitat that had been conserved and managed for grizzly bear habitat is ultimately developed in a way that is adverse to bears. The 2002 mitigation plan changed conservation easements from 50-year to perpetual and specified that conservation easements be held by the U.S. Forest Service. The easements would contain sufficient terms to ensure that the subject property would be perpetually conserved and managed for grizzly bear habitat.

The mitigation plan includes 484 acres of habitat enhancement within BMUs 4, 5 or 6 to improve habitat conditions for grizzly bears. Revett would fund habitat enhancement, commensurate with loss of habitat effectiveness on these acres to improve habitat conditions through road closures, burns or other projects on existing or acquired lands within BMUs 4, 5 and 6. Enhancements would be preferred in the affected BMU and would include, but are not limited to, prescribed fire to restore whitebark pine, and road closures and obliterations. If opportunities for enhancement are not available in the affected BMU, then work would be done in adjacent BMUs

The 2006 mitigation plan includes a series of road closures. The following roads have been identified for year-round road closure as part of mitigation (Table A4).

The 2006 mitigation plan requires Revett to either establish a trust fund or post a bond prior to implementation of the project to insure full implementation of the mitigation plan (USDA 2002a and 2006). Revett would make deposits in five-year increments over the life of the mine to fund the mitigation plan conservation measures. More details regarding the bond can be found in the Record of Decision for the Rock Creek Mine (USDA 2003). The 2006 mitigation plan also specifies that funding from Revett would be necessary for a number of conservation measures

that are needed over the operational life of the mine, and would provide long-term and lasting benefits to the CYE grizzly bear population. The expense of some of the general conservation measures in the Rock Creek Mine mitigation plan could be shared with proponents of projects proposed in the future in the CYE, if those projects are likely to cause adverse effects on grizzly bears. Thus, the funding ratio(s) for some of the conservation measures in the mitigation plan may be adjusted over time. However, Revett would remain responsible for funding of conservation measures that are obviously linked to minimizing the direct adverse effects to grizzly bears caused by the development and operation of the Rock Creek mine. Revett would also remain responsible for funding all measures in the mitigation plan if projects appropriate for shared funding are not proposed in the CYE. The grizzly bear conservation measures suitable for potential shared funding or possible assumption by proponents of future projects are noted in the mitigation plan (Appendix B).

Table A4. Year-round road closures associated with the Rock Creek Mine Project (from USDA 1998)		
Road Number	Road Name	Closure
FR 2285	Orr Creek	1.61 miles w/ barrier
FR 2741X		0.18 miles w/ barrier
FR 150	Rock Creek	2.92 miles w/ gate*
FR 2741A		0.47 miles w/ barrier
* The north 0.42 miles will be obliterated and the south 2.5 miles will be gated.		

STATUS OF THE SPECIES

The grizzly bear originally inhabited a variety of habitats from the Great Plains to mountainous areas throughout western North America, from central Mexico to the Arctic Ocean. With the advent of Euro-American 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, grizzly bears occupy less than 2 percent of their former range south of Canada (USDI 1993a). 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 Montana, Wyoming, Idaho and Washington and are often associated with National Parks and wilderness areas. Grizzly bear populations persist in the Yellowstone Grizzly Bear Ecosystem (YGBE), Northern Continental Divide Ecosystem (NCDE), CYE, and Selkirk Ecosystem (SE). A small number of grizzly bears are believed to exist in the North Cascades of Washington.

The grizzly bear was classified as a threatened species under provisions of the Act 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.

Life History

The following information is abridged from the Grizzly Bear Recovery Plan (Recovery Plan) (USDI 1993a). Grizzly bears are among the largest terrestrial mammals in North America. South of the United States - Canada border, adult females range from 250 to 350 pounds and adult males range from 400 to 600 pounds. Grizzly bears are relatively long-lived, in the wild they may live 25 years or longer. 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. Their body temperature drops no more than 5° C (approximately 10° F) 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 5 months, generally beginning in fall (September to November) and extending until spring (March to April)(Craighead and Craighead 1972b; Pearson 1975).

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 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 seek vegetation, tuber, or fruits as they develop and become available, 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. Both habituation and food conditioning increase chances of human-caused grizzly bear mortality as a result of real or perceived threats to human safety or property. Nuisance grizzly bear mortalities can be a result of legal management actions, defense of human life, or illegal killing.

Adult grizzly bears are individualistic and normally solitary, with the exceptions of females with cubs and 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 (Murie 1944, 1962; Jonkel and Cowan 1971; 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 several hundred square miles for males, and 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). The average age at first reproduction in the lower 48 States for females is 5.5 years, and litter size ranges from 1 to 4

cubs who stay with the mother up to 2 to 3 years. Males may reach physiological reproductive age at 4.5, but may not be behaviorally reproductive due to other dominant males preventing mating.

Home ranges of collared grizzly bears overlapped extensively in the CYE on a yearly and lifetime basis (Kasworm et al. 2005). Bears typically utilized the same space at different times. This phenomenon was especially true of female grizzly bears and their female offspring. Male home ranges overlap those of several females to increase breeding potential, but males and females consort only during the brief courtship and breeding period. Adult male home ranges also overlap, but males seldom use the same area at the same time, to avoid conflict.

Natural mortality is known to occur from intra-specific predation, but the degree to which this occurs in 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 not been documented as a major mortality factor. Natural mortality is difficult to document or quantify in rare, relatively elusive animals such as grizzly bears.

Human-caused mortality has been slightly better quantified; recent models speculate that reported mortality may be only 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, altering habitat and resulting in the direct killing of grizzly bears. Grizzly bears historically were targeted in predator control programs in the 1930s. Predator control was probably responsible for extirpation in many states that no longer support grizzlies. The legal grizzly bear hunting season in Montana was closed in 1991. More recent human-caused mortality includes management control actions, defense of life, 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. Displacement from essential habitats due to avoidance of human activities may reduce fitness of grizzly bears, affecting survival in some instances.

Current Status and Distribution

In the conterminous 48 States, the CYE and five other areas in mountainous ecosystems of Montana, Wyoming, Idaho and Washington have been identified for grizzly bear recovery (USDI 1993a). The Recovery Plan established recovery zones in each grizzly bear ecosystem, the YGBE, NCDE, CYE, Selkirk Ecosystem, North Cascades Ecosystem, and the Bitterroot Ecosystem. Recovery zones are areas large enough and of sufficient habitat quality to support a recovered bear population, and represent the areas within which the population and habitat criteria for achievement of recovery will be measured. According to the Recovery Plan the

species can be delisted throughout the lower 48 states when each of the populations in recovery zones has met specific recovery criteria and has been delisted (USDI 1993a).

The estimated total population of grizzly bears in the conterminous U.S. at the time of listing was 800 to 1,000 individuals (USDI 1993a). Grizzly bear populations have increased in the YGBE and NCDE ecosystems since listing in 1975. The nature of grizzly bears and the rugged terrain they inhabit makes census difficult. The Recovery Plan relies on conservative, reasonably measurable parameters with which to assess population status in regards to recovery: number of females with cubs, the distribution of family groups, and the relationship between the minimum population estimate and known, human-caused grizzly bear mortality.

The Recovery Plan details specific recovery objectives for recovery zones within each grizzly bear ecosystem where grizzly bear populations persist: the YGBE, NCDE, CYE, and Selkirk Ecosystems. Grizzly bear recovery efforts in the North Cascades Ecosystem and Bitterroot Ecosystems are in the planning stages. In the North Cascades Ecosystem, most of the grizzly bear population occurs north of the Canada - United States border, but a few grizzly bears persist south of the border. Grizzly bears appear to have been eliminated from the Bitterroot Ecosystem decades ago; however, a vast amount of suitable habitat occurs there (USDI 2000b).

Status of the grizzly bear population in the CYE

The CYE is essential to the conservation and recovery of grizzly bears. Grizzly bears remain on less than two percent of their historic range in the lower 48 States. The CYE grizzly bear population is one of only four remaining populations of the listed entity, and is estimated to be 30 to 40 grizzly bears. The CYE represents one of six recovery areas comprising the remaining suitable habitat for grizzly bears in the coterminous United States. Grizzly bear populations require large areas of relatively wild habitat, populations inherently grow very slowly, and conflicts between grizzly bears and people are difficult to avoid and often result in grizzly bear mortality. The juxtaposition of the CYE population to the Selkirk ecosystem and NCDE grizzly bear populations to the east and west respectively, makes it essential to long-term survival and recovery of grizzly bears throughout a significant portion of its range in the United States.

The CYE grizzly bear recovery zone encompasses approximately 2,600 square miles (1,664,000 acres) (USDI 1993a) in northwestern Montana and northeastern Idaho (Figure A2). The CYE recovery zone is bordered to the north by the Canadian border, to

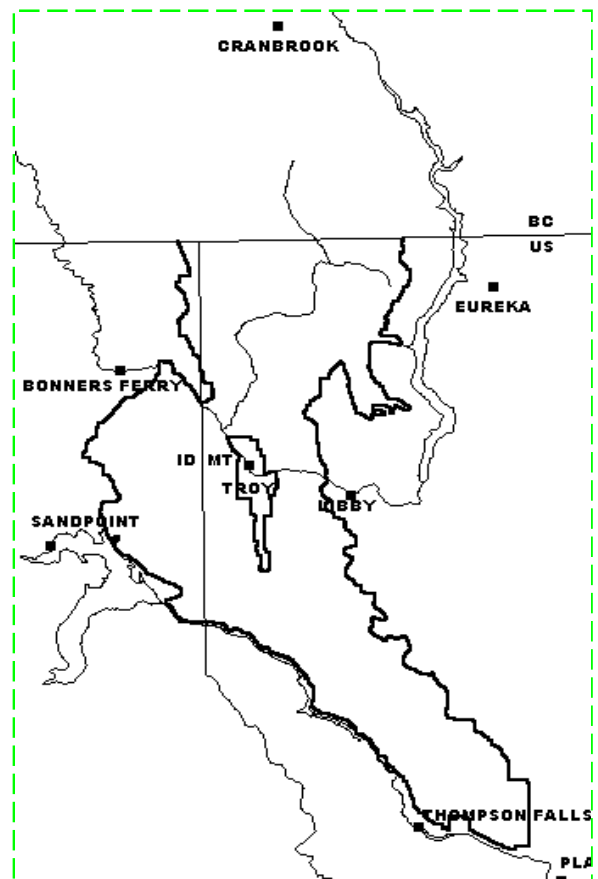


Figure A2. Cabinet-Yaak grizzly bear recovery zone.

the south by the Clark Fork River and Montana Highway 200, to the west by the towns of Moyie Springs and Clark Fork, to the east by the town of Libby. The CYE is bisected by the Kootenai River.

The following CYE recovery zone description is summarized from Kasworm et al. (2005). Land ownership within the CYE recovery zone is approximately 90 percent public under federal administration (about 1,444,000 acres), 5 percent state, and 5 percent private. Land under federal administration is managed by the Kootenai, Lolo and Idaho Panhandle National Forests. The principal private land-owner in the CYE Recovery Zone is Plum Creek Timber Company, Inc. (Plum Creek). A land exchange between the Forest and Plum Creek was finalized in 1997, which transferred approximately 21,422 acres to public ownership, primarily within the CYE. Individual landowners live on various-sized acreage along the major rivers and numerous patented and unpatented mining claims exist along the Cabinet Mountains.

The CYE is often described in terms of having two portions. The Cabinet Mountains portion forms the southern half of the CYE, covering approximately 978,000 acres of national forest lands. The Cabinet Mountains portion is topographically diverse, with a steep mountain range up to 8,700 feet near the center and more definable seasonal habitats. The Cabinet Mountains Wilderness area is approximately 34 miles long, varies from .5 to 7 miles wide and consists of 94,272 acres of higher-elevation habitat. The northern Cabinet Mountains are bisected by a valley of private land including the town of Troy. The southern Cabinet Mountains are therefore connected to the Yaak to the north by 2 relatively narrow corridors of habitat. The Yaak portion of the ecosystem covers about 466,000 acres of national forest lands and has gentler topography and slightly lower elevations, up to 7,700 feet. Seasonal grizzly bear habitats are not as clearly definable. More grizzly bear research and telemetry work has occurred in the Yaak than in the Cabinet Mountains portion of the ecosystem.

CYE Recovery Plan goals The Recovery Plan estimated that a recovered population in the CYE recovery zone would consist of a minimum of about 100 individual grizzly bears. Grizzly bears also live in and use areas outside the CYE recovery zone. Therefore, Recovery Plan population parameters include bears observed up to 10 miles outside the recovery zone boundary (USDI 1993a). This biological opinion will use the term CYE grizzly bear population as referring to grizzly bears within the CYE recovery zone and the band of habitat up to 10 miles around it. Bear Management Units (BMUs) were delineated to approximate the size of an average female home range, and provide the basic analytic unit for monitoring population distribution and habitat conditions.

According to the Recovery Plan, a fully recovered population of approximately 100 bears in the CYE could theoretically sustain a total of 6 known, human-caused grizzly bear mortalities (6 percent of the population) annually, if no more than 2 were female (30 percent of the total mortality). To facilitate recovery in all grizzly bear ecosystems, the Recovery Plan goals state that in each population, known human-caused mortalities may not exceed 4 percent of the population estimate, and that no more than 30 percent of this mortality shall be females. The Recovery Plan states that grizzly bear populations would probably not experience overall decline if annual, known human-caused mortality remains less than four percent, but cautions that demographic, genetic or other problems can be amplified in small populations. Furthermore,

the Recovery Plan includes a human-caused mortality *goal* of zero in the CYE until key parameters demonstrate a minimum population of approximately 100 grizzly bears (USDI 1993a). This goal is based on the current small size of the grizzly bear population, emphasizing that managers should strive to prevent human-caused mortality. However, although mortality levels can be reduced by recovery actions, it is unlikely that all human-caused mortality can be eliminated. Considering the current status of the CYE population, all grizzly bear mortality must be considered serious and current human-caused mortality levels should be reduced. In reality, the goal of zero human-caused mortality of grizzly bears in the CYE is not likely attainable over time, but recovery programs aim to reduce mortality to the extent possible.

Current Recovery Plan criteria/goals and data are shown in Table A5. The Recovery Plan goals are compared to the most recent information. None of the Recovery Plan goals were met in 2005. The CYE demographic parameters from 1988 through 2005 are presented in Appendix C.

Table A5. Status of the Cabinet-Yaak recovery zone through 2005 in relation to the demographic recovery goals from the grizzly bear recovery plan (from Kasworm et al. in litt. 2006a).		
Demographic Parameter	Recovery Plan Target/Limit	2000 through 2005
Females w/cubs (6-year average)	6.0	1.8 (11/6 yr)
Total known, human-caused mortality limit (4 percent of minimum estimate) (6-year average)	0.9	1.8 (6 yr ave)
Known, human-caused female mortality limit (30 percent of total known, human-caused mortality)(6-year average)	0.3	1.5 (6 yr ave)
Distribution of females with young	18 of 22 BMUs	12 of 22 BMUs

CYE grizzly bear research information Research information collected in the CYE has been used to estimate the number of grizzly bears in the ecosystem. To date, the best available information suggests a population of 30 to 40 grizzly bears in the entire CYE (Kasworm and Manley 1988, Kasworm et al. 2002, Kasworm et al. 2005). Using Recovery Plan calculation methods using sightings of females with cubs (U.S. Fish and Wildlife Service 1993), the *minimum* population estimated for 2004 was 35 grizzly bears for the entire CYE (Kasworm et al. 2005).

Separate population estimates were also made for the Cabinet Mountains and the Yaak River drainage of the Cabinet-Yaak ecosystem. Kasworm and Manley (1988) estimated the Cabinet Mountains portion of the CYE alone supported a population of 15 or fewer grizzly bears. The Service's 1999 finding stated insufficient data were available to change the Kasworm and Manley (1988) estimate for the Cabinet Mountains. Beginning in 1988 the population was experimentally augmented with 4 young female grizzly bears (Kasworm et al. 1998, Servheen et al. 1995). Montana Fish, Wildlife and Parks translocated a female grizzly bear in 2005, and a subadult female in 2006, from the NCDE into the Cabinet Mountains as part of their program to augment the population,.

The Yaak River drainage adjoins grizzly bear habitat in British Columbia, and contains about 40 percent of the CYE recovery zone. A minimum population estimate for 1989 to 2004 was derived by examination of observations and captures of grizzly bears by agency personnel in the Yaak study area during that time. Forty-eight individuals were identified: 27 radio-collared grizzly bears and 21 unmarked individuals (Kasworm et al. 2005). Some sightings believed to be the same individuals may actually be separate additional animals. Of the 48 individuals, 20 were known or suspected to have died from both human (12) and natural (8) causes during 1989 through 2004. Total individuals identified during this period (48 grizzly bears) less known mortality (20 grizzly bears) suggested a population of at least 28 animals in the Yaak area. A population estimate of 20 to 30 grizzly bears for the entire Yaak portion of the CYE is reasonable.

The distribution of grizzly bears is based on sighting data collected across the CYE. From 1994 to the present, credible sightings of individual grizzly bears were recorded in all 14 BMUs making up the Cabinet Mountains portion of the ecosystem. Female grizzly bears with young were reported in seven of the 14 BMUs in the Cabinets (Kasworm et al. 2005, Kasworm et al. in litt. 2006a). From 1989 to present, credible sightings of grizzly bears were recorded in all eight BMUs in the Yaak portion of the CYE. Sightings of females with young were reported in seven of the eight BMUs. About half of the credible sightings of females with young in these BMUs did not appear to come from marked bears. The actual number of unmarked females represented is unknown. This information suggests that grizzly bears are well distributed across the CYE, although females with young are less well distributed across the Cabinet Mountains portion of the CYE.

During 2005 alone, 50 reliable sightings of grizzly bears were reported from across the entire CYE (Kasworm et al. in litt. 2006a). Also, about 15 to 20 grizzly bear observations have been recorded across the Clark Fork River to the south east of the project area (Wayne Kasworm, U.S. Fish and Wildlife Service, pers. comm. 2000). Land to the south of the Clark Fork River is not included within the recovery zone.

Researchers also collect information used to estimate the trend of the CYE grizzly bear population. Trend analysis information thus far has been statistically inconclusive. Population data from 1983 to 1998 resulted in a positive point estimate of lambda (rate of change over time, based on birth and death rates). However, wide confidence intervals suggested the population trends should be cautiously evaluated (Wakkinen and Kasworm 2004). The point rate of increase for 1983 through 2002 was much lower and indicated a declining population (Kasworm et al. 2005). The unusually high grizzly bear mortality from 1999 through 2002 influenced the change in the point estimate of the rate of increase. Mortality was both human-caused and natural. Several years of very poor huckleberry crops probably influenced the mortality levels. Lower survival rates across most sex and age classes (particularly subadult female and adult females) and somewhat lower reproductive rates most influenced the decline. The probability of decline was 89 percent (Kasworm et al. 2005). Updated analysis through 2005 indicate the probability of decline was 91 percent (Kasworm et al. in litt. 2006b).

The increase in natural mortality beginning in 1999 may be linked to poor food production during 1998 through 2000 (Kasworm et al. 2005). Huckleberries are the major source of late

summer food for bears in the CYE, and berry production during these years was half the 11-year average. Four of seven cub mortalities between 1989 and 2004 came from one female bear that lost litters of two cubs each during 2000 and 2001. The effect of seven cub mortalities may be greatest in succeeding years when some of these animals might have been recruited to the reproductive segment of the population.

Finally, demographic information collected from grizzly bears in the CYE has been used in population growth and extinction simulations. Despite the relatively small size of the CYE, it is unlikely that at this time that habitat is the factor most limiting the grizzly bear population. The population of grizzly bears in the CYE remains vulnerable to extinction because of small population size (USDI 1999b; Proctor et al. 2004). The existing small population and correspondingly few reproductive-age female grizzly bears are more plausible factors limiting population growth. Grizzly bear reproductive rates are inherently low, because females grizzly bears typically do not breed until age 4 or older, average 2 cubs per litter, stay with cubs for 2 to 3 years, and have few litters during their lifetime. Cub mortality rates are relatively high. Given the small size of the CYE population, mortality of adult female grizzly bears is especially deleterious to population growth.

Proctor et al. (2004) indicated the likelihood of extinction for a grizzly bear population of 50 individuals with vital rates similar to the CYE population was 85 percent within one hundred years. Based on simulations of population growth rates and extinction probabilities, Proctor et al. (2004) recommended augmentation of the population, reduction of current rates of human-caused mortality, and ensuring female interchange between population segments, to reduce the likelihood of extinction. Efforts to augment grizzly bears have been relatively successful thus far in the CYE (Kasworm et al. In prep., Montana Fish, Wildlife and Parks, in litt. 2006, Servheen et al. 1995), and elsewhere (Quenette et al. 2001).

Demographic factors affecting the status of the CYE grizzly bear population

In 1999, the Service concluded that grizzly bears in the CYE were in danger of extinction due to: 1) habitat alteration and human intrusion into grizzly bear habitat; and 2) a small population facing potential isolation by activities across the border in Canada (Service 1999). The cumulative impacts of recreation, timber harvest, mining and other forest uses with associated road construction had reduced the amount of effective habitat for grizzly bears. Further, access management plans had the potential to reduce this threat, but had not been fully implemented. The Service's 1999 finding summarized major factors affecting the status of the CYE grizzly bear population through 1997. The following section includes recent information related to mortality factors affecting small population size and grizzly bear habitat conditions.

Mortality and small population size Table A6 reports total known grizzly bear mortality in the CYE from 1982 through 2005. Thirty grizzly bear mortalities were detected over this 24-year period in the recovery zone or within 10 miles. Of these, 21 (shaded on Table) were known human-caused within the Recovery Zone or 10 miles of the zone in the United States. In the past six years, eleven known mortalities were believed to be human-caused and are reflected in the current measures of Recovery Plan mortality parameters. Appendix C includes a table (Table 1)

that also tracks grizzly bears killed further than 10 miles outside the recovery zone in British Columbia; these mortalities are not counted in recovery parameters.

Table A6. Known grizzly bear mortalities associated with the Cabinet-Yaak recovery zone, 1982-2005. Shaded rows indicate human-caused mortalities (adapted from from Kasworm et al. 2005).

Mortality Date	Tag #	Sex	Age	Location	Mortality Category and Cause
Autumn 1982	None	M	AD	Grouse Creek, ID	Human, Poaching
1984	None	N/A	N/A	Harvey Creek, ID	Human, Mistaken Identity
Autumn 1985	14 ¹	M	AD	Lyons Gulch, MT	Human, Self Defense
Summer 1986	106 cub ¹	N/A	Cub	Burnt Creek, MT	Natural
Autumn 1987	None	F	Cub	Flattail Creek, MT	Human, Mistaken Identity
Autumn 1988	None	F	AD	Seventeen Mile Creek, MT	Human, Self Defense
Summer 1989	129 ¹	F	3	Burnt Creek, MT	Human, Research
1990	192	M	N/A	Poverty Creek, MT	Human, Poaching
1992	678	F	37	Trail Creek, MT	Unknown
Summer 1993	258 ¹	F	7	Libby Creek, MT	Natural
Summer 1993	258-cub ¹	N/A	Cub	Libby Creek, MT	Natural
Spring 1996	302 ¹	M	3	Dodge Creek, MT	Human, Unknown ²
1997	None	M	AD	Libby Creek, MT	Human, Poaching
Spring 1999	106 ¹	F	21	Seventeen Mile Creek, MT	Natural, Predation
Spring 1999	106 ¹ -cub	N/A	Cub	Seventeen Mile Creek, MT	Natural, Predation
Spring 1999	106 ¹ -cub	N/A	Cub	Seventeen Mile Creek, MT	Natural, Predation
Autumn 1999	358	M	15	Yaak River, MT	Human, Management Removal
Summer 2000	303-cub ¹	Unk	Cub	Fowler Creek, MT	Natural
Autumn 2000	592 ¹	F	3	Pete Creek MT	Human, Under Investigation ^{2,3}
Spring 2001	None	F	1	Spread Creek MT	Human- Mistaken Identity
Autumn 2001	None	F	AD	Elk Creek, MT	Human, Train Collision
Summer 2002	577 ¹	F	1	Marten Creek, MT	Natural
Autumn 2002	None	F	3	Porcupine Creek, MT	Human, Under Investigation
Autumn 2002	353 ¹	F	AD	Yaak River, MT	Human, Poaching
Autumn 2002	None ¹	F	cub	Yaak River, MT	Human, Poaching
Autumn 2002	None ¹	Unk	cub	Yaak River, MT	Human, Poaching
Autumn 2002	None ¹	Unk	cub	Yaak River, MT	Human, Poaching
Autumn 2005	None	F	AD	Government Creek, MT	Human, Train Collision
Autumn 2005	694 ¹	F	2	Pipe Creek, MT	Human, Under Investigation ²
Autumn 2005	688 ¹	M	3	Yaak River, MT	Human, Mistaken Identity

¹ Part of radio collar sample at time of mortality.
² Human-caused mortality determined only because of the radio collar on the animal at the time of death.
³ Bold indicates known human-caused mortalities included in most recent Recovery Plan 6-year averages.

Known mortality was unusually high from 1999 through 2002 when compared with past history. During this three-year period, 14 known grizzly bear mortalities occurred within the recovery zone; five mortalities were natural and nine were human-caused. No human-caused mortalities were documented in 2003 or 2004. In 2005, human-caused mortality was again high compared to the past annual mortality. Three grizzly bears died, all due to human causes. During the six-year period from 1999 through 2005, 12 human-caused mortalities of grizzly bears occurred for an average annual rate of 2.0 per year (human-caused mortalities alone). During the previous 17 years, 1982 through 1998, only 13 known grizzly bear mortalities were documented, of which three were natural, nine were human-caused and one was unknown. Total known annual mortalities (natural and human-caused) averaged 0.7 per year for this 17-year period. The number of undetected, unreported grizzly bear mortalities are not known in any year.

In 2002, four human-caused grizzly bear mortalities occurred but were not detected until 2003 (Kasworm et al. 2004). A female grizzly bear known to have three cubs was illegally killed on private land; another small bear carcass was found and identified through a DNA match as one of her female cubs. The other two cubs are presumed also dead according to interagency protocol for documenting mortality, which assumes that cubs who lose their mother during their first year do not survive.

The Recovery Plan uses *minimum* population estimates and six-year averages to calculate sustainable mortality rates and limits. Therefore, the limits are conservative to account for unreported unknown mortality. However, the plan cautions that demographic problems and the impacts of stochastic events can be amplified dramatically in small populations, such as the 30 to 40 grizzly bears in the CYE. As such, our current human-caused mortality goal in the CYE is zero.

The proportion of human-caused, female grizzly bear mortality is relatively high in the CYE. Since 1982, known human-caused female mortalities comprised 48 percent (10 of 21) of the total known, human-caused mortality. If we assume one of the two cubs of unknown sex killed in 2002 was female, then female mortality is 52 percent of total known, human-caused mortality (11 of 21 known mortalities).

The Recovery Plan limit for 2005 on *total* known human-caused mortality was 0.9 grizzly bears averaged over six years, compared to the known average of 1.8 from 2000 through 2005 (see Table A5). The Recovery Plan limit on *female* known human-caused mortality is 30 percent of the total. Thus, for 2005, the Recovery Plan limit on female mortality was 0.3 averaged over six years, compared to the actual known six-year average of 1.5 females. This number exceeded the Recovery Plan limit. The population has not yet attained annual Recovery Plan criteria for females with cubs, distribution of females with young, or female mortality limits.

Female survival is the most important element for recovery of the CYE grizzly bear population (USDI 1993a). Grizzly bear population growth and recovery are closely correlated with the number and survivorship of adult female bears. Extinction may be imminent for grizzly bears in the CYE if human-caused mortality results in a significant loss of adult and subadult females. Loss can be manifested through direct mortality or indirectly due to displacement if females fail to secure the food resources needed to support reproduction. Females and cubs are also vulnerable to natural mortality, such as predation by larger males; in the CYE in 1999, an older female and her two cubs were killed by another grizzly bear.

Populations with fewer than 50 to 100 adults are at high risk of extinction (ICUN 2003). Proctor et al. (2004) modeled a grizzly bear population of 50 adults using vital and mortality rates similar to those of CYE grizzly bears, as estimated by Wakkinen and Kasworm (2004). Results suggested that such a population would have an 85 percent probability of extinction within 100 years. Proctor et al. (2004) concluded the following combination of actions was necessary to reduce the likelihood of extinction to acceptable levels over the short term and the long term:

- population augmentation;
- enhancement and re-establishment of population interchange; and
- reduction of human-caused mortality.

Recently, Montana Fish, Wildlife, and Parks began a grizzly bear population augmentation program in the Cabinet Mountains, in cooperation with the Forest and the Service. In 2005, the State stated its intention to augment one to two female grizzly bears into the Cabinet Mountains each year (Montana Fish, Wildlife, and Parks, in litt. 2005). The preferred alternative in the Montana Fish, Wildlife, and Parks Grizzly Bear Management Plan for Western Montana, DEIS, 2006-2016 (2006), is to relocate 10 to 15 sub-adult male or female, or appropriate adult females, from other areas within the next 3 to 5 years. It further stated that at present time, the emphasis for augmentation would be on females because it is believed there are still sufficient males within the CYE area to support recovery. Accordingly, in October, 2005, a seven year-old female grizzly bear was relocated into the Cabinet Mountains from the NCDE. In August, 2006, a subadult female was relocated into the Cabinet Mountains from the NCDE. According to an agreement with Montana Fish, Wildlife and Parks, the Service will monitor all bears augmented into the Cabinet Mountains, dependent upon funding, as part of an ongoing monitoring and research effort. Funding for this monitoring effort is dependent upon available agency funding.

Small isolated populations are theoretically at risk of negative effects due to inbreeding. Maintaining occasional genetic interchange between grizzly bears in Canada and bears in the United States would benefit the CYE population as would connections with the Selkirks and NCDE populations. At this time, interchange probably occurs between Canada and the United States (Proctor et al. 2004). A recent map of grizzly bear distribution indicates grizzly bear occurrences between the northwest NCDE and the CYE (USDA et al. 2002). A research and monitoring effort is underway to determine whether grizzly bears have moved between the NCDE and the Yaak area of the CYE (C. Servheen, pers. comm. 2005). This project will look at the relatedness of these two populations and the origins of any grizzly bears found between the two recovery zones.

At this time, the Cabinet Mountains grizzly bear population segment is probably isolated from that in the Yaak portion of the CYE (Mattson and Merrill 2004; Proctor et al. 2004). Augmentation of the Cabinet Mountains segment will aid in alleviating the isolation by increasing density and population pressures within that portion of the CYE. However, interchange of bears is ultimately dependent on creating and/or maintaining effective habitat linkage zones between the Yaak and the Cabinet Mountains. The State's plan to augment the Cabinet Mountains (Montana Fish, Wildlife and Parks in litt. 2005 and 2006a) would also assist in maintaining the genetic health of the population. Studies demonstrate that inbreeding depression can be reversed through augmentation (Hedrick 1995 and 2001; Keller and Waller 2002).

Habitat factors affecting the CYE grizzly bear population

A number of factors influence the quality and availability of habitat for grizzly bears in the CYE. The Forest uses several habitat measures to assess the condition of grizzly bear habitat. Here we summarize two primary factors that influence, account for, and/or moderate the majority of

human impacts on grizzly bear habitat: habitat effectiveness and access management. This section also summarizes other primary habitat factors influencing the CYE grizzly bear population.

Habitat effectiveness in the CYE Habitat effectiveness is defined as the amount of secure grizzly bear habitat remaining within BMUs after area disturbed by open roads and major activities such as timber harvest and mines, is subtracted from the total habitat in a BMU (BA). The acres actually impacted, along with a zone of influence surrounding them, are included in the calculation. The areas affected by roads and major activities are considered as having less than expected use by grizzly bears.

The CYE is divided into 22 BMUs. The Forest manages all of 15 BMUs and shares management of two more BMUs with the Pan Handle National Forest. The Pan Handle National Forest manages four BMUs. The Lolo National Forest manages BMU 22.

Prior to 2004, the Forest Plan included a standard of 70 percent or more habitat effectiveness in a BMU as adequate for bear security. The BMUs on the Forest are approximately 100 square miles. The Pan Handle and Lolo National Forests use a similar 70-square mile habitat effectiveness threshold for bear security. Since the 2004 Forest Plan amendment no longer requires habitat effectiveness on the Kootenai Forest, the last time the Forest analyzed habitat effectiveness was in 2003. Although no longer a Forest Plan standard, habitat effectiveness values are informative. In 2003 the Forest provided relatively high habitat effectiveness across the landscape. In 2003, 76 percent (13 of 17) of CYE BMUs on the Forest portion of the CYE provided 70 percent habitat effectiveness or more (USDA in litt. 2003). The remaining 4 BMUs provided 60, 65, 65, and 60 percent habitat effectiveness. In BMUs not currently meeting the 70 percent, highways, county roads, private roads and Forest roads required for private land access accounted for, at least in part, not meeting the standard. The BMU 22 is managed by the Lolo National Forest and provided 71 percent habitat effectiveness in 2003, and will likely improve as a result of a recent Forest Service project decision (Dave Wroblewski, Lolo National Forest, pers. comm. 2005).

Motorized access management in the CYE Wakkinen and Kasworm (1997) used the analysis techniques recommended by the IGBC (IGBC 1994) to analyze the average multi-year home ranges of six female bears in the CYE and Selkirk ecosystems. The IGBC (1994 and 1998) recommended ecosystem-specific data for open and total motorized route density and core area be used to limit motorized access in grizzly bear habitat. The CYE research documented:

- total motorized route densities of greater than two miles per square mile averaged 26 percent of a female home range;
- open motorized route densities of greater than one mile per square mile averaged 33 percent of a female home range; and
- a female home range averaged 55 percent core area (area further than 500 meters from motorized access routes or high-use nonmotorized trails).

The results may indicate that grizzly bears in the CYE have adapted to these road densities, or may be partially an artifact of the existing road densities in the CYE. In any case, the data used

in the analysis was collected from female grizzly bears that were successful in surviving to adulthood and producing cubs in the CYE and Selkirk's roaded environment. In 2004, the Forest amended its Forest Plan, using the parameters above to develop site specific BMU access standards (USDA 2004).

All 22 BMUs in the CYE have specific Forest Plan standards for open motorized route density limits. Forest Plan standards for each BMU, along with current open motorized route density, total motorized route density, and core area percentage within all CYE BMUs are displayed in Appendix D.

The 2004 Forest Plan amendment required 15 of 22 BMUs (68 percent) Forest-wide to have open motorized route densities of greater than 1 mile per square mile limited to no more than 33 percent of the BMU (the average female home range open motorized route density) (see Appendix D). Currently, 17 of 22 BMUs meet the Forest Plan amendment standards or provide better conditions for grizzly bears. Of the five BMUs that do not meet standards, four have open motorized route densities exceeding one mile per square mile in 34 to 39 percent of area, the remaining BMU has 59 percent.

Similarly, the amendment required 17 of 22 BMUs (77 percent) Forest-wide have total motorized route densities of greater than 2 miles per square mile limited to no more than 26 percent of the BMU (the average female home range total road density) (see Appendix D). Currently, 15 BMUs (68 percent) meet or provide better conditions than the Forest plan standard. The seven remaining BMUs (32 percent) exceed the amendment limits. Road densities in most BMUs have decreased since 1995. The amendment includes a schedule for reductions in open and total road densities.

The amendment requires that 20 of 22 BMUs (91 percent) reach at least 55 percent core area or more (the average female home range core size) (see Appendix D). The amendment will eventually result in increasing core habitat within the CYE by 11,170 acres to 943,513 acres (or about 57 percent of the CYE). Currently, 12 of 22 BMUs (55 percent) in the CYE meet Forest Plan standards for area for core area. Nine BMUs (41 percent) fall below 55 core, but 7 of these provide between 49 to 54 percent core. Since 1995, core area has increased in at least 13 of 17 of the BMUs wholly managed by the Forest. Improvements have occurred slowly. The nine BMUs managed by solely the Forest and in the Cabinet portion of the CYE (BMUs 1, 2, 3, 4, 5, 6, 7, and 8) provide from 54 to 85 percent core area.

From 1995 until the Forest Plan was amended in 2004, the Forest adhered to no net increase in open road density or total motorized route density and no net loss of core areas within BMUs. Since 1995, baseline access management conditions generally improved across the Forest. However, as described above, several BMUs have open and/or total motorized route densities exceeding the amended Forest Plan standards (Appendix D). The Forest Plan amendment provides a schedule for access changes to gradually improve and meet the Forest Plan standards.

Private forest management activities occur within the CYE. Plum Creek Timber Company is the primary private forest manager in the CYE. The Forest routinely requests consultation on activities on Plum Creek land that involve Forest roads or other permits. Activities on Plum

Creek lands that are solely on Plum Creek land, but occur within MS-1 habitat, are conducted according to Plum Creek grizzly bear habitat standards which involve a linear open road density standard of 1 mile per square mile, maintenance of cover for bears, and protection of seasonal habitats (USDI 2000c; Brian Gilbert, Plum Creek Timber Company, pers. comm. 2000). The open motorized route density, total motorized route density and core areas reported in Appendix D includes all lands in the BMUs. Thus, data presented in Appendix D includes Plum Creek roads to the extent the Forest and Plum Creek have been able to share this information.

Other factors affecting grizzly bear habitat The CYE is long and narrow (see Figure A2). An area of predominantly private land of mixed ownerships, approximately 22 miles long and up to 5 miles wide, occurs near the middle of the recovery zone. It includes the town site of Troy, the Kootenai River corridor just east and west of Troy and the private lands along the Highway 56 corridor. This area is classified as MS-3 habitat, or habitat with permanent human developments where grizzly bear use is discouraged. In the event of human-bear conflicts, the conflicts are resolved in favor of humans. This area encompasses primarily low elevation spring habitat rendered mostly unsuitable for grizzly bears as a result of the high density of people. As grizzly bear numbers slowly increase in the ecosystem, the area presents a higher risk of grizzly bear mortality due to potential human-bear conflicts. Risks to grizzly bears increase as concentrations of residences, roads, unsecured human-food attractants such as garbage cans, dumpsters, and pet foods, hunting and other recreation increase in and around this area. It also presents an area that likely displaces some bears, particularly some females and females with cubs, away from low-elevation that might contain high quality spring habitat.

Potential isolation from grizzly bears in the Canada portion of the greater CYE is identified as a potential threat to grizzly bears in the U.S. portion of the ecosystem. Conditions in Canada and along the international boundary currently allow movement of grizzly bears between Canada and the Yaak portion of the CYE, but grizzly bear habitat is being impacted by highways and associated development in Canada. Research has documented the impacts of highways on wildlife populations. Highways affect wildlife by increasing mortality and reducing movements and ultimately landscape connectivity (Chruszcz et al. 2003). Highway corridors, with commonly associated railroads and human settlement, may result in significant fragmentation of grizzly bear habitat. Recent studies on habitat connectivity and fragmentation indicate that traffic volumes on roads influence both grizzly bear use of habitat near roads and whether grizzly bears cross roads. Waller and Servheen (2005) found that 52 percent of the grizzly bears they sampled crossed U.S. Highway 2, in Montana south of Glacier Park, at least once during the study. However, crossing frequency was negatively related to highway traffic volume, with grizzly bears crossing mostly at night when traffic volumes were low (10 vehicles per hour). Grizzly bears also strongly avoided areas within 500 meters of the highway. In Banff National Park and surrounding parklands, Chruszcz et al. (2003) concluded that two patterns emerged from their study of grizzly bear movements in relation to highway traffic volumes: the avoidance of high-volume roads in a major transportation corridor (11 of 74 grizzly bear crossed the Trans-Canada Highway during 12 years of research) and the importance of high-quality habitat in determining grizzly bear movements relative to roads. In this protected area, grizzly bears were more likely to cross high-volume highways when moving from areas with low habitat values to areas of high habitat values.

Proctor (Proctor et al. 2005; 2003 *in* Proctor et al. 2004) found that the southern tip of the occupied habitat in the Purcell-Yaak area appeared to have limited female connectivity with adjacent areas across Highway 3 (in British Columbia), potentially creating a small female island population. Further to the south, the U.S. Highway 2 corridor (in Montana) runs east-west across the CYE, and includes a major state highway, railroad, the Kootenai River, and private land development and roads. The corridor bisects the CYE between the Yaak and Cabinet Mountains portions. The Service has no information documenting movement of grizzly bears between the Yaak and Cabinet Mountains; grizzly bears in the Cabinets are likely isolated from the Yaak segment and the Selkirk grizzly bear population at this time (Proctor et al. 2004). With increasing human populations, the Highway 2 corridor could be or may eventually become a significant barrier to grizzly bears attempting to move between the Yaak and Cabinet Mountains. One model influenced by habitat capability (for grizzly bears) and human population size depicted the CYE as having grizzly bear source area consisting of two patches separated by Highway 2 (Mattson and Merrill 2004). An increasing human population and higher grizzly bear mortality rates would further reduce the size of the source areas. A total barrier to movement would present a substantive impediment to grizzly bear recovery in the CYE, affecting the distribution and demographic and genetic health of CYE grizzly bears. Impacts would especially affect those grizzly bears in the Cabinet Mountains, as connectivity with grizzly bear population in the Yaak and Canada would essentially be severed. Further, the small number of grizzly bears in the Cabinet Mountains amplifies the demographic and genetic concerns related to such a barrier. An ongoing research project is documenting movement of bears across this corridor, using black bears (Kasworm et al. 2005), in order to identify existing areas with potential for linkage. Improving connectivity between the Yaak and Cabinet Mountains' portions of the CYE is a primary recovery goal (C. Servheen, pers. comm. 2005).

The Genesis Troy copper/silver mine occurs in BMU 3. The mine had been in operation from 1981 to 1993 and affects approximately 50 acres of disturbed area at the mine site on national forest system lands and an additional 400 acres of private lands. The mine is located approximately 15 miles south of Troy, Montana. This underground silver-copper mine was originally owned and operated by ASARCO (1979-1999), employing approximately 350 people. The mine was operated by Asarco from 1981 until 1993, when it shut down due to metal prices. The mine and permit were acquired by Revett Silver Company in 1999 and is operated by Genesis Inc., a wholly owned subsidiary of Revett Silver Company. It was reopened for production by Revett/Genesis in 2004 and currently employs approximately 150 employees (Revett, pers. comm. 2006). Production is approximately 4000 tons of ore per day with possible expectations of increasing production to 6500 tons per day. One to two trucks per day haul the ore concentrate from the mine to the railroad loading facility in Libby, Montana. The expected remaining mine life is 3 to 5 years. A revised reclamation plan is being updated and incorporated into the over-all Plan of Operations. In addition, the Forest re-consulted with the Service regarding the bull trout and possible changed conditions for grizzly bears. Impacts from past activities at the Troy mine are not known to have impacted bears in the southern portion of the CYE. No human-caused mortality of grizzly bears as result of past mine operations has been documented. Potential impacts during additional operation would have been primarily associated with additional workers living in the area. However, most of these employees were hired from the local area and many would also work at the Rock Creek Mine. A large ingress of people into the area associated with the Troy Mine in addition to that associated with the Rock

Creek mine was not expected and did not occur (J. McKay, pers. comm. 2005). Revett intends to finish work at the Troy Mine unit while the permitting, evaluation adits and development adits are completed at the Rock Creek Mine.

Several small patented mining properties (approximately 19, based on Figure A and B in 1998 BA, Appendix 10; J. McKay, pers. comm. 2003) occur along the borders of the Cabinet Mountains Wilderness. Large scale mineral development is unlikely on many of these small patents (J. McKay, pers. comm. 2000) due to the size of the patents and the nature of the mineral deposits. However, as patented (private) land inholdings, these scattered small parcels increase the risk of adverse grizzly bear-human interactions due to increased potential for contact with people, food and other attractants. Potential uses of these private lands include timber harvest, residences, cabins or other facilities, and hunting camps. All properties can legally be accessed by foot or horseback, and some have motorized access rights.

The Bull Lake Estates subdivision occurs in BMU 3. The Forest requested consultation on issuance of an access permit across national forest lands to access the subdivision. The Service issued a biological opinion and an incidental take statement on the project in 2000 (USDI 2000a). In 2002, the Service issued a biological opinion and an incidental take statement on the State Highway 1 project in eastern Idaho, between the Yaak portion of the CYE and the Selkirk ecosystem (USDI 2002). Incidental take statements in each of the biological opinions reduce the impacts of anticipated take on the species. Neither of these actions has of yet resulted in incidental take.

Status of grizzly bears in the YGBE, NCDE and Selkirk Ecosystem

In the YGBE, Recovery Plan parameters are generally positive and most recovery criteria have been met in recent years. In the fall of 2005, the Service published a draft rule proposing to delist the proposed distinct population segment (DPS) of grizzly bears in the YGBE (70 FR 69854). The best information suggests the YGBE grizzly bear population is stable to increasing. The long-term conservation of the proposed DPS continues to depend largely on managing conflict between grizzly bears and people.

In the NCDE, results from monitoring grizzly bears from 1987 through 1996 indicate the Recovery Plan criteria for several population recovery parameters were met, including: (1) numbers of females with cubs, (2) numbers of BMUs with family groups, (3) occupancy requirements for BMUs, and (4) total human-caused grizzly bear mortality. Female grizzly bear mortality exceeded recovery criteria limits through 1993, and again from 1997 through 2005 (C. Servheen in litt. 2006). Grizzly bear population estimates based on DNA-hair snag research in the NCDE are expected in 2007 (Katherine Kendall, U.S. Geological Survey, pers. comm.: oral presentation to the NCDE Subcommittee, spring meeting, 2006). Preliminary analysis of the results identified 486 individual grizzly bears, with about 80 percent of the sample analyzed.

The Selkirk Ecosystem grizzly bear population has not met Recovery Plan objectives (Wakkinen and Johnson 2005). The Selkirk Ecosystem Recovery Plan criteria requires observation of at least six distinct females with cubs (over a 6-year average) for recovery. The 2004 status is 1.2 distinct females with cubs over a 6-year average. The Recovery Plan human-caused annual

mortality limit (averaged over a 6-year period) for the ecosystem is no more than 0.2 bears, but the 6-year average for 2004 was 2.5 bears. The human-caused female mortality limit is 0.1 bears measured over 6 years, but in 2004 the average over the past 6 years was 0.8 females. The Recovery Plan calls for 7 of 10 BMUs be occupied by females with young over a 6-year period, but only 4 BMUs were occupied at least once in the period from 2000 through 2004 (Wakkinen and Johnson 2005).

ENVIRONMENTAL BASELINE

Under the provisions of section 7 (a)(2) of the Endangered Species Act, the Service is required to consider the environmental baseline when considering the "effects of the action" on listed species. The environmental baseline includes the past and present impacts of federal, state, or private actions and other human activities in the action area (50 CFR 404.02). The baseline analysis is a snapshot of the health of the species and habitat at a specified point in time.

The "action area" is defined as all the areas to be affected directly or indirectly by the Federal action, not merely the immediate area involved in the action (50 CFR 402.02). The action area for the analysis of effects of the Rock Creek Mine on grizzly bears includes the southern portion of the Cabinet Mountains in the CYE: BMUs 4, 5 and 6, where direct and indirect effects may occur, and surrounding BMUs 2, 7, 8 and 22 where indirect effects related to habitat fragmentation and mortality would likely affect grizzly bears (Figure 3). On the national forest, eight BMUs in the Cabinet Mountains portion of the ecosystem occur north and outside of the action area (BMUs 1, 3, 9, 10, 18, 19, 10, and 21). Private lands adjoining the recovery zone that would be directly or indirectly affected by the proposed mine are also considered part of the action area. Included are the 342 acres of private land that would be developed for the mine, as well as the area where most of the employees and others associated with the mine would settle. This area includes the Clark Fork Valley from Clark Fork, Idaho to Thompson Falls, Montana, and the Lake Creek drainage and the community of Troy.

Status Of Grizzly Bears In The Action Area

The Rock Creek Mine site would border the southwest edge of the CYE. Much of the impact would occur on private patented land on the edge or outside of the grizzly bear recovery zone. The southwest edge of the project area is approximately 1 air mile east of Noxon, Montana. Surface activities are planned along approximately 3 miles of Rock Creek and up the West Fork of Rock Creek.

Kasworm and Manley (1988) estimated the entire Cabinet Mountains section of the CYE supported a population of 15 or fewer grizzly bears. This estimate has not changed since 1988. Three grizzly bears were trapped during 1983 to 2001 in the Cabinet Mountains, requiring an average of 1768 trap nights expended per individual captured (Kasworm et al. 2002). This compares to 25 grizzly bears captured in the Yaak portion from 1986 to 2001 with an average of 210 trap nights per bear captured. These data support the premise that relatively few grizzly bears live in the Cabinet Mountains portion of the CYE.

It is not known how many grizzly bears inhabit the action area. Grizzly bear home ranges are large; average life home ranges reported in the CYE were 1294 square kilometers for males (500 square miles) and 667 square kilometers for females (258 square miles)(Kasworm et al. 2002). Kasworm and Manley (1988) documented grizzly bear use of the action area. Kasworm et al. (2005) reported 42 credible sightings of grizzly bears in the CYE in 2004, and 35 credible sightings in 2005 (Kasworm et. al. in litt. 2006) (Appendix C). In the Cabinet Mountains during 2004 alone, 16 sightings were distributed among the Cabinet Mountains BMUs 2, 5, 6, 18, 19, and 20; in 2005, 16 sightings were distributed among the Cabinet Mountains BMUs 3, 4, 5, 6 and 20. Based on these sightings and the large home range sizes, we assume the entire action area is occupied by grizzly bears.

Females with young have been documented in five of 14 BMUs in the Cabinet portion of the CYE, including action area BMUs 2, 5, 6, and to the north, in 18 and 21 (outside the action area), at least once each during the past 6 years (Kasworm et al. 2005) (see Appendix C: Figure 4). In 2004, one credible sighting of a female with cubs was reported in BMU 5; ten credible sightings of female with young (yearlings and two-year olds) occurred in BMUs 2, 5, and 6. In 2005, seven credible sightings of females with young were reported in BMUs 5 and 6 in 2005 (Kasworm et al. in litt. 2006a). These sighting of females in action area BMUs as well as in BMU 21 were indicative of recent reproduction in the Cabinet Mountains.

Based on female with young sighting data, at least one and possibly 2 reproductive-aged females appear to be using BMUs 4, 5 and 6. Sightings of females with young were reported in these BMUs in 1996, 1997, and 2000 (Kasworm et al. 2002). The proximity of the BMUs, the number of young present, and whether these young were cubs or yearlings/two-year-olds in the 1996 and 1997 suggests that there were at least two reproductive age females present. The 2000 data may be a sighting of one of the same females with a succeeding litter, and therefore cannot be identified as a third female. No sightings of females with young were received from the Cabinet Mountains during 2001 and one credible sighting of a female with 3 cubs occurred in BMU 2 during 2002 (Kasworm et al. 2005). During 2003, the Service received nine credible sightings of females with cubs or yearlings or two-year-olds in BMUs 2, 5, and 6 (Kasworm et al. 2005; W. Kasworm, pers. comm. 2005). These sightings appear to originate from at least two different adult females, one with cubs and one with yearlings or two-year-olds. Outside the action area, sightings also occurred in BMUs 18 (female with a cub) and BMU 21 (female with a yearling or two-year-old). Based on distance from other sightings and numbers or age of young, these would appear to represent two additional adult females. During 2004, the Service received seven credible sightings of females with cubs or yearlings or two-year-olds in BMUs 2, 5, and 6. These sightings appear to originate from at least three different adult females, one with cubs, one with two yearlings or two-year-olds, and one with three two-year-olds (Kasworm et al. 2005; W. Kasworm, pers. comm. 2005). Sighting data from 2005 has not been fully analyzed at this time.

Based on the population estimate of 15 or fewer grizzly bears in the Cabinet Mountains, a significant proportion of the adult females in the Cabinet Mountains may reside in the action area. For instance, if we conservatively assume 10 grizzly bears reside in the Cabinet Mountains, about three of those grizzly bears would be reproductive-aged females, based on assumption that 0.28 of a grizzly population would be adult females (based on Knight et al. 1988 and Knight et al.1993 as cited *in* USDI 1993a). If we assume that 15 grizzly bears occur in the

Cabinets, about five would be adult females. As discussed above, two or perhaps three of these females may have home ranges within the action area.

Although there are insufficient data to change the estimate of 15 or fewer bears in the Cabinet Mountains section of the CYE, the consistent sightings of individuals, females with cubs or young, and the augmentation of bears to the CYE are positive indicators, as are 2004 and 2005 sightings that document reproduction in the Cabinet Mountains. About 15 to 20 grizzly bear observations have been recorded across the Clark Fork River to the south east of the project area and recovery zone (W. Kasworm, pers. comm. 2000). These are individual observations, and do not necessarily represent 15 to 20 different bears. The observations do however indicate occupancy south of the recovery zone.

During 1990 through 1994, four female grizzly bears were released during an experimental program designed to test grizzly bear population augmentation techniques (Kasworm et al. 1998, Servheen et al. 1995). All bears came from the North Fork of the Flathead River in British Columbia and had no history of conflict. Three of the four were monitored in the Cabinet Mountains for one year or more. One of these animals died after producing a cub a year after release. The cub is also presumed dead. Cause of death was unknown, but not believed to be human-caused. A fourth bear left the area, but was recaptured and released in the Cabinet Mountains. The radio signal from that animal was lost about a month later and her fate is unknown. However, hair snagging techniques and DNA analysis confirmed the presence of at least one of the transplanted bears remaining in the Cabinet Mountains during 2004 (Kasworm et al. In prep.). The grizzly bear identified was transplanted in 1993 as a two-year-old. Genetic analysis has confirmed the presence of 3 offspring from the original 1993 transplant and furthermore, that those offspring have also reproduced.

In 2005, Montana Fish, Wildlife, and Parks announced their plans to continue with an augmentation plan in the Cabinet Mountains (Montana Fish, Wildlife, and Parks in litt. 2005). They plan to augment the Cabinet Mountains with one to two female grizzly bears per year. Montana Fish, Wildlife, and Parks first recommended augmentation in *The Grizzly Bear in Northwestern Montana* (Montana Fish, Wildlife and Parks 1986). In 2006, the DEIS for the Montana Fish, Wildlife and Parks Grizzly Bear Management Plan for Western Montana, 2006-2016, detailed support for original 1986 recommendations. The DEIS preferred alternative is to relocate 10 to 15 subadult male or female, or appropriate adult females, to the CYE within the next 3 to 5 years, with initial emphasis on relocating females. Accordingly, in October of 2005, a seven year-old female was captured in the NCDE and relocated into the Cabinet Mountains. Recent telemetry data indicated that she had denned not far from her release site. She emerged from her den this spring and remained in or near the release area (W. Kasworm, pers. comm. 2006). In August of 2006, a two to three-year-old female was captured in the NCDE and relocated into the Cabinet Mountains (Montana Fish, Wildlife and Parks, in litt. 2006b).

Given the status of the CYE grizzly bears, an aggressive augmentation effort is warranted. Population simulations in Proctor et al. (2004) indicated that augmentation of female bears had the most positive effect on population growth in the short-term. Proctor et al. (2004) recommended placing 12 sub-adult female grizzly bears into the Cabinet Mountains between 2004 and 2010. Additional population simulations using data from the CYE grizzly bear

population indicate that under two different improved survival scenarios, 12 to 24 female grizzly bears augmented into the Cabinet Mountains would produce a stable population trend (Kasworm et al. 2006b). The authors indicated that the survival scenarios appear attainable based on other studies of similar bear populations, and that improvements in survival rates can occur from a variety of efforts designed to reduce human caused mortality (e.g. information, attractant storage, enforcement, habitat security, etc.). Given Montana Fish, Wildlife and Parks commitment to augmenting this population with at least one to two female grizzly bears per year, and depending whether the survival scenarios are achieved through mortality control measures, we would expect that the CYE grizzly bear population would achieve stability within 6 to 24 years. On average, if 1.5 bears were relocated per year, the population could reasonably be expected to stabilize within approximately 16 years. If more females were relocated and/or human-caused mortality rates lowered, the population would stabilize sooner.

Factors Affecting The Species Environmental Baseline In The Action Area

The first discussion in this section analyzes and describes the environmental baseline in the action area as compared to numerous Forest grizzly bear habitat standards. The second section focuses on other factors affecting grizzly bears in the action area.

Habitat management

Roads providing human access into grizzly bear habitat are widely recognized as having the potential to adversely impact grizzly bears. Forest Plan standards address the impacts of roads on grizzly bears and consider standard forestry activities as well: timber harvest, road building and maintenance, recreation, and special forest products. This section uses Forest Plan standards applicable to this proposed action to assess the condition of the environmental baseline.

The first part of this section includes a discussion of various measures of grizzly habitat condition as measured by Forest Plan criteria. In the 2003 biological opinion, the environmental baseline for the proposed action was described in relation to the Forest Plan standards at that time, including habitat effectiveness and linear road densities. The 2004 amendment to the Forest Plan replaced previous access management standards and assessment criteria with BMU-specific access standards, in accordance with IGBC recommendations (IGBC 1994 and 1998). Forest Plan standards and 2005 road densities and core area for all CYE BMUs are displayed in Appendix D. We report habitat condition in these terms below. Habitat effectiveness values and some BAA (bear analysis area)-scale values originally calculated for the proposed action remain biologically informative as well, and therefore are summarized here as well.

Habitat effectiveness *Prior to the 2004 access amendment, the Forest Plan included a standard requiring 70 percent or more of secure habitat (habitat effectiveness) within a BMU as a measurement of the cumulative effects of activities.*

Habitat effectiveness is the percent of “secure” habitat remaining within a BMU after the area disturbed by major activities and the zone of influence around the activities is subtracted. The zone of influence is generally 0.25 mile or greater around features such as open roads, or major activities such as timber harvest areas, local disturbances, and developed areas such as MS-3

lands. The influence zone represents the distance within which bears are assumed to be affected or displaced by the given activity. Habitat use by grizzly bears or habitat effectiveness is reduced by human activities, according to the cumulative effects model (Christenson and Madel 1982).

Habitat effectiveness was introduced in a cumulative effects model (Christenson and Madel 1982) and was used as a standard in the Forest Plan, until the 2004 Forest Plan amendment. Habitat effectiveness provides a measure of bear security within each BMU, but does not address habitat quality or the distribution of ongoing actions. Core area is a similar concept. However, habitat effectiveness is influenced only by major activities and open roads and their buffers, but not closed or restricted road influences. Core area is free of motorized use of roads, motorized use of restricted roads or trails, high use non-motorized trails, and buffers around each. Core areas must remain in place for a minimum of 10 years.

Habitat effectiveness was last measured in 2003 (Table A7). Habitat effectiveness has remained the same, or changed only slightly since then in BMUs in the action area (W. Johnson, Kootenai National Forest, pers. comm. 2005), so we report it here. Of the three BMUs directly affected by Rock Creek, two were below habitat effectiveness standard of 70 percent in 2003, although improvements occurred since 1998 (Table A7). The low habitat effectiveness in BMU 4 is due in part to the major highways (Highways 200 and 56) that border or bisect the BMU. In BMU 6, habitat effectiveness is reduced by access to private timber lands intermingled with Forest lands in this BMU. Therefore, even lacking ongoing projects, these two BMUs would likely have never met the Forest Plan standard of 70 percent. However, BMU 6 is within one percent of meeting the standard. The BMUs 2, 5, 7, 8 and 22 met the standard. Over the entire action area, habitat effectiveness is about 73 percent.

Table A7. Habitat Effectiveness in BMUs associated with the proposed Rock Creek Mine, per year. Shaded BMUs provide 70 percent or more habitat effectiveness (from USDA 2002b and USDA 2003).

BMU	1995	1996	1997	1998	1999	2000	2001	2003
2	85	85	85	83	85	84	83	83
4	63	63	62	62	62	65	65	65
5	74	73	74	75	74	75	75	75
6	72	66	66	68	67	69	69	69
7	82	82	81	81	79	80	80	80
8	74	77	77	77	73	77	77	70
22					70	71	68	71 ¹

¹Dave Wroblewski, Lolo National Forest, pers. comm. 2003)

Open motorized route density *In 2004, the Forest Plan was amended to include BMU-specific standards for open motorized access route densities (Appendix D) in accordance with IGBC recommendations (IGBC 1994 and 1998). These standards replaced previous standards for linear road miles. Thirty-three percent of an average female home range exceeded one mile*

per square mile open motorized route density (Wakkinen and Kasworm 1997). In the following paragraphs, we compare the existing conditions to Forest Plan standards and to the average female home range characteristics reported in Wakkinen and Kasworm (1997).

Wakkinen and Kasworm (1997) used a moving windows analysis to document the relative proportions of open and total road densities and core area with female home ranges in the CYE and Selkirk Ecosystem. This research provided biological information on grizzly bears in the CYE that could be used to analyze BMU motorized access conditions, and develop standards to limit access to levels that were conducive to grizzly bear recovery. Thirty-three percent of an average female grizzly bear home range had open motorized route density greater than 1 mile per square mile, 26 percent of an average home range had total motorized route density greater than 2 miles per square mile, and 55 percent was core area. Some grizzly bears indicated a higher or lower tolerance for roads in their home range.

Five of the seven BMUs in the action area meet open motorized route density standards or provide better access conditions (lower open motorized route densities) than the Plan requires (Table 8; Appendix D). Table A8 compares the existing condition to the research information and the Forest Plan standards. The Forest Plan includes a time frame/schedule within which all BMUs will eventually reach standards.

Habitat conditions as affected by open motorized route density have improved over the past eight years (Table A8). The open motorized route densities in BMUs within the action area have all declined slightly. Only two exceed Forest Plan standards and the open road density levels in average female home range: BMU 22 contains 23 sections of private corporate timber lands (Dave Wroblewski, Lolo National Forest, pers. comm. 2003) and road densities in BMU 4 are elevated by Highways 200 and 56.

Table A8. Percent of BMUs with open motorized route density greater than 1 mile per square mile, per year, compared to amended Forest Plan standards (FP). Shading indicates BMUs that currently meet the density of average female home range*, and bolding meets FP standards.(from USDA 2002b and USDA in litt. 2006).						
BMU	1997	1998	1999	2000	2001	2005 (FP)
2		29	18	17	17	19 (20)
4		39	36	36	36	37 (36)
5	29	29	28	27	27	27 (30)
6	37	37	39	34	34	34 (34)
7	27	27	23	23	23	24 (26)
8	39	32	31	32	32	32 (32)
22	41	41		37	38	38 (33)
* For comparison, 33 percent of an average female home range exceeded 1 mile per square mile open motorized route density (Wakkinen and Kasworm 1997).						

Open motorized route densities are moderate within the action area and provide adequate to favorable conditions for use by grizzly bears. Five of the seven BMUs within the action area have open road densities comparable to or better than conditions in the average female home range as reported in research. (Wakkinen and Kasworm 1997).

Total motorized route density *In 2004, the Forest Plan was amended to include BMU-specific standards for total motorized access route densities. Twenty-six percent of an average female home range exceeded 2 miles per square mile total motorized route density (Wakkinen and Kasworm 1997).*

Four of seven BMUs in the action area meet the Forest Plan standard for total motorized route density or provide better access conditions (lower total motorized route densities) than the Plan requires (Table A9). The Forest Plan includes a time frame/schedule within which all BMUs will eventually reach standards.

The total motorized route densities in BMUs within the action area have declined slightly or remained stable since 2001. The BMUs 6 and 22 contain high proportions of private corporate timber lands that increase road densities, 6 and 23 sections respectively (W. Johnson, pers. comm. 2003 and D. Wroblewski, pers. comm. 2003).

Total motorized route densities are moderate within the action area and provide adequate to favorable conditions for grizzly bears. Five of the seven BMUs within the action area have total road densities comparable to or better than the conditions in the average female home range as reported in research (Wakkinen and Kasworm 1997).

Table A9. Percent of BMUs with total motorized route density exceeding 2 miles per square mile, per year, compared to amended Forest Plan standards (FP). Shading indicates BMUs that currently meet the density of average female home range*, and bolding meets FP standards (from USDA 2002b and USDA in litt. 2006).						
BMU	1997	1998	1999	2000	2001	2005 (FP)
2			15	14	14	14 (18)
4		28	27	26	26	26 (26)
5	23	23	21	21	22	24 (23)
6	35	35	34	33	32	32 (32)
7	22	22	19	20	20	20 (23)
8	23	23	21	21	23	23 (20)
22	42	42		41	41	37 (35)
* For comparison, 26 percent of average female home range exceeded 2 miles per square mile total motorized route density (Wakkinen and Kasworm 1997).						

Core area *In 2004, the Forest Plan was amended to include BMU-specific standards for the amount of core area. Fifty-five percent of an average female home range was core area. (Wakkinen and Kasworm 1997).*

Four of the seven action area BMUs meet Forest Plan standards for core area or provide better conditions (larger core areas) than the Forest Plan requires (Table A10). The BMUs 5 and 6 are within one percent of meeting the standard. The seven BMUs range from 51 to 77 percent core. The Forest Plan includes a time frame/schedule within which all BMUs will eventually reach standards.

Core areas in BMUs within the action area have all increased slightly or remained relatively stable since 2001. Table A10 indicates BMUs 5 and 6 have lowered core area from 2001 and as not meeting the standard. However, this is because of road database corrections in 2006 and not to any changes on the ground (USDA in litt. 2006a). Five of the seven BMUs within the action area provide core areas equal to or larger than the average core within a female home range as reported in Wakkinen and Kasworm (1997), and BMU 6 is within one percent. The BMU 22 provides 51 percent core area, despite having approximately 23 sections of private corporate timber lands, which typically limits the amount of habitat that can be managed as grizzly bear core area (Dave Wroblewski, Lolo National Forest, pers. comm. 2003). The Forest Plan includes a time frame/schedule within which all BMUs will eventually reach standards.

A substantial amount of core area is provided within the action area, providing good conditions for grizzly bears. Six of the seven BMUs within the action area provide core areas comparable to or larger than the core area in the average female home range as reported in research (Wakkinen and Kasworm 1997).

Table A10. Percent core area in BMUs associated with the Rock Creek Mine project, per year, compared to amended Forest Plan standards (FP). Shading indicates BMUs that currently meet amount of core in an average female home range*, and bolding meets FP standards (from USDA 2002b and USDA in litt. 2006).						
BMU	1997	1998	1999	2000	2001	2005 (FP)
2			77	78	77	77 (75)
4		62	61	63	63	63 (63)
5	60	60	61	62	62	59 (60)
6	51	51	51	53	55	54 (55)
7	65	65	66	66	66	67 (63)
8	56	54	57	57	56	56 (55)
22	48	48		47	47	51 (55)

* 55 percent of an average female home range provided core habitat (Wakkinen and Kasworm 1997).

Core areas are to be designed to include the full range of seasonal habitats available in the BMU. The 1998 BA analyzed seasonal habitats within the core areas affected by the Rock Creek Mine

(see *Seasonal Habitat Protection* below). Appendix 9 of the 1998 BA displays habitat components important to grizzly bears in the project area.

Opening size *The Forest Plan standard is to design harvest units to be 40 acres or less. If exceeding 40 acres under justifiable reasons, no point in the resultant opening should be more than 600 feet from cover (maximum 1,200 feet across).*

The 1998 BA does not describe the abundance or distribution of openings in the baseline condition, but historically projects have been planned to comply with this standard and openings within the action area comply (W. Johnson, pers. comm. 2000).

Movement corridors *The Forest Plan guide is to maintain unharvested corridors at least 600-feet wide between forest openings or natural openings. Functional hiding cover has a minimum of three sight distances (after harvest), where a sight distance is the mean distance at which 90 percent of an animal is hidden from view.*

The 1998 BA does not describe the abundance or distribution of movement corridors in the baseline condition, but historically projects have been planned to comply with this guidance for grizzly bears. Adequate movement corridors occur within the action area at the current time (W. Johnson, pers. comm. 2005).

Seasonal habitat protection *The Forest Plan standard includes:*

1. *Spring habitat protection--Objective is to schedule activities within spring habitat (southerly aspects less than 5,000 feet elevation) outside spring season (April 1-June 15).*
2. *Den site protection--Objective is to allow activities within .5 mile of known currently utilized den sites only outside the denning season (November 15-April 1).*

The Service considers spring seasonal habitat components to be well-distributed but often unavailable throughout the grizzly bear recovery zone due to the presence of human developments (roads and dwelling on mostly private MS-3 lands) in low lying areas.

Spring habitat is well represented in core areas in BMU 4, 5 and 6 when compared to its availability within each BMU. Spring habitat availability in core area habitat was analyzed by affected BMU. The Forest conducted an analysis of the amount of potential spring habitat (broadly defined as less than 5,000 feet elevation with south, east, or west aspect) captured by the designated core areas within each BMU (see Table 17 in BA). The BMU 4 contains the greatest abundance of spring habitat within the core area, estimated in the 1998 BA to be 27,633 acres (56 percent of the core area compared to 34 percent of the total area of BMU 4). The BMUs 5 and 6 contain an estimated 11,329 acres (30 percent of the core area compared to 16 percent of the total area of BMU 5) and an estimated 14,781 acres (42 percent of the core area compared to 24 percent of the total area of BMU 6) of spring habitat components within the core area.

Riparian habitat and wetlands support succulent vegetation important to bears. A small wetland, classified as spring habitat, occurs on the proposed tailings impoundment site. The wetland is currently MS-3 habitat and is considered unavailable to bears due to high road densities in the

area. Several small marshy lakes occur in the wilderness area on the surface several hundred feet or more above the underground rock formation that will be mined. Although these lakes provide succulent vegetation later in the season, they are likely under snow during the spring.

Denning habitat is generally defined as above 5,200 feet in elevation on north and west aspects in the Cabinet mountains, although this information is based on a very limited sample size of denning grizzly bears (Kasworm and Thier 1994). The Rock Creek drainage contains suitable denning habitat, however none exists within the immediate Rock Creek Mine permit area (BA). A transplanted grizzly bear used one den site in the Rock Creek drainage (BA).

Huckleberry fields are important in the fall for the CYE bear population. No large huckleberry fields occur in the immediate Rock Creek Mine permit area (BA). Kasworm et al. (2000) indicated that the productivity of many of the huckleberry fields that were stimulated by fires in the early 1900s had declined under closing forest canopies.

Summary of environmental baseline access conditions: We conclude that the environmental baseline in the action area is in relatively good condition for grizzly bears related to access management. The Service considers open and total motorized route densities and core area to be important habitat condition parameters for grizzly bears. Habitat effectiveness values also provide an indication of good habitat condition. Of seven BMUs, five meet the previous Forest Plan standard of 70 percent, and all provide 65 percent habitat effectiveness or more; five of seven meet or exceed the levels of core area reported for average female home ranges in the CYE; and four have open motorized route and five have total motorized route densities at or below averages reported in CYE grizzly bear research. Grizzly bear spring habitat is present in core areas in BMUs 4, 5 and 6. An examination of trends in road development and motorized access management in the CYE and Selkirk ecosystem indicated that the number of roads closed to the public and decommissioned increased during 1975 and 2001 on national forest (Summerfield et al. 2004). Even with new construction, there were fewer open roads in 2001 than in 1987 or 1975 for the three BMUs examined.

Other factors affecting the environmental baseline in the action area

The scope, complexity, length and long-term nature of changes on the landscape resulting from the Rock Creek Mine require that additional factors beyond those addressed in the Forest Plan be considered related to the mine.

Human population The human population of Sanders County is expected to grow from 10,233 people in 1999 to 13,540 people in 2020 (NPA DATA Services, Inc. 2001 in MDEQ and USDA 2001). This 32 percent increase would be greater than the expected 26 percent Montana population increase over the same period. From 1990 to 2000, the human population in Sanders County grew by approximately 18 percent compared to 13 percent growth statewide (Montana Department of Commerce 2003). There were 3.7 people per square mile compared to 6.2 people per square mile measured statewide (U.S. Census Bureau 2003). Larger communities in Sanders County include Plains and Hot Springs outside the CYE, and Thompson Falls which is considered inside the CYE. The human population in Lincoln County to the north is projected to grow more slowly than statewide averages, increasing from 18,819 in 1999 to 21,640 people in

2020, which is a 15 percent increase (MDEQ and USDA 2001). Larger communities in Lincoln County include Troy and Libby, which are within the CYE; Libby is outside the action area. Bonner County, Idaho is expected to grow from 36,071 people in 1999 to 53,130 in 2020, a 47 percent increase.

People living in or near grizzly bear ecosystems impact bears in several ways. Human-caused grizzly bear mortality is the most serious consequence of people in bear habitat. Thirty grizzly bear mortalities were detected over the 24-year period 1982 through 2005 in the recovery zone or within 10 miles. Of these, 21 were known human-caused. Four of these 21 human-caused mortalities occurred in the action area. In the past six years alone (1999 through 2005), 12 known mortalities were caused by people living or recreating in grizzly bear habitat (see Table A6). These mortalities resulted from malicious killing, self-defense, management removal because of food-conditioning, hunter related mistaken identity, or unknown causes. In the CYE during the past, the number of grizzly bears killed by members of the public during any one year was typically one, with the exception of 1999, when two grizzly bears were killed by the public. However, in 2002 four grizzly bears were killed by people, and in 2005, three were killed by people or died due to human causes. Recently, habitat condition models predict the potential negative impact of human population increases on grizzly bear habitat in the CYE (Mattson and Merrill 2004).

Recreational use Recreational use has been increasing in the Cabinet Mountains. According to the BA (Table 6, Appendix 12) 26 percent of Forest users fish, 38 percent hunt, 49 percent visit wilderness, 53 percent hike, 98 percent drive to enjoy scenery, and about 2 percent pick berries.

Non-motorized use of the Rock Creek Trail has been steadily increasing, from an average of 0.7 people per day during the active bear season (April 1 to November 15) in 1990 to high of 1.8 people per day in 1996, a 157 percent increase. The number of parties per week also is increasing. Estimates of the number of parties per week were made during two, 3-year evaluation periods (1990 to 1992 and 1995 to 1997) using registration card data. These surveys estimated 5.7 parties per week during 1990 to 1992 and 8.2 parties per week during 1995 to 1997. High-use trails are those with more than 20 parties a week. The reported level of use from 1995 to 1997 is likely an underestimate. Actual use is typically higher due to trail use by unregistered users, ranging from 50 percent to 400 percent (BA 1998). Correcting for the actual trail use, the existing use may currently range from 10.5 to 33 parties per week (BA 1998). High-use periods are summer (generally recreational hikers) and spring/fall (hunters). The area encompassed by high-use trails and buffers must be subtracted from core area and habitat effectiveness calculations (USDA 1988).

Snowmobiles and cross country skiing With the development of more powerful snow machines and more interest in the sport, snowmobile activity has been increasing on the Forest. New technology has provided more powerful equipment that allows users to reach areas considered inaccessible in the past. The 2004 access amendment documents that snowmobile use increased thirty-six percent in the CYE over the past ten years. This activity is expected to continue to be popular and likely to increase at a faster rate. Snowmobiling is legally prohibited within wilderness areas of the affected BMUs. In BMUs 4, 5 and 6, however, only two roads

are open to snowmobile use, and they are primarily access routes to jump off points for cross country skiing into the high country on the east side of the Cabinet Mountains Wilderness.

Cross-country skiing shows the single largest increase in recreation use. The estimated increase over the past decade is 70 percent. Use is expected to almost double in the next twenty years. On the west side of the Cabinet Mountain Wilderness, the Chicago Peak road is also used by snowmobilers to reach access for cross country skiing. Two small cross country ski play areas occur in the wilderness, one on each side of Cabinet Mountain Wilderness just inside wilderness boundary. Snowmobile and cross country ski activities in BMUs 4, 5 or 6 are expected to remain relatively low due to the topography, the lack of loop roads, and lack of cirque basins that attract snowmobile users (W. Johnson, pers. com. 2002). Potential effects of snowmobiling on bears are largely limited to late spring when females emerge from dens with cubs. Cross country skiing has not been reported to cause adverse effects to grizzly bears.

Hunting The project area occurs in state hunting unit 121. Recreation analysis indicated that hunting has shown a steady increase in the general area since 1984 (BA 1998). Thirty-eight percent of the recreational users in the Forest are hunters. Hunters using horses or other pack animals have occasionally dropped animal feed, which serves as an attractant to both black and grizzly bears. Mortality due to mistaken identity is a risk to grizzly bears that can increase with the number of hunters, the number of bears and the degree of attractants. Montana has implemented a public education program to teach hunters to differentiate grizzly bears from black bears and how to handle attractants in the backcountry. Effort were expanded in 2001 (Montana Fish, Wildlife and Parks 2001). These programs are intended to reduce potential hunter-related grizzly bear mortality.

In 2001, a subadult female grizzly bear was killed by a black bear hunter who mis-identified her as a black bear in an area outside the action area, but within the CYE. Montana Fish, Wildlife and Parks recently added several components to its Grizzly Bear Management Plan to reduce the potential for hunter-related grizzly bear mortality (Montana Fish, Wildlife and Parks 2001). One measure is the requirement that black bear hunters successfully complete Montana's black bear/grizzly bear identification test prior to obtaining a license. In the fall of 2005, a young male grizzly bear was mis-identified as a black bear and killed by a hunter. This mortality triggered re-initiation of section 7 consultation on the Service's approval of Montana's Grizzly Bear Management Plan.

Attractant storage Readily available human food and garbage is one of the threats identified in the listing of grizzly bears. Human food and garbage, compost, bird feeders, livestock and livestock feed, pet food, bee hives, barbeque grills, fruit trees and garden produce, unsecured food in campgrounds, gut piles and carcasses are all strong attractants to black and grizzly bears. This attraction is often strong enough to overcome a grizzly bear's natural wariness of humans. Unless attractants are secured, a grizzly bear becomes increasingly habituated and bolder, posing a threat to human safety. Such bears are generally destroyed or removed from the wild. through agency management actions.

The IGBC SCYE Information and Education Taskforce developed recommendations to initiate food storage in the SCYE, and presented these proposals to the IGBC SCYE Subcommittee in

2001. In 2001, the Forest initiated a voluntary food storage order requesting that the public secure food from bears while working, camping, hiking or otherwise using the forest. This voluntary food storage order applies throughout the action area.

Currently the Forest does not have grizzly bear-resistant garbage containers at all campgrounds or sites where garbage receptacles are provided within the action area. Education pamphlets are available at Forest District offices as well as other public places describing good attractant storage protocols in bear country. Many residents in the area have been responsive to Montana Fish, Wildlife, and Parks information and other agency brochures to keep wildlife-friendly households, but others have been resistant or remain uninformed about sanitation issues and grizzly bears. The Forest has provided access to a video on the use of bear spray and defensive behavior (IGBC–Safety in Bear Country Video, 2001) to back country users on a limited basis.

No known grizzly bear incidents related to poor attractant storage have occurred *in the action area*, possibly due in part to the low grizzly bear population, low human population and large portions of roadless area. Few black bear incidents have been reported. Either incidents are too few or too insignificant to report, or landowners have dealt with the problems without reporting to Montana Fish, Wildlife, and Parks. Additional people living or recreating in the area raise the likelihood of increased hunting pressure and possibilities of human-bear encounters (Bruce Sterling, Montana Fish, Wildlife and Parks, pers. comm. 2002).

Outside the action area, in 1999, a male grizzly bear was killed by government biologists in the Yaak because of attractant-related problems. The bear fed on compost, bird seed, unsecured garbage, broke into an outdoor refrigerator, and preyed on domestic goats. It was eventually captured and euthanized. The last incidents occurred in a small rural subdivision that had covenants against keeping livestock, but the covenants were not enforced. In 2002, three yearling grizzly bears were preemptively moved from an area just south of the CYE recovery zone across the Clark Fork River from the Rock Creek Mine site. These grizzly bears were not accompanied by their mother and were presumed orphaned. They were frequenting areas near homes south of the CYE and the Clark Fork River, near the action area. The bears were at risk of becoming habituated to the many human residences and unsecured food and garbage attractants along the Clark Fork River. The bears were captured, fitted with radio transmitters and moved into Martin and East Fork of Elk Creek, away from any human settlement. All three were underweight for their age (55 to 65 pounds). The young grizzly bears remained away from people. However, the female was found dead several weeks later due to natural causes (W. Kasworm, pers. comm. 2003). In 2005, two subadult male grizzly bears were frequenting cabin sites, in separate incidences, and were relocated elsewhere in the Yaak. The first incident involved two young bears frequenting cabins. One male was captured and relocated. The second incident involved a subadult male that obtained unsecured compost and fish. The bear was captured and relocated but was later killed by a black bear hunter in a case of mistaken identity.

These recent incidents indicate that unsecured attractants exist in the CYE, can affect the small grizzly bear population at this point, and will most likely become more a serious issue to grizzly bear recovery as grizzly bear and/or human populations increase.

Noise Baseline noise levels are measured in decibels, using the A scale (dBA). Zero dBA is the intensity when sound is audible to a young person with normal hearing. Noise is perceived as “doubling” for each 10 dBA. The lowest level at which sound begins to degrade the environment is 35 dBA (MDEQ and USDA 1998). Baseline ambient noise levels run from 25 dBA in the Cabinet Wilderness in calm conditions to 50 dBA on Highway 200 (with highway traffic).

Other access and facilities Montana Rail Link railroad runs along Highway 200 in a fairly developed utility corridor. It is mostly located on relatively flat ground and runs along the border of the CYE recovery zone. This rail system runs one train twice a week from Paradise to Trout Creek with the potential to connect to Sandpoint, Idaho, and Missoula, Montana. In 2001, a train-killed female was discovered along the tracks near Elk Creek and Heron. In 2005, another adult female was struck and killed by a train near Government Creek. No other train-related mortalities are known.

The main access road to the proposed Rock Creek Mine site, FR 150, is currently an open, high use route, receiving approximately 33 one-way trips per day, based on traffic counter use (SEIS). The road is not plowed in winter, nor is it gated. Primary use occurs during the summer.

Mines Approximately 19 patented mining properties occur in the Cabinet Mountains within the action area (BA 1998). Not all of the patented properties have legal road access. Recreational development is possible on some of these patented properties in the area. The Fourth of July and Way-up mine sites occur within the action area in BMU 6. The Forest recently authorized limited motorized access to these mine sites (USDA 2000b). Under the current authorization, motorized access on the two roads is limited to levels allowed for administrative use on restricted roads. The motorized use levels would not rise to open road levels. The Forest has assured the enforcement of attractant storage on national forest system lands, as specified in the terms and conditions of the Fourth of July and Way-up Mine biological opinion, but stated they have no jurisdiction on patented land (USDA 2000b).

Large-scale mineral development is unlikely on these or other small patents (J. McKay, pers. comm. 2000) because of the size of the patents and the nature of the mineral deposits. Potential activities on some of these private properties that could impact grizzly bears include clear-cutting, small-scale mining activity including surface disturbance and blasting, building structures, establishing hunting camps, and maintaining livestock compounds with food and attractants. These impacts were analyzed in the Service’s biological opinion for the Way Up and Fourth of July Mines (USDI 1998 and 1999). We anticipated a low level of grizzly bear mortality would occur due to displacement and direct killing of grizzly bears. However, baseline habitat conditions for grizzly bears have improved in BMU 6 since issuance of the 1998 biological opinion. Open motorized route density greater than one mile per square mile is 34 percent of BMU 6 (USDA in litt. 2006a), meeting the Forest Plan standard of 34 percent (USDA 2004), and nearly meeting the research average of 33 percent (Wakkinen and Kasworm 1997). Total motorized route density greater than two miles per square mile improved, decreasing from 35 percent in 1998 (USDA 2002b) to 32 percent of BMU 6 (USDA in litt. 2006a), meeting Forest Plan standards (USDA 2004). Core area has also improved in BMU 6, increasing from 51 percent in 1998 to 54 percent (USDA in litt. 2006a), nearly meeting the Forest Plan standard and

the research average (within one percent). Therefore, the potential for incidental take as a result of displacement is reduced, and is further reduced due to the terms and condition required in the biological opinion (USDI 1998 and 1999) should the project move forward. Some low level of mortality is anticipated from habituation and food conditioning if the properties are developed; terms and conditions in the incidental take statement in the biological opinion would reduce the likelihood of anticipated take from habituation as well.

EFFECTS OF THE ACTION

The effects of the action include the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline. This section will describe and analyze the effects of the Rock Creek Mine on grizzly bears.

The 1998 BA compared the direct effects of Alternative V of the proposed Rock Creek Mine project with the Forest Plan standards at that time and the associated access assessment criteria. These standards and/or criteria included habitat effectiveness, linear open road density, displacement areas by BAA, opening size, movement corridors and seasonal habitat protection. Terms and conditions of the 1995 incidental take statement in the Service's amended biological opinion on the Forest Plan (USDI 1995) also were compared to the proposed action. These terms and conditions included requirements related to open motorized route density, total motorized route density, and core area.

In 2004, the Forest Plan access amendment (USDA 2004) replaced previous standards and assessment criteria with standards and guidelines related to the management of open and total motorized route density and core (Appendix D). Thus, we are using the standards in the 2004 amendment as part of our analysis of effects. The Forest supplemented the 1998 BA with/or provided updated baseline information in 2004, 2005 and 2006.

This section analyzes the potential direct and indirect effects of the proposed action, including the measures in the 2006 mitigation plan. The effects of the proposed Rock Creek Mine will be discussed under the following, often overlapping, categories:

1. **Displacement of grizzly bears** resulting from disturbance associated with roads or activities, including: habitat effectiveness, linear open road density, open motorized route density, total motorized route density, core area, seasonal habitats, displacement habitat, opening size, seasonal habitat protection, corridor width; direct habitat loss.
2. **Mortality risk to grizzly bears** resulting from food conditioning and other human impacts, including recreation, access into grizzly bear habitat, and settlement.
3. **Fragmentation of grizzly bear habitat** resulting from impacts to a relatively narrow north-south corridor connecting the southern Cabinet Mountain BMUs (6,7, 8 and 22) to those to the north.

The analysis under each of these categories is organized into two major sections. Presented first is a synopsis of information and research regarding general, potential adverse effects on grizzly bears that could be associated with mining operations. Presented second is an analysis of the potential effects of the specific proposed action, including the accompanying mitigation plan. The first section, general potential impacts of mining operations, may include discussion of actions or impacts that **would not necessarily** occur or apply within the action area and/or **would not necessarily** be related to the proposed action, but provide background information or context for the second section, analysis of specific effects of the proposed Rock Creek Mine.

The effects analysis ends with the following sections:

4. **Conservation Needs of the Species**
5. **Species Response to the Proposed Action**

General Potential Effects Of Mining Operations On Grizzly Bears: Factors To Consider

Displacement

Grizzly bears are known to avoid, or be displaced from, preferred habitat because of human-caused disturbances. The term “displaced” does not necessarily mean that grizzly bears would totally avoid an area, or be excluded in some way from ever using an area. Displacement is used in general terms to describe “under-use” of habitat. In research, “significant under-use” of habitat means that bears use habitat “less than expected” compared to its availability. For instance, a given habitat may account for 30 percent of an analysis area, but may only receive 15 percent of bear use. Depending upon the confidence interval surrounding the 15 percent use, this may amount to statistically significant less-than-expected use of habitat, even though some use by bears is occurring. Displacement of grizzly bears from an area can range from short-term or diurnal avoidance to more significant long term under-use of habitat, depending upon the season, quality of habitat affected, and the age and sex of grizzly bears affected.

Displacement behavior in grizzly bears may be expressed through a change in diurnal habitat use or movement patterns, avoidance or under-use of otherwise preferred habitat, and/or other behaviors related to stress or fear. Displacement may be short term or long term, depending upon the nature of disturbance and consequences experienced by grizzly bears. Grizzly bears that avoid human activity may move into poorer quality habitat or habitat that is already occupied by other bears. These types of altered routine behaviors due to disturbances have been documented in grizzly bears. Clear cause-effect relationships have not often been statistically validated. However, numerous research efforts reported many grizzly bears under-use or avoid otherwise preferred habitats that are highly influenced by humans (Mace et al. 1999; Wakkinen and Kasworm 1997; Mace et al. 1996; McLellan and Shackleton 1989; McLellan and Shackleton 1988).

If large amounts of preferred habitat within a female grizzly bear’s home range is impacted by disturbances that cause displacement, the bear’s reproductive capacity may be affected. Female

grizzly bears that are deterred from adequate use of important resources in their home range may experience significant impairment of breeding, feeding and sheltering. Stress and increased caloric expenditure searching for food or protective cover in less desirable habitat may impact normal behavior patterns, possibly to the extent that reproduction is compromised. Female grizzly bears, in particular, have a strong home range affinity (IGBC 1987). They may avoid preferred habitats in response to disturbance, but have not been documented to move from established home ranges to a significant degree. Therefore, significant impacts to their home ranges can be deleterious. The reasons for this affinity are not completely understood, but may be related to how grizzly bears find and follow the phenological development of important food plants in their habitat, returning predictably to important habitats such as huckleberry fields in the fall or avalanche chutes in the spring. Bears appear to “learn” their home range, often expanding a home range as a bear matures while maintaining a central common core zone. Grizzly bears evidently learn to use their habitat from their mother. Home ranges of young, usually female young, often border or overlap that of the mother. Exploratory movements into unfamiliar territory can be expensive in terms of energy expenditure and the low potential of finding unoccupied habitat with adequate food resources to support the high caloric requirements of bears in the feeding season. An adult grizzly bear consumes up to 20,000 calories a day in preparation for denning. Lactating females may require an even greater caloric intake. Females with cubs are generally not as able to travel, limited by the need to feed and accompany the cubs. Grizzly bear home ranges are large and overlap. Displacement from preferred habitat into areas also occupied by other grizzly bears increases the potential for adverse intraspecific interaction. Intraspecific interaction may include predation on cubs by male grizzly bears. Bears moving in less known territory or sub-optimal habitat give up known escape cover and increase their chances of encounters with dominant male bears. Intraspecific competition and/or under-use of otherwise preferred habitat in adult females may result in reduced foraging efficiency leading to adverse changes in breeding behavior, lowered reproductive success, or reduced cub and sub-adult survival.

Research demonstrates that management of human access into grizzly bear habitat can moderate the displacement of grizzly bears caused by human activity (Mace et al. 1999; Wakkinen and Kasworm 1997; Mace et al. 1996; IGBC 1994). Roads into grizzly bear habitat have been widely recognized as having the potential to adversely affect grizzly bears (Nielson et al. 2004; Gibeau et al. 2001; Mace et al. 1999; Wakkinen and Kasworm 1997; Mace et al. 1996; McLellan 1989b; McLellan and Shackleton 1989; McLellan and Shackleton 1988).

Negative association with roads arises from 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. Such animals may not change this resultant avoidance behavior for long periods after road closures and lack of negative reinforcement. Displacement of bears away from preferred habitat is related to avoidance of people who shoot at bears (legal harvest, defense, mistaken identity or malicious shooting) and of the disturbance related to people, noise, activity, roads and traffic. In their Canadian study area, McLellan and Shackleton (1989b) found that bears near roads were more vulnerable to hunting, and found support for the hypothesis that non-secretive bears were eliminated from the population by hunters. Grizzly bears may avoid

quality habitat near roads except in poor food years when they may be forced to seek those resources at higher risk to their safety.

All of the factors contributing to displacement of grizzly bears from habitat in roaded areas have not yet been quantified by research. However, grizzly bears were consistently displaced from roads and habitat surrounding roads (Mattson et al. 1987; McLellan and Shackleton 1988; Aune and Kasworm 1989; Kasworm and Manley 1990; Mace et al. 1996; Wakkinen and Kasworm 1997; Mace et al. 1999). Along the Rocky Mountain Front in Montana, Aune and Stivers (1984) found that grizzly bears avoided roads and surrounding road 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 use because of roads. Mace and others (1996) found under-use of areas with high open and high total road densities on national forest lands in Montana, as measured by a spatial analysis method known as “moving windows”. Using a GIS computer model, this analysis identifies areas of high open or total road densities and revealed female home range selection was high for unroaded and low for roaded areas. Areas with lower open and/or total densities were used as expected. Mace and others (1996) found that as road densities and human use of roads increased, female grizzly bear use of adjacent habitat decreased significantly. In some years, avoidance of roads and areas of high disturbance may result in under-use of habitat. Waller and Servheen (2005) found that grizzly bears strongly avoided areas within 500 meters of U.S. Highway 2 in Montana, south of Glacier National Park. However, 52 percent of the bears sampled did cross the highway during the night when traffic volumes were lower (averaging 10 vehicles per hour).

Grizzly bears also avoid high-use trails and other disturbances, but existing literature provides little with which to estimate a threshold of tolerance by bears to people on trails, outside of national parks where recreationists do not carry firearms. Kasworm and Manley (1990) found that grizzly bears in the Cabinet Mountains used the 0-274 meter strip (approximately 899 feet) along trails 42 percent less than expected, based on availability. This pattern was consistent among the three grizzly bears analyzed. Distances greater than 3,322 meters (slightly over 2 miles) from the trails were used greater than their availability by one bear and the other two used it as expected. Actual use of the trails by hikers was not monitored in the study.

Grizzly bear displacement from disturbances other than roads (e.g. such as mining, seismic activity and aircraft) is usually related to distance from the activity. Individual bear behavior, the season of use, sex, habitat conditions and a wide variety of other factors influence grizzly bear response to human presence and activities. McLellan and Shackleton (1988) did not find significant displacement in terms of moving away from disturbance when radio monitored bears were exposed to seismic activities, gas exploration and timber harvest, although individual bears responded differently. They did document avoidance of roads and industrial sites (McLellan and Shackleton 1988, McLellan and Shackleton 1989b). McLellan (1989b) found that industrial activities did not appear to have a significant detrimental effect on the grizzly bear population in the Flathead Valley, British Columbia during the period of study. However, this southeastern corner of British Columbia had few permanent human residents or settlements. Cronin et. al (1999) found that some grizzly bears displayed fidelity to the Prudhoe Bay region in Alaska and

produced offspring there over several years in the presence of an active oil field, which may indicate tolerance of human activity. However, the authors indicated that bears were not hunted in the oil fields and suggested that it was possible the oil fields attracted bears due in part to anthropogenic foods in garbage. Grizzly bears conditioned to anthropogenic foods may be killed by hunters or as nuisance bears when they move to other areas (Shidler and Hechtel, in press in Cronin et al. 1999) (see also discussions in *Mortality Risk* section below).

Bears responded differently to people on foot, to moving vehicles and to fixed wing aircraft in open habitat as opposed to closed, often timbered habitat (McLellan and Shackleton 1989b). Grizzly bears closer to areas of high human use were less likely to immediately flee humans on foot than those in areas of low human use. The most pronounced reactions were to humans on foot in remote, open habitat.

Grizzly bears can 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, Cronin et al. 1999). In Glacier National Park, Jope (1985) suggested grizzly bears in parks habituate to high human use and showed less displacement, even in open habitats. In Banff National Park, an area where people are prohibited from carrying firearms, grizzly bears used habitat close to low-volume roads more than expected, and were more likely to cross low-volume roads than high-volume roads (Chruszcz et al. 2003). High habitat quality influenced the use of habitat near roads and the likelihood that bears would cross roads. Habituated grizzly bears were closer to roads than wary bears. 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 (high quality habitats) 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 with 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, forested habitat (C. Servheen, 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 or adapt to relatively high levels of human activity.

Anecdotal information regarding disturbance to bears around den sites has been reported but is inconclusive. Reynolds et al. (1984) reported elevated heart rates in one bear when a seismic shot detonated 1.4 km from its den and another responded to a shot 1.6 km from its den. Schoen et al. (1987) noted some grizzly bear movement within dens when fixed-wing aircraft flew within 150 meters above grizzly bear den sites. Reynolds et al. (1984) however, noted that heart rates of two monitored bears did not change during overflights. Harding and Nagy (1980) found that grizzly bears denned successfully 1.6 to 6.4 km from active mining camps but appeared to avoid drilling and staging camps by at least 1 km. In Sweden, Swenson et al. (1997) considered hunting early in the denning season a disturbance to brown bears. Swenson et al. (1997) suggested that denning bears may be more tolerant of industrial activity than humans or human activity such as hunting, survey work, shooting, fishing and dogs near the den site.

Human-caused grizzly bear mortality risk

Some human-grizzly bear interactions can result in negative outcomes that can lead to death or removal of the bear from the population:

1. Habituation, when a bear loses its natural caution around humans, often resulting from food conditioning, leaving the bear vulnerable to illegal shooting or management control actions in which a bear is killed or moved to avoid threats to humans or their property;
2. Encounters between grizzly bears and people in which people kill bears due to real or perceived threat to life or property damage; and
3. Increased exposure to black bear or other big game hunters who may mistakenly kill a grizzly bear due to mistaken identification.

Human-caused grizzly bear mortality most typically involves habituation of grizzly bears to people and their food, garbage and other attractants, or either intentional or unintentional mortality as people gain more access to grizzly bear habitat. Attractants include nearly all human and domestic animal and livestock foods, fruiting trees and shrubs near homes, and garbage. Management removal of habituated grizzly bears is a leading cause of known human-caused grizzly bear mortality in both the YGBE and the NCDE (from Montana Fish, Wildlife and Parks 2005, Gunther et al. 2005, Schwartz and Haroldson 2002, Servheen in litt. 2005a). Conflict situations caused by non-secured human attractants continue to be the major cause of bear-human conflict (Gunther et al. 2005, Schwartz and Haroldson 2001, Montana Fish, Wildlife and Parks 2001, Montana Fish, Wildlife and Parks 2005). In the past decade, the number of grizzly bear-human conflicts has increased in the YGBE (Schwartz and Haroldson 2001) and NCDE (Servheen in litt. 2005a). In the CYE, very few conflicts have been reported thus far. However, the potential for conflict is high, considering the number of unsecured attractants in grizzly bear habitat. In the CYE during the past decade, 1995 through 2005, a total of 14 known human-caused mortalities were attributed to the following causes: five to poaching; two illegal mistaken ID; one unknown; one management removal due to livestock conflict; three under investigation; and two were killed by trains (see Table A6). Further, in the past few years, three separate incidences involved moving and relocating young grizzly bears in the CYE because

they were frequenting areas near residences or garbage, and were at high risk of becoming habituated.

Continued exposure to non-secured attractants or human presence and activity without negative consequences can result in habituation. Grizzly bears are highly individualistic. As mentioned earlier, some bears can become conditioned to human presence and disturbance with little to no significant adverse effect. However others are eventually lured to human foods and attractants and become a threat to human safety. Habituation increases the potential for conflicts between people and bears. Human attractants such as food, garbage, livestock feed, and pet food pose powerful incentives for grizzly bears to use areas near people and residences. Habituated bears that obtain human food rewards often become involved in incidents where they threaten human life or property. Food conditioned bears generally experience high mortality rates; they are killed illegally or are eventually destroyed or removed from the population through management actions. Some bears, particularly subadults, more readily become habituated to humans and consequently suffer increased mortality risk. Habituated bears are more vulnerable to illegal killing because of their increased exposure to people. In the Yellowstone region, people killed habituated bears over three times as often than non-habituated bears (Mattson et al. 1992).

Montana Fish, Wildlife and Parks' grizzly bear specialist program is recognized as being successful in fostering public awareness and support of grizzly bear conservation. The program is aimed at resolving conflicts between bears and people, but also reducing the potential for conflicts to arise through education and information regarding attractant storage. Since many of the efforts are preventative, quantifying effects is difficult. In any case, ample evidence demonstrates that securing human food and garbage from grizzly bears can dramatically reduce the number of grizzly bears removed through management actions (see Gunther 1994). The results of bear specialist programs are summarized biannually at IGBC Subcommittee meetings and in annual reports, such as the annual "Yellowstone Grizzly Bear Investigations", and annual reports from the Montana Fish, Wildlife and Parks grizzly bear specialists in the NCDE (Madel 1996; Wenum 2002; Wenum 2004; Montana Fish, Wildlife and Parks 2005). Montana's bear specialists report annually on progress that can be measured. For example, conflict reports detail the number of grizzly bear conflicts before and after construction of electric fencing around attractant sites (see Agency Summaries *in* Schwartz and Haroldson 2001). The grizzly bear management program on the NCDE Rocky Mountain Front began in 1988. Since that time, records indicate that the presence of grizzly bears in the region, including females with cubs, has remained stable to slightly increasing, but the level of known human-caused grizzly bear mortality has declined (Mike Madel, Montana Fish, Wildlife and Parks, pers. comm. 2002).

Roads in grizzly bear habitat also create a serious risk of mortality to grizzly bears. Grizzly bear mortality can result directly from collisions with vehicles, but more commonly, indirectly through increased exposure to and interaction with humans. The specific relationship between roads and the mortality risk to 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. Forest roads facilitate human access into grizzly bear habitat, which directly or indirectly increases the mortality risk to grizzly bears. Grizzly bears are increasingly vulnerable to illegal and legal harvest as a consequence of increased road access by humans in Montana (Mace et al. 1996) and in the Yellowstone region (Mattson et al. 1992). In southeastern British Columbia, roads

increased access for settlers, legal hunters and poachers, the major source of adult grizzly mortality in that area (McLellan and Shackleton 1988; McLellan 1989c.) McLellan (1989a) reported that 7 of 13 successful legal hunters interviewed had been on a road when they harvested a grizzly bear.

McLellan (1989a) reported 11 human-caused grizzly bear mortalities during a 9-year period of research in southeastern British Columbia, whereas the study in the South Fork of the Flathead River, Montana, reported 13 mortalities during 6 years of research in the South Fork Study area, excluding legal mortalities. Although the British Columbia study area was roaded for gas exploration, timber harvest, and other uses, the area had very few permanent human residents and generally received lower use by humans than did the South Fork Study area, and had a very high density of grizzly bears for an interior population (McLellan 1989b). In 1994, grizzly bear population trajectories for the two study areas were computed (Servheen et al. in litt. 1994). In the British Columbia study area, high survivorship rates of adult and subadult females resulted in an upward trend in the grizzly population. In the South Fork Study area, a peninsular area largely bordered by settlement, dispersed rural residences, highways and a reservoir, relatively low adult and subadult female survivorship rates resulted in an annual decline in the grizzly bear population. Adult female grizzly bear mortality was the most important factor in determining trend. Most of the known grizzly bear mortalities were attributable to humans and occurred on private lands near or adjacent to national forest lands.

This comparison illustrates that the proximity of grizzly bear populations to human population centers and resulting availability of attractants on private lands, high numbers of people using forest roads, dispersed recreation or other activity in roaded habitat, and other factors leading to increased interaction between bears and humans pose considerable risks to grizzly bears.

In the North Fork of the Flathead River Valley in British Columbia, 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 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, nonhunting mortalities during the period of 1967 through 1986 occurred within 1 mile of roads. Recent models indicate that the relative risk of grizzly bear mortality was positively associated with human access, roads and trails or the area's human population size (Nielsen et al. 2005; Mattson and Merrill 2004). Bears were also killed by vehicle collision (Greer 1985, Knight et al. 1981, Palmisciano 1986, Servheen in litt. 2005a). The Grizzly Bear Compendium (IGBC 1987) and Mattson (1993) summarized impacts reported in current literature including direct mortality from legal and illegal harvest and other factors resulting from increased human-bear encounters.

We conclude that excessive road densities in grizzly bear habitat are among the serious adverse impacts to grizzly bears, especially when located near towns or cities. Where people are abundant and Forest access is provided nearby, roads receive more routine use and higher use levels. Negative impacts associated with roads and excessive road densities influence grizzly bear population dynamics and habitat use patterns in numerous ways.

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 people intent on illegally shooting bears, can collectively result in serious, detrimental effects to grizzly bear populations. Access management that provides adequate amounts of habitat secure from the influence of roads and high use trails, when combined with public information programs, efforts to foster local public support for grizzly bear recovery such as those of bear specialists, and law enforcement, can be instrumental in reducing mortality risks to grizzly bears by managing the present and anticipated future national forest road use levels that result from the increasing human population in western Montana.

Habitat fragmentation

Habitat connectivity is essential in maintaining the ecological functions of grizzly habitat. Connectivity allows normal use of home range, security from human-caused mortality risks, security cover and escape cover to avoid other grizzly bears, optimal opportunities for subadult grizzly bears to establish home ranges and the resulting distribution of bears across the landscape, and allows males unimpaired access to breeding partners, which promotes optimal conditions for successful reproduction. Habitat fragmentation can significantly reduce or preclude successful dispersal, movements associated with breeding behavior, or occasional migration, as well as increase the risks to bears moving through insecure habitat patches.

Within home ranges and during dispersal and home range selection movements, grizzly bears that are deterred from traveling to preferred feeding areas may experience reduced weight gain and increased risk of starvation or reduced reproductive success. High road densities, human development and activity with grizzly bear habitat can impact connectivity and bear movement. Altering preferred travel patterns results in bears using less optimal habitat, or using more resources and traveling farther to find suitable habitat. Subadult males were disproportionately killed by humans in many study areas, partly attributable to wider-ranging movements (Mattson 1993). If young bears, typically subadult males, are deterred from dispersing through secure habitat, they are more likely to range closer to people. In doing so they suffer increased risks of food habituation, mortality from hunters through mistaken identity, death due to real or perceived defense of life or property, collisions with vehicles, or control actions. Displacement into habitat already occupied by grizzly bears or unfamiliar habitat that fails to offer good bear security increases the chance of encounters with adult bears, which can lead to direct intraspecific mortality or indirect effects such as reduced fitness or survival due to stress or injuries.

Specific Effects Of The Rock Creek Mining Operations On Grizzly Bears

Displacement

The proposed Rock Creek mine would result in direct loss of 483 acres of grizzly bear habitat from the CYE recovery zone; 342 acres are privately owned lands and 141 acres are national forest, of which 115 acres are MS 1 habitat. The displacement analysis for the project included a cumulative analysis process developed by the IGBC to establish displacement distances from a

constant high noise and high activity environment (IGBC 1990 *in* USDA et al. 1998b) (see discussion 3 below for complete analysis). Based on this analysis, the 1998 BA predicted that bears would be displaced from this 483 acres and also from zones of influence around mine sites and roads (new and existing), which would result in under-use of about 7,044 acres. Upon re-examination of the net effects of this displacement, we found it important to note that grizzly bears are already displaced from about 5656 of this 7044 acres, due to existing roads not associated with the proposed mine. Additional disturbance attributable to only the mine and resulting in displacement of grizzly bears from currently undisturbed habitat would occur on less than 1400 acres.

In earlier biological opinions on this project, the Service indicated that actual displacement and under-use of habitat may occur from ridge to ridge in some places based on the steep topography surrounding the mine and facilities. To clarify this point, according to the Cumulative Effects Model displacement analysis (USDA et al. 1988) (CEM) used in the BA, displacement from mine activities would result in an influence zone of between .25 and .50 miles from actual mine features and roads (BA). In some areas within the Rock Creek drainage, a zone of .25 to .50 miles from roads would reach the ridgeline. It is not likely that the displacement effects from the mine would be realized on the other side of a ridge. Therefore, the area subject to displacement effects would be no more than 7044 acres. Further, the model indicated that of the 7044 acres, 5656 acres are already affected by disturbance from existing roads not associated with the mine.

The Service expects that displacement of areas by bears would occur initially within the drainage due to heavy road use and the continual noise and activity generated by the construction and operation of the mine (see item 3 below for more discussion of displacement). Displacement effects would be most pronounced near the roads and facilities at lower elevations in the drainage, which encompass areas of spring habitat. Habitat near the mine site, facilities and roads may be under-used by grizzly bears for the life of the mine. As mentioned, grizzly bears are already displaced from 5656 acres of this area impacted by existing human activity along the Clark Fork River and along Forest roads in the 7044 acre displacement area. The area includes road FR 150, which is an existing high-use road (see discussion 3 below for complete analysis). Long-term displacement from, or under-use of MS 1 habitat within portions of the Rock Creek drainage by some grizzly bears could occur as an indirect effect from increased high-intensity human activity. Females may teach avoidance of disturbed area to cubs, extending the displacement for an unknown period of time after the mine is reclaimed.

The CEM model adjusts the level of displacement effects from habitat near existing and new roads according to the level or intensity of the disturbance (see discussion 3 below for complete analysis). The construction and operation of the mine would result in increased traffic levels on the existing access and service roads, as well as main highways in and around the CYE. The primary impact of increased traffic would be an increase in existing levels of displacement of bears from 5656 acres of habitat near the main road. Forest route 150 is already considered a high-use road and is open to the public. Although bussing of mine employees would be required and would lessen mine-related traffic on FR 150, traffic levels on FR 150 are anticipated to increase 1,120 percent over pre-Rock Creek Mine levels during the lengthy construction phase (USDA 1998b). Traffic would remain from 30 to 300 percent above existing traffic levels during the 35-year operation phase of the Rock Creek Mine. Traffic along Montana Highway

200 also would increase. Existing roads and activities associated with the Rock Creek mine would serve to inhibit bear activity within this area. Further, displacement of bears is likely on an additional 1350 to 1400 acres (approximately) due to new mine-related roads, increased road use levels, and structures and the influence zones around them. Therefore a total of about 7044 acres would be affected by the proposed action.

Noise levels would be a primary factor contributing to the displacement of grizzly bears. Construction, operation and reclamation of the Rock Creek Mine would raise background noise levels substantially during the life of the operation. Blasting during adit construction would generate sounds up to 125 dBA within 900 feet of the blast and 60-80 dBA within the Clark Fork Valley and the Cabinet Mountains Wilderness. Blasting could be heard up to a mile or more away from the construction site (MDEQ and USDA 1998). Construction equipment would generate sounds up to 100 dBA within 50 feet. Mine operations noise of 52 to 62 dBA would exceed baseline conditions. The conveyor, crushing plant and ball mill are the loudest continual disturbances, and would be heard up to a mile or more away (MDEQ and USDA 1998, page 4-154). Traffic noise on FR 150 would increase from 30 to 70 dBA.

We do not anticipate that the construction and operation of the evaluation adit would result in similar levels of displacement. Disturbance effects of the evaluation adit would not approach levels associated with the construction and operation of the mine, considering the habitat condition (moderate motorized route densities and abundant core), number of employees, level of road use along an existing open road, and disturbances generated by construction and operation of the adit. Given the existing road management in the action area, effects would be moderate. The number of employees working on the evaluation adit would increase quarterly, beginning with 20 people in the first quarter and 55 during the fourth and last quarter (see *Asarco Rock Creek Exploration Project: exploration adit cumulative effects and baseline data*, in litt. 1992), as compared to over 300 during construction and operation phases. Crews would assemble at the office area just off Highway 200 and from there would be bussed to the adit site. Bussing of employees would minimize traffic on FR150, which is already an existing, high-use open road. Employees would be sourced from the Troy mine and would likely live in the Troy or Libby area (C. Rife, Revett Silver Co. pers. comm. 2006). Noise generated by construction and blasting for the adit would occur sporadically for about two weeks (John McKay, Kootenai National Forest, pers. comm. 2005). Blasting would then mostly occur underground. The noise generated would be short and sporadic and likely not audible to degrees that would significantly impact grizzly bear behavior. Based on experience at the Troy Mine, blasting noise would be eliminated at the surface after the adit has advanced approximately 500 feet underground (C. Rife, pers. comm. 2006). Electrical power at the adit would be sourced via a buried power line in the existing road thereby greatly reducing noise by eliminating the need for generators (C. Rife, pers. comm. 2006).

Mitigation plan measures to reduce or avoid displacement

The Service has concluded the conservation measures in the mitigation plan would adequately offset impacts to grizzly bears from both direct habitat loss and displacement from habitat due to disturbances generated by the mine. Several factors, including those outlined in the following paragraphs, lessen displacement and/or moderate the impact of displacement on grizzly bears in

the action area.

1. **We anticipate that displacement of grizzly bears would occur within the Rock Creek drainage, but these bears would likely have sufficient alternative habitat available elsewhere within their home ranges:**
 - **Substantial core areas and moderate road densities would provide secure alternative habitat for grizzly bears displaced from near the mine site (see discussion 4 below for details).** The proposed action would not result in less core habitat in any BMUs within the action area (USDA 2003). The BMUs 4 (127 square miles), 5 (109 square miles), and 6 (100 square miles) encompass approximately 81000, 70000, and 64000 acres respectively. These BMUs provide substantive core areas of approximately 50000, 40000, and 35000 acres respectively. The existing and resulting levels of secure core, and the seasonal habitats within them, would provide essential and available habitat for grizzly bears in BMUs 4, 5, and 6. Large core areas are also provided in the surrounding BMUs 2, 7, and 8 (see Table A10). Core areas in BMUs 2, 5, 6, and 7 are well connected through the action area and encompass portions of the Cabinet Mountains Wilderness.

As mentioned earlier, the Service considers core areas extremely important in partially mitigating the displacement impacts of the proposed action. Core areas in each of the three BMUs 4, 5, and 6 (63, 59 and 54 percent) are comparable to or larger than the core area within the average female home range reported in research (55 percent) (Wakkinen and Kasworm 1997) (see Table A13). Each of the home ranges used to develop the average were ranges of female who were successful in surviving to adulthood and producing cubs. Similarly, BMUs 2, 7 and 8 provide more core area than the average amount reported in research. Core areas in BMUs 2 and 7 are substantial at 77 and 67 percent. The BMU 8 provides 56 percent core and BMU 22 provides 51 percent.

Outside core areas, the proposed action would slightly decrease both open and total motorized route densities (USDA 2002b). Four miles of new road would be required and five miles of existing road would be reconstructed, but these road miles would not substantially expand the existing spatial distribution of roads in the BMUs (e.g. the existing areas impacted by human activity) and so would not increase total or open road densities, and would not decrease core area. Open motorized route densities within BMUs 4, 5, and 6 are near or lower than levels reported in average female home range (Wakkinen and Kasworm 1997). Of the remaining four BMUs in the action area (2, 7, 8 and 22), three of four have lower open road densities than that reported in research. Open motorized route density in BMU 4 (37 percent) is higher than the average reported in the research (33 percent), in part due to the presence of Highway 200 along the unit's boundary and Highway 56 which bisects the unit. Total motorized route densities in the action area are likewise near or lower than the average reported in the research. Only BMUs 6 (32 percent) and 22 (37 percent) have higher total road densities than that reported in the research (26 percent). Total motorized route density in BMU 6 is higher than the average due in part to Highway 200 which runs along its boundary and 6 sections of private corporate timber lands. Open and total motorized route densities in nearby BMUs 2, 7 and 8 are below the research average. Habitat effectiveness would be

reduced by two percent in BMU 4, one of seven BMUs in the action area. The proposed action would not decrease habitat effectiveness for grizzly bears in the remaining six of seven BMUs. The habitat effectiveness values in BMUs in the action area range 65, 69, 70, 71, 75, 80, and 83 percent, compared to the previous Forest standard of 70 percent (see Table A7).

- **A total of 2,450 acres of mitigation properties would be acquired; a portion *prior* to construction of the evaluation adit, a portion *prior* to construction of the mine and the remaining portion *prior* to the production phase (see Tables 1 and 3, and discussions under 3 below).** As properties are acquired, access management within BMUs 4, 5, and 6 would improve (as required by the mitigation plan). Disturbance impacts within spring habitat within the Rock Creek drainage and in other portions of BMUs 4, 5, and 6 would be alleviated to varying degrees, depending upon existing access, development on the properties acquired and proximity to spring habitat. Spring habitat may be conserved if acquired parcels contained spring habitat, or had existing access via roads through spring habitat, or could require roads through spring habitat for access in the future. See discussion under 3 below.
- **Based on the best available information, grizzly bear density in the Cabinet Mountains is currently relatively low.** Grizzly bear home ranges are large and overlap. With the low number of grizzly bears in the Cabinet Mountains at this time, about 15, it is unlikely that density-induced stresses currently affect adult female grizzly bears within their home ranges there. More likely, they have adequate amounts of space and habitat. As described earlier, we estimate that of the 15 grizzly bears, currently three to five adult females occupy the Cabinet Mountains. Based on habitat and area in each BMU, the Cabinet Mountains could likely support at least 14 female grizzly bears (W. Kasworm, pers. comm. 2006). In the action area, one or possibly two reproductive-aged females appear to be using BMUs 4, 5, and 6. During the six-year period from 1996 to 2001, at least one female grizzly bear with young was reported in each of BMUs 2, 4, 5 and 6 and in nearby BMU 7 as well (Kasworm et al. 2002). The proximity of the BMUs, the number of young present, and whether these young were cubs or yearlings/two-year-olds in the 1996 and 1997 data suggests that at least two reproductive age females were present. The 2000 data may be a sighting of one of the same females with a succeeding litter and so likely cannot be classed a third female. No females with young were reported in BMUs 8 or 22 to the south of the action area during that same period. During the period from 2000 through 2005, females with young (including cubs/yearlings/two-year-olds) were reported in five of 14 Cabinet Mountain BMUs: 2, 5, 6, 18 and 21 (Kasworm et al. in litt. 2006a).
- **The area affected by disturbance generated by the mine and roads is relatively small compared to the size of an average grizzly bear home range, and represents about five percent of the size of the life range of a female grizzly bear native to the Cabinet Mountains, so alternative habitat would be available to bears if displaced from areas near the mine site.** Grizzly bear home ranges are variable and range from approximately 17,000 acres (68 square kilometers) to 640,000 acres (2,600 square km) in the CYE (Kasworm et al. 2002). Male grizzly bears typically have larger home ranges

than females. However, female grizzly bear home ranges are also large; native adult female life ranges in CYE averaged approximately 165,000 acres (668 square kilometers; 258 square miles)(Kasworm et al. 2002). One of these native females lived in the Cabinet Mountains and had a life range of 143,000 acres (579 square kilometers; 224 square miles). The 7044 acres area from which grizzly bears would be displaced is relatively small compared to the size of an average grizzly bear home range. Further, of the 7044 acres, 5656 acres are already impacted by disturbance from existing roads.

- **Spring habitat remains available in the action area.** The area from which grizzly bears would be displaced is primarily spring habitat; a net loss of freely available spring habitat for grizzly bears would result during the construction phase and operation phase of the Rock Creek Mine. The proposed project is likely to displace grizzly bears from the active mine, mill and tailings sites, the access road and utility corridors, highly-used trails and other recreational areas, and possibly the surface conveyor that carries waste products from the exploratory adit to the mill site. Most of the 7000 acres impacted by the disturbances of construction and operation of the mine occur in low-elevation spring habitat, which is thought to be less abundant than other seasonal habitats in this ecosystem. Up to 6400 to 6500 acres of spring habitat would be less available and likely under-used by grizzly bears. Much of this spring habitat is already influenced by existing disturbance within the 5656 acre zone along existing roads in the area, but displacement effects would likely increase due to the substantial increase in level of human activity and traffic volumes on the roads due to the mine and at the mine sites (W. Johnson, pers. comm. 2002).

As mentioned, core areas in the action area are large. In many ecosystems, core area occurs at higher elevations and lacks quality spring habitat. Higher elevation habitat in the Cabinet Mountains tends to provide abundant summer habitat (BA 1998). However, the best information indicates that core areas in the affected BMUs do contain spring habitat, defined by aspect and elevation. Spring habitat occurs in proportionately greater amounts in core than in the BMU as a whole (from BA 1998), although some of this area would contain expanses of open rock and scree slope. Potential future improvements or additions to core area are possible due to acquisition or easement of mitigation land parcels. As required in the mitigation plan, once the Forest acquired or obtained easements on parcels, elimination or reduction of access routes or elimination of the potential for future routes leading to or crossing through the parcels would create or preserve core habitat for grizzly bears.

To compensate for the displacement from habitat by bears, the Forest conducted a spring habitat analysis using BAA scales. The BAA scale analysis was required by the Forest Plan prior to 2004. In 2004, the Forest Plan amendment replaced BAA scale analysis with road density and core area management at larger BMU scales. However, the BAA scale mitigation for compensating for the reduction in available spring habitat remains useful and will be retained for this project (W. Johnson, pers. comm. 2005). For the three BAAs directly impacted by the mine, five BAAs were identified to provide “displacement habitat”. “Displacement habitat” would be kept free from major activities throughout the 30-year life of the mine. These five BAAs would serve to secure a greater

amount of spring habitat for grizzly bears from major activities than the amount of spring habitat impacted by the project in the affected BAAs. The five displacement BAAs would secure 177 more acres of spring habitat (between 6577 and 6677 acres)(defined east, west, and south aspects) below 5000 feet and 7,452 more acres above 5,000 feet than that found in the three BAAs directly affected during the proposed Rock Creek Mine project. As mentioned previously, the displacement mitigation habitat would not increase the net amount of spring habitat available to grizzly bears, but overall would ensure a larger area of spring habitat remain free of major disturbance during operation of the mine, than the amount of spring habitat affected by the mine.

2. **The mitigation plan measures include 2350 acres of replacement habitat to reduce or mitigate for grizzly bear displacement and habitat loss, and an additional 100 acres to offset potential fragmentation.** The mitigation plan stipulates that 2350 acres of private lands in the CYE be acquired by Revett Silver Company through fee-title transfer or perpetual conservation easements (Appendix B) to compensate for both direct habitat loss and additional loss of habitat use by grizzly bears due to disturbance. An additional 100 acres is required to contribute to offsetting potential fragmentation of grizzly bear habitat in a north to south corridor along the Cabinet Mountains divide, east of the mine. Conservation easements would be held by the Forest. The revised mitigation plan requires perpetual conservation easements to ensure long-term conservation of the habitat parcels for grizzly bears whose home ranges include these areas.

The proposed Rock Creek Mine would physically alter 483 acres (see Table A2), of which 141 acres are national forest (115 are MS 1 habitat), and 342 acres are privately owned. The 1998 BA determined that displacement would impact another 6,561 acres, assuming bears would avoid an area 0.25 to 0.50 mile around physically disturbed sites and human travel routes. Therefore, the mine would contribute to under-use of (displacement from) approximately 7044 acres (of which 73 acres were already impacted by existing roads and 5656 acres were already affected by disturbance from existing roads) by grizzly bears for a period of time of about 35 years. Actual displacement of grizzly bears might occur as far as from ridge line to ridge line in some areas of the Rock Creek drainage; due to steep topography, the 0.25 to 0.05 mile influence zone would span from the road or site to the ridgeline in some areas.

As explained previously, the term “displaced” does not necessarily mean that grizzly bears would totally avoid an area, or be excluded in some way from ever using an area. Displacement is used in general terms to describe “under-use” of habitat. In research, “significant under-use” of habitat means that bears use habitat “less than expected” compared to its availability. For instance, a given habitat may account for 30 percent of an analysis area, but may only receive 15 percent of bear use. Depending upon the confidence interval surrounding the 15 percent use, this may amount to statistically significant less-than-expected use of habitat, even though some use by bears is occurring. Displacement of grizzly bears from an area can range from short-term or diurnal avoidance to more significant long term under-use of habitat, depending upon the season,

quality of habitat affected, and the age and sex of grizzly bears affected. The following paragraphs describe how mitigation acres were derived.

The mitigation plan requires a total of 2450 acres of private land within the action area be purchased or secured through perpetual conservation easements, and managed to conserve grizzly bears. The 2350 acres of replacement habitat acreage required to offset displacement on 7044 acres was determined by using the Cumulative Effects Model (CEM) (USDA et al. 1998) (BA 1998). Areas impacted by disturbance were assigned “compensation levels.” Compensation levels assigned the amount of replacement or mitigation habitat required for each acre of disturbed habitat and influence zones. Physically disturbed areas (Table A11) were assigned a compensation level of 100 percent. A compensation level of 100 percent means that the ability of the area to support bears has been reduced to 0 percent of its potential to support bears without the mine or existing disturbance feature. A compensation level of 100 percent requires a 1:1 disturbed to replacement acre mitigation. All physically disturbed sites (483 acres) were assigned compensation of 100 percent for each acre lost to development (Table A11).

Table A11. Approximate acres of surface feature disturbances, influence zones, Cumulative Effects Model compensation levels and required replacement habitat associated with the proposed Rock Creek Mine (data from BA 1998).			
<i>New Project Features</i>	Acres disturbed by site development or influence zone	Compensation factor (level)	Total Replacement Habitat Required (rounded acres)
Tailings impoundment	368 acres	x 1 (100%)	368 acres
Influence zone	486 acres	x .9 (90%)	437 acres
Mill site	41 acres	x 1 (100%)	41 acres
Influence zone	230 acres	x .9 (90%)	207 acre
Evaluation adit and support facilities	10 acres	x 1 (100%)	10 acres
Influence zone	62 acres	x .7 (70%)	43 acres
New total roads	64 acres	x 1 (100%)	64 acres
Influence zone	54 acres	x .7 (70%)	38 acres
Ventilation adit	0 acres		
Influence zone			10 acres
SubTotal (new features)	1315 acres		1218 acres
<i>Existing Project Features</i>			
Existing roads	73 acres		0 acres
Influence zone	5656 acres	x .2 (20%)	1131 acres
Total New and Existing Features	7044 acres		2349 (2350) acres

Each of these developed sites or features was then buffered by either a 0.25 or 0.05 mile influence zone, depending upon the level of the expected disturbance. The areas within each influence zone were then assigned compensation levels of between 70 to 90 percent, depending upon the intensity of the disturbance. For instance, a compensation level of 90 percent means that the effects of the mine would reduce the ability of the influence zone to support grizzly bears to 10 percent of its potential, and therefore the replacement acres required were 90 percent of the acres in the influence zone itself.

Note that the difference between the required 2350 acres of replacement habitat and the 7044 acres where displacement is expected to occur results primarily from the replacement acres required for the 5656 acre displacement area around 73 acres of *existing roads*. These roads already exist and already have a displacement effect on grizzly bears within the influence zones surrounding them. According to the CEM, the influence zone extends 0.25 miles from roads characterized as having “low linear motorized use.” Existing roads in the action area were characterized this way, and the zone of influence around them totaled 5656 acres. The CEM model predicts that “low linear motorized use” of roads would reduce the ability of the surrounding influence zone to support grizzly bears by 70 percent, or in other words, to 30 percent of its potential.

In the CEM analysis, the mining company was not held accountable for existing effects of the 73 acres of roads or the 5656 acre influence zone because this disturbance was already in the baseline and not caused by the mine. Further, the Forest had already accounted for this displacement and moderated its effect on grizzly bears by adhering to its road density limits (standards) within the affected BMUs (see discussion 4 below). Therefore, of the approximately 7044 acre disturbance zone that would be affected by the proposed action, 5656 acres are already impacted by 73 acres of existing roads and use on roads. The ability of the 5656 acre influence zone near existing roads to support grizzly bears has already been reduced by about 70 percent.

The mine would cause a significant increase in traffic on these existing roads. Thus, in accordance with the CEM, the categorization of existing roads was changed from “low motorized linear use” to “high motorized linear use.” According to the CEM, the increase in road use from “low” to “high” linear motorized use was expected to decrease the ability of the influence zone to support grizzly bears from the existing 70 percent by another 20 percent, or by a total of 90 percent. In other words, with the effects of the proposed action, the ability of the influence zone to support grizzly bears would be reduced to about 10 percent of its potential. Although the mining company was not required to offset the *existing* impacts within the 5656 acre influence zone, the mitigation plan requires offsetting the impacts of *increased* levels of disturbance associated with higher road use. The plan requires acquisition or easement on 1131 acres (20 percent of 5656 acres) of replacement habitat to compensate for the increased use of existing roads (see Table 11).

This replacement habitat strategy accounted for following:

- Although bears may still use influence zones, the effects of the project would substantially diminish the frequency or probability of their using the zones.
- Displacement effects attributable to the mine itself were identified and then added to existing displacement effects from roads already in the environmental baseline.
- The amount of replacement habitat required to adequately mitigate for displacement of grizzly bears was determined through an objective process based on the best information regarding levels of grizzly bear displacement caused by disturbance.

Additional features and effects of the mitigation plan related to replacement habitat:

- The revised mitigation plan would further require acquisition of fee title or perpetual easement on *an additional 100* acres of mitigation habitat (for a total of 2450 acres) to specifically address habitat fragmentation with a north to south habitat corridor east of the mine site, near and along the divide. Any acres acquired through fee title would be eventually transferred to Forest ownership, as would conservation easements. The mitigation plan specifies: “Secure or protect (through conservation easement including road closures, or acquisition in fee) from development (including but not limited to housing, motorized access) and use (timber harvest, adverse grazing, mining) 100 acres of replacement habitat that will enhance the north to south habitat corridor in the Cabinet Mountains.” These parcels are to be acquired *prior* to the beginning of the evaluation adit.
- The mitigation plan specifies: “Secure or protect (through conservation easement including road closures or acquisition in fee) from development (including but not limited to housing, motorized access) and use (timber harvest, adverse grazing, mining) replacement habitat to compensate for acres lost by physical alterations, or acres with reduced habitat availability due to disturbance.” Of the 2450 acres of mitigation properties required, 153 acres are required to be acquired *prior* to the development of the adit phase, 1783 acres are to be acquired during the evaluation adit phase *prior* to mine construction; the remaining acres are to be acquired *prior* to production phase (see Table A1 and Table A3). All 2450 acres are to be acquired within four or five years of the initial activities associated with mine construction.
- Revett has already secured 273 acres within the north-south corridor (Carson Rife, Revett Silver Company, in litt. 2005) by purchasing fee title. This property was ranked as number 2 in the priority ranking in “*Replacement Habitat Assessment for acceptable lands to consider*” (explained below). This property is valuable to conserving grizzly bear habitat in the north-south corridor because development of the property or access to or from it would be precluded by either transfer of ownership to the Forest, or by permanent conservation easement. If previous

landowners had requested access for homebuilding or logging, for instance, about one to four miles of new or reconstructed road could have been required and core area would have decreased within the corridor (W. Johnson, pers. comm. 2006).

- Each acquisition (or protection through easement) of privately-owned grizzly bear habitat would not necessarily increase the amount of habitat available to grizzly bears, because some private lands are undeveloped and currently available to bears. However, the mitigation lands were prioritized according to habitat quality *and risk of being developed in the future*, unless acquired by the Forest through fee title or easement. Thus, the long-term management of these lands is important to the conservation of grizzly bears and their habitat. On some private parcels with no existing roaded access, there was risk that the Forest may be required to provide reasonable private access in the future. Therefore, Forest acquisition of or easement on mitigation habitat that is *at risk* of development would benefit grizzly bears in the southern Cabinets over the long-term, by precluding access, development, or other management adverse to bears.
- Some of the potential mitigation properties have existing developments, and several potential parcels already have roaded access. Removing the developments and roaded access to these parcels would increase habitat available to bears, decrease future grizzly bear mortality risk due to sanitation issues and illegal mortality, as well as reduce existing displacement risks due to access and human activity. Depending upon the specific property, eliminating existing access (or preventing access to them in the future) would reduce or eliminate the potential for displacement on many acres in addition to the 2450 acres required. The mitigation plan calls for a total of 2450 acres to compensate for acres lost through physical alterations or acres with reduced habitat availability due to disturbance. Each of the properties is valuable to grizzly bear habitat conservation and would benefit grizzly bears if acquired. The specific location of mitigation properties and the roads on them and/or leading to them are as important as the total acres required. Acquisition or easement of parcels precludes development on any parcels acquired, and also allows elimination of the motorized access across Forest lands that have roads or motorized trails leading to the parcels. Elimination of such access routes could improve conditions on more acres than the mitigation properties alone. Acquisition of certain lands would allow the Forest to reduce or eliminate displacement of bears (or potential future displacement effects) on lands adjacent to them or on lands where access roads lead to them. Each acquisition would be reviewed by the Oversight Committee, and approved by the Forest in coordination with the Service, to ensure its value as grizzly bear habitat over time and to lessen the effects of displacement.
- The mitigation plan requires habitat enhancement on 484 acres. Habitat enhancement has potential of improving bear habitat if fruiting shrubs and/or spring vegetation can be enhanced, possibly through fire, and security habitat around these key habitats can be assured through road closures or other access restrictions.

- The mitigation plan would require that as properties are acquired, management of access in BMUs 4, 5 and 6 would be more conservative than that required in the Forest Plan. This would further reduce displacement of grizzly bears from habitat.
- Most mitigation properties required by the mitigation plan have not yet been acquired, and habitat enhancement actions are not yet specified. Therefore, the specific mitigation impact or reduction in potential displacement of grizzly bears that would result after acquiring these properties, implementing access management and implementing habitat enhancement activities cannot be accurately predicted at this time. However, in coordination with the Service, the Forest would assess and approve each of the potential parcels, ensuring that they each contribute to offsetting the impacts of the proposed Rock Creek Mine. A number of potential lands have been identified. The revised mitigation plan relies on the “*Replacement Habitat Assessment for acceptable lands to consider*” (not available to the public until replacement habitat mitigation is completed). The Service was involved in the development of the Replacement Habitat Assessment, which identifies many potential mitigation habitat parcels and prioritizes them according to location, development potential, and potential contribution to grizzly bear habitat security and improvement. The plan also states that **the Forest Service would have final approval of mitigation acres** and associated covenants prior to recording. The Forest would approve in writing and describe how the properties to be acquired would meet the habitat assessment requirements.

3. **Some grizzly bears may adapt to the consistent, repetitive noise provided that natural food availability and quantity are not reduced and they suffer no adverse consequences associated with the mine activity.** In the South Fork of the Flathead River in Montana, which encompassed multiple use national forest lands, adult female bears were likely to avoid highly roaded habitat and roads with high levels of use (Mace et al. 1996, Mace et. al 1999). Other research indicates that resident grizzly bears are more likely to habituate to human activity if the use is spatially and temporarily predictable, and the bear population is not hunted (Cronin et al. 1999, Mattson 1993, McLellan and Shackleton 1989a). Such conditions can exist along major roads and highways. Waller and Servheen (1999) reported five of nine grizzly bears radio-collared in the U.S. Highway 2 corridor in Montana, south of Glacier National Park, maintained home ranges that were centered over the highway corridor, and remained in the highway corridor during their active season. However, they found that grizzly bears strongly avoided areas within 500 meters of the highway (Waller and Servheen 2005). In Yellowstone National Park, Mattson et al. (1987) found displacement effects surrounding developments and reported that habituated adult females that used areas near developments suffered higher mortality rates than more wary bears. They suggested that sanitation of developments (securing attractants from bears) would allow adult females to occupy habitat near development and yet not incur the increased mortality risks typically associated with habituation. These results are consistent with those reported in Yonge (2001) and Tyers (unpublished 2006) in the Cooke City basin, in Montana, outside of

Yellowstone National Park. There, grizzly bears near Cooke City consistently foraged in very close proximity to high levels of human use if cover was sufficient and energetically efficient feeding opportunities were present (Yonge 2001). Also near Cook City, 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).

Grizzly bears would initially be displaced from about 7000 acres in the drainage due to high levels of human activity. Grizzly bears are already displaced from about 5656 acres of this area, as described earlier. However, the activities associated with Rock Creek Mine would become predictable, routine and concentrated along FR 150, especially as the operation phase is implemented. Habituation of grizzly bears to these activities would allow bears more use of surrounding habitat, but would be detrimental if human food or attractants were available. Food-conditioned bears typically become threats to people and so are often euthanized through management actions. Attractant storage measures would be implemented at the mine site, and routinely inspected by the State grizzly bear specialist, funded by Revett. Employees would be highly informed of the importance of attractant-storage issues through programs developed by the State grizzly bear specialist. Mine employees would be prohibited from carrying firearms when on duty. Public use of roads would occur, but illegal shooting would be discouraged by the presence of mine employees and associated traffic on the road. With full implementation of these measures, grizzly bears could potentially habituate to the activity and disturbance along FR 150 and use habitat nearer the mine site without negative consequences from mine activities.

We anticipate that the displacement impacts related to mine-generated disturbance within the Rock Creek drainage on resident female grizzly bears would decline as time goes on, although not entirely. Over time, we expect the potential for adverse consequences to grizzly bears frequenting areas near the mine site would be lowered because of effective sanitation, information and education mitigation efforts (see lists under 1, 2, and 3 of section: *Mitigation plan measures to reduce risk of grizzly bear mortality*, found later in this document). However, use of this habitat by grizzly bears may result in habituation to human presence. This habituation in turn may make less wary bears more vulnerable to human-caused mortality if they attempt to use other developed areas within their home ranges or, especially in the case of subadults, other areas to which they may wander or be displaced, such as residential sites. The two State grizzly bear specialists and the law enforcement officer would improve the level of information on co-existing with grizzly bears that is provided to area residents. The bear specialists would work within the communities to reduce the risk of attractant-related conflicts. Reducing the potential for such conflicts in communities within and outside the immediate action area is intended to contribute to offsetting the risks associated with grizzly bears habituated to people and human activity at the mine.

The specific effects of such habituation on specific grizzly bears in the area is difficult to predict, as is whether bears that become accustomed to mining activity and use the

habitat in the Rock Creek drainage would retain some wariness of people. Although grizzly bears are not hunted in the contiguous United States, people in the area would use trails and areas of the drainage further from the mine and mine activity for dispersed recreation, carry firearms and use the area for hunting. The sporadic disturbance generated by dispersed recreation and hunting would likely serve to keep some grizzly bears wary of people; grizzly bears more often flee from encounters with people when on foot or where human access and use is not spatially or temporally predictable (Jope 1985, Gunther 1990, and Albert and Bowyer 1991 *in* Mattson 1993; McLellan and Shackleton 1989b). Such activities present a greater direct mortality risk (for instance, malicious or accidental shooting) for habituated bears that do not retain some wariness of people. The programs conducted by bear specialists would increase public awareness of the presence of grizzly bears and bear behavior.

In summary, we expect female grizzly bears, especially females with cubs, would under-use or avoid habitat near the mine sites and roads. Such displacement is probably already occurring to some extent, as Forest road 150 is an open road, but displacement potential would increase with mine activity. As time goes on, however, these females or others are likely to regain the use of some areas in the Rock Creek drainage at higher elevations further from the roads and disturbance, especially to take advantage of quality summer or fall habitat. Grizzly bears may habituate to the noise and activity of the mine without suffering the negative consequences of habituation by retaining wariness of less predictable or routine human activity, such as dispersed recreation. We expect that displacement would be most significant during the construction phase, as adult female bears using the Rock Creek drainage would have to adjust to the newly increased human activity. As time goes by, we expect that the potential for impaired reproduction would decline as bears adjust by habituating to the disturbance or by using alternative habitats within their home ranges. Over the short- and long-term, the severity of the effects of displacement of grizzly bears from the project area would be alleviated by substantial amounts of core habitat and moderate motorized access levels in the action area (see discussion 4 below) and acquisition of replacement habitat (see discussion 3 below). Also, the following sections and discussions describe how the effects of displacement on the CYE grizzly bear population would also be moderated by continued augmentation, and improved connectivity between the Cabinets and the Yaak portion of the CYE.

- 4. Displacement within the BMUs would be moderated by Forest Plan standards that address habitat condition and displacement.** The 2004 Forest Plan amendment replaced previous access management standards and assessment criteria with subunit-specific access standards, in accordance with IGBC recommendations (IGBC 1994 and 1998). Project compliance with the 2004 amendment requirements is discussed below. However, habitat effectiveness and some BAA measures originally calculated for the proposed action and parts of the analysis remain biologically informative, and therefore are summarized here.

Habitat effectiveness is one measure of the impacts of human activities on grizzly bears. Habitat effectiveness is measured by identifying a zone of influence around open roads, logging activities, and other high-impact human activities in order to quantify the

remaining secure habitat outside the zone of influence. Road density, core area, and BAA displacement analyses are other measures of these impacts. These analyses provide a measure of the degree to which a bear must alter routine behavior in response to human activities, or the degree to which it is displaced.

Habitat effectiveness *Prior to the 2004 amendment, the Forest Plan standard was 70 percent or more of secure habitat (habitat effectiveness) within a BMU.*

Summary BMUs 5 and 6 would provide 70 percent or more habitat effectiveness during the project or after reclamation. Currently, habitat effectiveness in BMU 5 is 75 percent, which more than meets the prior 70 percent standard, and the project would not change habitat effectiveness (USDA 2002b and 2003). Current habitat effectiveness in BMU 6 provides 69 percent, and the proposed action would increase habitat effectiveness to 70 percent or higher. BMU 4 provides 65 percent. The proposed action would decrease habitat effectiveness an additional 2 percent in BMU 4, the BMU most directly impacted by the mine. Habitat effectiveness in this BMU will likely never reach the standard of 70 percent due to the influences of Highways 200 and 56. The proposed action does not affect habitat effectiveness in BMUs 2, 7, 8, or 22, which overall provide high habitat effectiveness values: 83, 80, 70 and 71 percent habitat effectiveness respectively (see Table A7).

Displacement habitat BAAs *Prior to the 2004 amendment, the Forest Plan standard was to provide displacement habitat in an undisturbed BAA adjacent to each BAA impacted by a major activity.*

Summary The project meets the previous standards or assessment criteria. The results of this analysis indicated 5 displacement BAAs were required to offset the loss of spring habitat within the 3 BAAs directly impacted by the major activity (mine). Five displacement BAAs would be provided.

Open and total motorized route density *The 2004 Forest Plan amendment limited open motorized route densities exceeding 1 mile per square mile to no more than 36 percent, 30 percent and 34 percent of BMUs 4, 5, and 6 respectively. The amendment limited total motorized route densities exceeding 2 miles per square mile to no more than 26 percent, 23 percent and 32 percent of BMUs 4, 5, and 6 respectively.*

Summary The proposed action would meet the access requirements of the amended Forest Plan. The proposed action would not substantially change motorized route densities. Open and total motorized route densities would not change, or would slightly decrease with implementation of the proposed action (Table A12).

The proposed action would not change motorized route densities in BMUs 2, 7, 8, or 22. Current route densities in the action area are moderate and provide conditions suited for use by grizzly bears. All but BMU 22 meet or are within three percent of meeting Forest Plan standards for open or total motorized route density. Further, in BMUs 4, 5, and 6, open and total route densities would remain the same or decrease (improve), and meet or

provide slightly better access management conditions than required by Forest Plan standards (Table A12). The exception is BMU 4, which is within one percent of open motorized route density standards, and would not change. The Forest Plan includes a time frame/schedule within which all BMUs will eventually reach standards.

Discussion The IGBC (1994,1998) recommended managing both open and total motorized route densities and providing adequate core areas for grizzly bears, based on research conducted within specific ecosystems. The Service endorsed this strategy to limit the effects of road densities on grizzly bears. Because of scale and the effects of motorized administrative use of closed roads on grizzly bears, management of core area and open and total route densities outside of core at the BMU scale is a better indicator of habitat security for grizzly bears than are displacement BAAs. As mentioned earlier the 2004 Forest Plan amendment incorporated management of route densities and core and discarded management on smaller BAAs scales.

The proposed action would not increase open or total motorized route densities, or decrease core area, in any BMU (Table A12). Open and/or total motorized route densities would decrease (i.e. improve) slightly in BMUs 4, 5, and 6.

Table A12. Percent of BMUs with open motorized route density exceeding 1 mile per square mile (OMRD) and total motorized route density exceeding 2 miles per square mile (TMRD) (data from USDA 2002b; USDA in litt. 2006).

	Percent of BMU**					
	BMU 4		BMU 5		BMU 6	
	OMRD	TMRD	OMRD	TMRD	OMRD	TMRD
Forest Plan Standard	36	26	30	23	34	32
Baseline 2005 (USDA in litt. 2006)	37	26	27	24***	34	32
Net percent change due to Rock Creek Mine (USDA 2002b)*	0	-1	-1	-1	-1	0

*Net change in road densities as a result of the Rock Creek Mine construction and operation, including full implementation of the proposed road closures in the BA, but **not** including mitigation lands.
 **For comparison, 33 percent of an average female home range exceeded 1 mile per square mile OMRD and 26 percent exceeded 2 miles per square mile TMRD (Wakinen and Kasworm 1997).
 ***TMRD increased by 1% in 2005 due to road construction on private land (U.S. Forest Service, in litt. 2006).

Open and total motorized route densities in BMU 6 are elevated by roads on private corporate timber lands (6 sections) in the BMU and by Highway 200. The project would slightly decrease open motorized route density in BMU 6, and would not change total motorized route densities in BMU 6 (see Table A12). If route densities on private lands remain similar to existing conditions, access conditions would meet or be slightly better than Forest Plan standards for BMU 6, during and after the proposed action.

In BMU 4, open motorized route density is elevated by Highways 200 and 56. The project would not increase open motorized route densities further. The Rock Creek Mine

road closures identified in the BA and revised mitigation plan (MDEQ and USDA 2001) would result in limiting high total motorized route densities to less than 26 percent of BMUs 4 and 5. If route densities on private lands remain similar to existing conditions, access conditions would meet or be slightly better than Forest Plan standards for BMU 4, during and after the proposed action.

Four of the seven BMUs within the larger action area have open motorized route densities (exceeding one mile per square mile) that are equal to or less than that within the average female home range as reported in Wakkinen and Kasworm (1997) and required by the Forest Plan amendment (see Table A8; and Appendix D). The proposed action would result in slight improvements (decreases) in open motorized route densities in BMUs 5 and 6. With implementation of the proposed action, five of seven BMUs would then have open motorized route densities similar to or slightly less than that in the average female home range as reported in research, meeting or providing better conditions than Forest Plan standards.

Four of the seven BMUs within the action area have total motorized route densities (exceeding two miles per square mile) that are comparable to or less than the average within a female home range as reported in research (Wakkinen and Kasworm 1997) and required by the Forest Plan amendment (see Table A9). The proposed action would result in slight improvements (decreases) in BMUs 4 and 5 (see Table A12). The acquisition or easement of mitigation lands would also either further reduce existing motorized route densities or prevent future increases in motorized route densities by obviating the need for access to privately-owned in-holdings.

Core area *The 2004 Forest Plan amendment required core areas of 63 percent, 60 percent, and 55 percent in BMUs 4, 5, and 6 respectively, and the incidental take statement in the 2004 biological opinion on the Forest Plan amendment requires no permanent loss of core area.*

Summary The proposed action would meet the requirements of the 2004 Forest Plan amendment and the 2004 incidental take statement in the biological opinion on the amendment (USDI 2004). The proposed action would not result in a reduction of baseline core area (USDA 1998b) in any BMUs. The biological opinion on the 2004 Forest Plan amendment concluded the proposed access management was not likely to jeopardize grizzly bears. Across the action area, core area exists in substantial amounts for use by grizzly bears and the proposed action would not decrease core area.

Discussion Core area currently comprises 63, 59 and 54 percent of BMUs 4, 5 and 6 respectively (USDA in litt. 2006a) (Table A13). The amount of core habitat would not decrease in any BMU and could improve further as a result of the acquisition or easement of mitigation properties associated with the proposed Rock Creek Mine project. The Service considers core areas extremely important in partially offsetting the impacts of the proposed action. The existing and resulting levels of secure core, and the seasonal habitats within them, would provide essential habitat for grizzly bears in BMUs 4, 5, and

6. Further, core areas in adjacent BMUs 2 and 7 are substantial at 77 and 67 percent. The BMU 8 provides 56 percent core and BMU 22 provides 51 percent.

	Percent BMU 4	Percent BMU 5	Percent BMU 6
Forest Plan Standard	63	60	55
Baseline 2005 (USDA in litt. 2006a)	63	59 ^{***}	54 ^{***}
Net percent change due to Rock Creek Mine (USDA 2002b)*	0	0	0
<p>*Net change in motorized route densities as a result of the Rock Creek Mine construction and operation, including full implementation of the proposed motorized route closures in the BA, but not including mitigation lands. **For comparison, 55 percent of an average female home range was core area (Wakkinen and Kasworm 1997). *** 1% change due to 2005 INFRA motorized route database corrections (U.S. Forest Service, in litt. 2006).</p>			

The proposed action may result in heavier use of popular hiking trails in the action area, due to increased people living in the immediate area. A reduction in effective core area habitat would occur if human use of the Rock Creek or St. Paul Trails in BMU 5 reach levels that would result in the displacement of grizzly bears. This trail is located in a narrow north-south movement corridor between BMUs 6,7,8 and 22 and the rest of the Cabinet Mountains to the north and northwest.

The mitigation plan includes funding for the Forest to monitor the trails and a contingency strategy to manage recreational use of the Rock Creek and/or St Paul Trails in the event use levels increase to “high use” levels. As proposed, “high use” levels during one year would result in limits on trail use imposed during the following year. This may result in short-term adverse impacts to grizzly bears in the area during the first year of high use. The Service agrees that trail management restrictions would be best implemented on a recreational season basis to foster public understanding and acceptance. The short-term impacts during the high use year that triggers restrictions would likely be tolerated by grizzly bears in the area provided remedies be immediately implemented prior to the following recreational season, and food and attractant storage is adequately monitored and enforced.

Core area in BMU 5 could potentially be impacted by a ventilation adit in the wilderness area (USDA 1998b). The proposed ventilation adit would be located in a cliff that the 1998 BA (USDA 1998b) states is not currently usable by grizzly bears. Currently the adit is predicted to affect a surface area of 800 square feet (SEIS). The adit portal size would be approximately 15 feet by 15 feet (Dave Young, Sterling Mining Company, in litt. 2000). It would be accessed from underground, and some rock might be expelled to the surface. The fans would be installed well below the surface and noise would be estimated to be less than 45dBA more than 50 feet from the adit. The 1998 BA (USDA 1998) states that the noise level from the adit would be low since fans would be deep in the adit and therefore concludes that there would be no loss of core. However, the noise generated by the ventilation adit may constitute an impact on grizzly bears and if it is

determined as such, the area would be buffered and discounted as core area as would area impacted by any other disturbances to grizzly bears.

The wilderness ventilation audit may not be needed, pending information gained during the evaluation audit and construction phases of the mine. The ventilation audit would be evaluated at the time it is needed (and if it is needed) to determine alternatives and to ensure latest technology is incorporated. If the ventilation audit is needed, the Forest and the Service would assess the situation prior to construction to further reduce potential impacts as appropriate.

Movement corridors *The Forest Plan standard is to maintain forested corridors at least 600 feet wide between management induced or natural forest openings. Functional hiding cover has a minimum of three sight distances following timber harvest, where a sight distance is the mean distance at which 90 percent of an animal is hidden from view.*

Summary The proposed Rock Creek Mine would meet the Forest Plan standard or assessment criteria of maintaining a minimum of 600 feet between openings (BA 1998). The BA noted that this standard was primarily intended for vegetation management-created openings (e.g. openings between harvest units).

Discussion The displacement of grizzly bears is affected by the availability and functionality of cover within which to move about home ranges. Although the standards would be met, the effectiveness of movement corridors and cover adjacent to the Rock Creek Mine area would be significantly impacted. The presence of new facilities (on-site), increases in motorized traffic levels on FR 150, and anticipated increases in motorized and non-motorized recreation due to improved access would increase disturbance to grizzly bears attempting to use these corridors near the mine site.

Conservation measures proposed for the Rock Creek Mine project include a transportation plan to reduce traffic levels, including busing employees to the mine facilities. Even with the transportation plan in effect the Forest anticipates a 1,120 percent increase in road use during construction phase of the proposed Rock Creek Mine and a 300 percent increase in road use during the operation phase (USDA 1998b). The increase in traffic volume on FR 150 would not approach levels that are likely to constitute a complete barrier to movement of grizzly bears, based on existing research (Waller and Servheen 2005, Chruszcz et al. 2003, Ruediger et al. 1999).

However, effective cover along FR 150, the principal access road, would be compromised by the increased traffic. The ability of the influence zone around the road to support grizzly bears would be reduced from existing levels, as discussed earlier under 3) above. Existing cover areas also may be impacted by the increased recreational use anticipated with the influx of people into the area.

Seasonal habitat protection *The Forest Plan standard is:*

1. *Spring habitat protection objective: schedule activities within spring habitat (southerly aspects less than 5,000 feet elevation) outside spring season from April 1 to June 15.*
2. *Den site protection objective: allow activities within one-half mile of known den sites only outside the denning season, from November 15 to April 1.*

Summary The project would not meet the Forest Plan standard for spring habitat. No seasonal avoidance of important spring habitats can be incorporated into the mine activities since the mine is planned to run year round, 7 days a week, and several shifts a day. A total of 26,822 acres of spring habitat components are present in the three BAAs directly affected by the Rock Creek Mine (USDA 1998b). Up to 6500 acres of this spring habitat will be impacted by the proposed mine sites and associated roads. However, as described previously, many of these acres are already affected by high use on existing roads, especially FR 150 and the Highway 200 (W. Johnson, pers. comm. 2002). Due to the increased traffic volumes and significant human activity along the FR 150 and at the mine site, this spring habitat would be under-used by grizzly bears.

Denning habitat is not expected to be impacted by this action (USDA 1998b, page 23). BMUs 5 and 6 provide denning habitat in designated roadless areas in high elevation grizzly bear habitats within the Cabinet Mountain Wilderness Area.

Discussion As mentioned earlier, this analysis indicated that five displacement BAAs be required, and have no major activity for the life of the Rock Creek Mine. Spring habitat would be lost to bears through facility or road development, and bears would likely be displaced from adjacent areas of spring habitat. Between 6400 and 6500 acres of spring habitat would be directly impacted by the proposed action and major activities, through site development, roads, or increased disturbance in adjacent influence zones. To compensate, five displacement BAAs would protect 177 more acres of spring habitat from major activities than that affected by the proposed mine. Displacement BAAs would not result in a net increase in acres of spring habitat, but would ensure that more acres of spring habitat were protected from major disturbances, throughout the life of the mine, than the amount of spring habitat lost to the mine. This measure provides for over 6500 acres of spring habitat to be available for use by grizzly bears throughout the life of the mine. Displacement BAAs also secure more potential denning habitat than that occurring in the active BAAs (USDA 1998b).

Further, based on the best information available, information in the BA indicates that core areas in BMUs 4, 5 and 6 contain substantive amounts of spring habitat (defined as <5000 feet elevation on south, east or west aspects) (see Table 17 in BA). The core areas within the BMUs provide proportionately more spring habitat than that available in the BMUs.

5. **The mitigation plan requires that the Forest form and lead an Oversight Committee that would develop an MOU to define the roles and responsibilities of each member and the committee itself. Participation by DEQ and Montana Fish, Wildlife and Parks on the oversight committee would be strongly encouraged. The Service would participate in an advisory capacity.** The mitigation plan includes several measures and requirements such as acquisition of fee title or conservation easements on property, and extends over a 35-year time period. The plan is complex and would require detailed oversight to achieve objectives. Accurately predicting or anticipating conditions related to the CYE grizzly bear population over such a long time frame is difficult. The mitigation plan states that the Oversight Committee has the responsibility to oversee the implementation of all mitigation requirements, and to collect and review new information on grizzly bears and other information relevant to CYE grizzly bears over the life of the mine. If such information or relevant data indicate the need, the provisions of adaptive management would allow modifications of the mitigation plan. The Service would be an ex-officio, nonvoting member of the Committee, with advisory responsibilities. We would review proposed revisions to the management plan or mitigation plan under the appropriate section 7 provisions, if required.

The Forest would also organize and lead regularly scheduled meetings, attended by agency, county commissioner, mining company, local citizen and other non-governmental group representatives, and the interested public in general. This group would meet regularly to review management objectives, implementation of mitigation measures and review monitoring and research results.

6. **The mitigation plan requires funding to conduct a long-term monitoring study of grizzly bears throughout the life of the mine within the action area, in coordination with the current grizzly bear research conducted in the CYE.** The Service's current monitoring effort in the CYE was expanded to include monitoring all grizzly bears augmented into the Cabinet Mountains as a result of the Montana Fish, Wildlife and Park's effort. However, annual federal funding for such monitoring is not assured and dependent upon annual federal budgets. Revett has agreed to provide funding to ensure that the Service is able to adequately monitor the augmented bears, as well as native bears (see mitigation plan). Monitoring information would provide essential survival and reproductive information females and cubs, both native and augmented bears. Augmentation of the grizzly bear population in the Cabinets Mountains, along with reduced grizzly bear mortality through mitigation plan measures, will over time provide an improved and improving baseline for the CYE grizzly bear population (see discussions under *Grizzly Bear Mortality Risks* section below). Over time, this improved population status is expected to more than offset any loss of reproductive potential in the female grizzly bears displaced from areas surrounding the mine.

Monitoring results would be used to assess whether mitigation measures, including road closures, habitat acquisition and easements, were in fact working to maintain grizzly bear use of habitat within the action area. If information suggested otherwise, the Oversight Committee would develop and recommend measures the Forest could implement to

remedy the situation, and allow agencies to employ adaptive management if needed to accommodate the conservation needs of grizzly bears in the area. The Service, in its advisory capacity on the Committee, would advise the Forest as to whether additional consultation may be required to assess new information or changes in the mitigation plan resulting from adaptive management.

Displacement summary In its March 28 2005 Order, regarding whether mitigation would sufficiently remedy the habitat problem, the court raised the concerns that it appeared the Service was “not even sure what the effects of displacement will be.”

The Service has determined that it is not possible to precisely quantify the effects of displacement especially when related to whether such displacement actually kills or injures wildlife by significantly impairing breeding, feeding or sheltering. Displacement is likely the result of the level of disturbance, relative habitat quality and population density. Displacement may not occur where the level of disturbance is low, or in very high value habitats even where disturbance levels are high, or may not occur if there is a lack of adequate quality habitat elsewhere. Displacement may not occur if bears have no options to move elsewhere due to the presence of other bears.

Precisely quantifying or predicting such effects on grizzly bears is difficult for several reasons. While displacement of grizzly bears, or under-use of habitat by bears, has been well-documented, research has yet to quantify the effects of disturbance or displacement on fitness or reproduction in grizzly bears. At this time we *estimate* that two adult females could potentially be using the Rock Creek drainage and other portions of the action area. As time goes on and grizzly bear numbers increase, more adult females, perhaps offspring of existing bears or augmented bears, may use the area. It is difficult to predict how many females would attempt to use the Rock Creek drainage over the course of 30 years. However, we know that road densities and core areas in the action area are mostly similar to or better than levels in the average female home range (Wakkinen and Kasworm 1997), so we do not expect that road density would substantially negatively impact use of the action area by females. Based on existing research, we expect that some individual female grizzly bears may be displaced by the high, constant levels of disturbance generated by the mine (Mace et al. 1996, Waller and Servheen 2005) and others may become accustomed to the continuous, routine disturbance (Mattson 1993, Yonge 2001, Tyers 2006). Of those bears displaced, some may find adequate habitat away from the mine and suffer no significant impacts. Some may be stressed to levels that impair their reproductive potential. Finally, factors such as availability of seasonal foods are dependent upon annual climate and precipitation, and have a strong influence on reproductive success (see Kasworm et al. 2005). All of these factors play a role in the reproductive success of females using the Rock Creek drainage. Most are not easily predicted or well understood given current information. Therefore, how the disturbance caused by the mine would affect female grizzly bears over a 30-year period is difficult to predict with certainty due to the influence of factors (e.g. individualist nature of bears, habitat quality, climate) that are inherently variable.

Despite the uncertainty, the best information suggests that there would *initially* be displacement effects on female grizzly bears now using the Rock Creek drainage. At the current time, we estimate that about two adult female bears may be using the action area (as discussed earlier). These female bears would be impacted initially because they are unaccustomed to the level of disturbance created by the mine. We expect this initial displacement would begin when construction of the mine begins and human activity levels substantively increase along FR 150, the route leading to the mine. Displacement of bears would be most pronounced at lower elevations in the drainage near the road, particularly spring habitat, but would extend throughout larger portions of the drainage for some time, affecting a total of about 7000 acres, including 5650 acres of habitat already disturbed by existing roads. It is not likely that the displacement effects of the mine would drive grizzly bears from established home ranges within the action area, especially female bears, even though displacement effects in the Rock Creek drainage during the construction phase initially may be significant. We anticipate that at some time during the 30-year life of the mine, most likely during the 5-year construction phase, one to two adult female grizzly bears may be displaced to the point where their reproduction is impaired. In other words, females may not breed or complete a pregnancy during a breeding cycle due to lack of adequate nutrition or stresses associated with displacement. We do not anticipate that this impairment would be permanent. We do not anticipate that this level of disturbance would result in the death of cubs, subadult or adult bears.

Over time, we expect that the severity of this effect would diminish to lower levels. Female grizzly bears initially displaced from Rock Creek drainage when construction begins would eventually regain their reproductive potential through adaptation, by using other portions of their home range or by habituating to the disturbance over time to regain use of preferred habitat. The area from which bears would be displaced, about 80 percent of which is already impacted by disturbance from roads, represents only a small proportion of an average female grizzly bear home range. Based on the size of grizzly bear home range, the direct displacement impacts of construction and operation of the mine and the existing habitat condition (including roads and core area) now and during the life of the mine, it is reasonable to expect that those grizzly bears that use the Rock Creek drainage would have alternative areas to use if displaced from areas near the mine. Existing and future levels of motorized route densities and core area, with implementation of the mine, meet or are within one percent of Forest Plan standards and are similar to or provide better conditions than those in an average female home range.

Further, 2450 acres of habitat would be acquired by the Forest or conserved under conservation easement to compensate for the displacement. Some of the identified habitat parcels have existing development or have roaded or trail access to them, and some as of yet undeveloped parcels would likely be developed within the next 30 years. As explained earlier in this biological opinion, the benefits of conserving this acreage would add to security on additional acres as well. Conservation of this habitat for grizzly bears over the long term would contribute to suitable habitat for female grizzly bears during the life of the mine. The replacement habitat acquisition would contribute further

to offsetting the long-term disturbance effects of the mine. Finally, some grizzly bears, either those living there now, their offspring, or bears immigrating to or augmented into the area, are likely to adapt to the consistent, repetitive noise provided that natural food availability and quantity are not reduced and they suffer no adverse consequences associated with the mine activity. The effects of attractant storage, lack of firearms at work sites, and intensive education program for mine employees would improve the likelihood that bears could successfully regain some use of habitat from which they were initially displaced. Thus, habitat conditions in BMUs 4, 5, and 6 should continue to allow female grizzly bears to successfully produce offspring over the long-term.

Therefore, the direct loss of habitat (483 acres, of which 115 are MS 1 habitat) plus under-use of influence zones around the sites and roads may initially have adverse effects on grizzly bears. We expect that during the construction phase of the mine, displacement effects on one or two adult female grizzly bears using the area would result in some level of impairment of reproduction, but would not impair females' reproduction over the long term. The lasting effect of the mine would be long-term under-use of habitat in, but likely not total avoidance of, the 7000-acre influence zone within the Rock Creek drainage. While this under-use of habitat by grizzly bears is of concern in an ecosystem the size of the CYE, these adverse effects would be offset by the conservation measures. Considering the large home range sizes of grizzly bears and the area of displacement, the information on grizzly bear home range use in the Cabinets (Kasworm et al. 2002, and 2005), Noranda's abandonment of the Montanore mine project in the east side of the action area, the year-long and seasonal road closures on the east side, the existing habitat condition, existing and future management of roaded access in action area BMUs, and habitat acquisition, it is reasonable to expect that grizzly bears with home ranges encompassing the Rock Creek drainage would have relatively secure alternatives to habitats from which they are displaced due to mine-related disturbances over the life of the mine. Finally, the grizzly bear monitoring required as part of the proposed action would enable the Service to evaluate the impacts of displacement on bears over time.

Human-caused grizzly bear mortality risk

The action area occurs within a narrow portion of the Cabinet. Since 1988, credible sightings of individual grizzly bears in all 14 BMUs in the Cabinet Mountains were reported, including BMUs in the action area (Kasworm et al. 2005). Based on large grizzly bear home ranges, grizzly bears that live in the southern Cabinet Mountains have a high probability of being somehow affected by the mine itself or by increased numbers of people working and living in the area.

The most prominent direct and indirect effects on grizzly bears from the implementation of the proposed Rock Creek Mine project would stem from the influx of mine employees into this relatively remote area. This local workforce would live within commuting distance of the proposed Rock Creek Mine. The FEIS (MDEQ and USDA 2001) suggested the number of immigrants (mine employees and families, and people associated with related employment) to the area could range from 450 to a high of about 770 during peak construction periods; numbers

would vary over a period of about 5 years during the construction period. Of total mine employees during construction periods, 206 to 230 would be local hires and 163 to 319 would be immigrants.

The initial influx of workers into grizzly bear habitat would be associated with the evaluation adit phase of the project. The first influx of people would range from 23 to 73 employees and their families (MDEQ and USDA 2001). Unmitigated, this number of people could pose some risk to bears in this ecosystem. This phase would bring people into an area that is relatively undeveloped at the current time, which could be associated with higher mortality risk to grizzly bears. However, these potential risks would be immediately addressed, reduced, and more than offset by the magnitude of the mitigation plan measures to address mortality risk, specifically those to be in place *prior to construction of the evaluation adit*. The bear management specialist and law enforcement officer would be on duty to advance bear awareness and education in the community and among the employees. Each employee would meet and receive information from the grizzly bear management specialist and law enforcement officer, receive a personal-use grizzly bear resistant garbage container for use at home, and be encouraged by Revett to respect the importance of grizzly bear conservation efforts needed to live compatibly with bears, in or near grizzly bear habitat. Other measures are listed in discussions below. Further, because the term of employment is limited (12 to 18 months), most of these employees would seek rentals, motel units, or mobile home recreational vehicle sites, rather than build new homes (in or near grizzly bear habitat) and remain in the area.

Most of the human impact would be associated with the subsequent five-year mine construction phase. Peak levels of immigrant workers, families and people associated with related employment would be about 770 people during the construction phase. Following the five-year construction period, the full production stage could last about 28 years during which time the mine would employ about 340 full time workers. During operation of the mine (post construction to full production), full time employees (including immigrants and original residents) and their families would live in the area for up to 30 years (MDEQ and USDA 2001). Of these 340 employees, about 240 would be local hires and 100 would be new immigrants to the area. Approximately 200 additional immigrants and their families would live in the Cabinet Mountains area to work at associated businesses that would develop. Fewer total immigrant numbers (workers, families and people associated through related employment) are associated with the production phase, about 660 compared to peak levels of about 770 during construction. Most immigrating employees and their families would settle in the local area. Of these total immigrants, 332 would live in the Noxon/Heron/Trout Creek area, with stable employment during full production. About 200 immigrants would settle in Thompson Falls. This immigration would result in an 11 percent increase in the current local population (Noxon/Heron/Trout Creek area) over a period of years (MDEQ and USDA 2001). The remaining immigrants would live further from the mine in Troy, Libby, and in eastern Idaho (see MDEQ and USDA 2001, Table 4-57) resulting in less of a proportional increase in population of these areas. Additionally, it is expected that people already living in the area would fill a number of the positions at and in support of the mine (see MDEQ and USDA 2001, Table 4-56).

The construction and full operations period would require between 304-320 new housing units (MDEQ and USDA 2001). The local area of Noxon/Heron /Trout Creek would see the largest number of new households, 116 to 125, and the rest would be distributed in the Thompson Falls, Troy, Libby and Eastern Bonner County, Idaho areas. Some new residents would build on undeveloped private land in or near the CYE, perhaps resulting in a permanent loss of habitat otherwise available to grizzly bears. Others would occupy existing housing within commuting distance. An estimated 150 acres of private land could be developed (USDA 1998b). Probably more important than actual acres of habitat developed, the associated increased number of people living on private lands in or near bear habitat would increase the potential for conflicts with grizzly bears related to sanitation, habituation or displacement, thus increasing grizzly bear mortality risks due to management actions or illegal actions. Large numbers of dispersed home sites in rural areas or new subdivisions in previously rural areas would impose adverse impacts on grizzly bears. If new home sites were developed in or adjacent to existing communities, less impacts on grizzly bears would occur than if homes were built further from existing towns or settlements. Grizzly bears tend to avoid areas of high human activity such as towns and communities. This tendency would generally keep many grizzly bears from wandering near new home sites that were located within or near existing communities, thus reducing the potential for habituation and food conditioning. We have no information predicting how many of the 304 to 320 new homes would be built in or near existing communities.

Potential sources of human-caused grizzly bear mortality as a result of direct or indirect impacts of the proposed mine can be attributed to two primary and somewhat overlapping categories, attractant-related and recreation-related mortality. Traffic-related mortality may also increase somewhat due to increased traffic along major roads such as Highway 200. Traffic levels along Highway 200 in and near the action area already exceed those levels that usually result in some mortality risk to wildlife (Ruediger et al. 1999). The effects of the action, including mitigation measures to reduce adverse effects, are discussed next under these categories, followed by an analysis of the effects of the mitigation measures aimed at reducing human-caused mortality risk.

Attractants The area proposed for Rock Creek Mine is currently relatively remote, and most people live along the main roads and in small towns. The proposed Rock Creek Mine would substantially increase the number of people working, recreating or maintaining homes in the area. The influx would occur over a very short time frame once hiring for the mine begins. Local residents already living in the area generally have had repeated exposure to grizzly bear issues through the media, workshops, school presentations and personal experience. Newly-arrived people coming from areas where grizzly bears do not occur, or immigrating from areas where living with wildlife is not emphasized, would increase the risks of conflicts between people and grizzly bears. Some people may be prone to poor compliance with sanitation recommendations. Voluntary education and information programs typically result in success over a period of time. Without pro-active attractant storage measures, grizzly bears in the area could be exposed to a rapid increase in available garbage, pet foods and other household attractants with little opportunity to adapt. Thus, the risk of the indirect effects of food conditioning or other types of habituation resulting from additional human residences on private lands would increase.

Unmitigated, an ingress of people could result in increased *potential* for attractant-related conflicts with grizzly bears on public lands as well. Attractant-related incidents would likely be infrequent at first; such incidents have not yet been reported in the Cabinet portion of the CYE, probably due to the existing small number of grizzly bears and sparse human population in the region. As the grizzly bear and human populations expand, the potential for conflict would increase.

We anticipate that food storage and attractant issues would be less problematic on Forest lands than on private lands. The Forest does not currently have a mandatory forest-wide food storage order that requires forest users to keep their food unavailable to grizzly bears. The mitigation plan requires that the Forest implement a food storage order specifically for BMUs 4, 5 and 6 prior to the construction of the evaluation adit. In addition, the Forest would implement a food storage order Forest-wide within 5 years of construction of the evaluation adit. These orders would be mandatory, and success would depend on enforcement by the Forest and upon long-term education and information efforts. The order would mandate that all human foods and attractants be made unavailable to grizzly bears. Additionally, grizzly bear resistant garbage receptacles would be required at the mine site as well as in campgrounds or other Forest facilities within all BMUs in the CYE where garbage containers are normally provided. These efforts to curb attractant-related conflicts on public land would become increasingly effective over time, with the increased levels of information programs in the CYE. These measures would substantively reduce the risk of grizzly bear mortality as a result of habituation and food conditioning on national forest lands. Such risks to grizzly bears resulting from the mine-related increase in number of people using the Forest would be lowered. Further, such risks outside the action area and not associated with the mine would be lowered from the existing condition.

Many of the human impacts associated with the Rock Creek Mine that may affect grizzly bears would occur on private lands, which are beyond the direct jurisdiction of the Forest or Revett Silver Company. Attractant storage conflicts between bears and people would likely arise on private lands over the 35-year life of the mine. Private land attractant storage issues are typically more difficult to resolve than those occurring on national forest.

Unmitigated, the mortality risk to grizzly bears associated with attractant storage would grow with increased numbers of residents in the vicinity of the mine. In both the YGBE and the NCDE, attractant storage issues became one of the primary causes of conflict between bears and people, and of human-caused grizzly bear mortality as the number of bears and people in and around the ecosystem increased. As discussed earlier, while attractant storage has not yet been a primary cause of human-caused grizzly bear mortality in the CYE, we expect its significance to increase as the bear population grows. In the past few years, one grizzly bear was killed through management action and five others relocated because of habituation or the risk of habituation to human foods and garbage. However, the proposed action addresses the problems and would significantly reduce the risks both from the proposed mine and the current condition. Benefits would accrue over time, especially as the grizzly bear population increases over time. Without funding for the conservation measures outlined in the mitigation plan, the current condition for grizzly bears is not expected to improve. Adequate funding through government sources is not likely within the near future. Details are described in the following section *Summary of all*

mitigation plan measures to reduce risk of grizzly bear mortality.

Over a 35-year period, the Rock Creek Mine would likely result in the risk of grizzly bear mortality because of attractant storage conflicts. The expected increase in numbers of people in the area and the 35-year life of the mine would increase the potential for bear-human confrontation. The agencies recognized this risk, and therefore the mitigation plan includes a number of measures to significantly reduce this potential for mortality associated with the mine. Further, the measures in the mitigation plan would substantially improve conditions for grizzly bears over current conditions not attributable to the mine. A full listing of measures to address sanitation-related risks occurs below in the *Summary of all mitigation plan measures to reduce risk of grizzly bear mortality.*

Recreation Roads and trails facilitate encounters between grizzly bears and humans, and roads markedly increase the risks of grizzly bear mortality, especially at higher open road densities. Seventy-five percent of the human-caused grizzly bear mortalities from 1982 through 1999 in the CYE were within 500 meters of an open road (W. Kasworm, pers. comm. 2002). Hunting-related incidences and poaching contribute to human-caused grizzly bear mortalities. Increased trail use leads to increased chances of bear-human interactions with bears that are not displaced from trails and the habitat around it.

As discussed earlier, open road and trail densities would not increase over existing levels due to the proposed action, and currently are moderate within the action area. The proposed levels of access management would be significant in moderating human access in the action area (see Tables 10, 12, 13). However, an influx of workers, supporting businesses, and families would likely increase recreational use of the existing roads and trails in the action area. Improved access and a substantial increase in local population is expected to increase recreational and hunting use within grizzly bear habitat. In particular, use of the Rock Creek Trail along the East Fork of Rock Creek is expected to increase substantially with the improvement of access, greater publicity and increased people moving to the area. This trail would be accessed by the improved road to the mine and would be expected to attract greater use following improvement of the road. The Rock Creek Trail is currently considered a low use trail, and is not considered a significant detrimental impact to core area or habitat effectiveness.

A reduction in security for grizzly bears could occur within the north south corridor if human use on the Rock Creek or St. Paul Trails increased to levels that displace grizzly bears and contribute to fragmentation of the north to south corridor, or result in a corresponding increase in human food and attractants made available to bears. The potential for confrontations between bears and people would be expected to increase if high use of the Rock Creek Trail should occur. Increased hiking and camping in the area could lead to increased food and attractant storage problems, resulting in conflicts between grizzly and recreationists.

From 1982 through 2005, only four grizzly bears were known to be mis-identified and killed during big game or black bear hunting seasons in the CYE. Increased hunting pressure in the area would elevate the potential for grizzly bears to be misidentified as game species and inadvertently killed. Montana Fish, Wildlife and Parks manages and regulates all hunting in the

action area and currently implements a proactive hunter education program aimed at reducing the potential for mistaken identification of game animals (Montana Fish, Wildlife and Parks 2001). As a result of the fall, 2005 mistaken identity-related death of a grizzly bear by a black bear hunter, the Service has reinitiated consultation on the Montana Fish, Wildlife and Parks grizzly bear management plan (Montana Fish, Wildlife and Parks 2001).

The potential for poaching could increase with the influx of workers with diverse social, cultural and economic backgrounds, many of whom may be unfamiliar with or lack interest in wildlife conservation. For example, following the initial phase at the Montanore Mine project, some workers associated with the mine were convicted of poaching deer (USDI 1993b). From past experience, Montana Fish, Wildlife and Parks has found that poaching incidents tended to increase during construction activities. The spike in illegal activities seems to correlate with transient work forces that work “around-the-clock” schedules, but tends to decline once construction is complete and the stable work force is in place (Mark Soderlind, Montana Fish, Wildlife, and Parks, pers. comm. 2000).

Unmitigated, over a 35-year period, the Rock Creek Mine would likely result in the risk of legal and illegal mortality of grizzly bears. The expected increase in numbers of people using the Forest to recreate over the 35-year life of the mine would increase the potential for conflicts between grizzly bears and people. The agencies recognized this risk, and therefore the mitigation plan includes a number of measures to reduce the potential for mortality. See below for a summary and analysis of the measures in *Summary of all mitigation plan measures to reduce risk of grizzly bear mortality.*

Vehicle collision The Rock Creek Mine would result in increased traffic levels on the access and service roads in the action area, as well as main highways in and around the CYE. Traffic levels on FR 150 are anticipated to increase 1,120 percent over pre-Rock Creek Mine levels during the construction phase (USDA 1998b). Traffic would increase from 30 to 300 percent above existing traffic levels during the 35-year operation period of the Rock Creek Mine. Traffic along Montana Highway 200 also would increase. Grizzly bear mortality resulting from motorized vehicles collision has been documented (Servheen in litt. 2005a; IGBC 1987). Typically, these collisions have occurred on major highways or roads that receive higher traffic volume and have higher speed limits, such as U.S. Highway 2 south of Glacier National Park, and Montana Highways 83 and 93.

The Rock Creek Mine would result in an increase in the average vehicle speed on FR 150 due to the proposed paving of the main access road and several spur roads within the Rock Creek Mine area. As vehicle numbers and/or speed increase on FR 150 and Highway 200, the mortality risk to bears attempting to cross these principal access routes would also increase. The small number of grizzly bears living in the action area and surrounding areas has and would probably continue to contribute to the lack of grizzly bear mortalities along roads in the area. At least one grizzly bear is known to have crossed Highway 200 along the boundary of the action area (Kasworm and Manley 1988). The Service lacks data and information with which to accurately estimate the level of risk associated with higher traffic volumes. If vehicle collision is a risk, it is more likely to occur along Highway 200 than along FR 150, due to higher traffic volumes and speeds along

that route. Traffic on Highway 200 already poses a risk to grizzly bears, although no vehicle-related mortality has been recorded. Traffic levels from 2000 to 3000 vehicles per day usually have adverse impacts on wildlife due to habitat fragmentation and mortality (Dr. Tony Clevenger and Dr. Paul Paquet, pers. comm. *in* Ruediger et al. 1999). Traffic levels on Highway 200 are already in this range. The lack of bear mortality reported is probably a result of few grizzly bears within the CYE, and/or their ability at this point to navigate the highway successfully. Traffic levels are expected to increase, with or without the mine. The level of mortality risk to grizzly bears on Highway 200 that could be attributable to the mine would not likely be determinable, given the already high levels of traffic and anticipated increases not associated with the mine.

Mitigation plan measures to reduce risk of human-caused grizzly bear mortality

The following measures are included in the mitigation plan and would reduce or minimize the mortality risks associated with the proposed action. The 2006 mitigation plan was fashioned in recognition that current levels of human-caused grizzly bear mortality in the CYE were too high, and that measures to reduce mortality were needed with or without the proposed action. Collectively, the measures represent a substantial effort to reduce and minimize human-caused grizzly bear mortality risk, not only that associated with the mine, but also risks that arise from current conditions in the CYE:

1. Management of road and trail access into grizzly bear habitat.

- The Forest would ensure no increases in open or total motorized route densities or decreases in core area within BMUs 4, 5, and 6 for the life of the mine; open and total road densities are near or lower than research averages and core areas are substantial, equal to or greater than 55 percent of the area in each of BMUs 2, 4, 5, 6 (54 percent), 7, and 8 (see *Analysis of Displacement Effects on Grizzly Bears* section for greater detail on access management);
- The Forest would close portions of roads on the east front of the Cabinet Mountains, contributing to a more secure habitat corridor from north to south along the face (see Table A4 and discussion);
- As the total 2450 acres of mitigation habitat is acquired through purchase or easement, management actions would decrease motorized route densities and/or increase core areas, acquisition of fee title or conservation easement would eliminate existing access and/or preclude the development of improved access and/or attractant sources, thus reducing future mortality risks to bears; and
- The revised mitigation plan requires Revett to fund monitoring and requires the development of a recreational management plan to ensure high trail use does not occur. The recreation management plan would be completed prior to construction of the mine would be reviewed by the Service, and signed by the U.S. Forest Service. The Forest would monitor trail use, and in the event that high use occurred, the plan to limit visitor use and reduce levels of trail use on Rock Creek Trail would be implemented. This action would reduce potential risks to grizzly bears along this particular trail. Recreational use of other trails and open roads in the action area is expected to generally

increase. High use on other trails in the area would be accounted for in route density calculations and/or core area requirements and mitigated as needed to maintain or improve habitat conditions for grizzly bears.

The impacts of increased numbers of people accessing the Forest would be adequately moderated by full implementation of the measures above. Although use of roads and trails would increase, the existing access baseline meets or is very near meeting Forest Plan standards for grizzly bears, and would remain so and gradually improve due to the measures above. As a result, we do not expect that access management related to the mine would result in increased mortality risk to grizzly bears.

2. **Management of attractants.** A **(2006)** denotes measures added to the mitigation plan in 2005 and 2006):

- Prior to construction of the evaluation adit, Revett Silver Company would fund Sanders County and Montana Fish, Wildlife, and Parks to upgrade the county garbage transfer station near the mine entrance to make it grizzly bear-resistant prior to construction of the evaluation adit. Mine employees living in the local area would use this facility to dispose of their trash.
- Revett would fund the eventual upgrade of 16 county garbage transfer stations in the CYE to bear-resistant during construction and operation of the mine. Preventing food conditioning of both black bears and grizzly bears at the garbage transfer stations, as well as at residences, has proven very important in both the YGBE and NCDE (Tim Manley, Montana Fish, Wildlife and Parks, pers. comm. 2002). **(2006)**
- Revett would require employees to attend annual educational workshops on living with grizzly bears, attractant storage at home and in the back-country, and would prohibit employees from feeding bears.
- Revett would fund purchase of grizzly bear-resistant garbage containers for all employees living in or near grizzly bear habitat, for their personal use at home. **(2006)**
- Revett would provide 20 additional personal use containers/year for distribution to the public by the grizzly bear specialists. **(2006)**
- Revett Silver Company would fund grizzly bear resistant garbage containers for Forest campgrounds that provide garbage receptacles in BMUs throughout the CYE. **(2006)**
- Grizzly bear-resistant containers would be used at mine facilities, in place in advance of any work being initiated on any phase of the mine, and would be emptied at least weekly unless problems arise, whereupon, removal would be daily.
- Revett would have a company-sponsored education program to advance knowledge of how people can coexist with grizzly bears in and near grizzly bear habitat. **(2006)**
- Prior to construction of the evaluation adit, the Forest would implement a mandatory food storage order for BMUs 4, 5 and 6.
- The Forest would implement a Forest-wide food storage order within five years of construction of the evaluation adit. **(2006)**
- Revett would fund two **(2006)** grizzly bear specialist positions dedicated to work in the CYE (see discussion 3 below), one of which would be funded prior to construction of the evaluation adit. Combined with the grizzly bear information and education program, two

bear specialists and wildlife law enforcement officer, the measures listed above would significantly improve existing and future sanitation conditions within the action area and the CYE.

Unmitigated, a mine development such as the one proposed would increase conflicts between people and grizzly bears due to attractants. If the project moves forward with the mitigation plan, the current conditions for grizzly bears related to attractant storage would be substantially improved over its current condition. None of the measures listed immediately above exist within the ecosystem today, and most would be contingent upon securing government funding, which has not been available in the past. The mine would result in an increased number of people living in the area, but the measures listed above would reduce the potential for conflicts, not only those associated with the mine but also those not attributable to the mine. Further, the mitigation plan now includes measures that address attractant issues across the ecosystem, outside the immediate action area. Mine-related attractant risks to grizzly bears would be reduced and while not entirely eliminated, their adverse impact would be more than offset by the above measures in combination with item 3 immediately below. These measures would benefit the action area as well as the entire CYE.

The mitigation measures outlined above and in 3 below represent the full complement of the types of actions that are recognized by grizzly bear experts as being effective in reducing conflict between bears and people and they would affect the entire CYE. With reasonable certainty, we expect that implementation of such measures would result in a net decrease in the potential for conflict and in the actual number of conflicts between grizzly bears and people that would arise in the CYE, with or without the Rock Creek mine project. We expect that the mitigation measures would prevent conflict and /or resolve conflicts in ways that prevent the removal or death of more than one grizzly bear over the 35-year life of the project, thus more than offsetting the loss we anticipate from the project (one grizzly bear). In other words, we believe that the measures to be implemented by Revett and the Forest would result in a net reduction in future human-caused grizzly bear mortality rates that would have occurred without the project.

3. Enhancement of law enforcement and comprehensive, proactive information and education programs that build public support of grizzly bear recovery. A (2006) denotes measures added to the mitigation plan in 2005 and 2006.

- Prior to the construction of the evaluation adit, Revett would provide funding for a wildlife law enforcement position to reduce the potential for illegal activities (e.g. poaching) and readily handle any illegal activity that may arise due to the increased number of people living in the area.
- Prior to the construction of the evaluation adit, Revett would fund a bear specialist position to help educate mine personnel, their families and other residents in the area about how to live and recreate safely in grizzly bear habitat, to implement proactive sanitation efforts in the communities, and to respond to black or grizzly bear conflict situations;

- Prior to the beginning of construction of the mine, Revett would fund a second grizzly bear specialist to live in the Libby area and work in the northern reaches of the CYE. **(2006)**
 - All three of these positions would receive funding from Revett throughout the life of the project.
 - Funding for two bear specialist and a law enforcement positions would be adequate for highly skilled, full-time, professional staff (including benefits);
 - Funding for these positions would ensure that Montana Fish Wildlife and Parks creates new positions in addition to the Montana Fish Wildlife and Parks staff already in the area; duties of the positions would be clearly defined to deal with the grizzly bear issues related to the Rock Creek Mine.
 - The duties of these personnel would include monitoring and documenting black and grizzly bear-human encounters and how these situation were handled as well as conflict resolution.
 - These personnel would remain in place during temporary shutdowns and for a reasonable amount of time following mine reclamation to maintain continuity in community relationships, grizzly bear incident response and monitoring.
- Revett would develop a public outreach program that conveys its support of grizzly bear conservation in the CYE. **(2006)**
- Mine employees would be prohibited from carrying firearms while on duty.
- Defer the construction phase of the mine until at least six female grizzly bears have been augmented into the Cabinet Mountains. **(2006)**

Prior to construction of the evaluation adit, the revised mitigation plan requires funding for one grizzly bear specialist and one law enforcement position to be located in the vicinity of the mine, to primarily deal with the Rock Creek Mine mitigation issues, and initiate preventative management and education programs to avoid impacts to threatened and endangered species. The presence of the grizzly bear specialist and wildlife law enforcement officer in the community would be consistent and long term (retained for the life of the mine), including periods of shutdown. These personnel would be on the job prior to the time construction began on the evaluation adit. The positions would be based in the Noxon/Heron/Trout Creek area where the majority of immigrating people would settle.

The local State wildlife law enforcement agent and bear specialist would make personal contacts with mine employees and with other area residents as well. This effort would begin to address the current mortality risks in the action area. The bear specialist's duties would be similar to those described in Montana Fish, Wildlife and Parks Bear Management reports (Montana Fish, Wildlife and Parks 2005). The bear specialist would work with and provide information to all mine employees and other area residents on managing garbage, foodstuffs and livestock at their homes or camping and hunting sites to avoid attracting bears. Information on game carcass management and other issues related to hunting in grizzly bear habitat would be provided, enhancing Montana Fish, Wildlife and Parks' hunter education programs already in place. The law enforcement officer would provide additional wildlife and conservation information, and

work as a deterrent to reduce the risk of illegal human-caused grizzly bear mortality. These personnel would precede the influx of mine construction workers so that pre-emptive planning could occur and education programs would be in place when people arrive. The bear specialist would respond to conflicts between people and both black and grizzly bears, and result in timely resolution if they arise. Every mine employee would be exposed to the information and support provided by the bear specialist and law officer. Mine employees would attend mandatory annual grizzly bear update workshops/presentations presented by the grizzly bear specialist. This level of personal contact with mine employees and area residents would improve awareness of grizzly bear conservation issues, and improve local support for grizzly bear recovery.

Prior to construction of the evaluation adit, Revett would provide funding for the grizzly bear monitoring study. Further, grizzly bear resistant garbage facilities would be in place at the mine site and on Forest locations in BMUs 4, 5, and 6, a mandatory food storage order would be issued for BMUs 4, 5, and 6, and the county garbage transfer station at the mine entrance would be made grizzly bear-resistant, all prior to activities beginning on the evaluation adit and prior to any grizzly bear conflicts arising. Should sanitation related incidents occur, the bear specialist would be available to respond to the situation quickly to avoid escalation of the problem. As mine employees are hired, each employee would be provided with a personal use grizzly bear-resistant garbage container, as well as workshops and other forms of information related to grizzly bear conservation from programs developed by the bear specialist and law enforcement officer. This is a significant level of effort aimed at the 55 or so employees hired to construct and work at the evaluation adit. Thus, we do not expect construction and operation of the evaluation adit to result in grizzly bear mortality.

Prior to construction of the mine itself, a second State bear specialist would be funded to work in the Libby area, and implement a similar program for residents of the northern part of the CYE, including the Yaak. This effort would further address human-caused mortality risk associated with the existing conditions throughout rest of the CYE outside the action area. The bear specialist positions would include duties comparable to the existing grizzly bear management specialist positions within the Montana Fish, Wildlife, and Parks, and would be provided adequate funding for public education programs and workshops, aversive conditioning equipment, dogs, electric fencing and other prevention work.

Combined, the local presence of these personnel in addition to the grizzly bear monitoring/research effort, food storage orders, measures to secure attractants, other mitigation efforts and other recovery efforts, is expected to contribute significantly to increased public awareness, cooperation and support of grizzly bear conservation needs, not only in the action area but across the CYE. No other grizzly bear ecosystem has received this level of concerted effort to reduce conflicts between grizzly bears and people, and to human-caused mortality of bears.

The importance of these new positions cannot be overstated. Bear specialists are influential in numerous ways that promote recovery of grizzly bears. Montana Fish, Wildlife and Parks stated that perhaps the greatest advancement in the management of problem bears has been the development of bear management specialist positions (Montana Fish, Wildlife and Parks 2001).

The combination of shortened response time to grizzly bear conflict reports, preventative actions to remove attractants, the deterrent effects of local law enforcement, and perhaps most important, building community involvement in the management and conservation of grizzly bears, has been invaluable in dealing with nuisance bears, preventing habituation of bears, and fostering local public support of grizzly bear conservation (see Montana Fish, Wildlife and Parks 2005a; Wenum 2002; Wenum 2004). Grizzly bear management specialists have been able to keep grizzly bears alive through an array of preventative measures. For example, in 1998 grizzly bear specialists trapped and radio-collared six nuisance grizzly bears in the North Fork of the Flathead River Valley (Tim Manley, Montana Fish, Wildlife and Parks, pers. comm. 2006). The bear specialists initiated an intense, proactive information and education effort with people living in the area. In the past three years, there have been no reports of nuisance grizzly bear activity in the North Fork, despite a substantial number of people living in grizzly bear habitat. In other areas, a Montana Fish, Wildlife and Parks bear specialist was instrumental in developing the trust and confidence of local residents participating in a study that ultimately resulted in reducing conflicts between ranchers, bee-keepers and grizzly bears along the Rocky Mountain Front region in Montana (Primm and Wilson 2004). State bear specialists also participated in the highly successful Blackfoot Challenge project (Primm and Wilson 2004). The groups involved created a wildlife committee to improve human-wildlife management in the Blackfoot River Valley, Montana. This committee worked on human-grizzly bear conflict abatement through many means: workshops, outreach, and sanitation projects. These efforts now enhance existing state grizzly bear management programs.

If the proposed project moves forward, conditions for grizzly bears related to law enforcement, conservation education, proactive prevention of conflicts between bears and people as well as responsive conflict resolution, would be significantly improved over its current condition. None of the measures listed immediately above exist within the ecosystem today. All are needed within the CYE in the short and long term to reduce levels of human-caused grizzly bear mortality. Currently, the nearest grizzly bear specialist is based in Kalispell, and covers about one-third of the NCDE as well as the CYE. The local grizzly bear specialists and law enforcement officer would provide enhanced levels of security and protection for grizzly bears that currently does not exist, thus improving current conditions for grizzly bears in the CYE. The positive effects of related programs would not only impact those people living in the action area and/or working at the mine, but would reach people living throughout the CYE ecosystem. The current conditions for grizzly bears in the CYE would also improve with the measures addressing access management, attractant storage, and research and monitoring (see discussion below). As new or existing residents to the area, mine employees would be among the most informed members of the public in the CYE about grizzly bear conservation, assisted by the support for conservation of grizzly bears from the company.

Overall, if the project proceeds and the mitigation plan is implemented, we expect a reduction in future rates of human-caused mortality of grizzly bears, even when we take into account the mortality risk posed by the mine. The human-caused grizzly mortality expected to result from the mine would be more than offset by reductions in the present level of human-caused mortality risks within the CYE, due to the benefits of the mortality risk management measures in the

mitigation plan. The net human-caused grizzly bear mortality rate is expected to decline within the CYE with full implementation of the mitigation plan associated with the proposed action.

The Service has determined that the full-time law enforcement and bear specialist positions to be funded by the Revett Silver Company are essential to offsetting the potential mortality risks associated with the Rock Creek Mine and those in the existing baseline. We expect that the law enforcement and bear specialist positions would significantly reduce and minimize the potential for human-caused grizzly bear mortality associated with the mine, although the risk cannot be entirely eliminated. However, the lowered mortality risk of the mine itself would be more than offset by the decrease in mortality risk conditions for grizzly bears in the action area and other areas of the CYE. As a result of the agency bear specialist and law enforcement positions, we expect:

- a significant reduction in the potential for increased conflicts between grizzly bears and people due to the increased number of people in the area as a result of the mine, and
- a net reduction in the overall existing mortality risks to grizzly bears on both national forest and private lands within the action area and across the CYE.

4. Support monitoring and research.

The mitigation plan requires funding for the ongoing grizzly bear monitoring and research effort in the action area for the life of the mine in conjunction with the ongoing grizzly bear research in the CYE, conducted by the Service. The study would monitor grizzly bears in the action area and gain information to ensure the effectiveness of the conservation measures. The Service would also monitor grizzly bears augmented into the CYE through Montana Fish, Wildlife and Parks' efforts, providing information with which to gauge the success of the effort and make improvements if needed. The ongoing monitoring and research would also act to increase public awareness and interest in grizzly bears. Because of the increased potential for detecting bear mortality, monitoring would likely act as a deterrent to illegal killing of grizzly bears. Data collected from radio-collared grizzly bears would enhance our understanding of survival and mortality, which is crucial to determining population trend. Furthermore, the monitoring would provide information as to whether or not the mitigation plan is working to allow grizzly bears to safely use habitat and move through the action area and north-south corridor. Because this information is important to judging the effectiveness of the mitigation, Revett has agreed to ensure adequate funds as part of the mitigation plan for this ongoing work during the life of the mine.

5. Reduction of risks posed by increased traffic on FR 150.

- Revett Silver Company would implement a transportation plan requiring employees be bused from parking lots near the highway up through the drainage to work. Bussing employees would substantially reduce the expected elevated levels of traffic but overall traffic levels would remain high. Controlling employees on their way to work sites would significantly reduce the potential for illegal harassment or shooting of grizzly bears and reduce litter and other attractants along the route;

- the use of salt would be avoided when sanding during winter plowing operations on road FR 150 to reduce attracting bears to roadways,
- palatable vegetative forage like clover (*Trifolium spp.*) would not be used to reclaim disturbed sites from construction facilities and roads; and
- the remains of road-killed carcasses along roads would be removed daily.

Summary of human-caused mortality risks The Service concludes that the mitigation plan measures aimed at decreasing the risk of human-caused mortality of grizzly bears would significantly reduce human-caused mortality risks associated with the proposed action. We expect that these measures would reduce not only the risk of mortality attributable to the mine, but also risks that currently exist and future risks not attributable to the mine. Further, habitat conditions such as habitat effectiveness and access management can affect mortality risk. Both have generally remained stable or improved over the past decades, and are expected to improve in the action area as a result of the mitigation plan

Table A14 displays the past causes of mortality in the CYE and the proportion of the mitigation funding directed at each cause. Fifty three percent of the total mitigation plan funding would be directed at reducing human-caused mortalities of grizzly bears. The main causes of human-caused mortality between 1983 and 2006 were illegal/malicious killings and mistaken ID by big game hunters. Thirty-six percent of funding would be directed at these two categories and self defense. Combined these categories account for about 42 percent of all mortalities. Another 17 percent of the funding is directed at reducing human site conflicts, which currently accounts for about 3 percent of mortalities. As has occurred in the NCDE and YGBE, attractant related human-site conflicts are expected to become more of a problem in the CYE as the grizzly bear population increases. Table A14 indicates that mitigation funding is appropriately directed at main sources of human-caused mortality that may be associated with the mining project.

Table A14. Categories, numbers and percent of grizzly bear mortalities in the CYE between 1983 and 2005 compared to approximate Rock Creek Mine project mitigation funding allocated to efforts to reduce mortality (budgets and allocations may change).			
Category	Number of Mortalities	Percent of Total	Percent of Mitigation Plan Funding
Human site conflicts	1	3%	17%
Illegal/malicious	6	21%	36%
Mistaken ID	4	14%	
Self-defense	2	7%	
Train	2	7%	0
Car	0	0	0
Capture Mortality	1	3%	not applicable
Under investigation	3	10%	*not applicable
Natural	8	28%	not applicable

Livestock depredation	0	0	not applicable
Unknown	2	7%	*not applicable
Total	29		53%
Deaths/Year	1.26		

* not directly applicable, but the additional wildlife law enforcement officer would help alleviate problems associated with these categories

The proposed action would result in risk of human-caused mortality simply due to the increased number of people that would live in the area, but it also includes essential short- and long-term recovery actions that would benefit grizzly bears throughout the CYE. These beneficial actions would not likely occur otherwise in the near or long-term. The mitigation plan includes a full complement of the types of measures, actions and strategies known to reduce conflicts between grizzly bears and people. Within the first five years of work beginning with the evaluation audit, we expect that the mitigation measures aimed at reducing mortality would be effective at reducing the *existing* risks of human-caused mortality because of implementation of many grizzly bear conservation measures, described earlier, that currently do not exist. The measures in the mitigation plan would also significantly reduce the potential for human-caused mortality of grizzly bears that *is attributable* to the mine. This comprehensive approach to reducing potential mortality (e.g. bear specialists in the action area and in Libby, increased law enforcement presence, sanitation efforts throughout the ecosystem, etc.) is also expected to significantly reduce the potential for grizzly bear mortality *not attributable* to the mine, within and outside the action area.

No empirical data is available with which to accurately predict the number of grizzly bears likely to be killed as a result of the proposed mine over 30 to 35 years. The proposed mine would result in additional people living and working in and near the Cabinet Mountains. The expected increase in human population in the Noxon/Heron/Trout Creek area and Thompson Falls is about 11 percent (MDEQ and USDA 2001), and less in the communities of Troy, Libby and eastern Idaho.

The best information upon which to base estimates of future human-caused grizzly bear mortality includes the existing rates and causes of human-caused mortality information in the CYE and in the action area, baseline habitat and access conditions leading to existing mortality levels, and the adequacy of the conservation measures in the proposed action and requirements in the mitigation plan.

Although the conservation measures in the mitigation plan would significantly lower risks, we expect that the mitigation plan measures cannot entirely eliminate the risk of human-caused grizzly bear mortality associated with the project over 35 years, primarily due to the increased number of people living in the area. Legal grizzly bear mortality is possible through management action or defense of life, or illegally through malicious or accidental events. We expect that attractant-related conflicts between grizzly bears and people would most likely be the cause of grizzly bear mortality that would be attributable to the mine during the 35-year period. The potential for such conflict is substantially reduced by conservation measures in the

mitigation plan. While malicious killing remains a possibility, its likelihood is also significantly reduced by the presence of bear specialists and law enforcement, and the information provided through their programs. The company's support of grizzly bear conservation would act as a deterrent for any mine employee to illegally kill a grizzly bear or be negligent regarding attractant storage. Conflicts between grizzly bears and people recreating on the Forest are possible, but are less likely to be related to the mine. Based on the number of grizzly bears in the action area, existing mortality records and expected displacement effects near the mine, we consider this risk discountable.

During the 23- year period from 1982 through 2005, five known human-caused grizzly bear mortalities occurred within the Cabinet Mountains portion of the CYE, four of which occurred in the action area. In 1982, one grizzly bear was poached in BMU 19, outside the action area. In 1985, a grizzly bear was killed in self-defense in BMU 8. In 1997 a grizzly bear was poached in BMU 2, and in 2001 and 2005, grizzly bears were struck by trains. This information indicates approximately two known human-caused mortalities of grizzly bears occurred per decade in the Cabinet Mountains, since 1982. The mortalities in the 1980s predate the period when concerted interagency grizzly bear information and education efforts were initiated.

Three of the five known, human-caused mortalities in the Cabinet Mountains were a result of people using national forest lands and were due to poaching and self defense. None were caused by attractant-related problems on private lands. Self -defense and poaching caused three mortalities. These mortalities, especially those occurring in the 1980s, took place during a time when grizzly bear conservation programs and recovery efforts were not as developed and obvious as they are today. Further, there were no grizzly bear specialists or law enforcement officers working in the Cabinet Mountains focusing primarily on grizzly bear issues. The mitigation plan addresses this mortality through the bear specialists and law enforcement personnel, education and information provided to the mine personnel and community, access management on the Forest that provides substantial core areas and moderate road access, and a grizzly bear research and monitoring effort. Montana Fish, Wildlife and Parks has increased its efforts to inform and educate hunters about hunting in grizzly bear habitat (Montana Fish, Wildlife and Parks 2001). The mitigation plan also includes a substantial level of attractant management efforts at the mine, on the Forest and on county and private lands in the Cabinet Mountains, including an immediate mandatory food storage order in BMUs 4, 5, and 6, and an ecosystem-wide order within five years.

Based on existing levels and causes of grizzly bear mortality in the Cabinet Mountains and CYE, the proposed action, expected improvements in the environmental baseline due to implementation of the full compliment of conservation measures in the mitigation plan, we estimate that impacts of the proposed action would result in no more than one grizzly bear mortality over the 35-year life of the mine.

The number of CYE grizzly bears killed by people since 1982 is skewed toward females; 11 of 18 (61 percent) known sex, human-caused mortalities were female. In the Cabinet Mountains, of five known human-caused mortalities, three were known to be males and two were female. In general males and subadult male grizzly bears have larger home ranges and conduct wider

exploratory and home range movements, making them more vulnerable to confrontations with people (McLellan et al. 1999). However, due to existing information on this ecosystem, we analyzed the worse case scenario where the one human-caused mortality associated with the mine would be a female bear. We do not expect mortality associated with the evaluation adit phase, but it is more likely during the construction phase of the mine itself, when the number of employees is highest, or at sometime during the operation phase.

As described above, analysis of all factors leads us to conclude that the proposed action would fully offset the expected grizzly bear mortality due to the mine and result in a net reduction in human-caused mortality of grizzly bears within the CYE, through the implementation of measures that improve conditions for grizzly bears by reducing the current and future risk of human-caused mortality not attributable to the mine. We expect that the mitigation plan conservation measures would prevent the human-caused mortality of more than one female grizzly bear over a 35-year period. Without the proposed action, we reasonably expect that few if any of the proposed conservation measures outlined above would occur in the near future.

Fragmentation

The CYE is a long, narrow ecosystem, approximately 100 miles long north to south and ranging from 15 to 35 miles east to west. The Cabinet Mountains Wilderness is a small, unroaded area in the higher elevations of the ecosystem, approximately 34 miles long and varying in width from 0.5 to 7 miles. The Cabinet Mountains Wilderness consists of approximately 94,272 of the 1,664,000 acres of the CYE (5.7 percent) (MDEQ and USDA 1995) and contains all or part of BMUs 1, 2, 4, 5 and 6. The BMU 8 contains the Cataract Roadless Area. These unroaded or wilderness areas provide a relatively high quantity of summer habitat, abundant throughout the CYE, but relatively limited important spring habitat. The Cabinet Mountains Wilderness forms the central section of the north to south movement corridor, linking the Cabinet Mountains to the Yaak River basin to the north. The wilderness area is unroaded, however it is impacted in places by open roads leading near or adjacent to its borders. The influence of nearby roads is especially detrimental where the wilderness narrows or where habitat in the wilderness is not conducive to grizzly bear movement, such as open areas devoid of cover.

The proposed action would not increase, and would decrease slightly, open and total motorized route densities (USDA 2002b). Core area would not decrease and potentially could increase with acquisition of mitigation habitat parcels. Open and total motorized route density and core areas in BMUs 4, 5, and 6 are near those reported for the average of female home ranges documented by Wakkinen and Kasworm (1997) (see discussion in previous section *Analysis of Displacement Effects on Grizzly Bears*). The moving windows calculations for BMUs 4, 5 and 6 do not necessarily depict the significance of the location of some key forest roads and private land parcels, particularly roads occurring in the north to south movement corridor.

Roads in the action area tend to be concentrated in the lower elevations where the spring habitat is concentrated and where human development and activities are situated. Several roads on the east side especially impact grizzly bears, including the Bear Creek Road (FR 4784), Midas Creek Road and associated spurs (FR 4778), and the South Fork Miller Creek Road (FR 4724). Bear

Creek road would be gated upon project implementation (W. Johnson, pers. comm. 2006), which would significantly improve grizzly bear habitat in BMU 5. The very end of Midas Creek Road (FR 4778) is restricted yearlong, and the South Fork Miller Creek Road (FR 4724) is open yearlong (W. Johnson, pers. comm 2006).

Other roads, particularly on the eastern slope of the Cabinet Mountains in BMUs 5 and 6, access patented and other mineral claims in the Snowshoe fault zone. These roads originate at lower elevations and lead up slope to higher elevations. A few approach the wilderness boundary, contributing to the constriction of the north-south movement corridor and risks of adverse encounters between grizzly bears and people. Two such routes are the proposed access roads to the Way-up and Fourth of July patented mine parcels. The biological opinion on these access routes was completed in 1998 (USDI 1998b) and amended in 1999 (USDI 1999a). In the biological opinion, the Service concluded that these roads would have significant adverse effects on grizzly bears. Terms and conditions specified in the incidental take statement limit the amount of motorized access to these parcels to that allowed for administrative use on restricted roads. Road use levels should not reach those of open roads. Other patented mining properties occur in the same general area, including those held by Mines Management, Inc., some of which were formerly leased by Noranda Minerals Corporation. Should private patented lands be developed or used in ways that displace or pose mortality risks to grizzly bears, the impacts to habitat connectivity could become more severe. However, where access or other federal permits are required, consultation under section 7 of the Endangered Species Act would be required and could provide a means to offset any adverse impacts to grizzly bears.

Approximately nine roads, including the roads accessing Way-Up and Fourth of July parcels, partially bisect the southern Cabinet Mountains from east to west in BMUs 5 and 6. Portions of some of the roads enter the north south corridor (W. Johnson, pers. comm. 2003). Of these, seven are open to the public and two allow access to only landowners with inholdings. On the west side, two roads are open to the public and are within the north south corridor. Open roads occurring within this corridor pose displacement and mortality risks to bears attempting to move north or south through the ecosystem. The displacement resulting from these roads is particularly disruptive to grizzly bears because they cross important spring habitat, which is limited in the ecosystem, and early-season huckleberries, also not abundant within the southern portion of the ecosystem. A few of these roads run from the highways bordering the CYE up to the edges of the wilderness area bringing people near secure bear habitat. Additionally, roads just outside the corridor boundaries on the east side occur in or traverse through important spring habitat. The Vermilion River road (FR 154) bisects BMU 8.

Near the proposed Rock Creek Mine project action area, the ecosystem narrows to approximately 15 miles, its narrowest portion. The topography of this narrow mountain range and human development on the east and west slopes constrict the width of the ecosystem, impacting the north to south movement corridor for grizzly bears in BMUs 4, 5, and 6. The BA delineates this north south movement corridor and existing and potential sites that may constrict the corridor and impair movement of bears through the area (see BA: Appendix 10, figures A, B, and C) (Appendix E). Distances between existing or potential sites of high human use could be less than 2 miles in some cases. This corridor is critical as it links grizzly bear habitat in the southern

Cabinet Mountains, specifically BMUs 6, 7, 8, and 22 with habitat in the Cabinet Mountains BMUs to the north.

The proposed Rock Creek Mine has the *potential* to further constrict the north south corridor in the southern Cabinet Mountains, contributing to fragmentation of the block of habitat in BMUs 6, 7, 8, and 22 from areas to the north. Improvements and increased use of FR 150 along Rock Creek, and the predicted increased access to and use of Rock Creek Trail could displace grizzly bears using the north to south corridor, or those attempting to navigate the action area west of the divide. The major roads and activities associated with the Rock Creek mine could serve to inhibit grizzly bear movement west of the divide in the Rock Creek drainage itself along FR 150 and use of habitat near the mine site. When added to the existing patented private lands, other private in holdings, and roads occurring on the east side of the Cabinet Mountains, the proposed Rock Creek Mine would contribute to disturbance across BMUs 5 and 6.

Unmitigated, the disturbance and displacement of grizzly bears from the proposed mine and activities, and existing roads on the east side could reduce the safe movement and dispersal of bears moving north and south along the Cabinet Mountains. The 1998 BA suggested that a band of disturbance could potentially reduce the connectivity between the lower third of the Cabinet Mountains section of the CYE from the rest of the CYE (USDA 1998b, Appendix 10). It is important to note however, that the BA's analysis considered the Montanore Mine, with all of its associated activities on the east side, to be part of the environmental baseline. Noranda abandoned the Montanore Mine project (see Introduction), and its omission creates a significant improvement in the baseline conditions in the action area. Still, the effects of the Rock Creek Mine, when added to existing roads occurring on the east side of the divide, would contribute to human disturbance within the action area. Although it would not constitute a complete barrier to movement, the disturbance could evoke avoidance behavior by some bears and reduce use of the north south movement corridor, by inhibiting movement west of the divide. The disturbances on both sides of the divide may result in some grizzly bears moving into areas of human activity and increased mortality risk. Grizzly bears using BMUs 4, 5, and 6 may be compelled to change traditional movement patterns and behaviors.

Human use of the Rock Creek Trail along the East Fork of Rock Creek is expected to increase substantially with the improvement of access, greater publicity and increased people moving to the area. This trail would be accessed by the improved road to the mine and would be expected to attract greater use following improvement of the road. The Rock Creek Trail is currently considered a low use trail, and is not considered a significant detrimental impact to core area or habitat effectiveness.

If not addressed, a reduction in effective core habitat may occur if human use on the Rock Creek or St. Paul Trails increased to levels that displace grizzly bears and contribute to fragmentation of the north to south corridor. The potential for confrontations between bears and people would be expected to increase if high use of the Rock Creek Trail should occur. According to the BA, the Forest predicted the Rock Creek Mine would result in a 31 percent increase over the current (actual) use levels on this trail, ranging from 14 to 35 parties per week. This predicted increase was based solely upon a portion of the anticipated influx of Rock Creek Mine employees and their family members recreating during the life of the mine, and did not include a general

increased public interest in the area. The Service has determined that the average 18 percent annual increase in reported general recreation use of the trail from 1990 to 1996 would likely continue for at least part of the next 35 years. If the existing use exceeded 20 parties per week, trail use would be considered high and significant displacement of bears away from the area would be expected, but also expected is an increased chance of adverse human-grizzly bear interactions within the north south corridor.

The Rock Creek Mine directly affects BMUs 4, 5 and 6 just south of the Troy valley. Further human development in the valley and along the Clark Fork River would displace bears sensitive to human activities and could lead to further constriction of the ecosystem to the north of the action area. People coming to the area because of opportunities associated with the proposed Rock Creek Mine could contribute to the fragmentation as they build homes in grizzly bear habitat. However, of the predicted 300 to 320 new housing units that would result due to the mine, the Noxon/Heron/Trout Creek area would see the largest number of new housing units, between 116 to 125 (MDEQ and USDA 2001). The remaining units would be distributed in or near Troy, Thompson Falls, Libby, and eastern Bonner County, Idaho.

Mitigation plan measures to reduce and avoid fragmentation

- 1. The Forest would restrict Bear Creek Road (FR 4784).** The Forest closed this east-side route to the public for safety reasons and to mitigate the impacts of the proposed action (USDA 2002c). It is now reopened, but would be closed if the proposed action proceeds. This restriction was an important benefit to grizzly bears using the action area east of the Cabinet Divide. Bear Creek Road accesses some of the best spring, summer and fall grizzly bear habitat in the Cabinet Mountains (Kasworm and Manley 1988). Securing spring habitat in the drainage would be of particular importance. West of the divide, all or portions of routes FR 2285, 2741X, 150, and 2741A would be closed year long with barriers (Table A4). The proposed action would restrict access on a portion of FR 150 in BMU 4. This closure would effectively close a loop route which would significantly reduce traffic on this route and improve security conditions for grizzly bears in BMU 4.

The restrictions on public use of Bear Creek Road would significantly improve secure habitat for grizzly bears on the east side, creating a block of habitat to the south with no roads open to the public covering Bear, Cable, Poorman and Ramsey Creek drainages. The closure does not entirely eliminate impacts to important habitat on the east side, but results in a significant improvement for bears in the action area. Similarly, the restrictions on FR 150 (closure of the loop route) in BMU 4 and other routes would not compensate entirely for the increased activity and disturbance in adjacent BMU 6, along FR 150 and along the Rock Creek trail, but would significantly improve habitat conditions for bears west of the divide in the action area.

- 2. The revised mitigation plan provides funding for the development of a recreational management plan that would require monitoring to ensure high trail use on the Rock Creek trail does not occur.** The recreational management plan would be completed prior to construction of the mine. The U.S. Forest Service and the Service

would sign the plan. The Forest would monitor trail use, and in the event that high use occurred, would implement the plan to limit visitor use. This action would reduce potential risks to grizzly bears along this particular trail and would reduce the impact of the trail within the north south corridor. Recreational use of other trails and open roads in the action area is expected to generally increase. If use of any trails in core area would reach high use, the Forest would implement actions to either reduce human use to levels that maintain core area effectiveness, or create adequate core elsewhere within the BMU.

- 3. The mitigation plan requires acquisition of or easement on 2450 acres of mitigation habitat, 153 of which must be in the north south corridor.** As mentioned previously, a minimum of 153 acres of this mitigation habitat is required in BMUs 4, 5 and 6 to *specifically* reduce or mitigate for the potential fragmentation of the north to south movement corridor that results from impacts of the proposed mine. The mitigation plan requires that these 153 acres be acquired *before* the evaluation adit phase of the mine could begin. The 153 acres of mitigation habitat within the north to south corridor would improve connectivity, increase core area, and maintain benefits for grizzly bears throughout a larger area depending upon the current and potential access to the lands that could be eliminated and the parcels' development potential.

In 2005, Revett purchased 273 acres within the north-south corridor (C. Rife, Revett Silver Company, in litt. 2005). This property has high value for grizzly bears and was ranked number two in priority in the *Corridor Replacement Habitat Assessment for acceptable lands to consider*. Upon approval of the Service and Forest, this parcel could be used as part of the mitigation acres and transferred to the Forest. This parcel could be conserved into perpetuity as core habitat, which would eliminate an existing potential for fragmentation or loss of core because of private access development (W. Johnson, pers. comm. 2006). Additionally, the remainder of the required 2177 acres would gradually be acquired in phases prior to construction and operation of the mine to compensate for acres lost to physical alteration of habitat and disturbance (see schedule in Table A3). A portion of these acres could also improve security in the north south corridor.

The most critical objective of the required mitigation habitat is to maintain and improve grizzly bear habitat connectivity within the north to south movement corridor, to ensure grizzly bears in the southern Cabinet Mountains portion of the CYE can adequately maintain and use home ranges, and can move between BMUs 6, 7, 8 and 22 and BMUs to the north and north west, including BMUs 5, 4, 2 and beyond. The key element in assuring connectivity in the north-south movement corridor is the juxtaposition of properties acquired through fee title or easement to the proposed mine site, the mine's zone of influence, and the east-side roads. With the number of private land parcels available in Bum's 4, 5 and 6, there are a number of combinations of mitigation properties that would meet this objective. However, some combinations of mitigation properties may not adequately offset the significant potential for fragmentation of the north to south movement corridor. Therefore, the Service would review the combination of properties to ensure an adequate movement corridor and home range use for grizzly bears within BMUs 4, 5, and 6.

The revised mitigation plan relies on the *Corridor Replacement Habitat Assessment for acceptable lands to consider* (not available to the public until replacement habitat mitigation is completed). This assessment would ensure that the 153 acres acquired adequately reduces the potential for fragmentation of the north to south corridor. The Service was involved in the development of the Replacement Habitat Assessment, which identifies potential mitigation habitat parcels and prioritizes them according to location, development potential, and potential contribution to maintaining and improving connectivity in the north-south corridor. The plan also states that the Forest Service would have final approval of mitigation acres and associated covenants prior to recording. **The Forest would approve and describe in writing how the properties to be acquired effectively reduce the potential for fragmentation of the north to south corridor.** At the request of the Forest, the Service would review the identified properties to further ensure they contribute to an adequate movement corridor. Portions of the additional 2350 acres of mitigation habitat could also serve to further improve connectivity north to south, if those acquisitions were determined to be most beneficial to grizzly bears. The 273 acres already purchased by Revett lies in the north-south corridor, and was ranked as the number 2 priority mitigation parcel. As such, it is valuable in reducing the likelihood of fragmentation in the north south corridor. If the proposed action is approved, and Revett offers these parcels as mitigation habitat, we would work with the Forest to describe in writing how the parcels, acquisition or the easements on the parcels, accomplish our goals to avoid fragmentation.

The revised mitigation plan stipulates that private lands be acquired by Revett through acquisition of fee-title or *perpetual* conservation easements and transferred to the Forest Service through donation or land exchange. The revised mitigation plan requires perpetual conservation easements, which would ensure long-term protection of security habitat for bears who have incorporated these secure areas into their home ranges. Mitigation habitat would preclude development of existing private habitat that might occur without such protection. Acquiring mitigation habitat that is currently developed or at risk of development would benefit bears by eliminating or precluding development or other management adverse to bears over the long-term, provided these mitigation properties are managed in a way supportive of bear survival and recovery, especially in the north to south movement corridor. The mitigation plan requires these acres be managed for grizzly bear security pursuant to protective conservation easement terms or pursuant to Forest management strategies supportive of grizzly bear recovery and survival. Acquisition of fee title or permanent easement would ensure that these private lands remain secure for bear habitat in the future.

The 2350 acres of mitigation habitat would also contribute to improving connectivity of habitat in the general action area (see discussion above under *Mitigation plan effects on grizzly bear displacement and habitat loss*).

4. **The mitigation plan requires funding to conduct a long-term monitoring study of grizzly bears throughout the life of the mine within the action area, in coordination with the current grizzly bear research conducted in the Cabinet Yaak ecosystem.** The information would be used to ensure the mitigation measures, including road

closures, habitat acquisition, and easements, were in fact working to alleviate fragmentation of habitat within the action area. If monitoring information suggested otherwise, the Service would consider that as new information requiring initiation of additional consultation. Information gained through monitoring could be used to inform the adaptive management process.

5. **The proposed action and mitigation plan ensure no degradation of access management conditions for grizzly bears in BMUs 4, 5 and 6 for the life of the mine.** As discussed in detail in the previous section *Analysis of Displacement Effects on Grizzly Bears*, levels of open and total motorized route densities are near or below the average reported in CYE grizzly bear research. Core areas in BMUs 4, 5, 6, 7, and 8 are equal to, or in most cases substantially above the average reported in research. The mitigation plan requires the Forest to manage above these baseline conditions once mitigation properties are acquired and access management opportunities arise. This level of access management would contribute to reducing or mitigating for displacement and fragmentation effects of the mine.
6. **As mentioned earlier, the revised mitigation plan would require an Oversight Committee to establish an MOU that would define roles and responsibilities of members and the committee, whose primary function would be to oversee the 35-year grizzly bear management plan.** The Oversight Committee and defined management plan required in the mitigation plan is needed to coordinate and monitor the complex set of mitigations, the acquisition of lands and conservation easements, the monitoring and reporting, use of new information, and other requirements of the mitigation plan to ensure that the conservation needs of grizzly bears are met. This coordinated, calculated approach to full implementation of the mitigation plan, with adaptive management where needed, would alleviate the potential for fragmentation of the southern Cabinets as a result of the proposed Rock Creek Mine.

Summary of fragmentation risks Considering the current conditions in the action area, the proposed action would reduce north to south connectivity across the Rock Creek drainage itself, due to effects of the mine and increased traffic along FR 150. The increased traffic on FR 150 is not expected to create a barrier to grizzly bear crossing the drainage, but would probably affect general movement patterns and would affect grizzly bear use of habitat near the road. The potential for fragmentation due to roads and development would be reduced throughout the rest of the action area, especially within the north to south movement corridor. The effects of full implementation of all conservation measures in the proposed action and mitigation plan, is expected to result in an improvement in the connectivity of habitat within the corridor through proposed access management, closure of the FR 150 loop route, other road closures east of the divide (see Table A4), and acquisition of fee title or conservation easement on mitigation lands that are currently developed or at risk of development. Overall, the measures taken to improve connectivity throughout the north south corridor would compensate for the impacts of reduced connectivity across the Rock Creek drainage.

Conservation Needs of the Species

The Service has identified six priority needs to improve the present status of grizzly bears in the CYE and achieve grizzly bear recovery (C. Servheen in litt. 2005b). The agencies reviewed new scientific information and data available since the 2003 biological opinion and re-evaluated the 2003 mitigation plan to compare it to the six priority conservation needs. The six priority conservation needs are listed below, along with a summary of the proposed, revised mitigation plan measures that specifically address each need.

Three of the six conservation needs are similar to those assessed in Proctor et al (2004). Through population simulations, Proctor et al. (2004) documented extinction risks for the CYE grizzly bear population, and the influence of three factors that could substantially reduce the likelihood of extinction of the grizzly bear population. Over the long-term (100-year period) mortality reduction had the largest effect, while augmentation had the largest positive effect on growth rate over the short-term (10 years). Population growth rates dramatically increased as a result of augmentation over 10 years; even low rates of augmentation (one female per year) reduced the probability of extinction by 33 percent over 25 years. Adding three females per year cut extinction rates in half. Increasing the age of those bears augmented and increasing a 10-year effort to 20-years both lowered the extinction risk slightly. However, mortality reduction had the greatest positive effect on growth rates over a 100-year period and equally strong reductions in extinction probabilities. Finally, linkage enhancement **and** mortality reduction combined had a larger effect on lowering the extinction probability than 10 years of augmentation.

The following is a list of the three priority needs similar to those assessed in Proctor et al. (2004) and a summary of how the proposed action would address each need :

1. Augmentation should be done in the CYE, specifically 12 to 15 subadult females (Proctor et al. 2004) into the Cabinet Mountains within ten years.

In 2005, Montana Fish, Wildlife and Parks announced its plan to continue augmentation of the Cabinet Mountains, with one to two female grizzly bears per year. In 2006, the preferred alternative in the State's DEIS on the Grizzly Bear Management Plan for Western Montana supported the earlier recommendation for augmentation (Montana Department of Fish, Wildlife and Parks 1986). The DEIS recommended 10 to 15 grizzly bears should be augmented into the Cabinet Mountains. They released a six-year old female from the NCDE into the Cabinet Mountains in 2005, and a subadult female in 2006. Kasworm et al. (in litt. 2006) stated that the augmentation program should not be viewed as simply replacing bears lost to human-caused mortality, but should provide for overall increases in the grizzly bear population in the CYE. They estimated that between 12 and 24 female grizzly bears were needed to stabilize the population, again depending upon survival rates and age at the time of relocation.

Montana Fish, Wildlife and Park's augmentation plan fulfills one high-priority conservation need for grizzly bears in the CYE. The proposed action is not associated with the State's plan to augment the CYE. However, the Service has expanded its monitoring effort to monitor the augmented bears. Annual funding for the Service to monitor grizzly bears in the CYE is currently tenuous, dependent upon federal funding. Projected federal funding for the next few years is as of yet not adequate to ensure

continued monitoring of augmented or native grizzly bears through the Service's current program in the CYE (C. Servheen, pers. comm. 2006). Montana Fish, Wildlife and Parks will continue to augment the population if the Service monitors the augmented bears (C. Servheen, pers. comm. 2006). Therefore, in addition to the funding for monitoring bears required in the 2003 mitigation plan, Revett agreed to provide funding to the Service to monitor native bears as well as grizzly bears augmented into the Cabinet Mountains to help ensure augmentation would continue as needed. Further, Revett voluntarily offered to provide funding, if needed, to ensure augmentation efforts continue or increase the potential number of candidate bears that could be located and moved to the Cabinets each year (C. Rife, Revett Silver Company, in litt. 2005b).

The mitigation plan requires that the anticipated loss of one female grizzly bear as a result of the proposed action be offset *prior* to that loss occurring. The plan requires that construction of the mine be deferred until at least six females are relocated to the Cabinet Mountains. The rationale for six bears is found in Kasworm et al. (in litt. 2006). Through simulations, they demonstrated that augmentation to replace the impact of the loss of one reproducing adult female (the loss we anticipate in this biological opinion) would require three to six female grizzly bears depending upon survival rates and age at time of relocation. This requirement for six female grizzly bears of any age is therefore conservative, and offsets any potential loss of a female due to the mine. Two of the six females have been augmented to date. This measure would be complemented by a corresponding long-term reduction in the potential human-caused mortality rate of grizzly bears from that we would expect if there were to be no mine. This reduction is expected to occur both within and outside of the action area as a result of the combined effects of mitigation measures described below and in previous sections of this opinion.

2. **Reduction of grizzly bear mortality rates by addressing the causes of human-caused mortality through a) educating the public to reduce bear attractants at homes, farms, hunting camps, and recreation sites, b) hunter education to reduce misidentification kills and minimize attractive ungulate carcasses, and c) controlling human access (via roads).**

Specific measures that address this recommendation are listed below. Previous sections of this biological opinion described and detailed how each contributes to fulfilling the recommendation. **Italicized** measures are those that are not reasonably expected to occur in the near future without the funding provided by Revett as required in the mitigation plan, based on past and anticipated levels of government funding. A “**(2006)**” denotes those measures added to the mitigation plan during 2005 and 2006.

- *Montana, Fish, Wildlife, and Parks' grizzly bear specialist in Noxon, prior to construction of the evaluation adit*
- *Montana, Fish, Wildlife, and Parks' wildlife law enforcement officer in Noxon, prior to construction of the evaluation adit*
- *Montana, Fish, Wildlife, and Parks' grizzly bear specialist in Libby, prior to construction of the mine (2006)*
- *grizzly bear-resistant garbage containers for employees' personal use (2006)*

- *grizzly bear-resistant garbage containers for distribution to the public (2006)*
- *grizzly bear-resistant county garbage transfer station near mine entrance, prior to construction of the evaluation adit*
- *funding for making 12 county transfer stations bear-resistant (2006)*
- *funding for 20 electric fencing kits (2006)*
- *funding ongoing monitoring and research of native grizzly bears in the Cabinet Mountains, beginning prior to construction of the evaluation adit*
- *funding for ongoing monitoring and research of native bears and bears augmented through State program, beginning prior to construction of the evaluation adit (2006). From the initial work on the evaluation adit through the 35-year life of the project, funding would be available with which to monitor the grizzly bear population to assess grizzly bear population trend and habitat use, to ensure the mitigation measures were effective.*
- *funding for all sites on the Forest with garbage facilities to be made grizzly bear-resistant (2006)*
- *153 acres of high risk grizzly bear habitat within the north south corridor, acquired prior to construction of the evaluation adit by Revett and transferred to the Forest*
- *acquisition or easement of a total of at least 2450 acres of private, high risk-high value lands within the CYE, prior to construction and operation of the mine*
- *a public outreach effort urging support for grizzly bear conservation, sponsored by Revett, prior to construction of the evaluation adit (2006)*
- *food storage order in BMUs 4, 5, 6, prior to construction of the evaluation adit.*
- *forest road density management to control access, beginning prior to construction of the evaluation adit. No significant increases in open or total motorized access densities, or decrease in core area.*
- *food storage order across the CYE on the Forest.*

3. Management strategies should include interchange of female grizzly bears between the Cabinet Mountains and the Yaak as a goal, through identification of where bears cross highways to validate and improve existing predictive linkage models.

Specific measures that address this recommendation are listed below. Previous sections of this biological opinion described and detailed how each contributes to fulfilling the recommendation. **Italicized** measures are those that are not reasonably expected to occur in the near future without the funding provided by Revett as required in the mitigation plan, based on past and anticipated levels of government funding. A “**(2006)**” denotes those measures added to the mitigation plan during 2005 and 2006.

- *funds for continuing the ongoing monitoring of bears to assess and identify key connectivity lands between the Yaak and Cabinet Mountains (2006)*
- *153 acres of high risk grizzly bear habitat within the north south corridor, acquired prior to construction of the evaluation adit by Revett and transferred to the Forest*
- *acquisition or easement of a total of at least 2450 acres of private, high risk-high value lands within the CYE, prior to construction and operation of the mine*

- Forest road density management to control access, beginning prior to construction of the evaluation adit.

In addition, the proposed action would be compatible with the final three priority conservation needs identified by the Service:

4. Address the needs of bears outside the recovery zone.

The mitigation package would improve current conditions for grizzly bears within the CYE recovery zone. The bear specialists and law enforcement officer would also provide services to areas outside the recovery zone, thus benefiting grizzly bears occurring there. Also, motorized access management for grizzly bears occurring outside the recovery zone improved in 2004, with the Forest Plan amendment.

5. Increase public outreach and involvement

As described in this biological opinion, the proposed action contributes to this measure through measures listed below. **Italicized** measures are those that are not reasonably expected to occur in the near future without the funding provided by Revett as required in the mitigation plan, based on past and anticipated levels of government funding. A “(2006)” denotes those measures added to the mitigation plan during 2005 and 2006.

- *a public outreach effort to obtain support for grizzly bear conservation, sponsored by Revett, prior to construction of the evaluation adit. (2006)*
- the Forest will organize and lead regularly scheduled meetings, attended by representatives of participating agencies, the interested general public, and representatives of the county commissioners, mining company, local citizen and other non-government groups to review objectives and implementation of the mitigation measures, and review monitoring and research information. (2006)
- *Montana, Fish, Wildlife, and Parks’ grizzly bear specialist in Noxon, prior to construction of the evaluation adit.*
- *Montana, Fish, Wildlife, and Parks’ wildlife law enforcement officer in Noxon, prior to construction of the evaluation adit.*
- *Montana, Fish, Wildlife, and Parks’ grizzly bear specialist in Libby, prior to construction of the mine. (2006)*

6. Access management

As described earlier in this biological opinion, access management related to the proposed action contributes to this priority conservation need.

- forest road density management to control access, beginning prior to construction of the evaluation adit; no significant increases in open or total motorized access densities, or decrease in core area; potential decreases in road densities and increases in core as a result of acquisition of mitigation habitat.

In summary, the proposed action contributes to each of the six priority conservation needs for recovery of grizzly bears in the CYE.

Species Response to the Proposed Action

Recent trend estimates for the CYE grizzly bear population strongly suggest a decline. The probability of decline was from 1983 through 2002 was 89 percent (Kasworm et al. 2005). Updated analysis through 2005 indicated the probability of decline is 91 percent (Kasworm et al. in litt. 2006b). It is unlikely that at this time habitat is the factor most limiting the grizzly bear population. The existing small population and correspondingly few reproductive-age female grizzly bears are more plausible factors limiting population growth. Grizzly bear reproductive rates are inherently low, because females grizzly bears typically do not breed until age 4 or older, average 2 cubs per litter, stay with cubs for 2 to 3 years, and have few litters during their lifetime. Cub mortality rates are relatively high. Mortality of adult female grizzly bears is especially deleterious to population growth. The population of grizzly bears in the CYE remains vulnerable to extirpation because of small population size (USDI 1999b; Proctor et al. 2004).

Small population size, human-caused mortality and reduced habitat connectivity have long been recognized as significant problems in the CYE grizzly bear population, and in other wildlife populations as well. A population of only 30 to 40 grizzly bears makes any number of human-caused mortalities, in addition to natural mortality, a significant factor in population decline. Human-caused mortality in the CYE is limiting population increase and contributing to extinction risk (Mattson and Merrill 2004; Procter et al. 2004). The number of human-caused mortalities of grizzly bears over the past 24 years is 21, or an average of less than 1 per year. The effect on the population has been significant. The existing human-caused mortality rate, given the small grizzly bear population, is not sustainable with or without the Rock Creek Mine. This presents a management challenge, considering the number of human-caused mortalities (less than 1 per year) compared to the number of people who use or live in grizzly bear habitat in the CYE each year. We are not able to predict and prevent all circumstances that could cause any one specific person, at a specific time and place, to kill or cause the death of a grizzly bear. However, as the human and grizzly bear populations grow, there are actions that agencies and governments can take to reduce the potential for human-caused grizzly bear mortality.

As described in detail earlier in this biological opinion, we expect that one grizzly bear may be killed due to impacts of the mine, but not until during the construction or operation phase of the mine. During those phases of the mine, the number of people living in the area would increase substantially. We do not anticipate mortality of grizzly bears during the initial two to three years of construction and operation of the evaluation adit.

In the March 28, 2005 Order, the court expressed strong concerns that the CYE population was at least not increasing, and concluded that contemplating additional take was “not rational”. In response to the court’s concerns, the agencies reviewed new information available since the 2003 biological opinion and re-analyzed the proposed action and mitigation plan.

As part of our analysis in the 2003 biological opinion, we had calculated annual known, human-caused mortality rates in order to estimate the effects of the proposed mine on the CYE grizzly

bear population. In this analysis, we did not estimate annual rates as there is no relevant research on sustainable mortality in small grizzly bear populations that would lend insight into the rate. In this biological opinion, we relied instead on an analysis of the anticipated effects of the proposed mine in consideration of the most recent estimated rate of trend and probability of decline (Kasworm et al. 2005; Kasworm et al. in litt. 2006b) and projections in Proctor et al. (2004).

As a result, the Forest and Revett agreed to *additional* measures over those already in the 2003 mitigation plan, to ensure that the plan directly addressed each of the primary factors limiting growth of the CYE population:

- small population size,
- human-caused mortality, and
- connectivity,
- as well as the three additional conservation needs of the grizzly bears in the CYE

Through this analysis, we concluded that prior to the proposed Rock Creek Mine project commencing, specific actions were needed that would work collectively to improve the existing status of CYE grizzly bears by stabilizing the population through augmentation and a reduction in human-caused mortality of grizzly bears. Further, such actions to improve the existing environment for grizzly bears were needed, whether or not the Rock Creek Mine project moved forward. Improvements in the current conditions are needed to cultivate a grizzly bear population that is able to sustain some level of human-caused mortality, as the risk of human-caused mortality cannot be entirely eliminated. The plan requires measures that address and alleviate the problems of small population size and existing rates of human-caused mortality, as well as measures to improve and maintain habitat connectivity. Finally, we concluded that the 2003 mitigation plan included measures that addressed these issues within the action area, but did not address these issues across the Cabinet Mountains and the CYE as a whole.

In 2005, several opportunities arose as Revett was advised of the situation caused by the current conditions in the CYE. Revett agreed to provide additional, significant levels of funding for needed conservation measures. This level of funding dedicated to grizzly bear conservation in the CYE is not likely available through limited federal, state or local government funds. Revett agreed to establish a fund to be used for several additional measures that further reduce the potential for human-caused mortality and improve habitat conditions on public and private lands *throughout* the entire ecosystem, beyond the project area. The 2006 mitigation plan includes measures that reduce or offset the impacts of the mine, but also includes several proactive measures that would alleviate problems related to grizzly bear mortality and habitat connectivity that *are not and would not* be attributable to the mine. These measures were necessary in order to improve the current population status of grizzly bears in the CYE to the point the population could sustain potential adverse impacts from the mine and not result in jeopardy to the species.

Table A15 summarizes the total mitigation plan funding proportions directed at the major issues affecting grizzly bears in the CYE. It outlines both current management efforts and proposed management under the mitigation plan. The table summarize how issues central to the recovery of grizzly bears in the CYE are currently addressed, and how the proposed project would address each. The mitigation plan allocates resources to various issues in proportion to needs in reducing

mortality risk, and other risks to CYE grizzly bears.

Without the funding from the project sponsors, most of the grizzly bear conservation measures outlined above would not occur in the near future. Critical needs for augmentation, human-caused mortality reduction and habitat connectivity are now subject to available agency funding or would not occur. Agency budgets have remained flat or been reduced in recent past; the in 2006, the Service had no funding available for most of the recovery actions listed above.

As detailed earlier, the mitigation plan requires the Oversight Committee to oversee and monitor the implementation of all mitigation measures by the Forest and Revett, and review all new information on grizzly bears and grizzly bears in the CYE. If needed, the Oversight Committee would develop appropriate modifications or revisions of the management plan and recommend these to the Forest. This information would come from sources including information from the research and monitoring effort conducted over the life of the mine. The Forest and participating agencies would meet regularly with the interested public and local governments, to review implementation of the plan. We expect that this would increase public trust of agency sponsored efforts and public support for grizzly bear recovery.

Issue	Current management	Enhanced management	% of mitigation effort	% of mortality
Population size	Low numbers placed opportunistically; Limited monitoring due to limited funding	Augmentation of 2-3 bears annually: <ul style="list-style-type: none"> • Ongoing for 10-15 years • Monitoring of all placed bears to document survival and reproduction • Increased placement increases genetic health and increases fitness 	42%	
Mortality	High human-caused mortality risk <ul style="list-style-type: none"> • Risks increasing due to increasing development • No bear management specialists, resulting in ongoing conflicts • illegal killing continues 	Lower due to: <ul style="list-style-type: none"> • Two bear management specialists advance education and minimize conflict potential • Dumpsters placed at private homes • Fencing transfer stations • Additional warden reduces potential for illegal killing and advances efficient investigations of bear mortalities 	53%	Illegal 20.7% Site conflicts 3.4%
Population Trend	Declining	Stabilized and then increasing due to: <ul style="list-style-type: none"> • Increased augmentation, with necessary monitoring • Enhanced survival due to new programs and actions: sanitation, outreach, hunter education, bear specialist and warden positions. 	Combination of: <ul style="list-style-type: none"> • 27%: augmentation • 15%: NEPA for Canadian bears • 53%: mortality control 	

Issue	Current management	Enhanced management	% of mitigation effort	% of mortality
Attractants	Minimal efforts	Enhanced attractant control due to: <ul style="list-style-type: none"> • Bear specialists positions • Bear resistant dumpsters on KNF • Bear resistant dumpsters at homes • Fencing of transfer station 	Combination of: <ul style="list-style-type: none"> • 36%: FWP positions. • 17%: bear resistant dumpsters and transfer stations, and outreach. 	Site conflicts 3.4%
Linkage	Minimal efforts	Enhanced efforts due to: <ul style="list-style-type: none"> • Monitoring of bears in Hwy 2 area • Outreach to local residents regarding sanitation and conflict prevention • Easements and acquisitions possible with identification of key crossing • Increased bear numbers due to augmentation and reduced mortality with eventual occupancy of linkage areas. • Enhanced sanitation in linkage areas, bear resistant dumpsters at private residences 	5%	

We conclude that the number and type of measures included in the mitigation plan to reduce human-caused mortality can reasonably be expected to reduce current and future human-caused mortality risks across the CYE, including risks associated with the mine. We expect that the displacement, mortality and fragmentation risks associated with the mine would be fully or more than offset because important aspects of current conditions for grizzly bears in the CYE would be substantially improved (especially few breeding age females and a reduction in human-caused mortality risk), and would continue to improve as time goes by, due in large part to the measures in the mitigation plan, in conjunction with other recovery actions.

The proposed action including the mitigation plan would more than offset the loss of one grizzly bear (due to direct mortality) and the potential reduction in reproduction (or “harm” associated with displacement). The combined effects of measures in the proposed action would ensure the current conditions for bears improved and so would gradually increase the number of grizzly bears in the CYE to levels that could sustain and absorb impacts from the mine and result in a net benefit to the species. The combined measures affect both the project action area and entire CYE. In conjunction with the State’s augmentation program, the mitigation plan is expected to contribute to meeting the overall conservation needs of grizzly bears in the CYE (listed above). The measures are reasonably expected to improve the current conditions for grizzly bears by supporting augmentation, reducing the probability of grizzly bear mortality due to the mine, reducing the current rate of human-caused grizzly bear mortality not associated with the mine within and outside the action area, and improving both connectivity within the north-south corridor (273 acres have already been purchased for this purpose) and within the entire CYE, by aiding in the identification of key parcels linking the Cabinet Mountains with the Yaak portion of the ecosystem. Over time, with full implementation of the proposed action and mitigation plan, we expect to see the number of grizzly bears grow, the population stabilize and then increase toward recovery goals.

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 Rock Creek Mine are not considered as cumulative effects because they require separate consultation pursuant to section 7 of the Act (50 CFR 402.14).

The cumulative effects of increased public recreational use of the action area, private land development for homes and business, and the significant amount of roading and forest management activities associated with private corporate timber lands within the action area are expected to continue. Recreational use and timber harvest on private property may have considerable local impacts on grizzly bears in the southern portion of the Cabinet Mountains. The Service believes these cumulative effects would adversely impact grizzly bears in the action area. On Plum Creek lands within the action area, Plum Creek applies timber harvest management direction for grizzly bears conservation, following the principles outlined in a September 15, 1993 letter (Plum Creek Timber Co., Inc. in litt. 1993) to the Service. The guidelines include direction for managing open road density, road location, cover, size of openings, timing of operations, and riparian habitats. These guidelines moderate the impacts of timber harvest on grizzly bears.

Other projects in the action area pose fragmentation risks in the narrow recovery zone. Two small patented mining properties (Way-up and Fourth of July mines) were recently granted a Forest Service right-of-way authorization. Through consultation on this action, terms and conditions were issued to minimize the impact of anticipated incidental take. The Forest concluded that it was unable to entirely restrict access to private land under ANILCA, nor restrict activities conducted on the private lands. Further, more than a dozen other patented mining properties occur in the corridor between the east and west sides of the southern Cabinet Mountains. The Forest has limited jurisdiction to reduce impacts that could occur on these private properties. Large scale mineral development is unlikely on these small patents (J. McKay, pers. comm. 2000) due to the size of the patents and the nature of the mineral deposits. However, potential activities on some of these private properties that could adversely impact grizzly bears include clear-cutting, small-scale mining activity including surface disturbance and blasting, construction of buildings, hunting camps, and livestock operations with food and attractants. Road access is not currently authorized to all patent owners, but the Forest may not have the authority to adequately manage future access to private lands in ways compatible with grizzly bear recovery.

Activities on private land in-holdings, especially on the east side of the Cabinet Mountains, could potentially affect grizzly bear movements within the north-south movement corridor, effectively constricting the secure habitat for bears to less than 2 miles wide in BMUs 4, 5 and 6. The north to south corridor contains expanses of scree habitat (exposed rock) lacking cover, and steep topography. Many private land in-holdings contain cover that would be used by grizzly bears moving through the area. Further constriction of the corridor may force grizzly bears into contact with people, could increase adverse intra-specific conflicts with other bears, or could

displace them from essential habitat to the extent that significant impacts to reproduction and survival result. The impacts of development on private in-holdings would be reduced and in some cases eliminated within the north-south corridor in BMUs 4, 5 and 6 through the acquisition or perpetual easement of 2450 acres as required in the mitigation plan. Revett has recently acquired 273 acres in the north-south corridor, which would be used as mitigation property if the mine is permitted (Carson Rife, Revett, in litt. 2005a). This property has high value to grizzly bears; it was rated as the number two priority by the agencies in their list of priority lands for acquisition or conservation easement. This property, managed for grizzly bear conservation, would contribute to long term habitat connectivity in the north-south corridor and reduce the potential for displacement of bears into the future.

Montana Fish, Wildlife and Parks began its augmentation effort in the Cabinet Mountains with plans to augment one to two female grizzly bears per year in 2005 (Montana Fish, Wildlife and Parks, in litt. 2005). Montana Fish, Wildlife and Parks proposed augmentation in 1986 in *The Grizzly Bear in Northwestern Montana* (1986 FEIS). In 2006, the State released its *DEIS on the Grizzly Bear Management Plan for Western Montana*, which included a preferred alternative to augment the CYE with 10 to 15 subadult male or female grizzly bears, or appropriate adult females, from other areas. In 2005, an adult female was relocated to the Cabinet Mountains from the NCDE; the bear emerged from her den in the CYE in spring, 2006. In 2006, a subadult female was relocated to the Cabinet Mountains, also from the NCDE. Montana Fish, Wildlife and Parks' augmentation plan to relocate grizzly bears, and two (or possibly more) female grizzly bears per year, is consistent and compatible with recent conservation recommendations for the CYE (Proctor et al. 2004), and with the priority conservation needs of grizzly bears in the CYE. Augmentation will significantly improve the short-term conditions for the population of grizzly bears in the CYE. Revett has agreed provide funding to ensure the Service has adequate annual funds to monitor augmented bears.

One population simulation estimated that 13 female grizzly bears would need to be augmented into the Cabinets to stabilize the population (Proctor et al. 2004); another estimated 24 females were needed given current mortality rates (relatively low survival rates) or that 12 were needed if mortality rates were lower (higher survival rates) (Kasworm et al. 2006b). The CYE grizzly bear population would need to be augmented and mortality rates would have to be lowered from existing levels to ultimately reduce the likelihood of extinction (Proctor et al. 2004). The Montana Fish, Wildlife and Parks has a bear management program; however, resources for that program are currently limited in the CYE. Success of Montana Fish, Wildlife and Parks' effort will take several years and must be documented through monitoring augmented bears. Based on the Service's earlier augmentation efforts in the CYE (described previously), we expect that augmentation will be successful over the next decade and significantly improve the status of the CYE grizzly bear population. We consider this program critical to the short-term (10 years) health of the population, and to recovery over the long-term.

The proposed action would increase the human population by about 11 percent in the local area. Without the proposed mine, Sanders and Lincoln Counties were expected to grow by 32 and 15 percent respectively between 1999 and 2020. Within the action area, development of private land in the center of the CYE near Troy continues. Expected increases in human development in or near the action area may displace bears sensitive to human activities and lead to further

constriction of the ecosystem to the north of the action area, impacting grizzly bears in the action area. Human development has inherent risks of habituation, food-related grizzly bear management problems, and increases opportunities for poaching or malicious killing of grizzly bears. Greater sprawl of residences along the Clark Fork River will continue to impact grizzly bears in the southern Cabinet Mountains.

Experience in other grizzly bear ecosystems demonstrates that human population growth can affect grizzly bear populations to varying degrees. The adverse effects of human population growth mentioned above can be moderated where: homes are built adjacent to or within the footprint of existing communities versus rural, dispersed developments; communities implement adequate attractant storage measures; private land owners have access to information on living in grizzly bear habitat; landowners have support in dealing with nuisance bears; hunters and recreationists are informed and aware of grizzly bear conservation needs; and access management on public lands provides adequate grizzly bear security. For instance, the grizzly bear population in the larger Yellowstone grizzly bear ecosystem has grown and expanded its range despite substantial growth in the human population adjacent to and within the ecosystem within the past 20 years. Much of this growth, however, is in part attributable to the large portion of the recovery zone in Yellowstone National Park, where human activity is highly regulated.

Human population growth presents special challenges to maintaining grizzly bear populations as small as the CYE grizzly bear population (see Mattson and Merrill 2004). The human population in Sanders County is projected to gradually increase over the next 35 years, with or without the mine, as is Lincoln County. The communities of Noxon, Heron, Trout Creek, Thompson Falls and Troy are expected to grow. Reduction of human-caused mortality is a key factor in reversing the decline of the CYE grizzly bear population. It is unlikely that sufficient local or state government sources or private sources of funding would be available for most programs or actions to significantly reduce human-caused mortality in the near term. We anticipate that the increased human population growth that is not associated with the mine would result in an additional human-caused grizzly bear mortality in the action area over existing mortality rates over the 35-year life of the mine. However, if the mine were to proceed, the grizzly bear specialist and law enforcement positions, sanitation measures on private and public land, access management on public lands, and the grizzly bear monitoring effort required in the revised mitigation plan would work to substantially reduce, but could not entirely eliminate, the adverse impacts of such human population growth within the Cabinet Mountains portion of the CYE. Without measures such as those in the mitigation plan, we anticipate higher human-caused mortality rates.

CONCLUSION

After reviewing the current status of the grizzly bear, the environmental baseline for the action area, the effects of the proposed Rock Creek Mine and the cumulative effects, it is the Service's biological opinion that the Rock Creek Mine as proposed, is not likely to jeopardize the continued existence of the listed entity of grizzly bears. No critical habitat has been designated for this species, therefore none would be affected.

The Service completed an initial biological opinion for the Rock Creek Mine project on

December 15, 2000 (USDI 2000c) in which we concluded that the proposed action was likely to jeopardize grizzly bears. The Service withdrew this biological opinion in March, 2002, and the Forest subsequently withdrew the ROD.

Subsequently, two significant new actions occurred. Noranda formally withdrew its plan of operations and abandoned several required permits necessary to develop the proposed Montanore mine, west of the Cabinet divide (Noranda Inc. in litt. 2002a, 2002b, 2002c, 2002d). The withdrawal of the Montanore Mine project represented a significant improvement in the baseline for grizzly bears within the action area and within the entire Cabinet Mountains. Second, the Forest agreed to incorporate all of the substantive provisions of the reasonable and prudent alternative required to preclude jeopardy to CYE grizzly bears (as outlined in the 2000 biological opinion for the proposed Rock Creek Mine) into their proposed action. The 2000 biological opinion's reasonable and prudent alternative, incorporated into the 2002 mitigation package, was developed to address adverse impacts of both the Montanore and Rock Creek mines operating in the southern Cabinet Mountains. Although the Montanore Mine was removed from the environmental baseline in the action area, the 2002 mitigation plan and additional measures for the Rock Creek mine were not substantively changed or weakened, and were strengthened in some areas due to inclusion of the measures in the reasonable and prudent alternative. In 2003, the Service completed an amended biological opinion that determined the proposed action was not likely to jeopardize grizzly bears.

In March 2005, as a result of another legal challenge, the court set aside and remanded the 2003 biological opinion to the Service for reconsideration. This current biological opinion addresses the concerns raised by the court, and considers new information including additional human-caused mortality and publications related to viability and trend of the CYE grizzly bear population. This biological opinion analyzed an improved mitigation plan proposed by the Forest, which was developed in consideration of the court's concerns and new information.

This biological opinion analyzed the effects of the proposed action and 2006 mitigation plan on grizzly bears. We concluded that collectively, the measures would reduce, remove, or more than offset the potential adverse effects of the proposed action. The Service believes the mitigation plan addresses the key conservation needs of grizzly bears in the CYE, and ensure that the proposed action would not likely jeopardize grizzly bears. We base our conclusion on the entire analysis found in this document, all information provided by the Forest, discussions with the Forest and with Revett staff, discussions with Montana Fish, Wildlife and Parks biologists, and information in our files.

The Service concludes that the combination of the actions required in the proposed action and mitigation plan would eliminate the likelihood that the proposed action itself would appreciably diminish survival and recovery of grizzly bears, and would in fact improve conditions over the long-term over the existing conditions, ultimately promoting the recovery of the CYE grizzly bear population. The recovery of the CYE population supports survival and recovery of grizzly bears in the listed entity.

The following *summarizes* the primary means by which the proposed action and mitigation plan avoid jeopardy:

1. **Conservation Needs** Results in Procter et al. (2004) indicated that the CYE grizzly bear population had an 85 percent probability of extinction within 100 years. The authors indicated that three actions could significantly reduce the probability of extinction: a) augmentation of the population, most effective on population growth in the short-term, b) reduction of grizzly bear mortality, most effective on population growth in the long-term, and c) enhanced population interchange, which along with reduction of mortality, had the largest effect on reducing extinction probability. Further the Service (in litt. 2005b) included these three actions as priority conservation needs for recovery in the CYE, along with the following three additional needs: d) increased public outreach, e) needs of grizzly bears outside the recovery zone, and f) access management.

In summary, this biological opinion described and analyzed the mitigation plan measures or other measures expected to occur that fulfill each of the six recommended actions: a) funding to ensure the Service is able to continue to monitor Cabinet Mountains grizzly bears, both native and augmented bears; b) a comprehensive set of required measures expected to reduce human-caused mortality not only within the action area, but throughout the entire CYE; c) funding to ensure and expedite research that would help enable us to identify existing and potential areas of habitat linkage between the Cabinet Mountains and the Yaak portion of the CYE; d) a CYE bear specialist program, increased law enforcement, and a public outreach program sponsored by Revett; and e) no increases in open or total motorized route densities and no loss of core, with potential additional improvements through habitat acquisition. We conclude that these measures would contribute to improving the status of the grizzly bear population in the entire CYE, and be effective at an ecosystem scale to improve the existing conditions for grizzly bears. We also conclude that these measures would contribute to reducing and/or offsetting the potential adverse effects of the proposed action to levels not likely to appreciably diminish survival and recovery of grizzly bears, as analyzed in this biological opinion

2. **Human-caused Mortality Risk** To the extent possible, management actions should reduce potential mortality risks to grizzly bears in an attempt to meet the intent of the CYE Recovery Plan human-caused grizzly bear mortality *goal* of zero.

In summary, the current Recovery Plan human-caused mortality goal for the CYE population is zero. The Service recognizes that over time, with the number of people in the CYE, this goal is not likely achievable with or without the development of the Rock Creek Mine. The Recovery Plan recognized the amplified risks of human-caused grizzly bear mortality in the CYE due to small grizzly bear population size and possible stochastic events. Given the *current* status of the grizzly bear population, the population would continue its decline with additional unabated loss of subadult or adult female grizzly bears.

As mentioned in 1. above, the mitigation plan contains a comprehensive package of measures that have been shown in practice to work together to reduce mortality risks to grizzly bears. Mitigation plan measures to reduce the potential for grizzly bear mortality were discussed in detail in this biological opinion. The mitigation plan also requires a

grizzly bear monitoring program that would assist in detecting and identifying the causes of grizzly bear mortality, and in assessing the success of mitigation efforts. However, the mortality risks increase with the direct and indirect affects of the mine and these risks cannot be entirely eliminated over the 35-year life of the mine.

The Service anticipates that no more than one grizzly bear would be killed or removed from the population as a result of the proposed action. We base this expectation on the environmental baseline, existing and past grizzly bear mortality rates, causes of mortalities, and total effects of the mitigation measures. Given the current status of the population, the unmitigated loss of a female due to the proposed action would contribute to the decline of grizzly bears in the Cabinet Mountains, given the potential isolation of grizzly bears in Cabinet Mountains from those in the Yaak portion of the CYE. Unmitigated, female mortality would be especially detrimental if it occurred within the near-term before this population benefits from either natural population growth or the combination of augmentation and reduced human-caused mortality. We anticipate that the loss of a grizzly bear, if it occurs, would occur during the construction or operation phase of the mine.

We expect no net increase in human-caused mortality rates even with the potential mortality due to the mine. According to recent scientific population simulations, augmentation of the population **and** a reduction in mortality are essential factors in reducing the probability of extinction. As explained in this biological opinion, the mitigation package includes examples of most of the kinds of measures known to reduce human-caused mortality. The proposed action reduces the potential for grizzly bear mortalities that could be *attributable to the mine*. The mitigation plan goes further in that it is expected to improve the current environmental baseline conditions for grizzly bears by *reducing current and future rates of human-caused mortality not directly or indirectly attributable to the mine*. The combination of augmentation and actions to reduce current rates of human-caused mortality significantly reduces the potential for further decline of the population if a grizzly bear is killed as a result of the mine during the construction or operations phase. We reasonably expect that the measures taken to reduce potential for human-caused mortality, within and outside the action area, would result in no net increase, and more likely a net decrease, in overall human-caused grizzly bear mortality rates within the CYE, even with the one bear lost to the mine itself. The combination of augmentation and reduction in human-caused mortality would contribute to avoiding an appreciable reduction in the numbers, distribution and reproduction of grizzly bears.

Further, construction of the mine would be deferred until at least six females were augmented into the population. This number of females would offset the potential loss of a female grizzly bear due to the effects of the proposed mine (Kasworm et al. 2006b), if such loss were to occur. Further, the State's augmentation effort would continue, with the expressed intent of increasing total number of grizzly bears in the CYE (Kasworm et al. 2006b). Montana Fish, Wildlife and Parks expects to relocate at least one to two (possibly more, see Montana Fish, Wildlife and Parks 2006) female bears per year, to the Cabinet Mountains. Revett would ensure that the Service has annual funding to monitor bears relocated into the Cabinet Mountains. Revett has further agreed to provide funding

for actual augmentation, in the event that Montana Fish, Wildlife and Parks is unable to continue its program. Augmentation would continue to contribute to the persistence of bears in the Cabinet Mountains and to the eventual stabilization and growth of the CYE grizzly bear population.

The Service anticipates some low level of take would also occur in the form of harm (habitat alteration) or harassment, which would occur as a result of initial disturbance (e.g. noise and activity) near the mine site and the resulting displacement of one or two female grizzly bears from key habitats. We anticipate this take would occur through impaired reproduction in these females, and would occur during the construction phase of the mine, as adult female bears now using the Rock Creek drainage would have to adjust to a relatively sudden and substantial increase in human activity within the action area. This type of take is difficult to quantify and detect, and the likelihood of its occurring is based in part on the nature of individual bears using the action area. However, to offset or minimize such impacts: a) the Forest would continue to provide substantial levels of core habitat and limit motorized route densities in the affected BMUs to levels that are reasonably expected to allow most grizzly bears alternative habitats for use if displacement occurs; b) private land acquisitions and easements on 2450 acres would contribute to mitigating and alleviating the displacement effects of the mine over the long term by securing existing and additional core habitat for perpetuity; c) over the long term, the augmentation program and reduction in human-caused mortality rates would also contribute to alleviating and offsetting the effects of any loss of reproductive potential caused by displacement. Based on existing scientific information on displacement, we expect that within a year or two, the potential for impaired reproduction would diminish as female bears adjust, by using alternative habitats within their home ranges or habituating to the routine disturbance generated by the mine.

We conclude that our projections of anticipated human-caused mortality and harm or harassment related to the mine, when added to other human-caused mortality, would be within the range of mortality that would not lead to population decline. The effects of an anticipated human-caused grizzly bear mortality and the impaired reproduction (resulting from displacement) on the population would be more than offset by both existing and improved habitat conditions, the net reduction in existing and anticipated future grizzly bear mortality rates, and augmentation (Kasworm et al. 2006b; Proctor et al. 2004). Therefore, we conclude that the effects of the anticipated levels of human-caused female grizzly bear mortality and the temporarily reduced reproductive potential described in this biological opinion would not appreciably diminish the likelihood of the survival and recovery of grizzly bears.

3. **Fragmentation** Reduce or minimize displacement effects of the mine to maintain and improve habitat connectivity within the Cabinet Mountains, and between the Cabinets and the Yaak portions of the CYE. In particular, ensure grizzly bear use of the habitat within the affected BMUs (4, 5 and 6) and movements between BMUs to the north and south of these BMUs to allow (a) adequate use of essential habitat by and movement of grizzly bears within their home ranges, (b) exploratory movements, (c) breeding behaviors and movements and genetic interchange; and (d) dispersal.

Interchange of grizzly bears between the Cabinet Mountains and the Yaak is a recovery goal. Population and habitat connectivity within the CYE grizzly bear population would contribute to significantly reducing the likelihood of extinction. The mitigation plan requires funding for continued research aimed at identifying key areas of connectivity between these two portions of the CYE. The mitigation plan also requires purchase of properties or conservation easement on 2450 acres. Key private land parcels have been identified and ranked according to habitat value for grizzly bears and risks of development that would affect connectivity. These purchases or easements would enhance and promote long-term connectivity within the narrow Cabinet Mountains portion of the CYE.

Acquisition of 153 acres of mitigation properties would be required within the north-south corridor, and must be approved by the Service to preclude significant fragmentation of the north-south corridor. Based on recent property purchased by Revett (273 acres) within the north-south corridor, more than 153 acres of key habitat would be acquired for grizzly bear conservation within the corridor. A total of 2450 replacement acres are required to offset displacement effects of the mine. A portion of the additional acres would likely be within the north-south corridor as well, and would improve long-term habitat security and facilitate movement of bears and use of habitat within BMUs 4, 5, and 6, and potentially BMUs 7, 8 and 22. These mitigation measures would directly and indirectly reduce the connectivity impacts of the mine and offset habitat loss and displacement due to human-caused disturbance.

Table A16 summarizes access management and habitat effectiveness conditions within the action area with implementation of the proposed action. Key Forest Plan standards are met, and habitat effectiveness is 70 percent or greater in six of seven BMUs. With few exceptions, open and total motorized route access would be managed at levels similar to or better than the average reported in grizzly bear research in the CYE (Wakkinen and Kasworm 1997). Core areas within BMUs are substantial and would not decrease. BMU 6 has core area comparable in size to, and five of the remaining six BMUs exceed the average core area size reported for female grizzly bears in the CYE. The Forest would improve conditions for grizzly bears related to human access management as opportunities arise with the acquisition or perpetual conservation easement of the mitigation properties. Proposed access management would contribute to enhancing north south connectivity in the action area.

We conclude that fragmentation of the north south corridor would be avoided by existing and proposed access management in combination with the acquisition of mitigation properties identified to specifically remedy fragmentation issues. The risks of fragmentation and displacement would be reduced to levels that would not significantly impair the movement of grizzly bears within BMUs 4, 5, and 6 and therefore would not contribute to an appreciable reduction in the likelihood of the survival and recovery.

Table A16. Projected access management and habitat effectiveness (HE) conditions with implementation of Alt. 5 for the proposed Rock Creek Mine⁵.				
BMU	% Core¹	% OMRD > 1 mi/mi² (2)	% TMRD >2 mi/mi² (3)	% HE (est) (4)
2	77	17	14	83
4	63	36	25	63
5	59	26	23	75
6	54	33	32	70
7	67	23	20	80
8	56	32	23	77
22	51	38	41	71

¹ For comparison, 55 percent of an average female home range was core area (Wakkinen and Kasworm 1997).

² For comparison, 33 percent of an average female home range exceeded 1 mile per square mile open motorized route density (Wakkinen and Kasworm 1997).

³ For comparison, 26 percent of an average female home range exceeded 2 miles per square mile total motorized route density (Wakkinen and Kasworm 1997).

⁴ For comparison, previous Forest Plan standard for habitat effectiveness was 70 percent of BMU.

⁵ Percents are based on current conditions and could vary if access conditions change due to other actions within a BMU. However, Forest actions will not increase route densities or decrease core in BMUs 4,5, and 6 throughout life of mine.

Further, the 2004 Kootenai Forest Plan amendment requires that 20 of 22 BMUs (91 percent) in the CYE reach at least 55 percent core area or more (the average female home range core size) (see Appendix D). The amendment will eventually result in increasing core habitat within the CYE by 11,170 acres to 943,513 acres (or about 57 percent of the CYE). Currently, 16 of 22 BMUs (73 percent) in the CYE provide at least 55 percent core area or more. Of nine BMUs managed solely by the Forest and in the Cabinet portion of the CYE, eight provide 55 percent core area or more; one provides 54 percent. This environmental baseline contributes to habitat connectivity throughout the CYE.

The combination of reduced rates of human-caused mortality, augmentation of the population, and maintenance or re-establishment of habitat connectivity is expected to more than offset impacts of the mine. This combination of actions is expected to contribute to the eventual stabilization and recovery of the CYE grizzly bear population. We conclude that the proposed action, which fully or partially supports this combination of actions, would not appreciably diminish the likelihood of the survival and recovery of grizzly bears.

4. **Oversight and Implementation** Establish the processes and infrastructure needed to ensure that a) the mitigation plan is fully implemented and that mitigation measures are timely and effective; b) the revised mitigation plan is coordinated and effectively implemented; and c) adaptive management is used when needed over the 35 year life of the mine.

In summary, the Forest has agreed to form and lead an Oversight Committee that develops and oversees implementation of the proposed action and mitigation plan.

Committee members would include participating agencies, including Montana Fish, Wildlife and Parks and MDEQ. The Service would participate as an advisor to the group. The Oversight Committee would be responsible for overseeing the full implementation of the mitigation plan measures. The committee would serve as a forum to disseminate progress reports, address concerns, and provide general information regarding the mine to the public. The committee would review new grizzly bear information, including that collected by the required monitoring and research effort, grizzly bear specialist and law enforcement officer, and determine whether the proposed action and mitigation measures are effective. If not, the Forest and Revett would be responsible to take action to remedy the situation, which may include using adaptive management to fully meet the intent and desired goals of the mitigation package, thus avoiding jeopardy. The Service would review any proposed modifications, additions or revisions of the management plan or mitigation plan as appropriate under the provisions of section 7 of the Act.

The Service concludes that with the establishment of an Oversight Committee, the complex and numerous aspects of the proposed action and the mitigation plan would be effectively implemented to reduce the impacts of the proposed mine to levels that are not likely to appreciably diminish the likelihood of 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 prohibits 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 regulation to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is further defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, carrying out 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 deemed by the Service as necessary to minimize or reduce the amount or extent of the anticipated level of incidental take of grizzly bears. 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 to Revett, as appropriate, for the exemption in section 7(o)(2) to apply. The Forest has a continuing duty to regulate the activity covered by this incidental take statement. If the Forest 1) fails to assume and implement the terms and conditions or 2) fails to require that Revett 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. In order 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 {50 CFR § 402.14 (i)(3)}.

Amount or Extent of Take Anticipated

High motorized route densities increase the risk of incidental take of grizzly bears by habituating some bears, and modify habitat to levels that displace some bears, both are activities that may significantly impair breeding, feeding, and sheltering. Research in the NCDE (Mace and Manley 1993, Mace et al. 1996) and CYE (Wakkinen and Kasworm 1997) revealed significant displacement of female grizzly bears from highly roaded habitat. Displacement of grizzly bears from highly roaded habitat is significant when it keeps them from preferred or otherwise available habitat to the extent it reduces breeding, feeding or sheltering.

The proposed action would not increase motorized route densities or decrease core areas and so is in compliance with the Service's 2004 incidental take statement on the Forest Plan (USDI 2004). Both motorized route densities and core area percentages in the action area BMUs, specifically those most impacted by the mine (BMUs 4, 5, and 6), do not change or would slightly decrease as a result of the proposed action. Motorized route densities may decline (improve) further and core areas may increase (improve) as mitigation properties are acquired. For most Forest access management actions that comply with the 2004 incidental take statement, we would not anticipate incidental take of grizzly bears over that anticipated in our incidental take statement. However, the Service concludes that the proposed Rock Creek Mine would result in displacement effects to grizzly bears in the Rock Creek drainage that are greater than those associated with usual forest management activities and would continue for a longer period of time. The proposed action would result in two types of incidental take: take in the form of harm or harassment due to displacement and due to habituation and resulting mortality.

Indirect take due to harm or harassment may occur due to displacement of grizzly bears, specifically adult female bears, from essential habitat. Although the project conforms with the 2004 biological opinion and incidental take statement, the disturbances generated by increased road use and human activity exceed that anticipated in 2004. Displacement of female grizzly bears from key habitats near the mine site and associated roads could result in their failure to obtain adequate food resources, which in turn could result in reduced fitness and/or reproductive success. We expect incidental take as some impairment of normal breeding and feeding behavior of adult females that affects reproduction, either through failure to breed or failure to complete a pregnancy.

We do not expect subadult or cub grizzly bear mortality as a result of such displacement. We do not expect mortality, injury, or significant impairment of breeding, feeding or sheltering of male grizzly bears as a result of displacement.

It is the biological judgment of the Service that one or possibly two adult female grizzly bears attempting to use this area would be affected by the potential long-term displacement from portions of the areas affected by the proposed mine, approximately 7000 acres. Female grizzly bears are already displaced from 5656 acres of this area because of disturbance caused by existing open motorized routes, but disturbance levels would increase due to the proposed action. As described in the biological opinion, the premise that one or two adult female grizzly bears would be impacted over time is based upon (a) information from the Cabinet Mountains related

to the number of females with young (Kasworm et al. 2002; Kasworm et al. 2005a); (b) the existing population estimate of grizzly bears in the southern portion of the Cabinet Mountains (Kasworm et al. 2005a); (c) the lack of detectable significant increases in the population as a whole since 1983 (Kasworm 2001, Kasworm et al. 2005a); and (d) the existing disturbances in the Rock Creek drainage and the east side of the divide. This number of adult females may represent two of three to five total adult female bears currently living in the Cabinet Mountains. (If we use a conservative estimate of 10 bears in the Cabinet Mountains, approximately 0.284, or approximately three of these bears would be adult females. If we use the upper estimate of 15 total bears, the number of adult females in the Cabinets could be five.)

The Service anticipates that incidental take of grizzly bears resulting from the displacement from mine activities associated directly or indirectly with the Rock Creek Mine would be difficult to quantify or detect. As described earlier in this opinion, grizzly bears are typically independent and vary in their responses to disturbance. We are unaware of scientific or commercial information available that has quantified the effects of disturbance or displacement on the reproductive or recruitment potential of grizzly bears. We are unaware of scientific or commercial information that could be used to quantify the exact level of incidental take associated with displacement effects, which would manifest itself through impaired breeding and/or feeding in one or two adult females. Where incidental take is difficult to quantify, we use surrogate measures to gauge the impact of the take on the species and determine whether anticipated levels of take would be exceeded. Based on research related to the displacement of grizzly bears from roads and roaded habitat (Mace and Manley 1993, Mace et al. 1996, Wakkinen and Kasworm 1997), in this case we will use the surrogate measures of open motorized route density, total motorized route density, and core to reflect the level of anticipated take and the point at which that level would be exceeded. In this case, we use the proposed levels of open and total motorized route density and core area in BMUs 4, 5, and 6, which limit the amount of human access and associated disturbances in grizzly bear habitat. If the proposed route densities are exceeded or if core area is decreased due to the proposed action, then the amount of incidental take anticipated may be exceeded.

Although we cannot accurately quantify incidental take through displacement, we expect that any displacement effects that result in decreased fitness of adult females to a degree that it impaired reproductive fitness would be relatively low based on the rationale found in the biological opinion. Over 35 years, not all female grizzly bears with home ranges encompassing portions of the Rock Creek drainage would be significantly impacted. Further, there are already existing human activities along FR 150 and lower elevation habitat within the drainage and along the Clark Fork River that already impart disturbance effects on grizzly bears, but bears are known to use the area in general. Grizzly bears that utilize the area are likely conditioned to some level of human activities. The best information suggests that there initially would be increased displacement effects on female grizzly bears using the Rock Creek drainage once construction of the mine begins and human activity levels rapidly and significantly increase along FR 150. The mine would cause higher levels of disturbance on 5656 acres currently near roads, and affect an additional 1400 acres. The displacement of female bears would be more pronounced and long term at lower elevations in the drainage, particularly in spring habitat, but could extend initially throughout larger portions of the drainage for a time.

Incidental take due to harm would also occur in the form of injury or mortality of grizzly bears as a result of human actions. We anticipate that incidental take attributable to the proposed mine is most likely to result through habituation and food conditioning of grizzly bears or increased human-grizzly bear encounters, which increases the chance of their removal through management control actions or illegal shooting or legal defense of life. Increased risk of habituation and food conditioning of grizzly bears and encounters are possible with the rapid influx of workers and their families to the action area during construction of the mine and increases in recreation in the area, leading to increased levels of food, garbage and other human-related attractants. As described earlier, the mitigation plan incorporated many measures to reduce food habituation of bears, attractants and adverse encounters between people and bears. However, even with full implementation of the mitigation plan and effective use of education and information and law enforcement, there remains a reasonable anticipation that one grizzly bear would be killed as a result of direct or indirect mine-related activities at some time during the more than 35-year duration of the mine.

The Service expects the existing baseline condition of the action area related to Forest access management and the full implementation of the mitigation plan would reduce the potential for human-caused mortalities of grizzly bears related to the proposed mine to no more than one mortality throughout the life of the mine. This premise is based on the estimated number of grizzly bears in the Cabinet Mountains (fewer than 15), the projected number of augmented grizzly bears, and on the number and causes of past known, human-caused grizzly bear mortality in the Cabinet Mountains (four from 1982 through 2005) (Kasworm et al. 2005).

All human-caused grizzly bear mortality within the action area would be investigated to determine whether the take could reasonably be attributed to the direct or indirect effects of the proposed mine. Take at the mine site, or bears directly killed by mine employees would be attributable to the mine. Take of a grizzly bear on private or public land would require an investigation to determine whether mortality could reasonably be attributed to the effects of the Rock Creek Mine. Grizzly bears may become habituated and food conditioned for reasons not attributable to the mine, and these bears may eventually run into conflict at the mine, in residential areas occupied by mine employees, or on public lands used by mine employees and their families. Grizzly bears may be struck by vehicles, however we do not anticipate this type of mortality would be attributed to the mine because of the mitigation plan measures, therefore such take is not exempted. Hunter-related grizzly bear mortality would result in the Service reinitiating consultation on Montana's grizzly bear management program (Montana Fish, Wildlife, and Parks 2001).

All human-caused mortality of grizzly bears within the CYE is investigated by the Service, Montana Fish, Wildlife and Parks, and/or Forest Service law enforcement. Human-caused grizzly bear mortality within the action area would be evaluated as to whether it could reasonably be attributed to the effects of the Rock Creek mine. The take of one grizzly bear deemed attributable to the mine would trigger re-evaluation of the situation by the Service to determine whether additional measures are needed to reduce the potential for future mortality. In addition, should the monitoring of the attractant related conflicts document that black bears are gaining food rewards in the action area, the Service shall determine whether additional measures should be implemented to reduce the potential for future mortality of grizzly bears. If the

human-caused grizzly bear mortality attributable to the mine exceeded one bear, reinitiation of consultation would be required.

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. As described in the biological opinion, some low level of indirect incidental take may occur as a result of displacement of females from essential habitat, which would impair reproduction but would not result in the death of a subadult or adult bear. Several factors moderate the impact of this displacement, as discussed in the biological opinion. Habitat management in the action area, especially motorized access management, provides large blocks of interconnected core habitat, and other areas have relatively moderate road densities. Based on research and road density analysis in the CYE and Selkirk ecosystem, the baseline levels of open and total motorized route density and core area would substantially moderate the displacement effects of the action within the Rock Creek drainage. Grizzly bears have large home ranges. Those female grizzly bears that use the Rock Creek drainage would likely have alternative habitat to use if displaced. The mitigation plan requires that a total of 2450 acres be acquired to compensate for the 7044 acres if disturbance, and be managed for grizzly bear habitat. Also, we anticipate that the impacts of disturbance within the Rock Creek drainage on female grizzly bears would decline over time in quality seasonal habitats at higher elevations and further from the roads and mine site as the females habituate to some degree to the disturbance levels and/or select other areas of their home range. Disturbance related effects that impair breeding, feeding or sheltering would likely decline to low levels over time. Further, the proposed action would result in improvements in access management due to 2450 acres of habitat acquisition or easement, which is expected to further reduce the overall displacement effects of the mine.

Currently, known human-caused mortality in the CYE is skewed toward females. At this time human-caused mortality of female grizzly bears in the CYE exceeds levels that are sustainable and promote recovery. Whether or not this level of female grizzly bear mortality will continue is unknown. However, the proposed action includes a suite of actions that are expected to diminish the potential for human-caused mortality, both that mortality attributable to the mine and not attributable to the mine. The survival of female grizzly bears is essential to the persistence and growth of the CYE grizzly bear population. Grizzly bear recovery efforts will continue to work toward reducing human-caused mortality.

The Service concludes that the unmitigated loss of one grizzly bear due to the mine over 35 years could affect the length of time needed for recovery of grizzly bears in the CYE. If one female is killed over a 35 year period, the length of time needed for recovery would be more prolonged. Recovery would be most impacted with the loss of an adult female, and less so with the loss of a female cub. Further, the unmitigated loss of one female *prior* to the time the population experiences some level of recovery, specifically population stabilization or growth, would appreciably reduce the already diminished long-term survival prospects of the grizzly bear population in the CYE.

However, we anticipate that take would not occur until during either the construction phase of the mine itself or the operational phase, due to the large increase in number of mine employees and associated human population growth in the area. Therefore, the construction phase of the mine would proceed only after at least six female grizzly bears were augmented into the Cabinet Mountains. This number of female bears would minimize the impact of the loss on the population in the event a female grizzly bear was killed (Kasworm et. al. 2006). Also, as described earlier in this opinion, we also expect that the suite of measures in the mitigation plan would work concurrently and pro-actively to reduce rates of human-caused grizzly bear mortality from current levels. The mitigation plan would work to reduce potential human-caused mortality both attributable to the mine and not attributable to the mine, and both within and outside the action area. The mitigation plan would fully offset the impacts of any take that does occur due to the mine by reducing the current rates of human-caused mortality of grizzly bears across the entire CYE, including the mortality of grizzly bears not attributable to the mine. Therefore, we anticipate that full implementation of the proposed action and mitigation plan would result in a net reduction in future potential human-caused grizzly bear mortality rates in the CYE.

Reasonable and Prudent Measures

This biological opinion includes reasonable and prudent measures (RPMs) to minimize incidental take. These measures, which are described below, are nondiscretionary and must be implemented by the Forest in order for the exemption in §7(o)(2) to apply. The Forest has a continuing duty to regulate the activities that are covered by this incidental take statement. If the agency fails to adhere to the terms and conditions of the incidental take statement, the protective coverage of §7(o)(2) may lapse. Should the amount or extent of incidental taking be exceeded, or any of the mitigation and conservation efforts be modified, the Forest must confer with the Service immediately to determine if reinitiation of consultation is required.

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize impacts of incidental take of grizzly bears:

1. Reduce the potential for incidental take of grizzly bears resulting from displacement from essential habitat.
2. Reduce the potential for incidental take of grizzly bears resulting from habituation and food conditioning.
3. Monitor and record all conflicts between people and grizzly bears, and people and black bears.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the Forest must, in addition to implementing the mitigation plan as proposed, comply with the following terms and conditions which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

1. The following terms and conditions implement RPM 1 :
 - a) Forest actions shall not result in a net decrease of core area, nor a net increase open or total motorized route densities within BMUs 4, 5, and 6 during the life of the proposed mine.
 - b) The Forest shall ensure that reductions in open and/or total motorized route densities or increases in core areas made possible by acquisition of or obtaining conservation easements on mitigation habitat shall be completed within 3 years of acquisition or easement. Improvements shall constitute the baseline from which term and condition 1.a. above is then measured during the life of the mine. At a minimum, upon acquisition or easement, the Forest and Service shall determine whether, where legally possible, the Forest shall temporarily immediately close access routes to reduce open motorized route densities. Final planning processes would then be conducted.
 - c) Within one year of issuing the permit for the evaluation adit the Forest shall berm or barrier Bear Creek road (FR 4784) to increase core area in BMU 5 for the life of the mine.
 - d) Currently, a portion of Midas Howard Creek Road (FR 4778) is restricted year-long; the South Fork Miller Creek Road (FR 4724) is partially open year-long and has a spring closure on about 6 miles of the route. These closures shall remain in place for the life of the mine to increase grizzly bear security in spring habitat. Additional closures may occur through separate planning processes and may occur due to information gained through the monitoring and research effort.
 - e) The Forest shall ensure that land exchanges related to mitigation properties would not result in a loss of MS-1 grizzly bear habitat in the CYE, unless such loss results in significant habitat benefits for grizzly bears, as agreed to by the Service.
 - f) The Forest shall ensure that administrative use levels on restricted roads in BMUs 2, 4, 5, 6, 7 and 8 shall be limited to no more than 57 round trips per year divided by spring, summer and fall seasons.
 - g) Access management changes shall be monitored and included in the annual Kootenai National Forest monitoring reports.
2. The following terms and conditions implement RPMs 2 and 3 :
 - a) Prior to the construction of the evaluation adit, the Forest shall ensure that Revett shall provide funding for the grizzly bear specialist and the law enforcement officer for a period of no less than 5 years. The mitigation plan requires funding for these positions throughout the life of the mine. This up-front funding would ensure the necessary funding to comply with the mitigation plan in the event of a temporary lapse of activity at the mine between the evaluation adit and

construction phases. The mitigation plan requires the positions remain active in the event of temporary shutdowns. If after the evaluation adit phase, Revett withdraws its plan of operation or rescinds permits with the intention of not moving forward with development of the mine, this term and condition would not be required.

- b) Prior to the construction of the mine, the Forest, Montana Fish, Wildlife and Parks bear specialists and Service grizzly bear personnel, shall assess the 16 county garbage transfer stations other than the site near the mine entrance. The group shall work with the counties to prioritize the sites and set a schedule for upgrading the sites to grizzly bear-resistant, at those sites deemed in need of such action.
- c) Prior to construction of the mine, the Forest shall ensure that Revett provide funding for five years of salary and expenses for the additional grizzly bear specialist position, to be funded for the life of the mine (as in 2a above).
- d) The Forest shall seek approval to give the State law enforcement officer authority to enforce the food storage order on the Forest within 2 years of issuing the permit to proceed with the evaluation adit.
- e) Any grizzly bear mortality within the action area shall be investigated by the Service, Forest and Montana Department of Fish, Wildlife and Parks. If deemed attributable to the effects of the mine, additional measures as needed and as approved by the Service shall be taken to prevent additional grizzly bear mortality.
- f) The Forest shall monitor grizzly bear and black bear sanitation incidents in BMUs 2, 4, 5 ,6, 7, and 8 and take corrective action through Forest enforcement of the food storage order and/or other adequate remedy, or through activities coordinated or conducted by the grizzly bear management specialist and/or Oversight Committee. Incidences involving black bears will be reviewed by the grizzly bear management specialists and the Service to assess whether the conditions leading to the incident may also be a risk to grizzly bears in the area.
- g) The Forest shall work with the grizzly bear specialist on public outreach programs that will advance awareness of grizzly bear conservation issues among the public in and surrounding the Cabinet Mountains.

Reporting Requirements

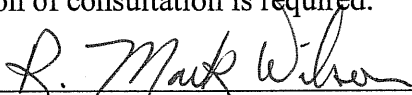
- a) By April of the each year, the Forest shall prepare an annual report of grizzly bear and black bear sanitation incidents and corrective measures taken during the previous year.

- b) By April of each year, the Forest shall prepare an annual report that summarizes actions taken to comply with the above terms and conditions implementing RPMs 1, 2, and 3 during the previous year .

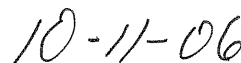
The reasonable and prudent measures and implementing terms and conditions are designed to minimize the impact of incidental take that might otherwise result from the proposed Rock Creek Mine. If during the course of the proposed action, the level of take (one grizzly bear during life of the mine) is exceeded, such incidental take would require reinitiation of consultation. If terms and conditions implementing reasonable and prudent measure 1 are not adhered to, this may indicate that the level of exempted take due to displacement has been exceeded. The Service retains the discretion to determine whether this is the case and reinitiation of consultation is required. 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.

REINITIATION NOTICE

This concludes formal consultation on the proposed Revett Silver Company Rock Creek mine as proposed by the Kootenai National Forest. 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 retained (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 not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. The Service retains the discretion to determine whether the conditions listed in (1) through (4) have been met and reinitiation of formal consultation is required. In instances where the amount or extent of incidental take is exceeded, reinitiation of consultation is required.



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Date

REFERENCES

- Aune, K.A. and W.F. Kasworm. 1989. Final report: East front grizzly studies. Montana Department of Fish, Wildlife and Parks, Helena. 332 pp.
- Aune, K.A. and T. Stivers. 1984. Ecological studies of the grizzly bear in the Pine Butte Preserve. Montana Department Fish Wildlife and Parks. Helena. 154 pp.
- Boyce, M.S., E.M. Kirsch and C. Servheen. 2002. Bet-hedging applications for conservation. *J. Biosci.* 27 (Suppl. 2) 385-392.
- Christenson, A.G. and M.J. Madel. 1982. Cumulative effects analysis process. U.S. Forest Service, Kootenai National Forest, Libby, Montana 53pp.
- Chruszcz, B., A.P. Clevenger, K.E. Gunson, and M.L. Gibeau. 2003. Relationships among grizzly bears, highways and habitat in the Banff-Bow Valley, Alberta, Canada. *Can. Journal of Zoology.* 81:1378-1391.
- Craighead, F.C. and J.J. Craighead. 1972a. Grizzly bear prehibernation and denning activities as determined by radio tracking. *Wildlife Monographs* 32. 35 pp.
- Craighead, F.C. and J.J. Craighead. 1972b. Radio tracking of grizzly bears and elk in Yellowstone National Park, Wyoming, 1959-1960. pp 55-62 *in* P.H. Oehser, ed. National Geographic Society Research Reports, 1955-1960. National Geographic Society, Washington, D.C.
- Cronin, M., R. Shidler, J. Hechtel, C. Strobeck, and D. Paetkau. 1999. Genetic relationships of grizzly bears in the Prudhoe Bay region of Alaska: Inference from microsatellite DNA, mitochondrial DNA, and field observations. *The Journal of Heredity* 90(6):622-628.
- Craighead, J.J., J.S. Sumner and J.A. Mitchell. 1995. The grizzly bears of Yellowstone: their ecology in the Yellowstone ecosystem, 1959-1992. Island Press, Washington, D. C. 535 pp.
- Dood, A.R., R.D. Brannon and R.D. Mace. 1986. Management of grizzly bears in the Northern Continental Divide ecosystem. *Transactions of the North American Wildlife Natural Resources Conference* 51pp.
- Egbert, A.L. and A.W. Stokes. 1976. The social behavior of brown bears on an Alaskan salmon stream. *International Conference on Bear Research and Management* 3:41-56.
- Gibeau, M., S. Herrero, B.N. McLellan, J.G. Woods. 2001. Managing for grizzly bear secure areas in Banff National Park and the central Canadian Rocky Mountains. *Ursus* 12:121-130.

- Glenn, L.P., J.W. Lentfer, J.B. Faro and L.H. Miller. 1976. Reproductive biology of female brown bears (*Ursus arctos*), McNeil River, Alaska. Pages 381-390 in M.R. Pelton, J. W. Lentfer, and G. E. Folk, Jr., eds. Bears—their biology and management. IUCN Publ. New Series 40.
- Greer, K.R. 1985. Montana statewide grizzly bear mortalities, 1983-84. Montana Department of Fish, Wildlife and Parks, Helena. 51pp.
- Gunther, K. 1994. Bear management in Yellowstone National Park 1960-93. International Conference on Bear Research and Management 9(1): 549-56
- Gunther, K.A., M.T. Brucino, S. Cain, K. Frey, L. Hanauska-Brown, H.A. Haroldson and C.C. Schwartz. 2005. Grizzly bear-human conflicts in the Greater Yellowstone Ecosystem. Pages 57-60 in C.C. Schwartz, M.A. Haroldson, and K. West, editors. Yellowstone grizzly bear investigations: annual report of the Interagency Grizzly bear Study Team, 2004. U.S. Geological Survey, Bozeman, Montana.
- Harding, L. and J.A. Nagy. 1980. Responses of grizzly bears to hydrocarbon exploration on Richards Island, Northwest Territories, Canada. Int. Conf. Bear Biol. And Manage. 3:277-280.
- Hedrick, P.W. 1995. Gene flow and genetic restoration: the Florida panther as a case study. Conservation Biology 9:996-1007.
- Hedrick, P.W. 2001. Conservation genetics: where are we now? Trends in Ecology and Evolution 16:629-636.
- Herrero, S. 1978. A comparison of some features of the evolution, ecology, and behavior of black and grizzly/brown bears. Carnivore 1(1):7-17.
- Hornocker, M.G. 1962. Population characteristics and social and reproductive behavior of the grizzly bear in Yellowstone National Park. M.S. Thesis, Montana State University. 94 pp.
- Interagency Grizzly Bear Committee. 1986. Interagency grizzly bear guidelines. U.S. Forest Service, Missoula, Montana. 100 pp.
- Interagency Grizzly Bear Committee. 1987. Grizzly bear compendium. National Wildlife Federation, Washington, D.C. 540 pp.
- Interagency Grizzly Bear Committee. 1994. Interagency Grizzly Bear Committee -Taskforce report: grizzly bear/motorized access management. U.S. Forest Service, Missoula, Montana 7 pp.

- Interagency Grizzly Bear Committee. 1998. Interagency Grizzly Bear Committee -Taskforce report: Selkirk/Cabinet-Yaak grizzly bear recovery areas, interim access management rule set. 8 pp.
- Jonkel, C. and I. M.Cowan. 1971. The black bear in the spruce-fir forest. Wildlife Monographs 27:55 pp.
- Jope, K.L. 1985. Habituation of grizzly bears to people, a hypothesis. International Conference on Bear Research and Management. 5:322-327.
- Kasworm, W.F. 2001. Preliminary grizzly bear population trend estimates in the Cabinet-Yaak Recovery Zone, 1983-2000. Internal memo, U.S. Fish and Wildlife Service, Libby Montana.
- Kasworm, W.F. 2003. 2002 population demographics and status for the CYE in relation to the grizzly bear recovery plan (USFWS 1993). Internal memo, U.S. Fish and Wildlife Service, Libby, Montana.
- Kasworm, W.F. and T.L. Manley. 1988. Grizzly bear and black bear ecology in the Cabinet Mountains of northwest Montana. Montana Department of Fish, Wildlife, and Parks, Helena. 122 pp.
- Kasworm, W.F. and T.L. Manley. 1990. Road and trail influences on grizzly bears and black bears in northwest Montana. International Conference on Bear Research and Management. 8:79-84.
- Kasworm, W.F. and T.J. Thier. 1994. Cabinet-Yaak ecosystem grizzly bear and black bear research 1993 progress report. U.S. Fish and Wildlife Service, Missoula, Montana 57 pp.
- Kasworm, W.F., T.J. Thier, and C. Servheen. 1998. Grizzly bear recovery efforts in the Cabinet/Yaak ecosystem. *Ursus* 10:147-153.
- Kasworm, W.F., H. Carriles and T.G. Radandt. 2000. Cabinet-Yaak grizzly bear recovery area 1999 research and monitoring progress report. U.S. Fish and Wildlife Service, Missoula, Montana. 48 pp.
- Kasworm, W.F., H. Carriles and T.G. Radandt. 2002. Cabinet-Yaak grizzly bear recovery area 2001 research and monitoring progress report. U.S. Fish and Wildlife Service, Missoula, Montana. 48 pp.
- Kasworm, W.F., H. Carriles and T.G. Radandt. 2004. Cabinet-Yaak grizzly bear recovery area 2003 research and monitoring progress report. U.S. Fish and Wildlife Service, Missoula, Montana. 62 pp.

- Kasworm, W.F., H. Carriles and T.G. Radandt. 2005. Cabinet-Yaak grizzly bear recovery area 2004 research and monitoring progress report. U.S. Fish and Wildlife Service, Missoula, Montana pp.
- Kasworm, W.F., H. Carriles and T.G. Radandt. 2006a. Excerpts from *In prep* Cabinet-Yaak grizzly bear recovery area 2004 research and monitoring progress report. *Used with permission*. U.S. Fish and Wildlife Service, Libby, Montana.
- Kasworm, W.F., M. Proctor, C. Servheen, T. Manley, J. Brown, and J. Williams. 2006b. Simulations of grizzly bear population augmentation on trend estimates in the Cabinet-Yaak recovery zone. January 26. Unpublished report. U.S. Fish and Wildlife Service, Missoula, Montana. 8 pp.
- Keller, L.K. and D.M. Waller. 2002. Inbreeding effects in wild populations. *Trends in Ecology and Evolution* 17:230-241.
- Kendall, K. 2006. Pers.comm. during oral report to the NCDE Subcommittee: Northern Divide Project; May 9 2006, Missoula, Montana. U.S. Geologic Survey, East Glacier, Montana.
- Kistchinksii, A.A. 1972. Life history of the brown bear (*Ursus arctos L.*) in northeast Siberia. Pages 67-73 in S. Herreo ed. *Bears: their biology and management*. IUCN Publ. New Series 23.
- Knight, R., B.M. Blanchard and K. Kendall. 1981. Yellowstone grizzly bear investigations: annual report of grizzly bears. 1980. U.S.D.I. Natl. Park Serv. Interagency Grizzly Bear Study Team, Bozeman, Mont. 55pp.
- Mace, R.D. and T.L. Manley. 1993. South Fork Flathead River grizzly bear project: progress report for 1992. Montana Department of Fish, Wildlife and Parks, Helena. 34 pp.
- Mace, R.D., J.S. Waller, T.L. Manley, L.J. Lyon and H. Zuuring. 1996. Relationships among grizzly bears, roads and habitat in the Swan Mountains, Montana. *British Ecological Society. Journal of Applied Ecology*, 33, 1395 - 1404.
- Mace, R.D., J.S. Waller, T.M. Manley, K. Ake and W.T. Wittinger. 1999. Landscape evaluation of grizzly bear habitat in western Montana. *Conservation. Biol.* 13:367-377.
- Madel, M.J. 1996. Rocky Mountain front grizzly bear management program: four year progress report. Montana Fish, Wildlife and Parks. Helena.
- Maguire, L.A. and C. Servheen. 1992. Integrating biological and social concerns in endangered species management; augmentation of grizzly bear populations. *Conservation Biology* 6:426-434.

- Mattson, D.J. 1993. Background and proposed standards for managing grizzly bear habitat and security in the Yellowstone ecosystem. Cooperative Park Studies Unit, University of Idaho, Moscow. 17 pp.
- Mattson, D.J. and R.R. Knight. 1991. Effects of access on human-caused mortality of Yellowstone grizzly bears. U.S. National Park Service. Interagency Grizzly Bear Study Team Report 1991B, Bozeman, Montana 13 pp.
- Mattson, D.J. and Merrill. 2004. A model-based appraisal of habitat conditions for grizzly bears in the contiguous United States. *Ursus* 15 Workshop Supplement: 76-89.
- Mattson, D.J., R.R. Knight and B.M. Blanchard. 1987. The effects of developments and primary roads on grizzly bear habitat use in Yellowstone National Park, Wyoming. International Conference on Bear Research and Management. 7:259-273
- 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.
- McLellen, B.N. 1989a. Effects of resource extraction industries on behavior and population dynamics of grizzly bears in the Flathead drainage, British Columbia and Montana. Ph.D. Thesis, University of British Columbia, Vancouver. 116 pp.
- McLellen, B.N. 1989b. Dynamics of a grizzly bear population during a period of industrial resource extraction. I. Density and age-sex composition. *Canadian Journal of Zoology*. 67:1856-186.
- McLellen, B.N. 1989c. Dynamics of a grizzly bear population during a period of industrial resource extraction. II. Mortality rates and causes of death. *Canadian Journal of Zoology*. 67:1861-1864.
- McLellen, B.N. and R. Mace. 1985. Behavior of grizzly bears in response to roads, seismic activity and people. Preliminary report. Canada Border Grizzly Project, Cranbrook, B.C. 53 pp.
- McLellen, B.N. and D.M. Shackleton. 1988. Grizzly bears and resource extraction industries: effects of roads on behavior, habitat use and demography. *Journal of Applied Ecology*. 25:451-460.
- McLellen, B.N. and D.M. Shackleton. 1989a. Grizzly bears and resource-extraction industries: habitat displacement in response to seismic exploration, timber harvesting and road maintenance. *Journal of Applied Ecology* 26, 371-380.
- McLellen, B.N. and D.M. Shackleton. 1989b. Immediate reactions of grizzly bears to human activities. *Wildlife Society Bulletin* 17:269-274.

- McLellen, B.N., F.W. Hovey, R.D. Mace, J.G. Woods, D.W. Carney, M.L. Gibeau, W.L. Wakkinen and W.F. Kasworm. 1999. Rates and causes of grizzly bear mortality in the interior mountains of British Columbia, Alberta, Montana, Washington, and Idaho. *Journal of Wildlife Management* 63(3):911-920.
- Montana Department of Commerce 2003. Montana population projections. Report prepared by NPA Data Services Inc., dated July 2001. Website: www.commerce.stste.mt.us.
- Montana Department of Environmental Quality and USDA Forest Service. 1995. Draft environmental impact statement ASARCO Rock Creek project. Montana Department of Environmental Quality, Helena, Montana and Kootenai National Forest, Libby, Montana.
- Montana Department of Environmental Quality and USDA Forest Service. 1998. Draft supplemental environmental impact statement ASARCO Rock Creek project. Montana Department of Environmental Quality, Helena, Montana and Kootenai National Forest, Libby, Montana.
- Montana Department of Environmental Quality and USDA Forest Service. 2001. Final environmental impact statement for the Rock Creek Mine Project. Kootenai National Forest, Libby, Montana.
- Montana Department of Fish, Wildlife and Parks. 1986. The grizzly bear in northwestern Montana. Final environmental impact statement. Montana Department of Fish, Wildlife and Parks, Helena. 59 pp.
- Montana Department of Fish, Wildlife and Parks. 2001. Draft conservation plan for grizzly bear in Montana. Montana Department of Fish, Wildlife and Parks, Helena. 59 pp.
- Montana Fish, Wildlife and Parks. 2005a. Grizzly bear management and conflict report for 2004. Montana Department of Fish, Wildlife and Parks, Region 1, Kalispell. 59 pp.
- Montana Fish, Wildlife and Parks. 2005b. Memo from Jim Williams, Montana Fish, Wildlife, and Parks to Chris Servheen, U.S. Fish and Wildlife Service. Re: statement of intention. March 8. Montana. Montana Department of Fish, Wildlife and Parks, Kalispell. 1 pp.
- Montana Fish, Wildlife and Parks. 2006a. Grizzly bear management plan for western Montana. Draft environmental impact statement, 2006-2016. June. Montana Fish, Wildlife and Parks, Helena. 143 pp.
- Montana Fish, Wildlife and Parks. 2006b. News release: FWP moves female grizzly bear to west Cabinets. Region One. Aug. 17. Montana Fish, Wildlife and Parks, Kalispell.
- Mundy, K.R.D., and D.R. Flook. 1973. Background for managing grizzly bears in the national parks of Canada. *Canadian Wildlife Service Report. Series No. 22.* 35 pp.

- Murie, A. 1944. The wolves of Mount McKinley. U.S.D.I. National Park Service Fauna serial No. 5. U.S. Gov. Printing Office, Washington, D. C. 238 pp.
- Murie, A. 1962. Mammals of Mount McKinley National Park, Alaska. Mount McKinley Natural Historical Association 56 pp.
- Nielsen, S., S. Herrero, M. Boyce, R. Mace, B. Benn, M. Gibeau, and S. Jevons. 2005. Modelling the spatial distribution of human-caused grizzly bear mortalities in the central Rockies ecosystem of Canada. Final report of the Eastern Slopes Grizzly Bear Project.
- Noranda Incorporated. 2002a. Letter from Noranda Inc. to USDA Forest Service, Kootenai National Forest stating their decision to abandon the Montanore copper-silver project in Lincoln and Sanders Counties. 2 p.
- Noranda _____. 2002b. Letter from Noranda Inc. to Montana Dept. of Environmental Quality stating their decision to abandon the Montanore copper-silver project in Lincoln and Sanders Counties and relinquishing air quality permit 2613. 1 p.
- Noranda _____. 2002c. Letter from Noranda Inc. to Montana Dept. of Environmental Quality stating their decision to abandon the Montanore copper-silver project in Lincoln and Sanders Counties and relinquishing operating permit #00150 and MPDES permit MT-030279. 2p.
- Noranda _____. 2002d. Letter from Noranda Inc. to U.S. Army Corps of Engineers stating their decision to abandon the Montanore copper-silver project in Lincoln and Sanders Counties and relinquishing tailings impoundment permit 199270047. 1 p.
- Palmisciano, D. 1986. Grizzly mortality update. Unpublished report. Montana Department of Fish, Wildlife and Parks, Bozeman. 2 pp.
- Pearson, A.M. 1975. The northern interior grizzly bear *Ursus Arctos L.* Canadian Wildlife Service Report Serial Number 34, Ottawa. 86 pp.
- Primm, S., and S. Wilson. 2004. Re-connecting grizzly bear populations: prospects for participatory projects. *Ursus* 15(1) Workshop supplement:104-114.
- Proctor, M.F., C. Servheen, S.D. Miller, W.F. Kasworm, and W.L. Wakkinen. 2004. A comparative analysis of management options for grizzly bear conservation in the U.S. - Canada trans-border area. *Ursus* 15 (2): 145-160.
- Proctor, M.F., B.N. McLellan, C. Strobeck, and M.R. Barclay. 2005. Proc. Of the Royal Soc. B. doi:10.1098/rspb.2005.3246. Published online.
- Quenette, P.Y., M. Alonso, L. Chayron, P. Cluzel, E. Dubarry, D. Dubreuil, S. Palazon, and M. Pomarol. 2001. Preliminary results of the first transplantation of brown bears in the French Pyrenees. *Ursus* 12:115-120.

- Reynolds, P.E., H.V. Reynolds and E.H. Follman. 1984. Responses of grizzly bears to seismic surveys in northern Alaska. Proceedings of the International Conference on Bear Research and Management 6:169-175.
- Rife, C. 2005. Letter from Carson Rife, Revett RC Resources to Mark Wilson and Anne Vandehey, U.S. Fish and Wildlife Service. August 15. U.S. Fish and Wildlife Service, Helena, Montana. 8 pp.
- Rogers, L.L. and S.M. Rogers. 1976. Parasites of bears: a review. International Conference on Bear Research and Management. 3: 411-430.
- Ruediger, B., J.J. Claar, and J.P. Gore. 1999. Restoration of carnivore habitat connectivity in the northern Rocky Mountains. *In* Evink, G.L., P. Garrett and D. Zeigler, ed.s. Proceedings of the third international conference on wildlife ecology and transportation. FL-ER-73-99. Florida Dept. of Transportation, Tallahassee, Florida. 330 pp.
- Russell, R.H., J.W. Nolan, N.G. Woody, G.H. Anderson and A.M. Pearson. 1978. A study of the grizzly bear (*Ursus Arctos*) in Jasper National Park: A progress report 1976 and 1977. Parks Canada, prepared by Canadian Wildlife Service, Edmonton, Alberta. 95 pp.
- Schwartz, C.C. and M.A. Haroldson. 2001. Yellowstone grizzly bear investigations: annual report of the Interagency Grizzly Bear Study Team, 2000. U.S. Geological Survey, Bozeman, Montana.
- Schwartz, C.C. and M.A. Haroldson. 2002. Yellowstone grizzly bear investigations: annual report of the Interagency Grizzly Bear Study Team, 2001. U.S. Geological Survey, Bozeman, Montana.
- Servheen, C. 2003. 2002 population demographics and status for the NCDE in relation to the grizzly bear recovery plan. Unpublished internal memo, U.S. Fish and Wildlife Service, Missoula, Montana.
- Servheen, C. 2004. 2003 population demographics and status for the NCDE in relation to the grizzly bear recovery plan. Unpublished internal memo, U.S. Fish and Wildlife Service, Missoula, Montana.
- Servheen, C. 2005a. NCDE human-caused mortality issues. PowerPoint presentation. Missoula, Montana. 17 pp.
- Servheen, C. 2005b. Recovery needs for grizzly bears in the Cabinet Yaak ecosystem. Internal memo. U.S. Fish and Wildlife Service, Missoula, Montana. 1pp
- Servheen, C. 2006. 2005 population demographics and status for the NCDE in relation to the grizzly bear recovery plan. Unpublished internal memo, U.S. Fish and Wildlife Service, Missoula, Montana.

- Servheen, C., W.F. Kasworm, and T.J. Thier. 1995. Transplanting grizzly bears as a management tool-results from the Cabinet Mountains, Montana, USA. *Biological Conservation*. 71(261-268).
- Servheen, C., F. Hovey, B. McLellen, R. Mace, W. Wakkinen, W. Kasworm, D. Carney, T. Manley, K. Kendall and R. Wielgus. 1994. Unpublished. Draft: Report of the Northern Ecosystems researchers on grizzly bear population trends in the North and South Forks of the Flathead River, and the Blackfeet Indian Reservation of the NCDE; the Cabinet-Yaak ecosystem; the Selkirk ecosystem; and future data needs to improve trend estimates. Unpublished report to the IGBC, December 14, 1994, Denver, CO. 12 pp.
- Servheen, C. M. Haroldson, K. Gunther, K. Barber, M. Brucino, M. Cherry, B. DeBolt, K. Frey, L. Hanauska-Brown, G. Losinski, C. Schwartz, B. Summerfield. 2004. Unpublished. Yellowstone mortality and conflicts reduction report. April 7. Report to the Yellowstone Ecosystem Committee. 29 pp.
- Schoen, J.W., L.R. Beier, J.W. Lentfer and L.J. Johnson. 1987. Denning ecology of brown bears on Admiralty and Chichagof islands. *Proceedings of the International Conference on Bear Research and Management*. 7:293-304.
- Summerfield, B, W. Johnson, and D. Roberts. 2004. Trends in road development and access management in the Cabinet-Yaak and Selkirk grizzly bear recovery zones. *Ursus* 15z(1) Workshop supplement:115-122.
- Swenson, J.E., F. Sandegren, S. Brunberg and P. Wabakken. 1997. Winter den abandonment by brown bears *Ursus arctos*: causes and consequences. *Wildl. Biol.* 3(1):35-38.
- Tyers, D. 2006. New World Mine rehabilitation and bears in the Cooke City basin. Unpublished draft. *Used with permission*. U.S. Forest Service. Gardiner, Montana. 42 pp.
- U.S. Census Bureau. 2003. State and county quick facts: geography. Website: www.census.gov. February 27, 2003.
- USDA Forest Service. 1982. Lolo National Forest plan. Lolo National Forest, Missoula, Montana.
- USDA Forest Service. 1987. Kootenai National Forest Plan. Kootenai National Forest, Libby, Montana.
- USDA Forest Service. 1998a. Forest plan monitoring and evaluation report fiscal year 1997, Kootenai National Forest. Kootenai National Forest, Libby, Montana 121pp.
- USDA Forest Service. 1998b. Final biological assessment of threatened, endangered and proposed species for the proposed ASARCO Rock Creek Mine. Supervisor's Office Kootenai National Forest. Libby Montana.

- USDA Forest Service. 1999. Forest plan monitoring and evaluation report fiscal year 1998, Kootenai National forest. Kootenai National Forest, Libby, Montana. 78pp.
- USDA Forest Service. 2000. Harpole/Skranak Record of Decision. Kootenai National Forest, Libby, Montana.
- USDA Forest Service 2002a. Terrestrial, threatened and endangered species mitigation plan for the proposed Sterling Rock Creek Mine. Revision dated December 30. Kootenai National Forest. Libby, Montana 12 pp.
- USDA Forest Service 2002b. Updated baseline and alternative V analysis for the Rock Creek Mine project. Unpublished. report dated December 18 2002. Kootenai National Forest. Libby, Montana. 21 pp.
- USDA Forest Service. 2002c. Letter from the Kootenai National Forest identifying the intent to close the Bear Creek road. Kootenai National Forest. Libby, Montana. 2 pp.
- USDA Forest Service. 2003. Record of decision for the Rock Creek Project. Kootenai National Forest, Libby, Montana. 89 pp.
- USDA Forest Service. 2004. Record of decision for motorized access management within the Selkirk and Cabinet-Yaak grizzly bear recovery zones. Kootenai, Lolo, and Idaho Panhandle National Forests, Libby, Montana. 90 pp.
- USDA Forest Service. 2006a. Selkirk and Cabinet-Yaak grizzly bear recovery zones 2005 annual compliance monitoring summary report. *In* letter from Bob Castenada, U.S. Forest Service to Mark Wilson, U.S. Fish and Wildlife Service. May 24. 8pp.
- USDA Forest Service. 2006b. Terrestrial threatened and endangered species mitigation plan for the proposed Revett Rock Creek Mine. Kootenai National Forest, Libby, Montana. DATE 14 pp.
- USDA Forest Service, Idaho Department Fish and Game, Washington Department Wildlife, U.S. Fish and Wildlife Service, and Montana Department of Fish, Wildlife, and Parks. 1988. Cumulative effects analysis process for the Selkirk/Cabinet-Yaak grizzly bear ecosystems. 32 pp.
- USDA Forest Service, Montana Department of State Lands, Montana Department of Health and Environmental Sciences, and Montana Department of Natural Resources and Conservation. 1992. Final environmental impact statement Noranda Minerals Corp. Montana Reserves Company joint venture Montanore project.

- USDA Forest Service, Montana Department of State Lands, Montana Department of Health and Environmental Sciences, and Montana Department of Natural Resources and Conservation. 1993. Record of Decision Noranda Minerals Corp. Montana Reserves Company joint venture Montanore project. .
- USDA Forest Service, Montana Fish, Wildlife and Parks, Confederated Salish and Kootenai Tribes, Blackfeet Tribe, U.S. Fish and Wildlife Service. 2002. NCDE grizzly bear distribution map. U.S. Forest Service, Northern Region. Missoula, Montana.
- USDI Fish and Wildlife Service. 1982. Biological opinion on the Lolo National Forest Plan. U.S. Fish and Wildlife Service, Helena, Montana 8pp.
- USDI Fish and Wildlife Service. 1983. Biological opinion on the 1982 proposed Kootenai National Forest Plan. U.S. Fish and Wildlife Service, Helena, Montana 8pp.
- USDI Fish and Wildlife Service. 1985. Biological Opinion on the 1985 proposed Kootenai National Forest Plan. U.S. Fish and Wildlife Service., Helena, Montana 8pp.
- USDI Fish and Wildlife Service. 1993a. Grizzly bear recovery plan. U.S. Fish and Wildlife Service, Missoula, Montana. 181 pp.
- USDI Fish and Wildlife Service. 1993b. Final biological opinion on the construction and operation of the Montanore project. U.S. Fish and Wildlife Service, Denver, Colorado. 45 pp.
- USDI Fish and Wildlife Service. 1995. Incidental take statement: amendment to June 26, 1985 biological opinion on the Kootenai National Forest Plan. U.S. Fish and Wildlife Service, Helena, Montana. 15 pp.
- USDI Fish and Wildlife Service. 1998. Biological opinion on access requests for the Way-up and Fourth of July mines. U.S. Fish and Wildlife Service, Helena, Montana. 1999.
- USDI Fish and Wildlife Service. 1999a. Amendment to the incidental take statement for the Biological opinion on access requests for the Way-up and Fourth of July mines. U.S. Fish and Wildlife Service, Helena, Montana.
- USDI Fish and Wildlife Service. 1999b. 12 month finding on the petition to change the status of grizzly bears in Selkirk to endangered warranted but precluded (64 FR 26725) May 17 1999.
- USDI Fish and Wildlife Service. 2000a. Biological opinion on the Bull Lake Estates Project, Kootenai National Forest. U.S. Fish and Wildlife Service, Helena, Montana. 37 pp.
- USDI Fish and Wildlife Service. 2000b. Grizzly bear recovery in the Bitterroot ecosystem final environmental impact statement. U.S. Fish and Wildlife Service, Denver, Colorado.

- USDI Fish and Wildlife Service. 2000c. Biological opinion for the effects to grizzly bear and bull trout from the implementation of proposed actions associated with plans of operation for Sterling Corporation Rock Creek Silver/copper Mine. U.S. Fish and Wildlife Service, Helena, Montana. 132 pp.
- USDI Fish and Wildlife Service. 2001. Letter from Mark Wilson, U.S. Fish and Wildlife Service, to Bob Castaneda, U.S. Forest Service. March 6. U.S. Fish and Wildlife Service, Helena, Montana. 1 pp.
- USDI Fish and Wildlife Service. 2002. Biological opinion for the Idaho Transportation Department, Junction State Highway-1, Northeast Boundary County Project. U.S. Fish and Wildlife Service, Spokane, Washington. 43 pp.
- USDI Fish and Wildlife Service. 2003. Biological opinion and conference opinion on the effects to grizzly bear and bull trout and Canada lynx of the proposed Rock Creek silver/copper mine. U.S. Fish and Wildlife Service, Helena, Montana.
- USDI Fish and Wildlife Service. 2004. Biological opinion for the effects to grizzly bear and bull trout from the proposed amendment to the Kootenai and Idaho PanHandle National Forest Plans. U.S. Fish and Wildlife Service, Spokane, Washington.
- USDI Fish and Wildlife Service. 2004b. Letter from Mark Wilson, U.S. Fish and Wildlife Service, to Bob Castaneda, U.S. Forest Service. December. U.S. Fish and Wildlife Service, Helena, Montana. 1 pp.
- USDI Fish and Wildlife Service. 2006. Letter from Director, U.S. Fish and Wildlife Service, to Regional Directors, Regions 1,2,3,4,5,6 and 7, U.S. Fish and Wildlife Service. March 6. U.S. Fish and Wildlife Service, Washington, D.C. 2 pp.
- Wakkinen, W.J. and B.K. Johnson. 2005. Selkirk Mountains grizzly bear ecology project. December 2003-2004. Idaho Department of Fish and Game. Boise.
- Wakkinen, W.J. and W.F. Kasworm. 1997. Grizzly bear and road density relationships in the Selkirk and Cabinet-Yaak Recovery Zones for the Interagency Grizzly Bear Committee. U. S. Fish and Wildlife Service. Libby, Montana. 28 pp.
- Wakkinen, W.J. and W.F. Kasworm. 2004. Demographics and population trends of grizzly bears in the Cabinet-Yaak and Selkirk Ecosystems of British Columbia, Idaho, Montana, and Washington. *Ursus*. 15(1) Workshop Supplement: 65-75 pp.
- Waller, J. S. and C. Servheen. 1999. Documenting grizzly bear highway crossing patterns using GPS technology. Pgs. 21-23 In: Evink, G.L., P.Garrett and D. Zeigler, eds. Proceedings of the Third International Conference on Wildlife Ecology and Transportation. FL-ER-73-99. Florida Department of Transportation, Tallahassee, Florida. 330 pp.

- Waller, J. S. and C. Servheen. 2005. Effects of transportation infrastructure on grizzly bears in northwestern Montana. *Journal of Wildlife Management*. 69(3):985-1000.
- Wenum, E. 2002. Managing northwest Montana's black bears: an innovative approach. 5-year progress report. Region 1, Montana Fish, Wildlife and Parks. Kalispell, Montana. 32 pp.
- Wenum, E. 2005. Managing northwest Montana's black bears: in the urban interface. 2004 report. February. Region 1, Montana Fish, Wildlife, and Parks. Kalispell, Montana. 15 pp.
- Yonge, S.R. 2001. The ecology of grizzly bears and black bears in the Cooke City, Montana area. M.S. thesis. Montana State University, Bozeman. 90 pp.

APPENDICES