

# **Endangered Species Act Section 7 Consultation**

**BIOLOGICAL OPINION**

**and**

**CONFERENCE OPINION**

**on the**

**Effects to Grizzly Bear, Bull Trout and Lynx from the Implementation of  
Proposed Actions Associated with Plans of Operation for the**

**Sterling Mining Company Rock Creek Copper/Silver Mine**

**as proposed by the**

**U.S. Forest Service, Kootenai National Forest**

**U.S. Fish and Wildlife Service  
Montana Ecological Services Field Office**

**May 9, 2003**

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## I. INTRODUCTION

This document represents the U.S. Fish and Wildlife Service's (Service) biological opinion on the proposed Sterling Mining Company Rock Creek Copper/Silver Mine project located in the Rock Creek drainage, a tributary to the lower Clark Fork River in western Montana. Portions of the mine would occur on the Kootenai National Forest (Forest). This biological opinion addresses the **effects of the proposed action on the threatened grizzly bear (*Ursus arctos horribilis*), threatened bull trout (*Salvelinus confluentus*), and threatened lynx (*Lynx canadensis*)**. **Formal consultation for the proposed action** was initiated on August 3, 1998 when the Service received the biological assessment (BA)(USDA 1998b) for this project.

Section 7(b)(3)(A) of the Endangered Species Act of 1973 (Act) requires that the Secretary of Interior issue biological opinions on federal agency actions that may affect listed species or critical habitat. Biological opinions determine if the action proposed by the action agency is likely to jeopardize the continued existence of listed species or destroy or adversely modify critical habitat. Section 7(b)(3)(A) of the Act also requires the Secretary to suggest reasonable and prudent alternatives to any action found likely to result in jeopardy or adverse modification of critical habitat, if any has been designated.

This biological opinion addresses only impacts to federally listed species and does not address the overall environmental acceptability of the proposed action. This biological opinion refers only to the potential effects of the proposed action on threatened grizzly bears, bull trout and lynx. The Service has reviewed the proposed action as analyzed in the biological assessments and concurs with the Forest's determinations that the project would not likely adversely affect threatened bald eagles (*Haliaeetus leucocephalus*) or endangered wolves (*Canis lupus*).

On December 26, 2002, the District Court for the District of Columbia issued an Order that enjoins the Fish and Wildlife Service (Service) from issuing any written concurrences that actions proposed by any Federal agencies that may affect, but are not likely to adversely affect the Canada lynx. Until further notice, all consultations concerning Canada lynx must be conducted in accordance with the direction of the Court. Specifically, in order to complete the procedural requirements of section 7, any actions subject to consultation that may affect Canada lynx will require formal consultation as described at 50 CFR 402.14, and preparation of a biological opinion that addresses how the proposed action is expected to affect Canada lynx. In April, 2000, we received your request for concurrence that the proposed action is not likely to adversely affect the threatened Canada lynx. In compliance with the Court order, we prepared a formal biological opinion on the effects of this proposed action on lynx as part of this consultation.

Following the "Description of the Proposed Action" section, this biological opinion is separated into three Parts, for convenience and ease of interpretation. Part A addresses the grizzly bear, Part B addresses bull trout, and Part C addresses lynx.

## **Consultation History**

*Rock Creek Mine project* A complete consultation history of this project up to the time the final BA was issued (August, 1998) is summarized in Appendix 3 of the BA. On May 20, 1999, the Service received a May 13, 1999, amendment to the BA addressing the effects of the proposed action on bull trout (USDA 1999). The Service received another BA amendment dated April 4, 2000, addressing Canada lynx. On October 3, 2000, the Service received a summary of the preferred alternative (Alternative V), which included mitigation factors. Additional information related to the proposed action was collected through correspondence, phone discussions, electronic mail and during meetings. The complete administrative record for the consultation on this project is found in the Service's Montana Field Office in Helena.

The Service completed a biological opinion for the Rock Creek Mine project on December 15, 2000. The Service concluded that the proposed action would jeopardize the continued existence of the grizzly bear in the Cabinet-Yaak Ecosystem, and included a reasonable and prudent measure that would preclude jeopardy to the species. The Forest and the Montana Department of Environmental Quality (MDEQ) jointly completed the FEIS for this project (MDEQ and USDA 2001). As a result of the consultation process, the Forest and MDEQ incorporated additional stipulations in the preferred Alternative V description. A partial summary of changes are addressed in the Summary FEIS (MDEQ and USDA 2001, page S-20). A Record of Decision (ROD) followed the FEIS and incorporated the Rock Creek Mine biological opinion. The Service was served with a Summons and Complaint for Declaratory and Injunctive Relief on August 31, 2001. The Service withdrew the biological opinion in March, 2002, and the Forest subsequently withdrew the ROD. Additional consultation has been occurring since then. In August, 2002, the environmental baseline for the proposed action changed significantly with the abandonment of plans by Noranda Minerals Corporation to develop the Montanore Mine. On December 23, 2002, we received updated access management baseline information from the Forest (USDA in litt. 2002b), and on December 31, 2002, we received the revised and clarified grizzly bear mitigation plan (USDA in litt. 2002a)(Appendix C). The Service has produced this biological opinion based upon updated information. The proposed action now includes a mitigation plan that incorporates the substantive provisions of the Service's reasonable and prudent alternative in our December 15, 2000 biological opinion.

## **II. Description of proposed action**

The proposed Rock Creek Mine would be a 10,000-ton-per-day underground copper and silver mine in northwestern Montana. The mine, mill, and other facilities would occur in Sanders County, about 13 miles northeast of the town of Noxon (Figure 1). The mine originally was proposed by ASARCO Incorporated, but was sold to the Sterling Mining Company in 1999. The Sterling Mining Company is the new project proponent.

The proposed action is Alternative V, the Forest’s preferred alternative to the Sterling Mining Company proposed mine plan.

The complete description of Alternative V is provided in the FEIS (MDEQ and USDA 2001) and included in this biological opinion as Appendix A. Here we summarize only major features of the proposed action. The proposed action for the mine includes the development of an evaluation adit, a 5.5-year construction period, a 27.5-year operation/production period, and a 2-year reclamation period, for at least a 35-year period (Table 1).

Alternative V would result in construction of an evaluation adit, mine, mill, tailings paste facility, rail loadout, reverse osmosis and passive biotreatment facility, and various pipelines and access roads. A “bottom-up” construction option for the paste facility would be used and final design would incorporate measures to meet visual impact mitigation and reclamation goals. Some mine water would be stored in underground workings during mine operation, but most excess water would be treated and discharged to the Clark Fork River.

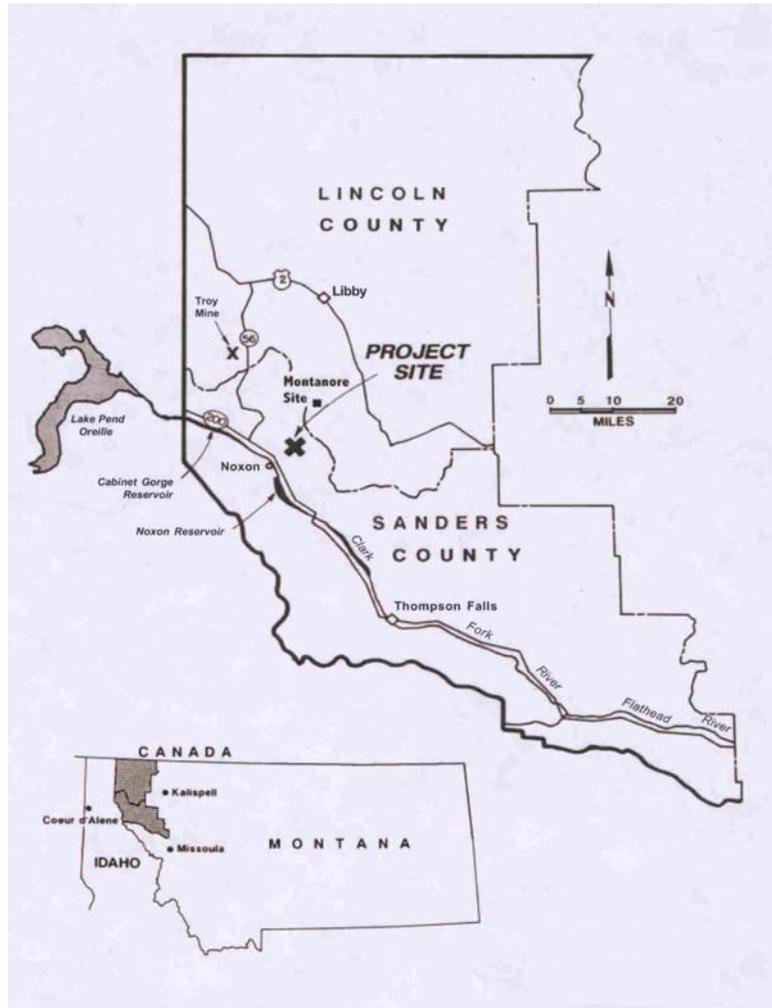


Figure 1. Proposed Rock Creek Mine project site (from MDEQ and USDA 2001).

Several check points are built into the development of the mine to address specific conditions as they develop. For example, initial exploration involves drilling an evaluation adit to further investigate and define the underground ore body. Results of the evaluation adit may result in various scenarios described in Alternative V. Should acid-forming rock be located, certain constraints would be required that would not be necessary if no acid-forming rock is encountered. Several similar check points and contingency plans occur throughout the life of the mine and will not be specifically addressed here.

Table 1. The estimated implementation schedule for the Sterling Mining Company Rock Creek Mine in Sanders County, Montana.

<b>Project Year</b>	<b>Activity</b>
1 - 3	Evaluation adit construction
2 - 3	Mine development <sup>1</sup>
4 - 5.5	Mine development <sup>1</sup> /surface facilities construction <sup>2</sup>
5.5 - 6	Start-up/limited production
7 - 33	Production
34 - 35	Reclamation

<sup>1</sup> Waste rock will be hauled mid-August through May during mine development period.  
<sup>2</sup> Includes construction of the mill site, waste water treatment plant, paste plant, and utilities corridor.

The Rock Creek Mine’s proposed permit boundary would encompass 1,560 acres; 483 acres would be directly impacted by mining activity and 1,078 would remain undisturbed. The analysis area includes approximately 3.54 miles of road construction and 5.43 miles of road reconstruction. Land encompassed by the proposed permit boundary is 48 percent private land and 52 percent national forest lands (Table 2).

The initial analysis for the proposed Rock Creek Mine project predicted construction of the mine would commence in 2000 (USDA 1998b). Therefore the calendar years identified during the analysis no longer correspond with the actual implementation of the project. The life of the mine may be shorter or longer than predicted, depending on the quality, quantity and accessibility of the ore body, market values of the minerals recovered and other factors that cannot be predicted at this time

Table 2. The proposed surface disturbance and features associated with the Rock Creek Mine project.

<b>Project Feature</b>	<b>Area in Acres</b>
Analysis area	198,394
Hard rock mine permit area	1,560**
Total area of surface disturbance	483
Tailings impoundment*	368
Mill site*	41
Exploration adit & support facilities	10
Roads	64
Road construction	3.54 miles
Road reconstruction	5.43 miles
Total road construction/reconstruction	8.97 miles
* Estimated surface disturbance includes all the features associated with the tailings impoundment and mill site.	
** Corrected permit area acres from MDEQ, December 2000. From Appendix A, Alternative V description	

## **Conservation measures and mitigation plans**

The Rock Creek Mine proposal includes a suite of conservation measures and mitigation plans developed during the informal consultation period and through the public National Environmental Policy Act (NEPA) review process. The original mitigation plan for grizzly bears was revised (USDA 2002a) during the consultation process to incorporate concerns of the Service and is found in Appendix C of this document. Mitigation and monitoring plans for bull trout are described fully in Appendix K of the FEIS (MDEQ and USDA 2001) and discussed in Part B. of this biological opinion.

### **PART A. GRIZZLY BEARS**

#### **DESCRIPTION OF THE PROPOSED ACTION SPECIFIC TO GRIZZLY BEARS**

The original mitigation plan for grizzly bears was revised during the consultation process to incorporate concerns of the Service. The 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) (Appendix C) to incorporate substantive portions of the reasonable and prudent alternative found in the original biological opinion issued by the Service (USDI 2000c). The effects of the proposed Rock Creek Mine were analyzed in this biological opinion based on incorporation of the revised mitigation plan as an integral part of the proposal. Any changes to the revised mitigation plan (USDA 2002a), 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 revised mitigation plan is included in its entirety in Appendix C.

### **Grizzly Bear Conservation Measures**

Conservation measures were designed 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 road FDR - 50;
- avoiding the use of preferred vegetative forage like clover (*Trifolium spp.*) to reclaim disturbed sites from construction facilities and roads;
- using bear-resistant containers for human food/waste; and
- removing the remains of road-killed carcasses along roads.

### **Grizzly Bear Mitigation Plan**

Mortality risk to grizzly bears would be reduced by minimizing human/bear confrontations through implementation of the following measures:

- the Sterling Mining Company would fund, for the life of the mine, a grizzly bear management specialist position under the Montana Fish, Wildlife, and Parks to educate people about bear behavior and how to reduce the potential for grizzly bear conflicts;
- the Sterling Mining Company 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;
- the Sterling Mining Company would develop a transportation plan to minimize vehicular traffic associated with the mine;
- the Sterling Mining Company would enact restrictions against feeding wildlife;
- the Sterling Mining Company would prevent 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;
- the Sterling Mining Company would fund bear-resistant garbage containers for Forest sites in the Cabinet Mountains where garbage containers are provided; and
- the Sterling Mining Company would fund the needed measures to make the Sanders County garbage transfer station near the mine entrance grizzly bear-resistant.

Several habitat protection and enhancement measures are also part of the project proposal. These include:

- the Sterling Mining Company would fund the fee title acquisition of or conservation easement on a total of 2,350 acres of grizzly bear habitat in part prior to the construction and in part, prior to operation of the project;
- the Sterling Mining Company would fund habitat enhancement measures on 484 acres in the affected BMUs;
- the Sterling Mining Company would fund the fee title acquisition of or conservation easement on 100 acres to specifically to improve grizzly bear habitat security and maintain or improve habitat connectivity between the northern and southern portions of the Cabinet Mountains;
- the Forest would manage motorized access in the affected BMUs to offset increases in access densities associated with the Rock Creek Mine; and
- the Sterling Mining Company would fund a grizzly bear monitoring and research effort in the southern Cabinet Mountains during the life of the mine.

The mine would include direct surface disturbance of 483 acres, of which 160 acres are private land and 323 acres are national forest. The BA identifies a maximum of 7,044 acres that 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 0.5 mile surrounding physically disturbed sites and human travel routes would be under-used by grizzly bears.

The proposed mitigation plan requires a minimum of 2,350 acres of replacement habitat to replace the 483 acres directly lost through mine development (Table 3), and account for displacement effects around these acres. These acres were required to compensate for the effects upon grizzly bears and their habitat from noise, disturbance and physical alteration on the 483 acres at the mine site, although 160 acres of the disturbance would occur on private land and some of the disturbance would occur in Management Situation 3 habitat, which is not considered suitable for grizzly bears due to existing permanent human development. Specific locations of over 8,000 acres of potential replacement mitigation habitat have been identified, but since acquisition is dependent upon willing sellers or successful conservation easements, exact mitigation properties 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 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 replacement habitat mitigation requirement would transfer currently private lands to public ownership or obtain perpetual conservation easements to mitigate for the 35-year disturbance.

Table 3. Mitigation Acres (MDEQ and USDA 2001)		
Activity Area	Replacement Acres	Timing
Exploration Adit	53	Prior to Adit Construction
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
<b>Total Alternative V</b>	<b>2,350</b>	<b>Prior to Operations</b>

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 insure 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 would be acquired prior to the production phase of the mine operation. The revised mitigation plan requires mitigation acres be acquired through acquisition, which would be transferred to the U.S. Forest Service, or through perpetual conservation easement. Table 3 shows the mitigation habitat acquisition schedule. This schedule would require all replacement habitat (except the 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” is described as lands within the bear analysis areas (BAAs) directly affected by the proposed action to mitigate for the direct surface disturbance that would occur. “Off-site

habitat” would be other lands within the southern Cabinet Mountains, including BMUs 4, 5, 6, 7 and 8. First choice for replacement habitat would be on-site habitat of suitable quality within the BAAs directly impacted by the mine. 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.

An additional 100 acres of mitigation habitat would be required to mitigate for 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 is defined as that occurring within the north to south movement corridor. Although the Service has identified parcels of land which are adequate mitigation for grizzly bear habitat fragmentation, and this identification would be used by the Forest and Service in implementing this portion of the mitigation plan, 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 on page 70 under *Analysis of Displacement Effects on Grizzly Bears: Additional mitigation plan effects on grizzly bear displacement and habitat loss.*).

The revised mitigation plan (USDA 2002a) 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 revised mitigation plan changes conservation easements from 50 year to perpetual and mandates 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 also includes 484 acres of habitat enhancement within BMUs 4, 5 or 6 to improve habitat conditions for grizzly bears. The Sterling Mining Company 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, road closures and obliterations. If opportunities for enhancement are not available in the affected BMU, then work would be done in adjacent BMUs.

The mitigation plan also includes a series of road closures. The following roads have been identified for road closure as part of mitigation (Table 4).

Table 4. Road closures associated with the Rock Creek Mine Project (from USDA 1998)			
Road Number	Road Name	Closure	Season
FDR 2285	Orr Creek	1.61 miles w/ barrier	year-long
FDR 2741X		0.18 miles w/ barrier	year-long
FDR 150	Rock Creek	2.92 miles w/ gate*	year-long
FDR 2741A		0.47 miles w/ barrier	year-long

\* The north 0.42 miles will be obliterated and the south 2.5 miles will be gated.

The proposed mitigation plan requires the Sterling Mining Company to either establish a trust fund or post a bond prior to implementation of the project to insure full implementation of the conservation plan. The Sterling Mining Company would make four deposits over 15 years.

**Consultation background** *Kootenai Forest Plan:* The Forest Plan is a general programmatic planning document that provides management goals, objectives, standards, and guidelines, under which project level activities, such as timber sales and associated roads may be planned and implemented. The Forest manages all of 15 of 22 BMUs within the CYE, and shares management of two more with the PanHandle National Forest. The Service issued a biological opinion of no jeopardy related to the effects of the Forest Plan on grizzly bears on June 26, 1985 (USDI 1985). The Forest Plan was finalized in 1987 (USDA 1987).

Through the informal and formal consultation process, the Forest and the Service developed and incorporated a management framework for grizzly bear habitat into the Forest Plan. This management framework consisted of standards and guidelines specifically developed to minimize and/or eliminate: (1) increased mortality risk to grizzly bears, (2) loss of habitat through activities that adversely modify or destroy important grizzly bear habitat, (3) loss of habitat through displacement of grizzly bears, and (4) the effects of past and present impacts of federal, state, and private actions.

To ensure a consistent approach to grizzly bear habitat management, the Interagency Grizzly Bear Committee (IGBC) endorsed the IGBC Guidelines (51 FR 42863, November 26, 1986) for use by land managers in all grizzly bear ecosystems. The IGBC coordinates a consistent approach to grizzly bear recovery across all grizzly bear recovery zones. Lands within ecosystems with grizzly bear populations or habitat were classified into various management situations that each have specific management direction. The IGBC Guidelines directed National Forests to:

1. stratify grizzly bear habitat into Management Situations 1, 2, and 3 (MS-1, MS-2, MS-3) pursuant to the Interagency Grizzly Bear Guidelines (51 FR 42863, November 26 1986);

2. incorporate into planning the definitions and management direction for each Management Situation according to the Interagency Grizzly Bear Guidelines; and
3. develop standards and guidelines for MS-1 and MS-2 that were specific to the forest, to coordinate multiple-use activities with the needs of grizzly bears.

The standards and guidelines in the Forest Plan were consistent with the management direction for each management situation. Most of the Forest land in the action area is classified as MS1. The guidelines for MS-1, MS-2 and MS-3 are as follows (from IGBC Guidelines):

1. The MS-1 lands are those that contain grizzly population centers and/or habitat that is needed for the survival and recovery of the species. The needs of the grizzly bear will be given priority over other management considerations. Land uses which can affect grizzly bears and/or their habitat will be made compatible with grizzly needs or such uses will be disallowed or eliminated.
2. The MS-2 lands are those areas that lack distinct population centers and the need for this habitat for survival of the grizzly bear is more uncertain. The status of such areas is subject to review. Here, management will at least maintain those habitat conditions that resulted in the area being classified as MS-2. The Forest no longer has MS-2 lands.
3. The MS-3 designation is intended for lands where grizzly bears may occur infrequently, but human developments such as campgrounds or resorts may result in conditions that make grizzly presence untenable for humans and/or grizzly bears. There is high probability that Federal activities here may affect the species survival and recovery. Management focus is on human-bear conflict minimization rather than habitat maintenance and protection. Grizzly bear presence and factors contributing to their presence will be actively discouraged.

All grizzly bear recovery zones are divided into analysis areas called BMUs. When delineating BMUs, the agencies attempted to encompass adequate amounts of all seasonal habitats needed to support a female grizzly bear (following Weaver et al. 1986). The BMUs were delineated to facilitate grizzly bear population monitoring, distribution, and habitat evaluation within each recovery zone. The BMUs approximate the average home size of an average female grizzly bear (approximately 100 square miles in the CYE) and form the basic analysis unit within which Recovery Plan parameters are measured. The Forest further subdivided BMUs into smaller areas (approximately 5000 to 15000 acres) called bear analysis areas (BAAs) which are used for various smaller scale habitat analyses.

The Forest Plan has several broad grizzly bear standards that are applied to projects in grizzly habitat. Associated assessment criteria to implement these standards were developed through informal and formal consultation with the Service. Although associated assessment criteria are not officially standards under the Forest Plan, they represent a standardized approach to addressing impacts to grizzly bears. A September 23, 1999, Forest Service draft memorandum

outlined the specifics of grizzly bear analysis and Forest Plan standards based on an Interim Access Strategy (USDA in litt. 1999) and clarified additional assessment criteria. Interim access standards are applied only to MS-1 habitats.

In 1993, research in the Northern Continental Divide Ecosystem (NCDE) demonstrated the significant impacts of restricted or closed roads on grizzly bear use of habitat (Mace and Manley 1993). Closed roads had a significant influence on grizzly bear use of habitat and the spatial aspects of all roads across a landscape was more important to assessing impacts on grizzly bears than was average linear road density. Further, closing open roads had a positive effect on use of an area by grizzly bears when open road densities were reduced below 1 mile per square mile. Mattson (1993) also suggested managing open and closed road densities, and providing adequate bear security areas across BMUs. In 1996, the final research paper on the effects of roads on grizzly bears in the South Fork study area (Mace et al. 1996) further supported the concepts of open and total motorized access management as important for grizzly bear habitat conservation.

On June 3, 1986, the Service published revised regulations in the Federal Register governing the section 7 process (50 CFR 402). These changes in regulations, along with new information on the effects of roads on grizzly bears, resulted in an amended biological opinion on the Forest Plan on July 27, 1995 (USDI 1995d). The amended biological opinion included an incidental take statement (1995 incidental take statement) wherein the Service concluded that existing high road densities on the Forest resulted in the incidental take of grizzly bears. The 1995 incidental take statement required motorized access management limits be applied within the grizzly bear recovery zone.

The 1995 incidental take statement considered the results of available grizzly bear access research (Mace and Manley 1993) and concluded that “harm” of grizzly bears is likely to occur when: 1) precise open motorized route density exceeded 1 mile per square mile in some proportion of a BMU; and 2) precise total motorized route density exceeded 2 miles per square mile in some proportion of a BMU, as calculated by a “moving windows” analysis. Moving windows analysis measures the proportions of a specified area (in this case a BMU) that provides core habitat, and the proportions with a specified open motorized route density and total motorized route density. The Service further determined that the specific proportions of a BMU affected by high road densities that could result in harm might depend on ecosystem-specific conditions. The Service recommended that information from each grizzly bear ecosystem be analyzed to determine the proportion of highly roaded habitat that results in incidental take through modification of habitat.

The 1995 incidental take statement included terms and conditions based on the recommendations of the IGBC Taskforce Report on Grizzly Bear/Motorized Access Management (IGBC 1994) for motorized access management on federal lands. The IGBC (1994) recommended the use of open and total motorized route density and core area to assess and manage grizzly bear habitat conditions. The terms and conditions in the 1995 incidental take statement required the Forest to conform to the direction in the Forest Plan, and determined that the anticipated levels of incidental take would be exceeded if proposed projects increased open road density above the

Forest Plan standard, increased the density of open motorized trail density, increased the net total motorized access route density, or decreased the existing amount of core area in the affected BMUs.

The 1995 incidental take statement also required the Forest to participate in the development of access management recommendations for open motorized trail route densities, total motorized route densities, and core area in collaboration with the IGBC Selkirk-Cabinet Yaak Ecosystem Access Taskgroup. This taskgroup developed a rule set (IGBC 1998), which the Service viewed as guidance for compliance with the 1995 incidental take statement until a final access management strategy was developed. The interim period for the rule set was determined to be 3 years (ending in 2001) until Forest Plans are revised or until the Selkirks/Cabinet -Yaak Ecosystem Subcommittee determines a need to modify the direction. The rule set direction required no adverse change from the open motorized route density, total motorized route density and core area levels of 1995.

*Other Forests* The Lolo National Forest manages one of the 22 BMUs in the CYE. An amended biological opinion (USDA 1996a) on the Lolo National Forest Plan (USDA 1982) included an incidental take statement with requirements similar to those in the biological opinion (USDA 1995c) on the Kootenai National Forest Plan (USDA 1987). A similar incidental take statement was developed (as of December 2000) for the Idaho Panhandle National Forest, which manages all or parts of six BMUs in the CYE. In general, the terms and conditions for the Forest and the Lolo and Pan Handle National Forests required no increase in open or total road densities and no loss of core habitat, until final forest-wide access management direction was established.

*Mineral Exploration in the Cabinet Mountains* In 1980, the Service concluded that mineral exploration as proposed in the Chicago Peak area of the Cabinet Mountains Wilderness was likely to jeopardize the continued existence of grizzly bears in the Cabinet Mountains. Chicago Peak is approximately 3 miles north of the proposed Rock Creek Mine and is in the same ore body. The biological opinion determined that exploration by the American Smelting and Refining Company (ASARCO) would displace grizzly bears from seasonally important habitat, which could lead to impaired reproduction or result in human induced mortality. This opinion also determined that mining in the Chicago Peak area as proposed would not be compatible with conservation of the grizzly bear in the Cabinet Mountains. The reasonable and prudent alternative developed for exploration reduced the exploration period, restricted public access to portions of the mountain range and postponed other impacting activities during the 4 year exploration.

*The Montanore Mine* The Service issued the final biological opinion for the Noranda Minerals Corporation Montanore Project in April 1993. This opinion found that the issuance of special use permits and approval of the Montanore plan of operation was likely to jeopardize the continued existence of the Cabinet-Yaak grizzly bear population. The reasonable and prudent alternative developed for the Montanore project focused on a no net loss of habitat strategy to avoid jeopardy. This strategy included strategic road closures, land acquisition and the return of

patented mining properties to public ownership at the termination of mine operations. Low mineral values kept the Montanore project inactive until 2002, when Noranda Minerals Corporation withdrew their plan of operation, abandoned the project and relinquished permits (Noranda Incorporated, in litt. 2002a, 2002b, 2002c, and 2002d).

*Rock Creek Mine* The Service completed a biological opinion for the Rock Creek Mine project on December 15, 2000 (USDI 2000c). The Service concluded that the proposed action would jeopardize the continued existence of the grizzly bear in the Cabinet-Yaak Ecosystem, and included a reasonable and prudent measure that would preclude jeopardy to the species. The Montanore Mine was considered part of the environmental baseline in both the Forest's analyses in the BA and in the FEIS on Rock Creek Mine (MDEQ and USDA 2001) and in the Service's original analysis of the proposed Rock Creek Mine. Because of the recent withdrawals of mining plans by Noranda Minerals Corporation (Noranda Inc. 2002a, 2002b, 2002c), the Montanore Mine is no longer considered part of the environmental baseline for the currently proposed Rock Creek Mine. This action has effected significant changes in the environmental baseline for grizzly bears in the action area.

The Montanore Mine would have resulted in adverse impacts to grizzly bears. The effects of the proposed Rock Creek Mine were also significant, especially when added to the impacts of the Montanore Mine. A substantive factor in this analysis of the Rock Creek Mine is that although Montanore Mine project has been abandoned and its effects on the environmental baseline are no longer considered in this analysis, the measures in the original grizzly bear revised mitigation plan considered in the Service's 2000 biological opinion for the Rock Creek Mine (USDI 2000c) has remained essentially unchanged or strengthened in many respects. This is a result of the Forest agreeing to incorporate the substantive provisions of our original (2000) reasonable and prudent alternative for Rock Creek Mine, as well as changes and revisions developed during consultation in 2002, into a revised mitigation plan for grizzly bears (USDA 2002a). The effects of this revised mitigation plan are analyzed in this biological opinion.

In the fall of 2002, the Forest reanalyzed access management impacts of the Rock Creek Mine to exclude the Montanore mine access impacts. This biological opinion is based on still relevant information in the 1998 BA as well as the new information provided in the reanalysis (USDI 2002b). Where new information differs from that reported in the 1998 BA, this opinion notes the change.

## **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 Euroamerican colonization in the early nineteenth century, grizzly bear numbers were reduced from over 50,000 to less than 1,000 in North America south of the Canadian border. Today, the grizzly bear occupies less than 2 percent of its 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), NCDE, CYE, and Selkirk Ecosystem. 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.

In response to a petition to change the status of grizzly bears in the CYE and Selkirk Ecosystems from threatened to endangered, the Service issued a 12 month finding of warranted but precluded for the CYE and not warranted for the Selkirk ecosystem in February, 1993 (58 FR 8250-8251). In May, 1999, the Service issued a 12-month finding on petitions to change the status of grizzly bear populations in the Selkirk area in Idaho and Washington to endangered, hereafter referred to as the 1999 finding. The 1999 finding concluded that reclassification of grizzly bears in the CYE and Selkirk Ecosystem recovery zones from threatened to endangered was warranted but precluded by work on higher priority species (64 FR 26725). The 1999 finding also reported data that indicated these two populations may be connected through Canada. The Service will consider formally recognizing a distinct population segment that would encompass both of these ecosystems in the future. Until a final determination is made on a distinct population segment, the Service will treat the ecosystems as separate. Until reclassification occurs, both the CYE and Selkirk populations will be treated as threatened.

## **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 years. Males may reach physiological reproductive age at 4.5, but may not be behaviorally reproductive due to other dominant males preventing mating.

Natural mortality is known to occur from intra-specific predation, but the degree to which this occurs in natural populations is not known. Parasites and disease do not appear to be a significant cause of natural mortality (Jonkel and Cowan 1971; Kistchinskii 1972; Mundy and Flook 1973; Rogers and Rogers 1976). As animals highly dependent upon learned habitat, displacement into unknown territory (such as subadult dispersal) may lead to submarginal nutrition, reduced reproduction or greater exposure to adult predatory bears or human food sources (which can lead to human-caused mortality). Starvation and loss in dens during food shortages have been surmised, but have not been documented as a major mortality factor. Natural mortality 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 (McLellen 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 1993). The Recovery Plan established recovery zones in each grizzly bear ecosystem, the YGBE, NCDE, CYE, Selkirks 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 are the areas within which the population and habitat criteria for achievement of recovery will be measured.

The estimated total population of grizzly bears in the conterminous U.S. at the time of listing was 800 to 1,000 individuals (USDI 1993). 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 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, vast amounts of suitable habitat occurs there. The Service prepared a FEIS and ROD that selected reintroduction of bears with a citizen management committee as the preferred alternative (USDI 2000b) to initiate recovery in the Bitterroot Ecosystem.

Recovery zones were divided into smaller areas called BMUs to facilitate population monitoring and habitat evaluation within each ecosystem. The BMUs approximate the average home range

of a female grizzly (100 square miles or larger) to assist in characterizing grizzly bear occurrence and distribution within each ecosystem and to track cumulative effects (USDA et al. 1988).

### **Status of Grizzly Bear Populations in the YGBE, NCDE and Selkirk Ecosystem**

The YGBE Recovery Plan parameters are generally positive and most recovery parameters have been met in recent years. The best information suggests the YGBE grizzly bear population is stable and is likely increasing. The long term conservation of the population continues to depend largely on managing conflict between grizzly bears and people, which often results in human-caused mortality of grizzly bears.

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 to 2001 (Servheen 2003).

The Selkirk Ecosystem grizzly bear population has not met Recovery Plan objectives. The Selkirk Ecosystem Recovery Plan criteria requires the observation at least six distinct females with cubs (over a 6-year average) for recovery. There was one distinct female with cubs (over a 6-year average) reported in 2001. The Recovery Plan human-caused annual mortality limit (averaged over a 6-year period) for the ecosystem is no more than 0.4 bears, but the 6-year average was 1.17 bears. The human-caused female mortality limit is 0.12 bears measured over 6 years, but in 2001 the average over the past 6 years was 0.17. The Recovery Plan calls for seven of ten BMUs be occupied by females with young over a 6-year period, but only four BMUs were occupied at least once in the period from 1996 and 2001 (Wakkinen and Johnson 2002).

### **Status of the Grizzly Bear Population in the CYE**

As mentioned earlier, the CYE grizzly bear population was found warranted for endangered status, but precluded by other listing priorities in 1993 and again in 1999. The Service found the CYE grizzly bear population warranted for endangered status due to the small size of the population and increasing human demands on grizzly bear habitat, such as logging, mining, recreation and road-building.

The CYE occurs in Montana and Idaho (Figure 2). The CYE grizzly bear recovery zone encompasses approximately 2,600 square miles (1,664,000 acres)(USDI 1993a). The CYE recovery zone is bordered to the north by the Canadian border, to 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. (2000). Land ownership within the CYE recovery zone is approximately 90 percent public under federal administration, 5 percent state, and 5 percent private. Land under federal administration is managed by the Kootenai, Lolo and Idaho Panhandle National Forests. The Plum Creek Timber Company, Inc. (Plum Creek) is the principal private land owner in the CYE Recovery Zone. 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 there are numerous patented and unpatented mining claims 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. 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 0.5 to 7 miles wide and consists of 94,272 acres of higher elevation habitat. The northern Cabinet Mountains are dissected 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 is 466,000 acres 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 estimates that a recovered population in the CYE recovery zone would consist of a minimum of 100 individual grizzly bears. Grizzly bears also occur in and use areas outside the CYE recovery zone and population parameters include bears observed up to 10 miles outside the recovery zone boundary (USDI 1993a). This biological opinion will use the term CYE to refer to the CYE recovery zone and the band of habitat up to 10 miles around the CYE recovery zone within which Recovery Plan parameters are reported.

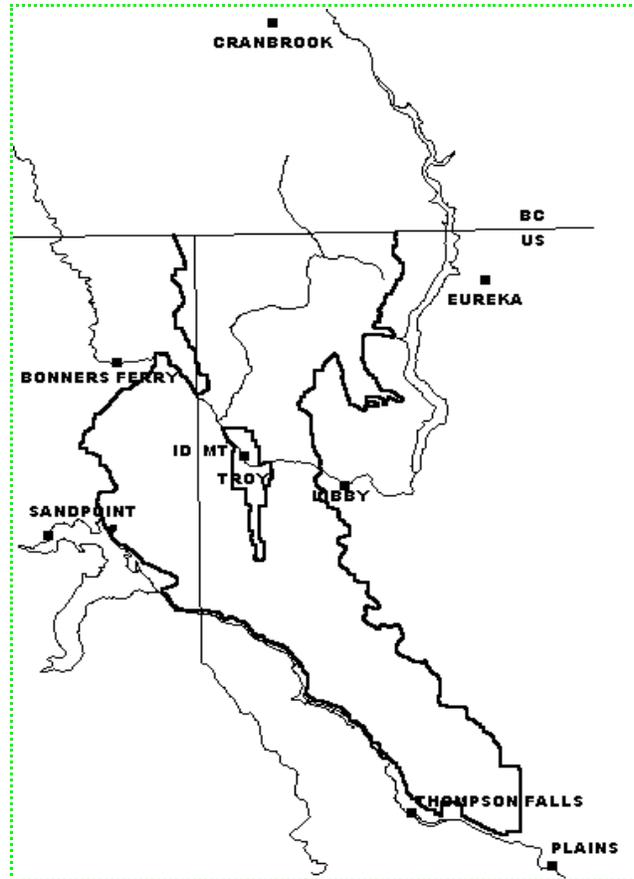


Figure 2. Cabinet-Yaak grizzly bear recovery zone.

Harris (1986) reported that the maximum human-caused mortality rate that could be sustained by a grizzly bear population without population decline was 6.35 percent. According to the Recovery Plan, a recovered population of approximately 100 bears in the CYE could theoretically sustain an annual total of 6 bear mortalities (6 percent of the population), of which no more than 2 were female (30 percent of the total mortality). To facilitate recovery, the Recovery Plan goal addressing mortality limits states that 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 a current mortality *goal* of zero until key parameters a minimum population of approximately 100 grizzly bears (USDI 1993), to emphasize that management should strive to prevent human-caused mortality. The Recovery Plan states that the population 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. In reality, the goal of zero human-caused mortality of grizzly bears in the CYE is not likely attainable over time, but recovery programs are aimed at reducing mortality to the extent possible.

Current Recovery Plan parameter data are shown in Table 5. The Recovery Plan goals are compared to the most recent information. Only one of the Recovery Plan goals were met in 2002, total annual, known human-caused mortality limits. The CYE demographic parameters from 1988 to 2002 are presented in Appendix B.

Table 5. Status of the Cabinet-Yaak recovery zone as of 2002 in relation to the demographic recovery goals from the grizzly bear recovery plan (Kasworm 2003).		
<b>Demographic Parameter</b>	<b>Recovery Plan Goals</b>	<b>Year 2002</b>
Females w/cubs (6-year average)	6.0	1.7 (10/6)
Total known, human-caused mortality limit (4 percent of minimum estimate) (6-year average)	1.4	1.0 (6 yr ave)
Known, human-caused female mortality limit (30 percent of total known, human-caused mortality)(6-year average)	0.4	0.8 (6 yr ave)
Distribution of females with young	18 of 22 BMUs	13 of 22 BMUs

**CYE research information** Kasworm and Manley (1988) estimated the Cabinet Mountains portion of the CYE alone supported a population of 15 or fewer grizzly bears. Four female grizzly bears were transplanted into the Cabinet Mountains from 1990 to 1994 (Kasworm et al. 2000). The Service’s 1999 finding stated there was insufficient data to change the Kasworm and Manley (1988) estimate for the Cabinet Mountains. Kasworm et al.(2000) stated in an update of

the 1999 finding that even though there was insufficient data to change the estimate of 15 or fewer bears in the Cabinet Mountains section of the CYE, the increase in sightings of individuals, females with young (verifying reproduction) and the augmentation of female bears to the CYE in the early 1990s are positive indicators. Kasworm et al. (2002) reported 10 reliable sightings of grizzly bears in the Cabinet Mountains during 2001 alone, distributed among the Cabinet Mountains BMUs 2, 5, 6, 7, 8, 9 and 21. Females with young were reported in 13 of 22 CYE BMUs during the six-year period between 1996 and 2001, including six of 14 BMUs in the Cabinet Mountains portion. 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.

The Yaak portion contains 40 percent of the land in the CYE. Females with young were reported in seven of the eight BMUs in the Yaak portion during 1996 through 2001 (Kasworm et al. 2002). Unduplicated counts of female grizzly bears over 3-year intervals and total counts of bears from 1989 to 1999 indicate a minimum population of 30 grizzly bears in the Yaak, 22 radioed bears and 8 unmarked individuals. Kasworm et al. (2000) noted that nine of these grizzly bears are known or suspected to have died during the period of 1989 to 1999. The minimum population estimates based on the information in the 2000 report revise earlier estimates in the 1999 finding and indicate the Yaak section of the CYE currently supports a minimum of approximately 20 bears. This estimate does not include credible reports from the public of grizzly bear observations, which suggest a population estimate of 20 to 30 bears in the Yaak section of the CYE would be conservative (Kasworm et al. 2000). The 1999 finding and updates by Kasworm et al. (2000, 2002) conservatively estimates the CYE recovery zone population, including both the Cabinet Mountains and Yaak portions of the ecosystem, to be 30 to 40 grizzly bears.<sup>27</sup>

Trend analysis information for the CYE is inconclusive. In addition to Recovery Plan monitoring, grizzly bear population trend analyses were conducted in the early 1990s for the CYE (Servheen et al. 1994). Data were insufficient to determine population trends in the CYE. In 1999, the Service analyzed data from 1983 to 1998, which indicated a slight increase in lambda (rate of change over time based on birth and death rates) using data for the CYE and Selkirks (64 FR 26725, May 17 1999), but wide confidence intervals suggested the population trends should be cautiously evaluated. Most recent population trend information is statistically inconclusive, though the point estimate of the rate of increase declined during 1999 to 2000 (Kasworm et al. 2000, Kasworm 2001). Unusually high grizzly bear mortality in 1999 influenced the decline in rate of increase (Kasworm et al. 2000).

### **Factors Affecting the Status of the CYE Grizzly Bear Population**

The Service's 1999 finding 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. It stated that

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.

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. Additionally, U.S. Highway 2 bisects the ecosystem between the Yaak and Cabinet Mountains portions. To date, the Service has no information documenting movement of grizzly bears across Highway 2 between the Yaak and Cabinet Mountains (W. Kasworm, pers. comm. 2002). The combination of the highway, river, railroad and associated development may be or may become a substantive barrier to movement of grizzly bears in the ecosystem.

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 6 reports total known grizzly bear mortality in the CYE from 1982 to 2002. Twenty-eight grizzly bear mortalities were detected over this 21-year period in the recovery zone or within 10 miles. Of these, 15 were known human-caused. In the past six years, six known mortalities were believed to be human-caused and are accounted for in the Recovery Plan mortality parameters. (Table 6 includes grizzly bears killed further than 10 miles outside the recovery zone in British Columbia; these mortalities are not counted in recovery parameters.)

Table 6. Known grizzly bear mortalities associated with the Cabinet-Yaak recovery zone, 1982-2000 (updated from Kasworm et al. 2002).

Mortality Date	Tag #	Sex	Age	Location	Mortality Category and Cause
Autumn 1982	None	M	AD	Grouse Creek, ID	Human, Malicious
1984	None	N/A	N/A	Harvey Creek, ID	Human, Mistaken Identity
Autumn 1985	14 <sup>1</sup>	M	AD	Lyons Gulch, MT	Human, Self Defense
Summer 1986	106 cub <sup>1</sup>	N/A	Cub	Burnt Creek, MT	Natural
Autumn 1987	None	F	Cub	Flattail Creek, MT	Human, Mistaken Identity
Spring 1988	134 <sup>1</sup>	M	AD	Hunting mortality BC Unit 4-5 <sup>2</sup>	Human, Legal Hunt
Autumn 1988	None	F	AD	Seventeen Mile Creek, MT	Human, Self Defense
Summer 1989	129 <sup>1</sup>	F	3.5	Burnt Creek, MT	Human, Research
1990	None	M	N/A	Poverty Creek, MT	Human, Malicious
1992	None	N/A	N/A	Trail Creek, MT	Unknown
Summer 1993	258 <sup>1</sup>	F	7.5	Libby Creek, MT	Natural
Summer 1993	258-cub <sup>1</sup>	N/A	0.5	Libby Creek, MT	Natural
1993	None	M	AD	Libby Creek, MT	Human, Malicious
Spring 1996	302 <sup>1</sup>	M	3.5	Dodge Creek, MT	Human, Unknown <sup>3</sup>
Autumn 1997	355 <sup>1</sup>	M	AD	Gold Creek, BC <sup>2</sup>	Human, Unknown <sup>3</sup>
Spring 1999	106 <sup>1</sup>	F	21	Seventeen Mile Creek, MT	Natural, Predation
Spring 1999	106 <sup>1</sup> -cub	N/A	0.5	Seventeen Mile Creek, MT	Natural, Predation
Spring 1999	106 <sup>1</sup> -cub	N/A	0.5	Seventeen Mile Creek, MT	Natural, Predation
Autumn 1999	596 <sup>1</sup>	F	2.5	Hart Creek, BC	<b>Human, Self Defense<sup>4</sup></b>
Autumn 1999	358	M	15	Yaak River, MT	<b>Human, Management Removal</b>
Spring 2000	538-cub <sup>1</sup>	Unk	0.5	Hawkins Creek, BC	Natural
Spring 2000	538-cub <sup>1</sup>	Unk	0.5	Hawkins Creek, BC	Natural
Summer 2000	303-cub <sup>1</sup>	Unk	0.5	Fowler Creek, MT	Natural
Autumn 2000	592 <sup>1</sup>	F	3	Pete Creek MT	<b>Human, Under Investigation<sup>3</sup></b>
2001	538-cub	Ukn	Cub	Cold Creek, BC	Unknown (natural)
2001	538-cub	Ukn	Cub	Cold Creek, BC	Unknown (natural)
2001	Ukn	F	Sub	Spread Creek MT	<b>Human- mistaken identity</b>
2001	Ukn	Ukn	AD	Elk Creek, MT	<b>Human, train collision</b>
2002	Ukn	F	1	Marten Creek, MT	Natural
2002	Ukn	F	Sub	Porcupine Creek, MT	<b>Human, Under Investigation</b>

<sup>1</sup> Part of radio collar sample at time of mortality.

<sup>2</sup> Mortality outside recovery zone more than 10 miles.

<sup>3</sup> Human caused mortality determined only because of the radio collar on the animal at the time of death.

<sup>4</sup> Bold indicates known human-caused mortalities included in Recovery Plan 6-year averages.

Total known annual mortalities (natural and human-caused) in the CYE averaged 0.7 per year from 1982 until 1999, a year in which five bears were known to have died. The level of known mortality was unusually high from 1999 to 2001 when compared with past history. During this three-year period, there were 13 known grizzly bear mortalities, eight were natural and five were human-caused. During the previous 17 years (1982 through 1998) 15 known grizzly bear mortalities were documented, of which three were natural, 11 were human-caused and one was unknown. The number of undetected, unreported grizzly bear mortalities are not known in any year.

In 1999, two of five known grizzly bear mortalities were human-caused. One subadult female grizzly bear was killed in a defense of life situation. One adult male grizzly bear was killed as a result of an agency management control action after becoming habituated and food conditioned while frequenting private lands in the Yaak adjacent to national forest system lands. Three other grizzly bears died of natural causes. In 2000, four grizzly bears were known to have died. One female subadult was killed illegally, three grizzly bear died of natural causes. In 2001, four grizzly bears were known to have died. A subadult female was killed due to mistaken identity by a hunter, one grizzly bear was apparently hit by a train, and two cubs died of natural causes. In 2002, two bears were known to have died. One yearling female grizzly bear, presumably orphaned, died of natural causes several weeks after being preemptively moved. Another subadult female grizzly bear died in the Porcupine Creek area of the Yaak. This mortality was apparently human-caused and is under investigation.

The Service is especially concerned about human-caused female grizzly bear mortalities in smaller populations such as the CYE because population growth and recovery are closely correlated with the number and survivorship of adult female bears. The population has not yet attained annual Recovery Plan criteria for females with cubs, distribution of females with young, or female mortality limits. Population trend information is statistically inconclusive, though the point estimate of the rate of increase has declined during 1999 to 2000 (Kasworm et al. 2000, Kasworm 2001). The rate of increase is currently being revised to include data from 2001 and 2002, but the analysis is not yet complete (W. Kasworm, pers. comm. 2003).

Seven known human-caused grizzly bear mortalities occurred in the CYE or within 10 miles during 1982 through 1991 (10 years). Eight known, human-caused mortalities occurring during 1992 through 2002 (11 years). Six of the eight mortalities occurred in the four-year period since 1999. Of the 15 human-caused mortalities since 1982, seven were females, six were males, and the sex of two was undeterminable. Of the female mortalities, one was an adult female, one was a cub and five were subadults (yearling to four years old).

The best available information suggests a population of 30 to 40 grizzly bears in the CYE (Kasworm and Manley 1988, Kasworm et al. 2002). Using the more conservative lower limit of the population estimate of 30 grizzly bears, the current annual known human-caused mortality rate is approximately 2.37 percent, or about 0.71 bears per year since 1982 (15 grizzly bear mortalities over 21 years). Annual, known human-caused female grizzly bear mortality is about 0.33 per year (7 known female mortalities over 21 years). Using the Recovery Plan 4.0 percent limit, a population of 30 grizzly bears could theoretically sustain about 1.2 known mortalities a year ( $30 \times .04 = 1.2$  per year) or 0.36 female mortalities ( $1.2 \times 0.30 = .36$ ); a population of 40 grizzly bears could sustain about 1.60 mortalities per year or 0.48 females. Some level of unknown, unreported grizzly bear mortality probably occurs in each grizzly bear ecosystem. A review of grizzly bear mortalities in British Columbia, Alberta, Idaho, Washington, and Montana concluded that of the studies reviewed, management agencies would have been unaware of about half of the deaths of radio-collared grizzly bears if not for the radio collars (McLellan et al. 1999). Using methods in McLellan et al. (1999), adjusting for unknown, unreported mortality results in a total (known and unknown) human-caused mortality rate of approximately 1.14

mortalities per year, or between 2.85 percent (using the upper population estimate of 40 bears) and 3.80 percent (using the lower population estimate of 30 bears) (Appendix D). Harris (1986) suggested that a larger grizzly bear population could sustain an annual total mortality of 6.35 percent. Both Harris (1986) and the Recovery Plan caution 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. However, the number of known and unknown grizzly bear mortalities that occurred has apparently not reached levels that result in detectable population declines in the CYE.

Female survival is the most important element for recovery of the population (USDI 1993a). Extinction may be eminent for grizzly bears in the CYE if human-caused mortality results in a significant loss of reproductive-aged 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 and to raise cubs to maturation. Females and cubs are also vulnerable to predation by larger males; in the CYE in 1999, an older female and her two cubs were killed by another grizzly bear.

The loss of genetic heterogeneity may be a significant long-term threat to the small grizzly bear population in the CYE. Lehmkuhl (1984) reported that inbreeding depression is the most important and immediate consequence of a reduced population size, driven by an increase in homozygosity. Early stages of inbreeding depression usually result in increased juvenile mortality, and other common indicators can include reduced viability and fertility (Falconer 1981, Lasley 1984, Wright 1977). Inbreeding depression manifests itself more prominently in populations that endure a severe bottleneck and are prevented from re-establishing their former numbers at a natural rate (human-induced mortality and habitat limitations continue to be a threat to population growth and recovery). Total isolation of the CYE grizzly bear populations from other grizzly bear populations would significantly increase the risk of population-threatening inbreeding. Maintaining occasional genetic interchange between grizzly bears in Canada, which currently retain a much larger gene pool across a large expanse of Canada, and bears in the United States would be beneficial to the CYE population. Connections with the Selkirks population and the NCDE population would also benefit the CYE grizzly bear population. A recent map of grizzly bear distribution indicates recent grizzly bear occurrences between the northwest NCDE and the CYE (Wittinger et al. 2002). A genetics research effort is ongoing to determine whether there has been some movement of grizzly bears between the NCDE and the Yaak area of the CYE (C. Servheen, pers. comm. 2003). This project will look at the relatedness of these two populations and the origins of any grizzly bears found between the two recovery zones.

### **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 of the 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*** 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. The acres actually impacted along with a zone of influence around each are included in the calculation. The areas affected by roads and major activities are considered ineffective for use by grizzly bears.

The Forest Plan defined 70 percent or more habitat effectiveness in a BMU as adequate for bear security. BMUs on the Forest are approximately 100 square miles. The PanHandle and Lolo National Forests use a similar 70-square mile habitat effectiveness threshold for bear security. The CYE has been divided into 22 BMUs. The Forest manages all of 15 BMUs and shares management of two more BMUs with the PanHandle National Forest. The PanHandle National Forest manages four BMUs. The Lolo National Forest manages BMU 22 and began reporting habitat security information in terms of habitat effectiveness in 2000 (Tricia O'Connor, Lolo National Forest, pers. comm. 2000).

The majority of the BMUs in the CYE meet the 70 percent habitat effectiveness standard; those that do not provide over 60 percent habitat effectiveness. Sixty-eight percent (15 of 22) of BMUs in the CYE currently provide 70 percent security habitat (habitat effectiveness) or more (USDA 2002b) (see Appendix E). The remaining 7 BMUs range from 60 percent to 69 percent habitat effectiveness. Eighty-two percent (14 of 17) of BMUs managed by the Forest or jointly managed by the Forest and the PanHandle National Forest currently meet the 70 percent standard for grizzly bear habitat effectiveness. The Lolo National Forest's BMU 22 provides 68 percent habitat effectiveness.

Of BMUs in the Cabinet portion of the CYE, five of 14 BMUs do not meet the 70 percent standard for grizzly bear habitat effectiveness (Appendix E). Two of these 5 BMUs provide 69 percent habitat effectiveness. In several BMUs not currently meeting the 70 percent standard, highways, county roads, private roads and Forest roads required for private land access account for, at least in part, the BMUs not meeting the standard.

***Access management*** 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 recommended ecosystem-specific data be used to limit motorized access in grizzly bear habitat. The research documented:

- total motorized route densities of greater than 2 miles per mile square 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.

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. Individual female grizzly bears indicated either a higher or lower tolerance for roads in their home range.

Although the access levels documented in Wakkinen and Kasworm (1997) have not been formally adopted by the Forest as management direction, the research provides for a comparison of BMU access conditions to the averages of those female grizzly bears studied. Open motorized route density, total motorized route density, and core area percentage within the CYE BMUs are displayed in Appendix E. The comparisons between year 1997 and 2001 display actual improvements in road access conditions but also include some minor discrepancies. Road layers have been evaluated and corrected each year since the moving windows process was initiated, and improvements in applying the moving windows model have resulted in minor deviations. The 1999 Annual Forest Monitoring Report (USDA 1999) had errors that were corrected in the 2000 numbers (USDA 2000a).

Currently, open motorized route densities greater than 1 mile per square mile occur in 33 percent or less of the BMU in 55 percent (12 of 22) of the BMUs in the CYE (USDA 2002b) (Appendix E). Open motorized route density declined in 16 BMUs and increased in four BMUs between 1997 and 2001. Open motorized route densities greater than 1 mile per square mile occur in 33 percent or less of the BMU in 65 percent (11 of 17) of the BMUs managed solely by the Forest. In the nine BMUs managed by solely the Forest and in the Cabinet portion of the CYE, seven of nine have open road densities greater than 1 mile per square mile in 33 percent or less of the BMU.

Currently, total motorized route densities greater than 2 miles per square mile occur in 26 percent or less of the BMU in 45 percent (10 of 22) of the BMUs in the CYE (USDA 2002b)(Appendix E). Sixteen BMUs show a decline in total motorized route density between 1997 and 2001. Five BMUs show increases, although all but one are slight increases. Road densities in most BMUs have decreased since 1995. Total motorized route densities greater than 2 miles per square mile occur in 26 percent or less of the BMU in 41 percent (7 of 17) of the BMUs managed by the Forest. In the nine BMUs managed by solely the Forest and in the Cabinet portion of the CYE, six of nine have total road densities greater than 2 miles per square mile in 26 percent or less of the BMU.

Current core area percentages meet or exceed 55 percent in 68 percent (15 of 22) of the BMUs in the CYE (USDA 2002b)(Appendix E). Sixty-five percent (11 of 17) of the BMUs managed by the Forest meet or exceed 55 percent core area. Since the 1995 incidental take statement, core area increased in 76 percent (13 of 17) of the BMUs managed by the Forest. Improvements have occurred slowly. The data show some decreases in core since 1995; these are primarily due to changes in the moving windows analysis (Wayne Johnson, Kootenai National Forest, pers. comm. 2002). All nine BMUs managed by solely the Forest and in the Cabinet portion of the CYE provide 55 percent core area or more.

Since the 1995 incidental take statement, the Forest has managed BMUs adhering to no net increase in open road density or total motorized route density, and no net loss of core areas. In this respect, the baseline condition of CYE grizzly bear habitat as affected by road densities is not expected to be degraded in the future. Since 1995, baseline access management conditions generally improved across the Forest. However, many BMUs have road densities exceeding the averages reported in research for female grizzly bear home ranges. The 1995 incidental take statement also required the Forest's participation in the development of recommendations for regulating levels of open and total motorized route density and core area within BMU, in association with the IGBC CYE/SE Access Committee. The Forest is currently in the process of amending the Forest Plan to establish numerical thresholds for these three parameters in each BMU based on recommendations from this committee. This action will be reviewed under a separate consultation.

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, 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 2000) (Brian Gilbert, Plum Creek Timber Company, pers. comm. 2000). The open motorized route density, total motorized route density and core areas reported in Appendix E includes all lands in the BMUs. Thus data presented in Appendix E 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 2). 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 townsite 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 habitat that might be important for their continued survival and development.

The Highway 2 corridor 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 ecosystem between the Yaak and Cabinet Mountains portions. Although the impacts of this corridor on grizzly bear movements within the CYE have not specifically been investigated, the Service has no information documenting movement of grizzly bears between the Yaak and

Cabinet Mountains. 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. 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 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. Improving connectivity between the Yaak and Cabinet Mountains portions of the CYE is a primary recovery goal (C. Servheen, pers. comm. 2002).

The Genesis Troy copper/silver mine occurs in BMU 3. The mine had been in operation from 1979 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 (David Young, Sterling Mining Company consultant, in litt. 2000). This mine employed between 300 to 350 employees and was similar in scope to the proposed Rock Creek Mine (John Mc Kay, Kootenai National Forest, pers. comm. 2003). The mine is currently shut down due to market conditions. Ongoing maintenance, primarily pumping water from the underground cavities, continues with a skeleton crew, and roads will remain gated. Approximately 4 years of additional operation is possible on this ore body (D. Young, in litt. 2000). The Sterling Mining Company owns the Troy Mine, and intends to complete the unit while the permitting, evaluation adits and development adits are completed at the Rock Creek Mine. Impacts from current activities at the Troy mine are not known to substantially impact bears in the southern portion of the CYE. Impacts during additional operation would primarily be associated with additional workers living in the area. However, most of these employees 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 is not expected (J. McKay, pers. comm. 2003).

Several 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. The Forest is required to provide reasonable access under current laws and regulations and can influence access across national forest system lands, but has no jurisdiction over activity on private lands. 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.

Major projects that have affected grizzly bears in the CYE include the Bull Lake Estates subdivision in BMU 3. The Forest requested consultation on issuance of an access permit across national forest lands. 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

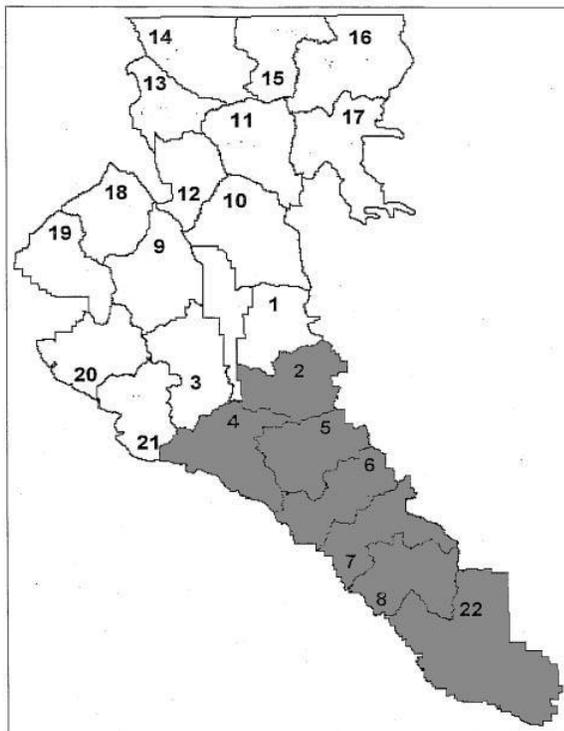
incidental take statement on the State Highway 1 project in eastern Idaho, between the Yaak portion of the CYE and the Selkirks ecosystem (USDI 2002).

## 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). 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, specifically, those areas 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.



**Figure 3.** Forest BMUs (shaded) in the action area for the proposed Rock Creek Mine.

### 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 will 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. There has been insufficient data to change this estimate 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 unknown 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. (2002) reported 10 reliable sightings of grizzly bears in the Cabinet Mountains during 2001 alone, distributed among the Cabinet Mountains BMUs 2, 5, 6, 7, 8, 9 and 21. 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 six of 14 BMUs in the Cabinet portion of the CYE, including BMUs 2, 4, 5, 6 and 7 at least once during the past 6 years (Kasworm et al. 2002) (Figure 4). The three young bears (two males and one female) located in 2002 outside the recovery zone near Heron are considered evidence of recent reproduction in the area.

Using female with young sighting data (Kasworm et al. 2002), there would appear to be at least one and possibly 2 reproductive females utilizing BMUs 4, 5 and 6. There were sightings of females with young in 1996, 1997, and 2000 in these BMUs. 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 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 therefore cannot



Figure 4. Distribution of female grizzly bears with young within the action area during 1997 through 2002.

be identified as a third female. 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 age 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 1993). If we assume the upper limit of 15 grizzly bears in the Cabinets, about 5 would be adult females.

Although there are insufficient data to change the estimate of 15 or fewer bears in the Cabinet Mountains section of the CYE, the increase in sightings of individuals, females with young and the augmentation of bears to the CYE are

positive indicators (Kasworm et al. 2000). 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). Four female grizzly bears were transplanted into the Cabinet Mountains from 1990 to 1994 (Kasworm et al. 2000). One transplanted female released in 1992 died of unknown causes in 1993. Another released in 1990 was last seen in 1992. The two others were released in 1993 and 1994 and were last detected by telemetry in 1995. The ultimate fates of these 3 bears are unknown. All were of reproductive age.

## **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 a number of 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 and associated assessment criteria 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 or associated assessment criteria applicable to this proposed action to assess the condition of the environmental baseline.

***Linear Open Road Density by BAA*** *The Forest Plan standard or associated assessment criteria is 0.75 miles per square mile or less per BAA in MS-1 habitat, unless there is an inactive BAA with less than 0.75 miles per square mile to provide security during the life of the project and the MS-1 habitat in the BMU as a whole has an average linear open road density of less than 0.75 miles per square mile.*

The Forest divided the BMUs into smaller areas called BAAs, which are approximately 5000 to 15000 acres and represent the analysis units for the cumulative effects model (USDA et al. 1988). The Forest quantifies the influence of roads on bears by establishing a linear open road density standard of no more than 0.75 linear miles of road per square mile within BAAs. The linear open road density is calculated by dividing the total miles of roads open to the public, with the exception of roads in MS-3 habitat, by the total square miles within the BAA.

Road densities in the BAAs have improved since the BA was completed in 1998. As of 2002, 4 of the 20 BAAs within the on-site BMUs 4, 5 and 6 affected by the Rock Creek Mine exceed 0.75 miles per square mile (W. Johnson, pers. comm. 2002). In BMU 6, the BAA 566 linear open road density is 1.18 due to private timber harvest and Harpole/Skranak Way-up/Fourth of July mine access. The effects of Harpole/Skranak Way-up/Fourth of July mine were addressed in a biological opinion, amended in 1999 (USFWS 1999). The BAA 566 has exceeded the road standard for years; roading levels are likely to remain high under current private land ownership patterns. The BAA 567 linear open road density was reported as 1.45 in the BA; the current

linear open road density is 0.85 miles per square mile and will remain so (W. Johnson, pers. comm. 2002). The FDR 4725 (4.18 miles) was shown as open in the earlier analysis but never was opened. Further, the Noranda-Montanore Power line road (0.73 mi.) would not be built. The remaining roads include Miller Creek Road 4724, which currently is closed during the spring season.

In BMU 5, the BA reported BAA 555 linear open road density as 1.17, but it is 1.08, due to the Montanore Mine project being abandoned (W. Johnson, pers. comm. 2002). The remaining open roads access private lands or are county roads. The BAA 752 open road linear density is 0.86 miles per square mile, which exceeds the 0.75 standard.

***Habitat Effectiveness*** *The Forest Plan standard or associated assessment criterion requires 70 percent or more of secure habitat (habitat effectiveness) within a BMU as a measurement of the cumulative effects of activities. The Service's 1995 incidental take statement did not specifically address habitat effectiveness, but the IGBC SCYE Subcommittee recommended continued use of the habitat security standard of 70 percent habitat effectiveness by BMU, except where land patterns or ownership or other considerations make this standard unattainable.*

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. The habitat around the activity is “ineffective” or assumed unusable during the life of the activity due to the disturbance.

Habitat effectiveness was introduced in a cumulative effects model (Christenson and Madel 1982) and is used as a standard in the Forest Plan. Habitat effectiveness provides a measure of bear security within each BMU, but does not address habitat quality or the distribution of ongoing actions. Habitat security (core area) is a similar concept. Habitat effectiveness is influenced by major activities and open roads and their buffers, but not closed or restricted road influences. Core area is influenced by the presence of open motorized routes, 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.

Of the three BMUs directly affected by Rock Creek, two remain below habitat effectiveness standard of 70 percent although improvements occurred since 1998 (Table 7). The low habitat effectiveness in BMUs 4 (65 percent) and 6 (69 percent) are due, in part, to the major highways (Highways 200 and 56) that border or bisect these two BMUs. Therefore, even lacking ongoing projects, these two BMUs may never meet the Forest Plan standard of 70 percent. The BMUs 2, 7 and 8 meet the standard, while BMU 22 fails to meet the standard.

Table 7. Habitat Effectiveness in BMUs associated with the proposed Rock Creek Mine (from USDA 2002b).

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

*Open motorized route density* Neither the Forest Plan or 1995 incidental take statement require attainment of specific motorized access route densities. The 1995 incidental take statement specified that the Forest shall adopt the open road and motorized trail route densities recommendations of the IGBC SCYE Subcommittee when they are developed. In the interim, terms and conditions included no net increase in open motorized route density. The Interim Access Rule Set established a no adverse change criterion pending the establishment of specific access numbers.

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 Selkirks Ecosystem. This research provides biological information on grizzly bears in the CYE to compare to BMU motorized access conditions. 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.

Currently, the proportions of BMUs 4, 5 and 6 that exceed one mile per square mile open motorized route density are 36 percent, 27 percent, and 34 percent respectively. Open road densities have declined in all three BMUs since 1997 (**Table 8**). Open motorized route densities exceed 1 mile per square mile in 17, 23 and 32 percent of BMUs 2, 7 and 8 respectively, and in 38 percent of BMU 22.

Habitat conditions as affected by open road density have improved over the past five years (Table 8.). The open motorized route densities in BMUs within the action area have all declined slightly. The Forest manages BMUs according to a no adverse change (increase) in open

motorized route density criteria. Five of the seven BMUs within the action area have high open road densities in proportions comparable to or less than the average within a female home range as reported in research (Wakkinen and Kasworm 1997). The BMU 22 contains 23 sections of private corporate timber lands (Dave Wroblewski, Lolo National Forest, pers. comm. 2003). The BMU 4 is affected by Highways 200 and 56..

Table 8. Percent of BMUs with open motorized route density greater than 1 mile per square mile (from USDA 2002b).					
BMU	1997	1998	1999	2000	2001
2		29	18	17	17
4		39	36	36	36
5	29	29	28	27	27
6	37	37	39	34	34
7	27	27	23	23	23
8	39	32	31	32	32
22	41	41		37	38
* For comparison, 33 percent of an average female home range exceeded 1 mile per square mile open motorized route density (Wakkinen and Kasworm 1997).					

**Total motorized route density** *The 1995 incidental take statement specified that the Forest shall adopt the total motorized route density recommendations of the IGBC SCYE Subcommittee when they are developed. In the interim, terms and conditions included no net increase in open motorized route density. The Interim Access Rule Set established a no adverse change criterion pending the establishment of specific access numbers.*

The current proportions of BMUs 4, 5 and 6 that exceed two miles/square mile total motorized route density are 26 percent, 20 percent, and 32 percent respectively. Total motorized route densities have declined in all three BMUs since 1997 (**Table 9**). Total motorized route densities exceed 2 miles per square mile in 14, 20 and 23 percent of BMUs 2, 7 and 8 respectively, and in 41 percent of BMU 22.

The total motorized route densities in BMUs within the action area have declined slightly over the past 5 years, with the exception of BMU 8, which did not change. The Forest manages BMUs according to a no adverse change (increase) in total motorized route density criteria. Five of the seven BMUs within the action area have high total road densities in proportions comparable to or less than the average within a female home range as reported in research (Wakkinen and Kasworm 1997). The remaining BMUs, 6 and 22, contain high proportions of private corporate

timber lands, 6 and 23 sections respectively (W. Johnson, pers. comm. 2003 and D. Wroblewski, pers. comm. 2003).

Table 9. Percent of BMUs with total motorized route density exceeding 2 miles per square mile (from USDA 2002b).					
BMU	1997	1998	1999	2000	2001
2			15	14	14
4		28	27	26	26
5	23	23	21	21	22
6	35	35	34	33	32
7	22	22	19	20	20
8	23	23	21	21	23
22	42	42		41	41
* 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** The 1995 incidental take statement specified that the Forest shall adopt the core area recommendations of the IGBC SCYE Subcommittee when they are developed. In the interim, terms and conditions included no net decrease in existing core area. The Interim Access Rule Set established a no adverse change criterion pending the establishment of specific access numbers.*

The current proportions of BMUs 4, 5, and 6 that provide core area are 63 percent, 62 percent, and 55 percent respectively. Core areas have increased slightly in all three BMUs since 1997 (Table 10). BMUs 2, 7, 8, and 22 provide 77, 66, 56 and 47 percent core areas respectively.

Table 10. Percent core area in BMUs associated with the Rock Creek Mine project (from USDA 2002b).

BMU	1997	1998	1999	2000	2001
2			77	78	77
4		62	61	63	63
5	60	60	61	62	62
6	51	51	51	53	55
7	65	65	66	66	66
8	56	54	57	57	56
22	48	48		47	47

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

The 1998 BA (see BA Table 18, pg 34) identified approximately 60.9 percent, 60.2 percent, and 49.9 percent core area habitat present in BMU 4, 5 and 6 respectively. Road management since the 1998 BA has improved core area numbers.

Core areas in BMUs within the action area have all increased slightly or remained relatively stable over the past 5 years. The Forest manages BMUs according to a no adverse change (decrease) in core area criteria. Six 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 research (Wakkinen and Kasworm 1997). The BMU 22 provides less core area than the average in research. The BMU contains 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 Wrobleski, Lolo National Forest, pers. comm. 2003).

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 or associated assessment criterion 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 standard or associated assessment criterion 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 standard. Adequate movement corridors occur within the action area at the current time (W. Johnson, pers. comm.2000).

***Seasonal Habitat Protection*** The Forest Plan standard or associated assessment criterion include:

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-July 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, dwellings, MS-3 lands, and habitat fragmentation) in low lying areas.

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 and 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 and 16 percent of the total area of BMU 5) and an estimated 14,781 acres (42 percent of the core area and 24 percent of the total area of BMU 6) of spring habitat components within the core area. Spring habitat is well represented in core area in BMU 4, 5 and 6 when compared to its availability within each BMU.

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. 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 unavailable under snow during the spring.

Denning habitat is generally defined 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; the 1998 BA states that none exists within the immediate Rock Creek Mine

permit area. A transplanted grizzly bear used one den site in the Rock Creek drainage (BA); it died later in the year of unknown causes.

Huckleberry fields are important in the fall for the CYE bear population. The 1998 BA states there are no large huckleberry fields in the immediate Rock Creek Mine permit area. Kasworm et al. (2000) indicated that the productivity of many of the huckleberry fields that were stimulated by fires in the early 1900s has declined under closing forest canopies.

*Summary of environmental baseline conditions:* The Service considers habitat effectiveness, open and total motorized route densities and core area to be important habitat condition parameters. Of seven BMUs, four meet the Forest Plan standard of 70 percent, all provide 65 percent habitat effectiveness or more, six meet or exceed the levels of core area reported for average female home ranges in the CYE, and five 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. Linear road densities are met at the BMU scale.

### **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 and 1995 incidental take statement be considered related to the mine. These factors include impacts related to mine employees and support services, influx of residences, increased trail use, sanitation, noise, transportation of ore, permanent loss of habitat and tailings placement.

**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. A considerable amount of the projected population growth could be expected to occur within the action area. 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. From 1982 to 2002, 15 grizzly bears were killed by people throughout the CYE (see Table 6). Of these, 13

were caused by people living or recreating in grizzly bear habitat. These mortalities resulted from malicious killing, self-defense, sanitation management removal, hunter related mistaken identity, or unknown causes. The number of grizzly bears killed by members of the public during any one year was one, with the exception of 1999, when two grizzly bears were killed by the public. Three of these 13 human-caused mortalities occurred in the action area.

*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 level of use from 1995 to 1997 represents a low use level rating for the Rock Creek Trail. Actual use is typically higher due to trail use by unregistered users, ranging from 50 percent to 400 percent (BA). Correcting for the actual trail use, the existing use may currently range from 10.5 to 21 parties per week. 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 (IGBC 1998b).

*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 2002 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 very likely to increase at a faster rate. Snowmobiling is legally prohibited within wilderness areas of the affected BMUs.

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. 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. 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).

*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. The 1998 BA (Appendix 12, Table 6) indicates that 38 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. These programs are intended to reduce potential hunter-related grizzly bear mortality.

Outside the action area, but within the CYE, in 2001, a subadult female grizzly bear was killed by a black bear hunter who mis-identified her as a black bear. A subadult female was killed by hunters in British Columbia in 1999 in a defense of life situation at a campsite (W. Kasworm, pers. comm. 2002 and Appendix B). Montana Fish, Wildlife and Parks has recently added several components to its Grizzly Bear Management Plan to reduce the potential for hunter-related grizzly bear mortality (MDFWP 2002). One measure is the requirement that black bear hunters successfully complete Montana's black bear/grizzly bear identification test prior to obtaining a license.

*Sanitation* Poor sanitation on the part of humans 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, barbecue 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 removed from the ecosystem.

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 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 sites 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 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.

There have been no known grizzly bear incidents related to sanitation 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 of the action area in 1999, a male grizzly bear was killed by government biologists in the Yaak because of sanitation-related problems. The bear followed classic habituation behavior, it fed on compost and bird seed, and eventually broke into outdoor refrigerators and preyed on domestic goats. The incidents occurred in a small rural subdivision which 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 human settlements 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 attractants along the Clark Fork River. The bears were captured, fitted with radio transmitters and moved into Martin and East Fork of Elk Creek, which are a distance 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).

These recent incidents indicate that unsecured attractants exist in the CYE, can affect the small grizzly bear population at this point, and may become more serious to grizzly bear recovery as the grizzly bear and 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*** Currently a local rail system, Montana Rail Link, runs along Highway 200 in a fairly developed utility corridor, largely 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. A Bonneville Power Administration 230 kV power transmission line runs along Highway 200 and, branching from that, an Avista Corporation 230 kV power transmission line runs from Noxon Reservoir to Hot Springs, just south of the southern boundary of the Cabinet Mountains Wilderness Area. The main access road to the Rock Creek Mine, FDR 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.

In 2002, the remains of a grizzly bear were found near railroad tracks and a county road approximately 0.5 miles east of Heron, near the action area. The bear was apparently hit and killed by a train in 2001 (W. Kasworm, pers. comm. 2002).

**Mines** Approximately 19 patented mining properties occur in the Cabinet Mountains within the action (BA). Not all of the patented properties have legal road access. There are possibilities of recreational development 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 owners applied for permanent access to their patented claims. The Forest recently authorized limited motorized access to the Fourth of July and Way-up mines (USDA 2000b). The biological opinion prepared for the project (USDI 1998b) was amended in 1999 because the Forest was unable to comply with the original terms and conditions regarding access management. Under the current authorization, motorized access on the two roads would be 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 good sanitation on national forest system lands, as specified in the terms and conditions of the Fourth of July/Way-up Mine biological opinion, but stated they have no jurisdiction on patented land (USDA 2000b).

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. 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, building structures, establishing hunting camps, and maintaining livestock compounds with food and attractants. These impacts were analyzed in the Service's biological opinion (USDI 1998b). We anticipated some level of unquantifiable grizzly bear mortality would occur due to displacement and direct killing of grizzly bears. However, baseline habitat conditions have improved in BMU 6 since issuance of the biological opinion. Open motorized route density improves with the proposed mine from high open motorized route densities (greater than one mile per square mile) in 34 percent to 33 percent of BMU 6 (USDA 2002b). This meets the research average (Wakkinen and Kasworm 1997). High total motorized route density (greater than two miles per square mile) has improved from 38 percent in 1998 to 32 percent of BMU 6 (USDA 2002b). Core area has also improved in BMU 6, from 44 percent in 1998 to 55 percent (USDA 2002b), also meeting the research average. The potential for incidental take as a result of displacement is substantively reduced due to the terms and condition required in the biological opinion and improvements in the baseline since 1998. Some low level of mortality is still anticipated from habituation and food conditioning. The terms and conditions in the incidental take statement are intended to reduce level of anticipated take from habituation as well. The Forest's ROD (USDA 2000b) and Service's biological opinion are currently under legal dispute.

## **EFFECTS OF THE ACTION**

The effects of the action include the direct, indirect, interrelated and interdependent effects of the proposed Rock Creek Mine. The 1998 BA compared the direct effects of Alternative V of the

proposed Rock Creek Mine project with Forest Plan standards and associated assessment criteria, which are habitat effectiveness, linear open road density, displacement areas by BAA, opening size, movement corridors and seasonal habitat protection. Requirements in the terms and conditions of the 1995 incidental take statement also were compared to the proposed action. These included requirements related to open motorized route density, total motorized route density, and core area. Additional direct and indirect effects associated with the implementation of the proposed Rock Creek Mine include impacts stemming from additional households, people and human activity, and the related issues of sanitation, associated access and facilities, and fragmentation.

The effects of the proposed Rock Creek Mine will be discussed under the following, often overlapping, categories:

1. **Displacement of grizzly bears** resulting from roads or activities; includes 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. **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; and
3. **Direct mortality risk to grizzly bears** resulting from food conditioning and increased mortality risk related to other human impacts, including recreation, access into grizzly bear habitat, and settlement.

The following sections are organized beginning with a discussion of general factors that should be considered. General factors may include discussion of actions or issues that do not necessarily occur or apply within the action area and are not necessarily related to the proposed action, but provide background information or context for the effects of the action analysis.

A discussion of the potential effects and risks of the proposed mine within the action area follows, followed by a discussion of the mitigation plan measures intended to address the effects.

## **Analysis of Displacement Effects on Grizzly Bears**

### **General factors to consider**

Roads into grizzly bear habitat have been widely recognized as having the potential to adversely affect grizzly bears. Management of human access into grizzly bear habitat is recognized as an effective management tool to moderate the displacement of grizzly bears caused by human activity (IGBC 1994).

Research has not yet quantified all of the factors contributing to displacement of grizzly bears from habitat in roaded areas. Research indicates, however, that grizzly bears were consistently displaced from roads and habitat surrounding roads (Mattson et al. 1987; McLellen 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, 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. McLellen 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 et al. (1996) found that as road densities and human use of roads increased, female grizzly bear use of adjacent habitat decreased.

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 a factor related to bears avoiding people who shoot at bears (legal harvest, defense, mistaken identity or malicious) and avoidance of the disturbance related to people, noise, activity, roads and traffic. In their Canadian study area, McLellen and Shackleton (1989b) found that bears near roads were more vulnerable to hunting, and found support for the hypothesis that non-secretive bears are eliminated from the population by hunters.

Grizzly bears also avoid high use trails and other disturbances, but there is little in the literature that establishes a threshold of tolerance of bears to increased trail activity 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 this study.

Research documents grizzly bear displacement response to disturbances other than roads, such as mining, seismic activity and aircraft, and 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.

McLellen 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 (McLellen and Shackleton 1988) and industrial sites (McLellen and Shackleton 1989b). 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 (McLellen and Shackleton 1989b). The most pronounced reactions were to humans on foot in remote, open

habitat. 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. In Glacier National Park, Jope (1985) suggested grizzly bears in parks habituate to high human use and showed less displacement, even in open habitats.

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.

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). Yonge (2001) found that grizzly bears near Cooke City, Montana, were willing to consistently forage in very close proximity to high levels of human use if cover was sufficient and energetically efficient feeding opportunities were present. Both Mattson (1993) and Yonge (2001) postulated that areas with higher levels of human activity might have a positive effect for bears by serving as a kind of refugia for weaker population cohorts (subadults and females with cubs) seeking to avoid intra-specific competition (adult males). However, Mattson qualified this observation by adding that the beneficial effects vary as to whether hunting is allowed, and how closely the human population is regulated. Further, food conditioned grizzly bears were much more likely to be killed by humans. Both Yonge (2001) and Mattson (1993) indicated that increases in human use levels can be deleterious if some human activities are unregulated, such as use of firearms, presence of attractants, nature and duration of human uses. Conversely, a level of coexistence between humans and grizzly bears can be achieved if such activities are controlled.

Grizzly bears prevented from using important resources in their home range due to avoidance of roads or other disturbances may experience significant impacts affecting breeding, feeding and sheltering. Stress and increased caloric expenditure searching for food or protective cover in an unknown area may impact normal behavior patterns, possibly to the extent that reproduction is compromised. 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. In some years, avoidance of roads may result in a significant underuse of habitat. Grizzly bears that avoid human activity may be forced into poorer quality habitat or habitat that is already occupied by other bears. Bears that are forced out of their familiar home range also utilize more energy finding shelter, food and den sites than bears within their undisturbed home range.

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. 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 often learn 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. Predation on cubs by adult grizzlies also is a risk. Bears moving into unknown territory give up known escape cover and increase their chances of encounters with male bears.

### **Effects of the proposed action - displacement**

The proposed Rock Creek Mine would physically alter 483 acres, of which 323 acres are national forest and 160 acres are privately owned. The 1998 BA determined that displacement (assuming bears would avoid an area 0.25 to 0.50 mile around physically disturbed sites and human travel routes) would impact another 6,420 acres, essentially resulting in under-use of this habitat by grizzly bears for a period of time exceeding 35 years. The constant, high level of activity around mine facilities and adit suggests a level of disturbance that may warrant a buffer higher than the 0.50 mile buffer allowed for habitat effectiveness. Topography in the area suggests that actual displacement of grizzly bears might occur as far as from ridge line to ridge line in some areas of the Rock Creek drainage. Displacement effects could vary 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 sections analyze the extent and impact of displacement effects.

The displacement effects of the proposed action will be described in the first part of this section in relation to the Forest Plan standards, 1995 incidental take statement, and other factors. The proposed action meets many Forest standards and incidental take statement requirements. Some elements of the proposed Rock Creek Mine project would not meet Forest Plan standards. The proposed action does not affect habitat effectiveness or access management in BMUs 2, 7, 8, or 22; the proposed action affects habitat effectiveness and access management primarily in BMUs 4, 5, and 6, and so some of the discussion focuses on these BMUs.

The second part of this section will discuss potential grizzly bear responses to the impacts of the proposed action as well as the effects of the mitigation plan or proposed action intended to reduce or mitigate for this displacement.

**Habitat effectiveness** The Forest Plan standard or associated assessment criterion is 70 percent or more of secure habitat (habitat effectiveness) within a BMU.

**Summary** BMUs 5 and 6 would meet the Forest Plan standard of 70 percent during the project or after reclamation (Table 11). Habitat effectiveness in BMU 5 meets the Forest Plan standard of 70 percent and the project would not change habitat effectiveness (USDA 2002b). Current habitat effectiveness in BMU 6 does not meet the standard, but the proposed action would result in a 1 percent increase in habitat effectiveness, meeting the standard. BMU 4 fails to meet the Forest Plan standard of 70 percent. The proposed action would decrease habitat effectiveness an additional 2 percent in BMU 4, the BMU most directly impacted by the mine.

Table 11. Habitat effectiveness of bear management units in the Cabinet Mountains of the Cabinet Yaak Ecosystem throughout the life of the Rock Creek Mine (USDA 2002b).			
	Habitat effectiveness (%) of BMUs		
	BMU 4	BMU 5	BMU 6
Baseline habitat effectiveness 2001	65	75	69
During project and following reclamation (after year 35)*	63	75	70
Net change due to Rock Creek Mine	-2	0	+1

\*Net change in habitat effectiveness 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.

**Discussion** The Forest Plan requires habitat effectiveness of 70 percent in every BMU. The direction for MS-1 grizzly bear habitat implies that where habitat effectiveness in MS-1 grizzly bear habitat is below the Forest Plan standard, Forest actions should at least maintain but more often improve habitat effectiveness.

The standard would not be not met in BMU 4, where habitat effectiveness would decrease from 65 to 63 percent as a result of mine activities. Habitat effectiveness in this BMU will likely never reach the Forest Plan standard of 70 percent due to the influences of Highways 200 and 56.

The proposed action would result in habitat effectiveness increasing in BMU 6, from 69 to 70 percent, meeting the standard. The proposed action includes road closures on FDR 150 and FDR 2285, which would result in slight increases in habitat effectiveness. Habitat effectiveness in BMU 5 currently meets the standard and would not change as a result of the mine.

The proposed action does not affect habitat effectiveness in BMUs 2, 7, 8, or 22, which provide 83, 80, 77 and 68 percent habitat effectiveness respectively (see Table 7.). The purchase of mitigation lands in BMUs 4, 5, and 6 would also either remove existing displacing activities or

prevent the development of new disturbances over the life of the mine and beyond. Since the exact identity of these lands has not yet been determined, we cannot quantify this beneficial effect of the proposed action on habitat effectiveness.

***Linear open road density by bear analysis areas*** *The Forest Plan standard or associated assessment criteria is 0.75 miles of road per square mile or less per BAA in MS-1 habitat, unless there is an inactive BAA with less than 0.75 miles of road per square mile to provide grizzly bear habitat security during the life of the project and the BMU as a whole has an average linear open road density of less than 0.75 miles per square mile. The 1995 incidental take statement required no increase in open road densities above Forest Plan standards.*

***Summary*** The proposed action meets the associated assessment criteria and 1995 incidental take statement. A linear open road density of less than 0.75 miles per square mile or less would not be maintained in all BAAs affected, but linear open road density measured within each BMU would be maintained at 0.75 miles per square mile or less. The linear open road density standards require BAA displacement habitat for active BAAs. Displacement BAAs must have suitable linear open road density levels and remain free from major activities (inactive) for the life of the mine. Five BAAs are identified as displacement BAAs for the three BAAs affected. Displacement BAAs identified in the proposed action would have road densities less than 0.75 miles per square mile for the duration of the mine.

***Discussion*** Implementation of the proposed Rock Creek Mine project would require approximately 4 miles of new road construction and up to 15 miles of road reconstruction on existing roads (MDEQ and USDA 2001).

The proposed Rock Creek Mine would directly affect “active” BAAs 747, 752 and 761. Of the three active BAAs directly affected by the mine, two (747 and 761) already meet the linear road density standard and the proposed action and the mitigation plan would reduce densities further. Linear open road density would decrease in BAA 747 from 0.62 to 0.59, and in BAA 761 from 0.77 to 0.62.

Linear open road density in BAA 752 is currently above 0.75 miles per square mile. The proposed action would decrease linear open road density in BAA 752 from 0.86 to 0.79, but not to levels meeting the linear open road density standard. The BAA 752 open road linear density would be greater than 0.75 miles per square miles due to roads needed for the proposed Rock Creek mine, access to major trail heads, and a portion of FDR 150 from the mine to ridge on the west. This open road would represent a compromise to allow berry picking and hunting access while a major portion of FDR 150 would be closed to eliminate a loop road. The closure of this loop route would reduce traffic on this route, improve bear security and improve an east-west movement area for grizzly bears across the top of Government Mountain. Further, the Forest would comply with the standard by providing an equivalent displacement area with open road densities of less than 0.75 mile per square mile. BAA 753 would provide displacement for 752.

Two of the affected BAAs required an additional BAA of displacement area each to provide equivalent quality of habitat impacted by the proposed mine (see discussion under *Displacement habitat* below). BAAs 762 and 763 would provide displacement for 761, and 745 and 746 would provide displacement for 747.

Linear open road densities do not display the effects of restricted or closed roads or roads in MS-3 habitat within the BAA (MS-3 lands are not managed for grizzly bear habitat under IGBC guidelines). However, the BMU habitat effectiveness described previously does consider the impacts of all open roads, including those in MS-3, and must be considered along with linear road density. For instance, four of the five displacement BAAs (762, 763, 745, and 746) have roads in MS-3 habitat that are not reflected in BAA linear open road density calculations, and as such have actual road densities higher than the 0.75 standard would indicate. The habitat effectiveness values discussed earlier do account for these roads. The BMUs 5 and 6 would meet the 70 percent habitat effectiveness standard with implementation of the proposed action. The BMU 4 would not meet the standard. The proposed action, as well as Highways 200 and 56 reduce habitat effectiveness in the BMU 4. It is likely that the lower elevation habitat along rivers and flatter portions of the BAAs that provide spring habitat is roaded MS-3 habitat and mostly unavailable to grizzly bears. If like habitat is not provided, further displacement may result or fewer bears may be able to use the area (see *Displacement habitat BAAs* discussion below).

The proposed action would comply with the linear open road density assessment criteria at a BMU scale. The linear open road density at the BMU scale for BMUs 4, 5 and 6 would not change significantly during the construction, operation or reclamation of the proposed Rock Creek Mine. The Forest proposes to restrict public access year-round during the construction and operation of the mine on a total of 5.65 miles of roads currently open to the public (Table 4).

Low linear open road densities in BMUs suggest low impacts on grizzly bears, but the measure may not adequately describe the potential impacts of specific roads. As with the BAA analyses, high road densities or other disturbances that occur in MS-3 habitat are not included in linear open road density calculations across BMUs. Open and total motorized route densities and core area as measured with a moving windows method offers a spatial analysis that accounts for the distribution of all roads, open and restricted, and high road densities within a BMU. (See *Open and total motorized route density* discussion below.)

*Administrative use* When administrative use is considered, BAAs identified as meeting the 0.75 mile per square mile open road standard may not meet the standard (USDA 1998b). Some Forest Service administrative use occurs on restricted roads. At some use level, motorized use of restricted roads imparts significant impacts on grizzly bears. At that level, the road is included as an open road in access calculations. Mace et al. (1996) found that increasing road use had increasing impacts on bears, but the lower end of administrative use that could be tolerated by bears without observable displacement was not quantified. Many of the roads within their study area were thought to have had no use, but traffic counters were not installed on gated roads and actual administrative use levels were not known (John Waller, University of Montana, pers. comm. 2000).

Analysis for the proposed Rock Creek Mine project addressed the potential impacts of administrative use by incorporating the 1993 Recovery Plan guideline that use of roads should not exceed 14 days per bear year; when administrative use exceeded 14 days per bear year, the road should be considered open (USDA 1998b). The administrative use of gated roads in the action area was monitored in 1992, 1993 and 1994. Using this data and the 14-day Recovery Plan guideline, all three of the BAAs directly affected by the proposed Rock Creek Mine and one of the five displacement BAAs exceeded the 0.75 mile per square mile standard. High levels of administrative use could result in displacement of grizzly bears. However, see discussion beginning on page 63 regarding BAA scale analyses.

***Displacement habitat BAAs*** *The Forest Plan standard or associated assessment criteria is to provide displacement habitat in an undisturbed BAA adjacent to each BAA impacted by a major activity.*

*Summary* The project meets Forest Plan 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.

*Discussion* The long-term nature, complexity and permanent changes that would result from the proposed mine require compensation for avoidance of important habitat by grizzly bears. The Forest developed a displacement analysis for the proposed Rock Creek Mine, using the cumulative effects model (USDA et al. 1988) developed for the Forest Plan. Displacement areas for the Rock Creek Mine were designed to primarily address the loss of or displacement from spring habitat in and around mine facilities and activity areas (USDA 1998b). Analysis at the BAA level, which is theoretically a subset of a female's home range, considers the distribution of secure habitat at small scales across the ecosystem.

Between 6400 to 6500 acres of spring habitat would be impacted during implementation of the mine (W. Johnson, pers. comm. 2002), essentially reducing availability for use by grizzly bears. Many of these acres are already impacted by disturbance from use on existing roads, and thus unavailable to wary bears; the mine would significantly increase disturbance over existing levels due to the increased traffic volumes and continual disturbance over the life of the mine. The proposed action would result in a net loss of spring habitat available to grizzly bears for the life of the mine.

To partially mitigate the loss of spring habitat, the five displacement BAAs would secure from major activities approximately 6577 to 6677 acres of spring habitat; 177 more acres of spring habitat (defined as less than 5,000 feet) and 7,452 more acres of higher elevation habitat than that found in the three BAAs directly affected during the proposed Rock Creek Mine project. (See also discussion on BAA scale analyses, core areas, and spring habitat under *Grizzly bear response to displacement effects*.)

Major federal activities would be deferred from the five displacement BAAs for the life of the Rock Creek Mine (USDA 1998b, Tables 15, 16 and map Appendix 14). Prohibiting major

federal activities in displacement BAAs would not increase the amount of spring habitat for grizzly bears, but it would secure the availability of spring habitat that otherwise might be impacted by other projects during the life of the proposed Rock Creek Mine. The proximity of secure habitat in BAAs adjacent to those directly affected is intended to provide usable habitat within nearby areas, particularly spring habitat, for grizzly bears displaced by mine activities. However, private mineral patents and claims exist in a few of the displacement BAAs. Should claimants or patent holders request additional access or conduct habitat disturbing activities on their private lands or mining claims on national forest system lands, the displacement BAAs may no longer provide secure habitat.

***Open and total motorized route density*** *The 1995 incidental take statement requires no net increase in open road densities above Forest Plan standards and no increase in total motorized access route density.*

***Summary*** The proposed action meets the requirement of the 1995 incidental take statement as open and total motorized route densities would not increase, and would slightly decrease with implementation of the proposed action. The proposed action would not change road densities or core area in BMUs 2, 7, 8, or 22.

***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 endorses this strategy to limit the effects of road densities on grizzly bears. Because of the larger BMU scale, and because of the effects of motorized administrative use of closed roads on grizzly bears, core area and management of open and total road densities outside of core, is a better indicator of habitat security for grizzly bears than are displacement BAAs.

Moving windows analysis is a method used to evaluate the effects of roads on grizzly bears. Moving windows analysis measures the proportions of a specified area (in this case a BMU) that provides core habitat, and the proportions with a specified open motorized route density and total motorized route density. Wakkinen and Kasworm (1997) used a moving windows analysis to determine that 33 percent of an average, multi-year female grizzly bear home range had an open road density greater than one mile per square mile, 26 percent of an average home range had total road density greater than 2 miles per square miles, and 55 percent of an average female home range was core area. The following discussion compares the effects of the proposed action on BMUs to the results of this research.

Earlier research in the NCDE (Mace and Manley 1993, Mace et al. 1996) demonstrated significant displacement of female grizzly bears from highly roaded habitat. Displacement of grizzly bears from portions of highly roaded habitat is significant when it keeps them from preferred or otherwise available habitat to the extent it reduces breeding, feeding or sheltering.

Current open motorized route densities exceed one mile per square mile in 36, 27, and 34 percent of BMUs 4, 5 and 6 respectively (Table 12), compared to 33 percent of an average female home

range reported by Wakkinen and Kasworm (1997). Current total motorized route densities exceed two miles per square mile in 26, 21 and 32 percent of BMUs 4, 5 and 6 respectively (Table 13), compared to 26 percent of an average female home range reported by Wakkinen and Kasworm (1997).

In BMU 6, high open (greater than one mile/square mile) and high total (greater than 2 miles/square mile) motorized route densities currently occur in more than 34 and 32 percent of the BMU respectively. Open motorized route density would decrease by one percent in BMU 6 and meet the research average for female home ranges. Total motorized route density would not change with the implementation of the proposed Rock Creek Mine project. Road densities in BMU 6 are elevated by roads on corporate timber lands (six sections) in the BMU and by Highway 200. The proposed action would not increase total road densities in BMU 6.

Open motorized route density in BMU 4 is elevated by Highways 200 and 56, and the project would not increase open road densities. 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.

Table 12. Percent of BMUs with open motorized route density exceeding 1 mile per square mile (USDA 2002b).

	Percent of BMU**		
	BMU 4	BMU 5	BMU 6
Baseline 2001	36	27	34
During project and following reclamation (after year 35)*	36	26	33
Net percent change due to Rock Creek Mine	0	-1	-1

\*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 open motorized route density (Wakkinen and Kasworm 1997).

Table 13. Percent of BMUs with total motorized route density exceeding 2 miles/square mile (USDA 2002b)

	Percent of BMU**		
	BMU 4	BMU 5	BMU 6
Baseline habitat effectiveness 2001	26	21	32
During project and following reclamation (after year 35)*	25	20	32
Net percent change due to Rock Creek Mine	-1	-1	0

\*Net change in habitat effectiveness 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, 26% of average female home range exceeded 2 miles per square mile total motorized route density (Wakkinen and Kasworm 1997).

Four of the seven BMUs within the action area have open road densities exceeding 1 mile per square mile limited to proportions equal to or less than the average within a female home range as reported in research (Wakkinen and Kasworm 1997) (see Table 8.). The proposed action would result in a slight decrease in BMUs 5 and 6. Five of seven BMUs would then have high open

road densities limited to proportions of the BMU equal to or less than the average within a female home range as reported in research.

Five of the seven BMUs within the action area have total road densities exceeding two miles per square mile limited to proportions comparable to or less than the average within a female home range as reported in research (Wakkinen and Kasworm 1997) (see Table 9). The proposed action would not change this number, but would result in slight improvements in BMUs 4 and 5. The acquisition or easement of mitigation lands would also either further reduce existing road densities or prevent future increases in road densities by obviating the need for access to privately-owned inholdings. (See also discussion under *Additional mitigation plan effects on grizzly bear displacement and habitat loss.*)

**Core area** *The 1995 incidental take statement requires no loss of core area.*

**Summary** The proposed action meets the requirement of the 1995 incidental take statement as it would not result in a reduction of baseline core area (USDA 1998b) in any BMUs.

**Discussion** Although the 1995 incidental take statement does not require 55 percent core areas, it does require the Forest to adopt recommendations of an interagency access committee as they are developed, using ecosystem specific research. The SCYE Access task force established a goal of achieving 55 percent core area based on Wakkinen and Kasworm (1997), in Priority 1 BMUs (IGBC 1998b). BMUs 4 and 6 were identified as Priority 1 BMUs.

Core area currently comprises 63, 62 and 55 percent of BMUs 4, 5 and 6 respectively (MDEQ and USDA 2001) (see Table 10). The amount of core habitat would 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 mitigating 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 substantive at 77 and 66 percent. The BMU 8 provides 56 percent core and BMU 22 provides 47 percent.

The Service is concerned that 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 substantive 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 revised mitigation plan includes funding for monitoring of the trails and proposes 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 would potentially be impacted by a ventilation adit in the wilderness area (USDA 1998b). The proposed ventilation adit location is in a cliff which 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, 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. The Service believes that the noise generated by the ventilation adit may constitute an impact on grizzly bears and if it is determined as such, the area should be buffered and discounted as core area, as would area impacted by any other disturbances.

The wilderness ventilation audit may not be needed, pending information gained during the evaluation adit and construction phases of the mine. The ventilation adit 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 adit is needed, the Forest and the Service would assess the situation prior to construction to further reduce potential impacts as appropriate.

***Opening size*** *The Forest Plan standard or associated assessment criterion are 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. Openings are thus a maximum 1,200 feet across.*

***Summary*** The mine facilities and tailings pile openings fail to meet this Forest Plan standard.

***Discussion*** This standard was designed for forest management activities, not long-term site development, and may not be applicable to this situation. Approximately 468 acres of grizzly bear MS 3 and MS 1 habitat are proposed for conversion to non-bear habitat for the 35 year operational period of the Rock Creek Mine. The largest opening proposed is for the construction and operation of the tailings impoundment and consists of 368 acres in MS-3 habitat. The remaining surface disturbance includes 115 acres of MS 1 habitat for the mill site and associated facilities, the exploration adit and supporting facilities and road construction or reconstruction. Due to the nature of an industrial site, opening size standards cannot be met.

***Movement corridors*** *The Forest Plan standard or associated assessment criteria is to maintain unharvested 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 proposed openings.

*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 within and adjacent to the Rock Creek Mine area would be significantly impacted. The presence of new facilities (on-site), increases in motorized traffic levels, 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. However, 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).

Effective cover along FDR 150, the principal access road, would be compromised by the increased traffic. Traffic on FDR 150 would primarily impact cover along the road in BAAs 761, 752 and 747. 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 or associated assessment criteria are:*

1. *Spring habitat protection objective is to schedule activities within spring habitat (southerly aspects less than 5,000 feet elevation) outside spring season from April 1 to July 15.*
2. *Den site protection objective is to 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. Many of these acres are already affected by high use on existing roads, especially FDR 150 and the Highway 200 (W. Johnson, pers. comm. 2002). Due to the increased traffic volumes and significant human activity along the FDR 150 and at the mine site, this spring habitat would be largely unavailable to 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* Displacement BAAs were analyzed to identify habitat that was similar in aspect and elevation as that directly impacted by the proposed Rock Creek Mine (USDA 1998b, tables 16 and 17). This analysis indicated that five displacement BAAs that would have no major activity for the life of the Rock Creek Mine would be required. Between 6400 and 6500 acres of spring habitat would be directly impacted by the proposed action and major activities. The five displacement BAAs would protect 177 more acres of spring habitat from major activities than that affected by the proposed mine (see *Displacement habitat* discussion above). Displacement BAAs would not result in a net increase in acres of spring habitat, but would secure more spring habitat throughout the life of the mine than the amount of spring habitat lost to 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 provide proportionately more spring habitat than that available in the BMUs.

***Traffic levels and noise*** The Rock Creek Mine would result in increased traffic levels on the access and service roads, as well as main highways in and around the CYE. Traffic levels on FDR 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 substantially. The major roads and activities associated with the Rock Creek mine would serve to substantially inhibit bear movement and activities near this area.

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 FDR 150 would increase from 30 to 70 dBA.

### **Grizzly bear response to displacement effects**

Habitat effectiveness is one measure of the impacts of human activities on grizzly bears and is measured by buffering open roads, logging activities, and other high-impact human activities to identify the remaining secure habitat. Road density, core area, and BAA displacement analyses are other measures that reflect these impacts. These analysis techniques provide an indirect 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. Displacement behavior in grizzly bears may be expressed

as a change in diurnal habitat use or movement patterns, avoidance or underuse of otherwise preferred habitat, or other factors related to stress or fear. Displacement may include movement into habitat that is already occupied by grizzly bears, which increases the potential for adverse intraspecific interaction. Intraspecific interaction may include predation on cubs and reduced foraging efficiency leading to adverse changes in breeding behavior, fetal reabsorption or reduced cub and sub-adult survival. Displacement may be short term or long term, depending upon the nature of disturbance and consequences experienced by grizzly bears. Altered routine behaviors have been documented in grizzly bears (IGBC 1987). Clear cause-effect relationships have not often been statistically validated. However, research reports many grizzly bears under-use or avoid otherwise preferred habitats that are highly influenced by humans.

The proposed Rock Creek mine would result in direct loss of 483 acres of grizzly bear habitat from the CYE recovery zone. The 1998 BA predicts that bears would be displaced from this habitat and a zone of influence around it that results in under-use of 7,044 acres. Grizzly bears are already displaced from some of this area impacted by human activity along the Clark Fork River and along Forest roads in the area, including FDR 150. Analysis for the project followed the displacement process developed by the IGBC (1990) to establish displacement distances from a constant high noise and high activity environment. The IGBC process was designed for traditional forest management activities (USDA 1998b). The Service contends that actual displacement and under-use of habitat may occur from ridge to ridge in some places, based on topography surrounding the mine and facilities. The Service expects that avoidance of areas further into the drainage and at higher elevations may occur initially due to excessive noise and continual activity generated by the mine. Displacement effects would be most pronounced at lower elevations in the drainage near the roads and facilities, which encompass areas of spring habitat. Habitat near the mine site, facilities and roads would essentially be unavailable to grizzly bear for the life of the mine. Some of this habitat is already impacted by the already high vehicular use of FDR 150. 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 this area to cubs, extending the displacement for an unknown period of time after the mine is reclaimed.

There would be a net loss of available spring habitat for grizzly bears during the construction phase and operational life of the proposed Rock Creek Mine. Most of the areas directly impacted by construction and operation of the mine are 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 unavailable to grizzly bears, in part due to existing disturbance and displacement along roads in the area, but also due to the substantive 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).

At smaller scales within the BMUs, high linear open road density would contribute to displacement of bears from preferred habitat, particularly spring habitat. Three of 20 BAAs (761, 752, 747) in the action area are directly affected by the Rock Creek Mine. Displacement would be long-term where it occurs along established roads and mine facilities. Implementation of the

proposed Rock Creek Mine project is likely to displace grizzly bears from the active mine, mill and tailings site(s), the access roads 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. Displacement from important spring and fall habitats would occur in some of the affected BAAs and could adversely affect grizzly bears now or at some time during the more than 35 year-life of the Rock Creek Mine.

To compensate for the displacement and loss of use of habitat by bears in the three BAAs directly impacted by the mine, five displacement BAAs were identified. These five BAAs would serve to secure from major activities a greater amount of spring habitat for grizzly bears than the amount of spring habitat impacted 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. The mitigation plan provides that these displacement areas would be kept free from major activities throughout the 30-year life of the mine. As mentioned previously, the displacement mitigation habitat would not increase the net amount of spring habitat available to grizzly bears, but would secure more acres than that affected by the mine.

The underlying assumptions of providing displacement habitat at the BAA scale is that areas into which grizzly bears would be displaced are within its home range and/or not already occupied by other bears, and if displacement habitat is occupied, adequate resources are present to support additional bears. An additional assumption is that displaced bears would actually use displacement areas outside their established home range. In most cases, grizzly bears would likely attempt to remain and survive in a home range area impacted by activity. Also, displacement habitat assumes that a grizzly bear is not already dependent upon both the displacement BAA and the BAA from which it is displaced. Given the current small population of grizzly bears in the CYE, these may be reasonable assumptions for the short term.

However, based on existing research on the effects of roads and activities on grizzly bears, the Service believes that long-term bear security is more appropriately met by ensuring maintenance of core area and managing open and total motorized route densities at larger scales throughout the life of the mine, rather than relying on BAA-scale displacement areas. The BAA displacement analysis was completed in 1993 in coordination with the Service (Kevin Shelly, U.S. Fish and Wildlife Service, pers. comm., as cited *in* the BA, page 28). The Service's 1995 incidental take statement stated that the risk of grizzly bear mortality and substantial under-use of habitat was higher in BAAs where the linear open road density standard has not been achieved than in BAAs that achieve the standard. Research since then (Mace et al.1996, Mace et al.1999, and Wakkinen and Kasworm 1997), and guidance by IGBC (1994 and 1998) suggested that larger scale, BMU level analysis may be a more appropriate scale of analysis for assessing disturbance and habitat protection. Earlier reports and unpublished research supported larger scale analyses as well (Mace and Manley 1993, Mattson 1993). Core areas have advantages over displacement BAAs as core area typically provides larger blocks of habitat with no motorized use of roads or trails, and remain secure for 10 years and often longer. Typically, much of core area is unroaded

altogether. High total motorized route density, open motorized route density and low amounts of core area within BMUs have been recognized by the Service to cause significant impairment of breeding, feeding and sheltering of grizzly bears as a result of bears being displaced from large areas of preferred or essential habitat that is heavily roaded (USDI 1995c).

The best information suggests that there would initially be significant displacement effects on female grizzly bears using the Rock Creek drainage as the mine begins operations and human activity levels substantively increase along FDR 150. This displacement of bears would be most pronounced at lower elevations in the drainage, particularly spring habitat, but would extend throughout larger portions of the drainage for some time, affecting at least 7000 acres or more. Several factors, including those outlined in the following paragraphs, moderate the impact of this displacement on grizzly bears in the action area.

Displacement is probably a factor of disturbance, relative habitat quality and population density. Displacement may not occur in very high value habitats or if bears have no options to move elsewhere due to the presence of other bears or lack of other areas of sufficient habitat. Based on the best available information, grizzly bear densities in the Cabinet Mountains are relatively low. In the action area, there would appear to be one or possibly two reproductive-aged females utilizing BMUs 4, 5, and 6. During 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 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 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. A subadult track in BMU 5 in 1999, a sighting of a subadult in BMU 5 during 2000, a female with a yearling in BMU 5 during 2000, and the three yearlings captured in 2002 south of the Clark Fork River near the mine site are indicative of recent reproduction in the southern Cabinet Mountains.

Grizzly bear home ranges are variable and range from approximately 68 square km (17,000 acres) to 2,600 square km (640,000 acres) in the CYE (Kasworm et al. 2002). Home ranges are typically much larger than BAAs (5000 to 15,000 acres) and encompass numerous BAAs. Further, only 3 of the 20 BAAs in BMUs 4, 5 and 6 would be considered active due to the proposed mine.

Male grizzly bears typically have larger home ranges than females. However, female grizzly bear large 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 area most affected by disturbance generated by the mine and roads (about 7000 acres) would represent about five percent of the size of this bear's life range.

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 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 10). Core areas in BMUs 2, 5, 6, and 7 are well connected through the action area and encompass portions of the Cabinet Mountains Wilderness. The proposed action would not result in decreased core habitat in any BMUs (USDA 2003). The proposed action will not decrease core area in any BMUs within the action area.

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 directly affected by the mine are equal to or greater than the average core area within female home ranges reported in the research (Wakkinen and Kasworm 1997). 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 substantive at 77 and 66 percent. The BMU 8 provides 56 percent core and BMU 22 provides 47 percent.

In many ecosystems, core area occurs at higher elevations and lacks quality spring habitat. Higher elevation habitat in the Cabinets tends to provide abundant summer habitat (BA). However, based on the best information available, the core areas in the affected BMUs contain spring habitat, defined by aspect and elevation, in proportions greater than its availability in the BMUs (from BA), although some of this area would contain expanses of open rock and scree slope. Much of the spring habitat at lower elevations that would be impacted by the mine is already impacted by roads. On smaller scales than core area, displacement area BAAs would provide more acres of spring habitat free of major activity for the life of the mine, than the acres of spring habitat impacted by the mine. These results do not include potential future improvements in core area due to acquisition or easement of mitigation land parcels. (See also discussion below in *Additional mitigation plan effects on grizzly bear displacement and habitat loss* ).

Outside core areas, the proposed action would not increase open or total motorized route densities, and would result in slight decreases in both (USDA 2002b). Four miles of new road would be required and 5 miles of existing road would be reconstructed, but these road miles would not increase total or open road densities, would not substantively change the existing spatial distribution of roads in the BMUs (e.g. the existing areas of human activity), and would not decrease core area. Open motorized route densities within BMUs 4, 5, and 6 are near or lower than average levels measured in Wakkinen and Kasworm (1997). Of the remaining four BMUs, three of four have lower open road densities than that reported in research. Open motorized route density in BMU 4 is higher than the average reported in the research, 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. BMUs 6 and 22 have higher total road densities than that reported in the research. 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 action area range from 65 to 82 percent, compared to the Forest standard of 70 percent.

The 2,450 acres of mitigation properties would be acquired *prior* to construction of the mine and/or the production phase (see Tables 1 and 3). As properties are acquired, access management within BMUs 4, 5, and 6 would improve (as required by the mitigation plan). Disturbance impacts 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 and development on the properties acquired. (See discussion below under “*Additional mitigation plan effects on grizzly bear displacement and habitat loss*”.)

The Service believes that some grizzly bears may be initially displaced from more than 7000 acres in the drainage due to high levels of human activity. Research in the South Fork of the Flathead River in Montana, which encompassed multiple use national forest lands, indicated that 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). However, research also 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 (Mattson 1993, McClellan and Shackleton 1989). Waller and Servheen (1999) reported five of nine grizzly bears radio-collared in the U.S. Highway 2 corridor in Montana maintained home ranges that were centered over the highway corridor, and remained in the highway corridor during their active season. Mattson et al. (1997) 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 would allow adult females to occupy habitat near development and yet not incur the increased mortality risks typically associated with habituation.

The activities associated with Rock Creek Mine would become predictable, routine and concentrated along FDR 150, especially as the operation phase is implemented. 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. Such habituation would be detrimental if human food or attractants are available to grizzly bears. Sanitation measures would be implemented at the mine site and employees would be made aware of grizzly bear sanitation issues through programs developed by the grizzly bear specialist. Mine employees would be prohibited from carrying firearms when on duty. Therefore, assuming a stable or slowly increasing grizzly bear population over 35 years, we anticipate that the displacement impacts related to mine-generated disturbance within the Rock Creek drainage on resident female grizzly bears may decline, as time goes on. Over time, grizzly bears may not experience adverse consequences near the mine site if the sanitation and information and education mitigation efforts are successful. 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.

It is difficult to predict the final effects of such habituation on grizzly bears in the area, and whether bears that habituate to impacts of the mine and use the habitat in the Rock Creek drainage would retain some wariness of people. Although grizzly bears are not hunted, people in the area would use the drainage for dispersed recreational use in areas of the drainage further from the mine and mine activity, 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 1989). 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.

We expect females, especially females with cubs, would avoid the high level of disturbances at lower elevations of the drainage near the mine sites and roads. As time goes on, however, females may regain the use of 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. Such 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.

It is not likely that the displacement effects of the mine would drive a grizzly bear from its established home range within the action area, especially female bears, even though displacement effects in the Rock Creek drainage may initially be substantive. Given the large home range sizes of grizzly bears, the information on grizzly bear home range use in the Cabinets (Kasworm et al. 2002), the abandonment of the Montanore mine project in the east side of the action area, and the year-long and seasonal road closures on the east side, grizzly bears using the action area likely have options if affected by disturbances generated by the mine. Based on the access management conditions in the action area, road and trail management required in the proposed action, improvements in grizzly bear habitat security as mitigation properties are acquired (see discussion below), the low number of grizzly bears in the action area and expected inherently slow population growth, 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.

Analysis for the Rock Creek Mine project assumed that the 483 acres directly impacted by the mine and facilities can be reclaimed to meet the conditions that make it suitable for grizzly bear utilization (USDA 1998b). The Service is unaware of data that demonstrates that restoration habitat would provide all of the same functions for grizzly bears as habitat that would be lost with implementation of the Rock Creek Mine project. The Service anticipates that the habitat impacted by physical mine construction should re-establish forest structural conditions within 30 years following reclamation. The ecological function of that natural habitat may not recover that

rapidly, due to loss or disturbance of topsoil, seed source, compaction and the addition of non-native materials including weeds, exotic reclamation seed, and/or building debris and waste products that are not totally removed. Complete restoration of native vegetation quantity, quality, diversity, function and distribution would probably be impossible.

### **Additional mitigation plan effects on grizzly bear displacement and habitat loss**

The revised mitigation plan (MDEQ and USDA 2001) stipulates that 2350 acres of private lands in the CYE be acquired by the Sterling Mining Company through fee-title transfer or perpetual conservation easements (Appendix C) to compensate for both direct habitat loss and additional loss of habitat use by grizzly bears due to disturbance. Conservation easements must be transferred to the Forest. The revised mitigation plan requires perpetual conservation easements which would ensure long-term conservation of the habitat parcels for grizzly bears whose home ranges include these areas.

Regarding the 2350 acres of mitigation habitat, 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 2350 acres of mitigation properties required, 53 acres would be acquired *prior* to the development of the adit phase, 1784 acres would be acquired over the initial three or four years of evaluation adit activity *prior* to mine construction; the remaining acres would be acquired *prior* to production phase (see Table 1 and Table 3). All 2350 acres would be acquired within 4 or 5 years of the initial activities associated with mine construction.

The revised mitigation plan also would require acquisition of fee title or perpetual easement on an additional 100 acres of mitigation habitat to specifically address habitat fragmentation. 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 would need to be acquired *prior* to the beginning of the evaluation adit.

The acquisition (or protection through easement) of privately-owned grizzly bear habitat does not necessarily increase habitat available to grizzly bears, because the lands may already be undeveloped and currently available to bears. However, these 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. On some private parcels with no existing roaded access, the Forest may be required to provide reasonable access in the future. Acquiring mitigation habitat that is *at risk* of development would significantly benefit grizzly bears in the southern Cabinets by precluding access, development, or other management adverse to bears over the long-term. Some of the

potential mitigation properties have existing development, and several potential parcels have roaded access. Removing the developments and roaded access to these parcels would decrease grizzly bear mortality risk due to sanitation issues and illegal mortality, as well as reduce displacement risks due to access and human activity.

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. The Forest suggested that grizzly bears may be displaced from over 7000 acres of habitat. Indeed, displacement of or under-use of habitat by grizzly bears may initially occur within even larger portions of the drainage. However, the specific location of mitigation properties and the road access associated with those properties is more important than the total acres required. Acquisition or easement of parcels precludes development on any parcels acquired but also allows elimination of the motorized access on parcels that have road or trail access. Elimination of such access routes would improve conditions on many more acres of grizzly bear habitat in addition to the 2450 acres of mitigation properties.

Habitat enhancement would be required on 483 acres. Habitat enhancement has some potential of improving bear habitat if fruiting shrubs and/or spring habitat 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 and that proposed in the DEIS for access management (USDA 2002). This would further reduce grizzly bear displacement from habitat. Assuming a stable or slowly increasing grizzly bear population over 35 years, we anticipate that the level of impacts on female grizzly bears stemming from disturbance within the Rock Creek drainage would decline as time goes on due to land acquisitions or easements. Disturbance related effects at levels that significantly impair breeding, feeding or sheltering would decline.

Specific mitigation properties 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, the Service and Forest must approve each of the potential parcels, ensuring that they each contribute to mitigating or directly reducing 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 and Service would have final approval of mitigation acres** and associated covenants prior to recording. The Service would approve in writing and describe how the properties to be acquired would meet the habitat assessment requirements.

The mitigation plan involves many measures and requirements such as acquisition of fee title or conservation easements over a 35-year time period. The plan would be complex and require detailed oversight to achieve objectives. Predicting or anticipating conditions related to the CYE grizzly bear population over such a long time frame is difficult. The revised mitigation plan would require the participation of the Forest, Sterling Mining Company, and the Service in a standing oversight committee, and the development of an MOU that defines the roles and responsibilities of each member and the committee itself. Participation by Montana Fish, Wildlife and Parks on the oversight committee would also be strongly encouraged. The mitigation plan charters the oversight committee with the responsibility to collect and review new information on grizzly bears, the results of the management plan, and other information relevant to CYE grizzly bears. If information or relevant data indicate the need, additional analysis and /or changes or additions to the mitigation plan would be made. The Service would review proposed revisions to the management plan or mitigation plan under the appropriate section 7 provisions, if required.

The mitigation plan also 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 maintain grizzly bear use of habitat within the action area. If information suggested otherwise, the Service may consider that as new information requiring additional consultation and perhaps, additional Forest road closures. Further, as described above, the mitigation plan requires the oversight committee to make recommendations to remedy the situation, and use adaptive management if needed to accommodate the conservation needs of grizzly bears in the area.

In conclusion, the effects of mine plus full implementation of all mitigation plan measures should result in changes from the baseline extent of grizzly bear displacement in the action area. Increased displacement of grizzly bears from spring habitat along FDR 150 and the mine site would occur in the Rock Creek drainage, but the area from which bears would be displaced represents only a small proportion of an average female grizzly bear home range. Further, the environmental baseline habitat conditions, proposed access management of open and total road densities and core area, and mitigation measures that work to improve habitat conditions and prevent further development on private lands protected through acquisition of fee title or easement, are reasonably expected to provide grizzly bears with alternative available habitat within their home ranges, if displaced.

## **Analysis of Fragmentation of Habitat**

### **General factors to be considered**

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 unimpaired access to breeding partners, which promotes optimal conditions for successful reproduction.

Habitat fragmentation can significantly reduce or eliminate successful dispersal, movements associated with breeding behavior, or occasional migration, as well as increase the risks to bears moving through insecure habitat patches. Significant impacts to breeding, feeding and sheltering would be expected. Habitat fragmentation could impart significant, long-term adverse impacts to the CYE.

Grizzly bears that are deterred from traveling to preferred feeding areas may experience reduced weight gain and increased risk of starvation or reduced reproduction. 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 safe 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.

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.

In areas outside the action area, the CYE is threatened by fragmentation. To the north, conditions in Canada along the international boundary allow movement of grizzly bears between Canada and the United States. Grizzly bear habitat in Canada is being impacted by highways and associated development. Further, as of 2002 there have been no documented movements of grizzly bears between the Yaak and Cabinet Mountains portions of the CYE (W. Kasworm, pers. comm. 2002).

### **Effects of the proposed action - fragmentation**

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 G). 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.

Open motorized route density, 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*). Motorized access route densities would not increase, and would decrease slightly, with the proposed action (USDA 2002b). However, 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 (FDR 4784), Midas Creek and associated spurs (FDR 4778), and the South Fork Miller Creek Road (FDR 4724). Bear Creek road was recently gated (USDA 2002c), which significantly improved grizzly bear habitat in BMU 5. Midas Howard Creek Road (FDR 4778) is restricted yearlong, and the South Fork Miller Creek Road (FDR 4724) is partially open yearlong and has a spring closure on about 6 miles of the route (W. Johnson, pers. comm 2002).

Other roads, particularly on the eastern slope of the Cabinet Mountains in BMUs 5 and 6, access patented and other mineral claims in the economically viable 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), but the road actions remain uncompleted as a result of litigation. 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 previously held 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(a)2 and 7(a)1 would be required.

There are approximately nine roads, including the roads accessing Way-Up and Fourth of July parcels, that partially bisect the southern Cabinet Mountains from east to west in BMUs 5 and 6, portions of which enter the north south corridor (W. Johnson, pers. comm. 2003). Of these, seven are open to the public and two allow access to landowners with inholdings only. 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 harmful 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 the center of 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 (FDR 154) bisects BMU 8.

The proposed Rock Creek Mine has the potential to further constrict the north south corridor in the southern Cabinet Mountains, contributing to fragmentation of habitat in BMUs 6, 7, 8, and 22 from areas to the north. Improvements and increased use of FDR 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 would serve to inhibit grizzly bear movement west of the divide in the Rock Creek drainage along FDR 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 in the Cabinet Mountains, the proposed Rock Creek Mine would contribute to a zone of disturbance across BMUs 5 and 6.

According to the 1998 BA, this 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. The Montanore Mine is no longer being proposed 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 occurring on both sides of the divide within the action area. Although it would not likely constitute a complete barrier to movement, the disturbance could evoke avoidance behavior by some bears and reduce the utility of the north south movement corridor. Conversely 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 forced to change traditional movement patterns and behaviors. 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.

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.

The Service is concerned about a reduction in effective core habitat 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 believes 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 real or perceived opportunities associated with the proposed Rock Creek Mine could contribute to the fragmentation as they build homes in grizzly bear habitat or recreate on the Forest. However, of the predicted 300 to 320 new housing units that would result due to the mine, the Noxon/Herron/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.

### **Effects of proposed action and mitigation plan measures on fragmentation**

Recently, the Forest closed Bear Creek Road (FDR 4784) to public use after the road was blocked by a land slide during 2002. The Forest would leave this east-side route closed to the public for safety reasons and to mitigate the impacts of the proposed action (USDA 2002c). This restriction is an especially 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 (W. Kasworm, pers. comm. 2002). Securing spring habitat in the drainage would be of particular importance. West of the divide, all or portions of routes FDR 2285, 2741X, 150, and 2741A would be closed year long with barriers (Table 4.). The proposed action would restrict access on a portion of FDR 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 significantly improves 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. Similarly, the restrictions on FDR150 (closure of the loop route) in BMU 4 and other routes improves conditions for grizzly bears west of the divide, but would not compensate entirely for the increased activity and disturbance in adjacent BMU 6, along FDR 150 and along the Rock Creek trail.

The revised mitigation plan provides funding for the development of a recreational management plan which would require monitoring to ensure high trail use on the Rock Creek trail does not occur. The mitigation plan would be completed within 3 years of the Record of Decision for Rock Creek Mine and would be signed by the U.S. Forest Service and the Service. Trail use would be monitored, and in the event that high use occurred, the plan to limit visitor use would be implemented. 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, measures would be required to either reduce human use to levels that maintain core area effectiveness, or create adequate core elsewhere within the BMU.

As mentioned previously, 100 acres of 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 100 acres be acquired *before* the evaluation adit phase of the mine could begin. The 100 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. Additionally, 2350 acres are required prior to the evaluation adit phase, construction, and/or operation of the mine to compensate for acres lost to physical alteration of habitat or to disturbance (see Table 3). A portion of these acres would also improve security in the north south corridor.

The most critical objective of the 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. The Service recognizes that with the number of private land parcels available in BMU's 4, 5 and 6, there are a number of combinations of mitigation properties that would meet this objective. The Service recognizes that there are some combinations of mitigation properties that would not adequately offset the significant potential for fragmentation of the north to south movement corridor. The Service would have to approve 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 100 acres acquired adequately offsets 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 and Service would have final approval of mitigation acres and associated covenants prior to recording. The Service would approve and in writing describe how the properties to be acquired effectively reduce the potential for fragmentation of the north to south 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 impacts to grizzly bears in BMUs 4, 5 and 6 and indirect effects to grizzly bears in BMUs 7, 8 and 22 that could result from potential fragmentation of the north to south movement corridor warrant strong mitigation. The revised mitigation plan stipulates that 100 acres of private lands in the corridor be acquired by Sterling Mining Company 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 alleviating the fragmentation of habitat in the general action area (see discussion above under *Mitigation plan effects on grizzly bear displacement and habitat loss*).

The mitigation plan also 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 serious 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. In that event, mitigation measures such as additional Forest road closures may be needed.

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 road densities are near or below the average reported in CYE grizzly bear research. Core areas in 4, 5, 6, 7, and 8 are equal to, or in most cases substantively 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 contributes to reducing or mitigating for displacement and fragmentation effects of the mine.

Finally, as mentioned earlier, the revised mitigation plan would require a standing management 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 Service believes the 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. The Service believes that this coordinated, calculated approach to full implementation of the mitigation plan would alleviate the potential for fragmentation of the southern Cabinets as a result of the proposed Rock Creek Mine.

In conclusion, considering the baseline conditions in the action area, the proposed action would likely result in reduced connectivity north to south across the Rock Creek drainage itself due to effects of the mine and increased traffic along FDR 150. However, the effects of full implementation of all measures in the proposed action and mitigation plan, including access management, closure of the FDR 150 loop route, and acquisition of fee title or conservation easement on mitigation lands that are currently developed or at risk of development, is expected to reduce the potential for fragmentation and result in an improvement in the connectivity of habitat throughout the action area, especially within the north to south movement corridor.

## **Analysis of Grizzly Bear Direct Mortality Risk**

### **General factors to be considered**

Most recent CYE grizzly bear population trend information is statistically inconclusive, though the point estimate of the rate of increase declined during 1999 to 2000 (Kasworm et al. 2000, Kasworm 2001). 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). At this low number of grizzly bears, all mortality must be considered serious; the Recovery Plan human-caused mortality goal is zero for the CYE and the plan suggests that management efforts strive to prevent all human-caused mortality in the CYE. However, although mortality levels can be reduced by recovery actions, it is unlikely that all human-caused mortality could be eliminated. The Recovery Plan suggests that the CYE grizzly bear population would probably not decline if known human-caused mortality remains less than four percent, but also cautions about the demographic problems that can be amplified in such a small population. Since the zero human-caused mortality goal is not likely to be attained, and the population can likely sustain some low level of human-caused mortality without decline, the Service does not use the goal of zero to assess the status of the population. Instead, we use the best information available at this time, including the four percent limit on annual known, human-caused mortality as suggested in the Recovery Plan and Harris (1986), which suggested a sustainable total human-caused mortality rate of 6.35 percent to compare current and projected mortality rates due to the proposed action.

The Service believes one reason the population of grizzly bears in the CYE remains vulnerable to extinction is because of small population size (USDI 1999). Despite the relatively small size of the CYE, 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 is more likely a factor limiting population growth. Grizzly bear reproduction rates are inherently low, since 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 CYE is relatively small, and the Cabinet Mountains portion of the action area is narrow. The number of grizzly bears in the Cabinet portion of the CYE is estimated at 15 or fewer (Kasworm et al. 2002). Since 1988 there have been credible sightings of individual grizzly bears in all 14 BMUs in the Cabinet Mountains, including BMUs in the action area (Kasworm et al. 2002). Based on large grizzly bear home ranges, grizzly bears that live in the southern Cabinet Mountains have a high probability of being affected by the mine itself or by increased numbers of people working and living in the area.

Human-grizzly bear interactions generally result in four negative outcomes all of which 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;
2. management control actions in which a bear is killed or moved to avoid threats to humans or their property;
3. encounter situations in which people kill bears due to real or perceived fear of life or property; and
4. increased exposure to black bear or other big game hunters who may mistakenly kill a grizzly bear due to mistaken identification.

The indirect effects of displacement caused by human disturbance (discussed earlier) can result in mortalities of young cubs or impair successful reproduction in females due to inadequate nutrition and physiological stress. Most frequent causes of direct mortality include sanitation-related habituation of grizzly bears to people, and human-caused mortality of grizzly bears either intentional or unintentional as people gain more access to grizzly bear habitat.

In the past decade, the number of grizzly bear-human conflicts has increased in the YGBE (Schwartz and Haroldson 2001) and NCDE (MFWP 2001). In the CYE, there have been very few reported conflicts. However, the potential for conflict is high, considering the number of unsecured attractants in grizzly bear habitat. Situations caused by non-secured human and domestic animal foods and garbage continue to be the major cause of bear/human conflict in Montana (Schwartz and Haroldson 2001, MFWP 2001). Management removal of grizzly bears is the leading cause of total known and known human-caused grizzly bear mortality in both the YGBE and the NCDE (from MFWP 2001, Schwartz and Haroldson 2002, USDI in litt. 2002).

In the CYE during 1992 through 2001, a total 6 known human caused mortalities were attributed to the following causes: 67 percent (4) under investigation; 14 percent (1) each to self defense/hunter, illegal mistaken ID, and management removal (USDI in litt. 2002). Since then, another grizzly bear was killed by a train and another human-caused mortality is under investigation.

Until recently, sanitation-related grizzly bear conflicts were rarely reported anywhere in the CYE. As mentioned earlier, in 1999 a male grizzly bear became food conditioned and was removed from the Yaak, and in 2002 three yearlings were preemptively moved from human settlements outside the CYE recovery zone, but near the action area. These recent food-related incidents indicate that unsecured food sources occur in the CYE, and problems will occur as both grizzly bear and human populations expand in area and increase in numbers. In the small CYE grizzly bear population, the loss of grizzly bears to otherwise avoidable food storage issues is significant to the population and recovery.

The IGBC SCYE Information and Education taskgroup developed food storage recommendations for federal agencies and also stressed the importance of adequate sanitation practices to other land owners or managers in occupied black bear or grizzly bear habitat (IGBC 2001). The taskgroup recognized the food sanitation issues are important as a public safety issue. As long as garbage, carcasses, or human/livestock food remains unsecured and attractants such as compost, fruit trees,

pet food, bird feeders and other such food sources are available to grizzly bears on public or private lands, the risk of grizzly bears being killed through management removal or in defense of life and property incidents remains high. Black bears, generally being more common and tolerant of people, often are the first bears to find attractants and can indicate potential future risks to grizzly bears.

The Forest does not currently have a mandatory forest-wide food storage order that requires forest users to keep their food properly contained. Only some campgrounds on the Forest have grizzly bear-resistant garbage containers, and funding for proactive education programs is not always available. The Forest initiated a voluntary food storage recommendation for “wild lands” in 2001 to address sanitation issues on the Forest and to emphasize stewardship and public safety. The recommendations are similar to the requirements in mandatory food storage orders in other grizzly bear ecosystems. There are no reports on how effective the voluntary food storage recommendations have been in reducing bear incidents or how well the public has been following the recommendations (Willie Sykes, Public Affairs Specialist, pers. comm. 2002). Experience in other ecosystems indicates that some type of enforcement may eventually be required to encourage some people to comply with food storage recommendations. The Forest also addresses sanitation issues by providing educational materials about living safely with bears at Ranger Stations, campgrounds and trail heads, and occasionally provides educational programs on wildlife.

Continued exposure to human presence, attractants, and activity without negative consequences can result in habituation, the loss of a bear’s natural wariness of humans. Grizzly bears are highly individualistic. Some bears can become conditioned to disturbance with little to no significant adverse effect, while others are eventually lured to human foods and attractants and become a threat to human safety. Some bears, particularly subadults, more readily become habituated to humans and consequently suffer increased mortality risk. Habituation in turn 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 humans. Habituated grizzly bears that obtain human food rewards often become involved in nuisance bear incidents, and/or threaten human life or property. Food conditioned bears generally experience high mortality rates, and are eventually destroyed or removed from the population through management actions. 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).

The Service believes that excessive road densities in grizzly bear habitat are among the most serious adverse impacts to grizzly bears, especially when located near human settlements or populations. Negative impacts associated with roads and excessive road densities influence grizzly bear population dynamics and habitat use patterns in numerous ways. 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.

Mortality is the most serious consequence of roads in grizzly bear habitat. Grizzly bear mortality results directly from collisions with vehicles and more commonly, indirectly through increased interaction with humans. High forest road densities and associated increases in human presence, foods, activity, noise, and other disturbances that do not result in direct negative consequences for bears can impact bears indirectly through the habituation of grizzly bears to humans. Habituation in turn often increases the potential for conflicts between people and bears.

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

McLellan and Mace (1985) found that a disproportionate number of mortalities occurred near roads. In the Yellowstone ecosystem, Mattson and Knight (1991) reported that areas influenced by secondary roads and major developments were most lethal to 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. Bears were also killed by vehicle collision, the most direct form of road-related mortality (Greer 1985, Knight et al. 1981, Palmisciano 1986).

Known, human-caused grizzly bear mortality in the South Fork Study area in Montana during the 6-year period of 1988 through 1994 appeared relatively high when compared to other studies. McLellan (1989) reported 11 human caused grizzly bear mortalities during a 9-year period of research in southeastern British Columbia, whereas the South Fork study reported 13 mortalities during 6 years of research in the South Fork Study area, excluding legal hunter and research related mortalities. Although the British Columbia study area was roaded for gas exploration, timber harvest, and other uses, the area had few permanent human residents and generally received lower use by humans than did the South Fork Study area. In 1994, grizzly bear population trajectories for the two study areas were computed (Servheen et al. unpublished 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, 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 and most of the known grizzly bear mortalities were attributable to humans.

This comparison illustrates that the presence of forest roads alone does not necessarily result in direct mortality of grizzly bears. The proximity of the forest roads to human population centers and the resulting high numbers of people using forest roads, dispersed recreation in roaded habitat, and other factors leading to increased interaction between bears and humans pose considerable risks to grizzly bears.

Social values and attitudes also contribute to the level of mortality risk to grizzly bears. Incidental or accidental human caused grizzly bear mortality, combined with a few individuals intent on illegally shooting 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, 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.

### **Effects of the proposed action - grizzly bear direct mortality risks**

The most prominent direct and indirect effects on grizzly bears from the implementation of the proposed Rock Creek Mine project stem from the influx of mine employees into this currently remote area. This local workforce would likely 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 and construction phase of the project. The first influx of people would be 23 to 73 employees and their families (MDEQ and USDA 2001). Even this number of people poses some risk to bears in this ecosystem, as this phase would bring people into an area that is relatively undeveloped at the current time. However, 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. Most of the human impact would be associated with the subsequent 5-year mine construction phase.

Following construction periods, the mine would employ 340 full time workers during the full production stage which could last about 28 years. During operation of 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, 240 would be local hires and 100 would be new immigrants. Approximately 200 additional immigrants and their families would live in the Cabinet Mountains area to work at associated businesses that would develop. This phase would result in total immigrant numbers (workers, families and people associated with related employment) decreasing to about 660 from 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 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. 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 grizzly bear habitat. 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 habitat loss, the associated increased human presence on private lands would likely increase the potential for conflicts with grizzly bears related to sanitation, habituation or displacement, and increased 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 the greatest adverse impact on grizzly bears. New home sites developed in or adjacent to existing communities would be less of an impact on grizzly bears than homes built further from existing areas of high human activity. Avoidance of areas of high human activity such as towns and communities would generally keep many grizzly bears from wandering near new home sites in communities, thus reducing the habituation and potential for food conditioning. We have no information predicting how many of the 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, sanitation-related and recreation-related mortality. The proposed mine may also increase somewhat the potential for grizzly bears to be killed by vehicles along major roads.

***Sanitation*** 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 substantively 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 migrating 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.

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. There would be increased risks of food conditioning or other types of habituation resulting from additional human residences on private lands. An ingress of people would likely result in some increased potential for sanitation-related conflicts with grizzly bears on public lands as well. These incidents would likely be infrequent as 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.

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 revised mitigation plan (MDEQ and USDA 2001) requires that the Forest implement a food storage order specifically for BMUs 4, 5 and 6 prior to the construction of the evaluation adit. This order would not be voluntary, and its 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 Cabinet portion of the CYE where garbage containers are normally provided. These measures would substantively reduce the risk of grizzly bear mortality due to habituation and food conditioning on national forest lands.

Many of the human impacts that may affect grizzly bears and are associated with the Rock Creek Mine would occur on private lands, which are beyond the direct jurisdiction of the Forest or the Sterling Mining Company. Sanitation issues would likely arise on private lands over the 35-year life of the mine. Private land sanitation issues are typically more difficult to resolve than those occurring on national forest. The Sterling Mining Company would be responsible for working with Sanders County and Montana Fish, Wildlife and Parks to secure from bears the existing county garbage transfer station near the mine entrance. Grizzly bear-resistant fencing or other means would be used. Mine employees living in the local area would use this facility to dispose of their garbage. Combined with the grizzly bear information and education program, bear specialist and law enforcement positions, this measure would substantively improve sanitation conditions within the action area and the broader southern Cabinet Mountains, in part by preventing food conditioning of both black bears and grizzly bears at the garbage transfer station (Tim Manley, Montana Dept. Fish, Wildlife and Parks, pers. comm. 2002) (see discussion in *Mitigation plan effects on direct grizzly bear mortality risks.*)

**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 be relatively moderate as a result of the proposed action, and would not increase over existing levels. 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, support staff, and families would likely increase recreational use of the existing roads and trails in the action area. Improved access, a substantial increase in local population and increased public attention to the area 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.

The Service is concerned about a reduction in security for grizzly bears 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 resulted 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. 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. Also expected is an increased chance of adverse human-grizzly bear interactions. Increased hiking and camping in the area could lead to increased food and attractant storage problems, resulting in conflicts with grizzly bears.

The revised mitigation plan provides funding for monitoring and requires the development of a recreational management plan to ensure high trail use does not occur. The mitigation plan would be completed within 3 years of the Record of Decision for Rock Creek Mine and would be signed by the U.S. Forest Service and the Service. Trail use would be monitored, and in the event that high use occurred, the plan to limit visitor use would be implemented. This action would reduce potential risks to grizzly bears along this particular trail. However, recreational use of other trails and open roads in the action area is expected to generally increase.

Since 1982, only one grizzly bear was known to be mis-identified and killed during big game hunting season. 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 (MFWP 2001). If grizzly bears are killed by hunters in the CYE, the Service would reinitiate consultation on the MFWP grizzly bear management plan (MFWP 2001).

The potential for poaching would 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 (W. Kasworm, pers. comm.

2000). From past experience, Montana Fish, Wildlife and Parks has found that poaching incidents tend 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).

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 and the 35-year period being analyzed leads to the conclusion that the potential for bear-human confrontation would increase. The mitigation plan includes a number of measures to reduce the potential for mortality (see discussion below under *Mitigation plan effects on grizzly bear mortality risk* ).

**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 FDR 150 are anticipated to increase 1,120 percent over pre-Rock Creek Mine levels during the construction phase (USDA 1998b). Traffic would remain 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 (IGBC 1987; W. Kasworm, pers. comm. 2002, T. Manley, pers. comm. 2002). 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 FDR 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 FDR 150 and Highway 200, the mortality risk to bears attempting to cross these principal access routes would also increase. The likely small number of grizzly bears living in the action area and surrounding areas has and will probably continue to contribute to the lack of known 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 (W. Kasworm, pers. comm. 2002). The Service lacks data and information with which to ascertain the level of risk higher traffic volume presents, however mortality risk to grizzly bears would increase to some degree. If vehicle collision is a risk, it is more likely to occur along Highway 200 than along FDR 150, due to higher traffic volumes and speed.

### **Mitigation plan effects on grizzly bear mortality risk**

Mitigation proposed for the Rock Creek Mine would reduce or mitigate for the mortality risks associated with sanitation and recreation in several ways:

- as discussed in detail in previous sections of this document, the Forest would ensure no increases in open or total road 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 substantive, equal to or greater than 55 percent of the area in BMUs 2, 4, 5, 6, 7, and 8 (see *Analysis of Displacement Effects on Grizzly Bears* section for greater detail on access management);

- as discussed in detail in previous sections of this document, as the 2450 acres of mitigation habitat is acquired through purchase or easement, management actions to decrease road densities and/or increase core areas would be taken; acquisition of fee title or easement would eliminate existing or preclude the development of attractant sources and resulting mortality risks to bears;
- the Forest would implement a mandatory food storage order for BMUs 4, 5 and 6;
- the Sterling Mining Company would fund grizzly bear resistant garbage containers at any Forest campgrounds that provide garbage receptacles in BMUs throughout the Cabinet portion of the CYE;
- grizzly bear-resistant containers would be used at mine facilities, in place in advance of any work being initiated on that phase of the mine, and would be emptied weekly unless problems arise, whereupon, removal would be daily;
- the Sterling Mining Company would work with 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;
- the Sterling Mining Company would require employees to attend mandatory annual educational workshops on living with grizzly bears and would prohibit employees from feeding bears; and
- a strategy to reduce high levels of trail use on Rock Creek Trail would be implemented if needed; high use on other trails in the area would be accounted for in open road densities and/or core area requirements and mitigated as needed to maintain or improve human access conditions for grizzly bears.

The mitigation plan addresses potential mortality risks associated with increased traffic on FDR 150 through the following measures:

- the Sterling Mining 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 substantively reduce the expected elevated levels of traffic but overall traffic levels would remain high. Controlling employees on their way to work sites would substantively reduce the potential for illegal harassment or shooting of grizzly bears and reduce litter and other attractants along the route;
- to reduce attracting bears to roadways, the use of salt would be avoided when sanding during winter plowing operations on road FDR 150; and
- the use of preferred 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.

The Service believes the full-time law enforcement and bear specialist positions to be funded by the Sterling Mining Company as part of the mitigation of the Rock Creek Mine would be most

valuable and effective in reducing grizzly bear mortality related to increased numbers of people living in the area. The mitigation plan requires that:

- the Sterling Mining Company would support a wildlife enforcement position for the life of the mine to reduce the potential of poaching or illegal activities with wildlife and to resolve situations that may arise;
- the Sterling Mining Company would support a bear specialist position for the life of the mine 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;
- these personnel would be established prior to the influx of people to the area for work on the evaluation adit, construction and production phases of the mine;
- funding for bear specialist and 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 are clearly defined to deal with the grizzly bear issues related to the Rock Creek Mine;
- the duties of these personnel would include monitoring black and grizzly bear-human encounters and how these situation were handled; and
- these personnel would remain in place during temporary shutdowns and for a reasonable amount of time following reclamation to maintain continuity in community relationships, grizzly bear incident response and monitoring.

The revised mitigation plan requires the grizzly bear specialist and law enforcement positions be located in the vicinity, to primarily deal with the Rock Creek Mine mitigation issues, and initiate preventative management to avoid threatened and endangered species issues. The grizzly bear specialist and law enforcement personnel would maintain a constant presence in the local communities. The positions would be based in the Noxon/Heron/ Trout Creek area where the majority of immigrating people would settle. Their work would focus with communities near the mine site, but also would extend throughout the Cabinet Mountains. The local law enforcement agent would make personal contacts with area residents, provide wildlife and conservation information, and work as a deterrent to reduce the risk of illegal human-caused grizzly bear mortality. The grizzly bear specialist would also make personal contacts with area residents, and would improve awareness of grizzly bear conservation in the community to reduce potential sanitation problems. The grizzly bear specialist would provide information to all mine employees and area communities on how to manage 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. The personnel would precede the influx of workers so that pre-emptive planning could occur and education programs can be in place when people arrive. If conflicts arise between black bears or grizzly bears and people, the bear specialist would respond. 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 prepared by the

grizzly bear specialist. The presence of the grizzly bear specialist and law enforcement in the community would be consistent and long term, and retained for the life of the mine, including periods of shutdown. The bear specialist position would include duties comparable to the existing grizzly bear management specialist positions within the Montana Fish, Wildlife, and Parks, and would include adequate funding for public education programs and workshops, aversive conditioning equipment, dogs, electric fencing and other preventative strategies.

The bear specialist and law enforcement officer would be hired prior to when activities begin on the evaluation adit. Funding for the grizzly bear monitoring study would also be provided prior to evaluation adit development. Similarly, 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 would be made grizzly bear-resistant, 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 workshops and other forms of information related to grizzly bear conservation from programs developed by the bear specialist and law enforcement officer. Together, the local presence of these personnel in addition to the grizzly bear monitoring/research effort 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 in the Cabinet Mountains portion of the CYE. Over time, the Service believes that the education and law enforcement positions required by the revised mitigation plan would substantively reduce the mortality risks to grizzly bears on both national forest and private lands in and near the action area and throughout the Cabinet Mountains.

The importance of these new positions cannot be overstated. MFWP states that perhaps the greatest advancement in the management of problem bears has been the development of bear management specialist positions (MFWP 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.

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 MFWP grizzly bear specialists in the NCDE. Many of the efforts are preventative, and so quantifying effects is difficult. In any case, there is ample evidence that securing human food and garbage from grizzly bears can dramatically reduce the number of grizzly bears removed through management actions (see Gunther 1994). 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 (MFWP 1994) (Mike Madel, Montana Fish, Wildlife and Parks, pers. comm. 2002).

The mitigation plan requires an 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 entail a telemetry study and DNA sampling of grizzly bears in the area to gain information on grizzly bear habitat use and on the effectiveness of mitigation measures. The ongoing monitoring and research would also act to increase public awareness and interest in grizzly bears, and would also likely act as a deterrent to malicious killing of grizzly bears. Radio-collared grizzly bears would also contribute to mortality information if bears die or are killed.

The Service believes that the mitigation plan measures aimed at decreasing the risk of human-caused mortality of grizzly bears are significant and comprehensive. However, the mitigation plan measures cannot entirely eliminate the increased risks of grizzly bear mortality associated with the direct and indirect impacts of the Rock Creek Mine over its expected 35-year operation. The Service expects that the proposed action would result in some level of human-caused grizzly bear mortality over 35 years, primarily due to the increased number of residents in the area. Grizzly bear mortality is possible legally through management action or defense of life, or illegally through malicious or accidental events. Sanitation-related problems on private lands are most likely to result in some conflicts between grizzly bears and people during the 35-year period. Conflicts between grizzly bears and people recreating on the Forest are possible. Vehicle collision, although less likely, may occur due to increased traffic on area roads.

There is no information or data 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/Herron/Trout Creek area and Thompson Falls is about 11 percent (MDEQ and USDA 2001), and less in communities of Troy, Libby and eastern Idaho. The best information upon which to base expectations related to human-caused grizzly bear mortality includes the existing human-caused mortality information in the CYE and in the action area, including the rates and causes of known grizzly bear mortality, 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.

We expect that the level of human-caused grizzly bear mortality would be low, based on the past levels of mortality and, because grizzly bear populations grow slowly, the continued relatively low number of grizzly bears in the area. Environmental baseline conditions, such as habitat effectiveness and access management have generally remained stable or improved over the past decades, and are expected to improve in the action area. Since 1982, four known human-caused grizzly bear mortalities within the Cabinet Mountains have occurred, three of which occurred in the action area. Two human-caused mortalities occurred in the 1980s, in BMU19 (1982, poaching, not in action area) and BMU 8 (1985, self defense). One occurred in 1993 in BMU 2 (poaching), and one in 2001 in BMU 4 (train collision). This information indicates approximately one to two

known human-caused mortalities of grizzly bears occurred per decade in the Cabinet Mountains, or 0.19 per year. Currently, throughout the CYE, 15 grizzly bears, or approximately 0.71 grizzly bears annually, are known to have died due to all human causes since 1982.

Three of the four 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 sanitation problems on private lands. These mortalities, especially those occurring in the 1980s, took place during a time when grizzly bear conservation was not as emphasized as it is today. The Montana Department of Fish, Wildlife and Parks has increased efforts to inform hunters about hunting in grizzly bear habitat (MFWP 2002). Further, there were no grizzly bear specialists or law enforcement officers working in the Cabinet Mountains focusing primarily on grizzly bear issues. The proposed action includes a comprehensive mitigation plan to address mortality, including the bear specialist and law enforcement personnel, education and information provided to the mine personnel and community, access management on the Forest including substantive core areas, and a grizzly bear research and monitoring effort. The mitigation also includes sanitation efforts at the mine, and on the Forest and on private lands in the Cabinet Mountains, and a mandatory food storage order in BMUs 4, 5, and 6. Based on existing levels and causes of grizzly bear mortality in the Cabinet Mountains, the expected environmental baseline and the proposed mitigation, we expect that impacts of the proposed action would result in no more than one additional grizzly bear mortality over the 35-year life of the mine. This equates to about 0.03 mortalities per year over existing human-caused mortality levels within the action area.

The number of CYE grizzly bears killed by people since 1982 is slightly skewed toward females; seven of 13 known mortalities were female. In the Cabinet Mountains, of four known human-caused mortalities, three were known to be males, the gender of the other bear is unknown. 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). In the action area during 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. Using female with young sighting data (Kasworm et al 2002), there would appear to be one or possibly two adult females utilizing BMUs 4, 5, and 6. Because of the higher vulnerability of male bears and the low number of grizzly bears in the area, we expect that the one anticipated grizzly bear mortality over the 35-year life of the mine would have less than a 50 percent chance of being female.

Recovery Plan methods use a limit on annual, known human-caused grizzly mortality of 4.0 percent of a *minimum* population estimate based on the unduplicated number of females with cubs sightings during the most recent three years. This method is intentionally conservative and underestimates the total population. The 4.0 percent limit is also based on an adjustment of the sustainable known mortality rate of about 6.35 percent (suggested in Harris 1986) with a 2:1 correction factor to allow for one unknown human caused mortality for every two known mortalities. In 2002, according to Recovery Plan methods, the known annual human-caused mortality (an average of one annual mortality over six years) was lower than the 4.0 percent limit (an average of 1.40 mortalities over six years).

In this case we use population estimates from long-term grizzly bear research conducted in the CYE instead of the *minimum* population based on only sightings of females with cubs. We consider the research information as the best information on the CYE grizzly bear population. The current estimate of grizzly bears in the Cabinet portion of the CYE is 15 or fewer bears. Since 1982, mortality averaged 0.19 mortalities per year. Using a more conservative estimate of 10 bears, this current level of known human-caused grizzly bear mortality in the Cabinet Mountains results in an annual known human-caused mortality rate of 1.90 percent. With the anticipated additional mortality, or 0.03 mortalities per year due to the mine, the anticipated enforcement personnel, education and information provided to the mine personnel and community, access management on the Forest including substantive core areas, and a grizzly bear research and monitoring effort. The mitigation also includes sanitation efforts at the mine, and on the Forest and on private lands in the Cabinet Mountains, and a mandatory food storage order in BMUs 4, 5, and 6. Based on existing levels and causes of grizzly bear mortality in the Cabinet Mountains, the expected environmental baseline and the proposed mitigation, we expect that impacts of the proposed action would result in no more than one additional grizzly bear mortality over the 35-year life of the mine. This equates to about 0.03 mortalities per year over existing human-caused mortality levels within the action area.

Throughout the CYE, 15 known, human-caused grizzly bear mortalities occurred since 1982, or 0.71 mortalities per year. Using the more conservative population estimate of 30 grizzly bears, this current level of known human-caused grizzly bear mortality in the CYE results in an average annual known human-caused mortality rate of about 2.38 percent of 30 bears. With the anticipated 0.03 grizzly bear mortalities per year, the annual rate would be 0.74 per year (0.71 plus 0.03), or known human-caused mortality rate would increase from 2.38 to 2.5 percent of 30 grizzly bears (0.74 mortalities / 30 bears). Using the upper limit of 40 grizzly bears in the CYE, the annual known human-caused mortality rate would increase from about 1.78 percent and to an anticipated 1.85 percent due to the expected mortality associated with the proposed mine. These average rates are more or less, but not directly comparable to the 4.0 percent limit on known, human-caused mortality of grizzly bears.

As mentioned previously, some level of unknown, unreported grizzly bear mortality probably occurs in each grizzly bear ecosystem. A review of known grizzly bear mortalities in British Columbia, Alberta, Idaho, Washington, and Montana concluded that of the studies reviewed, management agencies would have been unaware of about half of the deaths of radio-collared grizzly bears if not for the radio collars (McLellan et al. 1999). There are different methods of estimating unknown, unreported grizzly bear mortality. Here we use a conservative ratio of 1 known, reported human-caused mortality to 1 unknown, unreported (McLellan et al. 1999). Unreported mortality was calculated by removing management or agency located mortality from total known mortality and then adjusting the remaining mortalities by the correction factor. The resulting annual rate is referred to as the *total* annual human-caused grizzly bear mortality rate.

Within the Cabinet Mountains portion of the CYE during the past 21 years, of the 4 known, reported human-caused mortalities, there were no management or research deaths and no radio-collared unreported mortalities. Therefore, we adjust for unknown, unreported with an additional

4 unreported human-caused mortalities. This results in eight (four plus four unknown, unreported mortalities) human-caused mortalities over 21 years, or 0.38 mortalities per year, which results in an average total annual human-caused mortality rate of 3.80 percent of 10 grizzly bears. If we use the upper estimate of the number of grizzly bears in the Cabinet Mountains, the average total annual human-caused mortality estimate would be 2.53 percent of 15 grizzly bears.

Within the Cabinet portion of the CYE, an additional grizzly bear killed by people would result in an average total annual known and unknown human-caused mortality of 0.41 mortalities per year (0.38 plus 0.03) over the 35 year life of the mine. The anticipated total annual human-caused mortality rate would be between 2.70 percent (using the upper population estimate of 15 bears) and 4.10 percent (using the lower population estimate of 10 bears). Use of population estimates from the Cabinets aids in portraying effects of potential mortality on bears within the action area.

Our jeopardy analysis is based on effects to the CYE population. Within the entire CYE grizzly bear population during the past 21 years, there were 15 known reported human-caused grizzly bear mortalities. Of the 15, there were two management or research deaths and two radio-collared unreported mortalities. Subtracting these four mortalities from the total leaves 11 publicly reported mortalities. Therefore, we adjust for unknown, unreported with an additional 11 unreported human-caused mortalities based on the 1:1 correction factor (McLellan et al. 1999). This results in 22 public reported plus unreported mortalities. Management or research mortality is added to the total and results in 24 human-caused mortalities over 21 years, or 1.14 per year. The mortalities located on the basis of radio telemetry are not added back to the total because they are part of the fraction being estimated by the correction factor. This results in an total annual human-caused mortality estimate of between 2.85 percent (using the upper population estimate of 40 bears) and 3.80 percent (using the lower population estimate of 30 bears) of the population (Appendix D).

Within the entire CYE population, if an additional grizzly bear is killed over the life of the mine, the total annual known and unknown human-caused mortality would average 1.17 grizzly bears per year (1.14 plus 0.03) over the life of the mine. The total human-caused mortality rate would be between 2.92 percent (using the upper population estimate of 40 bears) and 3.90 percent (using the lower population estimate of 30 bears) of the population.

Further, we add the anticipated incidental take from the Way Up/ 4<sup>th</sup> of July Mines project of one mortality per 50 years, or 0.02 (USDI 1998b), the Bull Lake Estates project (USDI 2000a), of one mortality per 50 years or 0.02 per year, and the State Highway 1 project in eastern Idaho (USDI 2002), one mortality per 20 years, or 0.05 per year. The total anticipated level of mortalities due to existing baseline conditions in the CYE is 0.09 mortalities per year (.02 plus .02 plus .05).

With this additional anticipated mortality, the anticipated total annual known and unknown human-caused mortality rate would increase to 1.26 mortalities per year (1.17 plus 0.09), or from 3.15 percent (using the upper population estimate of 40 bears) to 4.20 percent (using the lower estimate of 30 bears) of the CYE grizzly bear population, averaged over the 35 year life of the mine.

The current and anticipated rates of human-caused mortality are not without consequences in a grizzly bear population of only 30 to 40 bears. Small populations such as grizzly bears in the CYE are more prone to extinction due to stochastic perturbations or other events than are larger populations. Therefore, the Recovery Plan suggests that management efforts continue to strive toward a goal of zero annual human-caused mortality. The Service realizes there is no way to preclude all human-caused mortality within the CYE grizzly bear population. The Recovery Plan suggests zero as a desired management *goal*, and suggests that the population should not decline if known, human-caused mortality remains below four percent. The goal of zero human-caused mortality is not likely attainable over time; therefore, the Service does not use it as a measure with which to assess population status.

The anticipated total human-caused mortality rate of between 3.15 to 4.20 is more or less comparable to the 6.35 percent sustainable rate suggested in Harris (1986). Harris (1986) estimated that a grizzly bear population could sustain a 6.35 percent annual harvest rate without decline. This estimate was based on several demographic assumptions that do not necessarily apply to the CYE population, including a population of grizzly bears substantively larger than that in the CYE. We recognize the importance of these distinctions. At this time however, Harris (1986) is considered the best information available for a measure of sustainable human-caused mortality rates based on grizzly bear populations. Research related to sustainable mortality rates for smaller grizzly bear populations have not been completed. We use Harris (1986) here only as one measure of sustainable human-caused mortality against which to compare an estimate of the anticipated annual total human-caused grizzly bear mortality in the CYE. We believe the anticipated total annual human-caused mortality rate of 4.20 percent for the CYE is conservative because: we applied a conservative 1:1 known/unknown mortality estimator as described in McLellan et al. (1999); we used the lower end of the CYE population estimate at 30 grizzly bears; we assume no substantive increase in the grizzly bear population over 30 to 35 years despite ongoing recovery efforts; and we assume that incidental take would occur despite the implementation of nondiscretionary terms and conditions designed to reduce the potential for take for each of the projects in the baseline. The Service recognizes that an annual total human-caused mortality rate of 4.20 percent is not optimum for grizzly bear population as small as that in the CYE, but it appears to be within the range of human-caused mortality that should not lead to imminent population decline. Recovery actions will continue to strive to reduce grizzly bear mortality levels.

Of concern is the proportion of female grizzly bear mortalities in the ecosystem. Of known human-caused mortalities in the CYE, seven were female grizzly bears, six were male and two were unknown. This information suggests that known human-caused female mortality is currently higher than that suggested in the Recovery Plan to promote recovery (no more than 30 percent of total human-caused mortality). The Service is concerned most with the human-caused mortality of adult female bears because of their importance to the growth of this small population. Of the seven known human-caused female grizzly bear mortalities, one was an adult, one was a cub and five were subadults. At this time, the research data is not sufficient to meaningfully estimate a rate of human-caused mortality of female grizzly bears. We expect that full implementation of the mitigation measures for the proposed action would be successful in reducing overall grizzly bear

mortality rates, including the number of female bears killed. Increased access management improvements, increased law enforcement presence, a bear specialist program, sanitation efforts, and an ongoing grizzly bear monitoring and research program in the Cabinet Mountains is reasonably expected to substantially reduce, but not entirely eliminate, the potential for human-caused mortality due to the proposed mine. If management actions are needed to control nuisance grizzly bears, females would be given the most protective status (IGBC Guidelines 1986). Pre-emptive moves of female grizzly bears could also be used to prevent habituation and food conditioning.

The discussion above illustrates that the effects of additional human-caused mortality on the CYE population can be serious, depending upon assumptions related to population size and unknown, unreported mortality. The Service assumes that using both the lower population estimate of 30 bears and a conservative ratio of unknown, unreported to known, reported grizzly bear mortality presents the a reasonable scenario of no more than an annual 4.20 percent total human-caused mortality rate.

As detailed earlier in this section, the revised mitigation plan requires many measures that would collectively substantively reduce the potential for mortality of grizzly bears in the action area. The mitigation plan requires the oversight committee to review all new information on grizzly bears, and grizzly bears in the CYE, and if needed, ensure the appropriate analysis and develop appropriate changes, additions or revisions to the management plan to ensure the needs of grizzly bears are met. This information would come from sources including information from the research and monitoring effort conducted over the life of the mine.

Furthermore, the revised mitigation plan may also mitigate for mortality that may occur due to the mine by reducing the potential for human-caused mortality of grizzly bears not attributable to the mine and/or outside the action area. For instance, the law enforcement officer and bear specialist would result in positive impacts within the entire Cabinet portion of the ecosystem through grizzly bear education programs, working intimately with the mine employees and the general public to foster support for grizzly bear recovery. There would also be a heightened law enforcement presence over that currently existing in the Cabinet Mountains. The mitigation plan also requires the presence of a grizzly bear monitoring and research effort, bear resistant garbage receptacles on Forest lands within the Cabinets, a grizzly bear-resistant county garbage transfer station, Service-approved access management on 2450 acres of mitigation lands, has identified specific properties which must be acquired and identified specific roads which must be closed, among other measures, in order to avoid jeopardy. It is reasonably expected and anticipated, that such efforts would work proactively to prevent mortality of grizzly bears in the Cabinet Mountains outside the action area.

The Service concludes that the mitigation plan for the mine is substantial and that combined with ongoing recovery efforts by federal and State agencies, the mortality attributable to the mine would not exceed one grizzly over the 35-year life of the mine. However, as illustrated in the estimated mortality rates above, the small population in the CYE can be substantially affected by relatively slight increases or decreases in human-caused mortality rates.

## 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 area, private land development for homes and business, and the significant amount of roads 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 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 U.S. Forest Service right-of-way authorization. The Forest concluded that it was unable to entirely restrict access to private land under ANILCA, nor restrict activities conducted on the private lands. There are more than a dozen other patented mining properties in the corridor between the east and west sides of the southern Cabinet Mountains. The U.S. Forest Service 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. 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, building structures, establishing hunting camps, and maintaining livestock compounds 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 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 disrupt 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 inholdings 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 inholdings would be reduced and in some cases

eliminated within the north south corridor in BMUs 4, 5 and 6 through the acquisition or easement of 2450 acres as required in the mitigation plan.

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 sanitation measures; private land owners have access to information on living in grizzly bear habitat and 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, in the YGBE, the grizzly bear population in this larger 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.

Human population growth presents special challenges to maintaining grizzly bear populations as small as the CYE grizzly bear population. 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. 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 monitoring effort required in the revised mitigation plan would work to reduce, but could not entirely eliminate, the adverse impacts of such human population growth within the Cabinet Mountains portion of the CYE. We anticipate that the increased human population growth that is not associated with the mine could 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. This could result in an anticipated total annual human-caused mortality rate of 4.30 percent (see discussion under *Conclusion 2*.)

## **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 approval of the Rock Creek Mine as proposed, is not likely to jeopardize

the continued existence of the grizzly bear in the CYE. 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 2000) in which we concluded that the proposed action was likely to jeopardize the CYE grizzly bear population. The Service withdrew the biological opinion in March, 2002, and the Forest subsequently withdrew the ROD. Since then, two substantive new actions have taken place. The Noranda Minerals Corporation formally withdrew their plan of operations and gave up several required permits necessary to develop the Montanore mine, west of the Cabinet divide (Noranda Inc. in litt. 2002a, 2002b, 2002c). The withdrawal of the Montanore Mine represents a significant improvement in the baseline for grizzly bears within the action area and within the entire Cabinet Mountains. The Montanore Mine would have had similar, and additive impacts on grizzly bears, especially related to the expected levels of human population growth in the Cabinet Mountains area. 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 and revised mitigation plan. The Reasonable and Prudent Alternative measures that were incorporated into the 2002 mitigation package and additional measures recommended by the Service during consultation in 2002 were developed in consideration of the impacts of both the Montanore and Rock Creek mines operating in the southern Cabinet Mountains. Despite the elimination of the Montanore Mine from the environmental baseline in the action area, the 2002 mitigation plan and additional measures for Rock Creek mine were not substantively changed, and were strengthened in some areas due to inclusion of the measures in the Reasonable and Prudent Alternative.

This biological opinion has described the Forest's revised mitigation plan for grizzly bears and its various measures that collectively would reduce and/or mitigate the potential serious impacts of the proposed action. The Service believes the final proposed action and revised mitigation plan adequately address key issues that reasonably ensure that the proposed action would not likely jeopardize the CYE grizzly bear population. We base our conclusion on the entire analysis found in this document, all information provided by the Forest, discussions with the Forest and with Sterling Mining Company staff, discussions with Montana Fish, Wildlife and Parks biologists, and information in our files. The following lists the most critical issues related to the proposed mine and summarizes the primary means by which the proposed action and mitigation plan address the issues:

- 1) Establish the processes and infrastructure needed to ensure the MOU is fully implemented and that mitigation measures are timely and effective; coordinate and effectively implement the numerous aspects of the revised mitigation plan; allow for adaptive management over the 35 year life of the mine.

In summary, the Forest and Sterling Mining Company, along with the Service, must participate in a standing committee that develops and implements the MOU. The MOU requirements are outlined in the revised mitigation plan. The 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 and meet the recovery needs of grizzly bears in the CYE. If not, the committee would be responsible to either take action to remedy the situation or use adaptive management to fully meet the recovery needs of the population. The Service would review any proposed changes, additions or revisions of the management plan or mitigation plan under the appropriate provisions of section 7 of the Act.

The Service concludes that with the establishment of a standing oversight committee and the development of an MOU, 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 would not appreciably reduce both the survival and recovery of the CYE grizzly bear population.

- 2) To the extent possible, 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 CYE grizzly bear population is small, estimated at 30 to 40 grizzly bears. In 1999, analysis indicated a slight increase in the finite rate of increase of this population, but wide confidence intervals suggested the population trend should be cautiously evaluated. Most recent population trend information is statistically inconclusive, though the point estimate of the rate of increase declined during 1999 to 2000.

The mitigation plan contains a comprehensive package of measures that 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 previous sections of this biological opinion. The revised mitigation plan requires a grizzly bear monitoring program that could assist in detecting and identifying the causes of grizzly bear mortality. However, the mortality risks increase with the direct and indirect affects of the mine and these risks can only be partially offset. Some mortality of grizzly bears can be anticipated at some time during the 35-year life of the mine, primarily as a result of increased numbers of people in the area.

The current Recovery Plan mortality goal for this 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. The Recovery Plan also suggested that the CYE population can sustain some low level of human-caused mortality without overall decline. The Service concludes that zero human-caused mortality is useful

as a management *goal*, but not appropriate in determining whether the proposed action is likely to jeopardize the continued existence of grizzly bears in the CYE. Instead, as described previously in this biological opinion, the Service uses a known human-caused mortality limit of 4.0 percent or a total annual human-caused mortality rate of 6.35 percent as more appropriate measures with which to compare and assess existing and anticipated rates of mortality, as human-caused mortality below these levels can be expected to allow increases in CYE grizzly bear numbers over time, and so allow recovery of the CYE grizzly bear population.

The Service anticipates no more than one grizzly bear would be killed or removed from the population as a result of the proposed action based on the environmental baseline, existing and past grizzly bear mortalities, causes of mortalities, and effects of the mitigation measures. Adjusting for unknown unreported mortality, and incidental take levels in the baseline, the anticipated total annual human-caused grizzly bear mortality rate would be between 3.15 percent (using the upper population estimate of 40 bears) and 4.20 percent (using the lower population estimate of 30 bears). Adding an additional mortality associated with cumulative effects of human population growth not associated with the mine (see *Cumulative Effects* section) would result in an anticipated 1.29 grizzly bear mortalities per year (1.26 plus 0.03), or an anticipated total annual human-caused mortality rate of 3.23 percent of 40 grizzly bears to 4.30 percent of 30 grizzly bears. The Service assumes that the use of both the lower population estimate of 30 bears and a conservative ratio of one unknown, unreported to one known, reported grizzly bear mortality results in a conservative estimate of an anticipated annual **4.30** percent total human-caused mortality rate for the CYE. This level of human-caused mortality is not optimal for a grizzly bear population as small as the CYE population, however, it appears to be within the range of mortality that would not lead to imminent population decline. Management and recovery actions would continue to strive to reduce human-caused grizzly bear mortalities in accordance with the Recovery Plan.

Current levels of known human-caused mortality of female grizzly bears are higher than the levels desired to promote recovery. The Service concludes that additional human-caused mortality of females, including the one possible female mortality due to the proposed mine, would increase the length of time needed for the population to reach recovery in this small ecosystem. The loss of adult female bears is particularly significant, and if excessive, could lead to extinction of the CYE grizzly bears. We estimate that three to five adult female bears occupy the Cabinet Mountains and the Yaak portion of the CYE likely includes five to nine adult females. We conclude that the anticipated level of one human-caused grizzly bear mortality over the 35-year life of the mine, if female, would prolong the period of time needed for recovery of the CYE, but would not appreciably reduce both the survival and recovery of the CYE population. The loss of an adult female over 35 years, when added to the existing and anticipated rates of human-caused grizzly bear mortality as described in this biological opinion, would impart the most negative affect population growth and prolong the time needed for recovery, but would not likely appreciably diminish the survival of the CYE grizzly bear population.

3) Maintain and improve habitat connectivity within the Cabinet Mountains, and reduce displacement effects of the proposed mine. 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 movements and genetic interchange; and d) dispersal.

In summary, a total of 100 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. An additional 2350 acres are required to offset displacement effects of the mine. A portion of these additional acres would likely be within the north south corridor as well, and elsewhere 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 and 8. These mitigation measures would directly and indirectly reduce the connectivity impacts and mitigate for habitat loss and displacement due to human-caused disturbance.

Table 14 summarizes access management and habitat effectiveness conditions with implementation of the proposed action. Key Forest Plan standards and associated assessment criterion are met with the exception of habitat effectiveness in BMU 4 and 22. The terms and conditions of the Service’s 1995 biological opinion on the Forest Plan would be met. With a 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 are substantial and would not decrease. BMU 6 has core area equal 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 conservation easement of the mitigation properties.

Table 14. Access management and habitat effectiveness conditions with implementation of the proposed Rock Creek Mine.				
BMU	Alt. 5 <sup>1</sup> Core %	Alt. 5 % BMU <sup>2</sup> OMRD > 1 mi/mi <sup>2</sup>	Alt. 5 % BMU <sup>3</sup> TMRD >2 mi/mi <sup>2</sup>	Alt. 5 % <sup>4</sup> habitat effectiveness
2	77	17	14	83
4	63	36	25	63
5	62	26	20	75
6	55	33	32	70
7	66	23	20	80
8	56	32	23	77

22	47	38	41	68
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<sup>1</sup> For comparison, 55 percent of an average female home range was core area (Wakkinen and Kasworm 1997).

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

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

<sup>4</sup> Forest Plan standard for habitat effectiveness is 70 percent of BMU.

We conclude that fragmentation of the north south corridor would be precluded 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 appreciably reduce both the survival and recovery of the CYE grizzly bear population.

## 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 the Sterling Mining Company, 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 the Sterling Mining Company 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**

The proposed action would not increase motorized route densities in the action area, nor decrease core areas. Both road 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 are slightly decreased as a result of the proposed action. The road densities may decline and core areas may increase as mitigation properties are acquired. High road densities increase the risk of incidental take of grizzly bears by habituating some bears and displacing some bears, both are activities that may significantly impair breeding, feeding, and sheltering. The proposed action would not increase road densities or decrease core areas and so is in compliance with the Service's 1995 incidental take statement (USDI 1995). For most Forest actions that comply with the incidental take statement, we would not anticipate incidental take of grizzly bears over that anticipated in the 1995 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 usual forest management activities and for a longer period of time.

The proposed action could potentially result in two forms of incidental take. Indirect take may occur due to displacement of grizzly bears, specifically female bears, from essential habitat. Displacement from key habitats could result in a lack of adequate food resources for female grizzly bears, which in turn could result in reduced fitness and impairment of reproduction. Incidental take could also occur in the form of direct take (injury or mortality) of grizzly bears as a result of several types of human actions such as malicious killing of bears, management removal of grizzly bears due to bear-human conflicts, or vehicle collision.

The Service anticipates some low level of indirect take of grizzly bears as a result of the displacement effects of the proposed action. We expect this take as some impairment of normal breeding and feeding behavior of females, which would impair potential levels of reproductive success. We do not expect adult or subadult grizzly bear mortality as a result of displacement. We do not expect mortality, injury, or significant impairment of breeding, feeding or sheltering of male grizzly bears as a result of displacement.

Based upon the scientific information available on the effects of disturbance on grizzly bears, it is the biological judgement of the Service that the potential long-term displacement of grizzly bears from portions of the areas affected by the proposed mine (7000 acres or within larger portions of the drainage) is likely to affect one or possibly two adult female grizzly bears attempting to use this area and could result in some impairment of feeding and/or breeding. Based upon the females with young information in the Cabinets (Kasworm et al. 2002), the existing population estimate of grizzly bears in the southern portion of the Cabinet Mountains (Kasworm et al. 2002), the lack of detectable significant increases or declines in the population as a whole since 1983 (Kasworm 2001, Kasworm et al. 2000) and assumption of a stable or very slowly growing population over the life of the mine, and the existing disturbances in the Rock Creek drainage and the east side of the

divide, it is likely that no more than two adult female grizzly bears would potentially be impacted over time. This number of adult females may represent two of three to five total adult female bears 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.

However, there is no scientific or commercial information available that quantifies the effects of disturbance or displacement on the reproductive potential of grizzly bears. We expect that displacement effects that result in decreased fitness of adult females to the degree that reproduction loss or loss of cubs occurred would be relatively low based on the rationale found in the biological opinion (see discussion under *Grizzly bear response to displacement effects*). Not all grizzly bears, including females, with home ranges encompassing the Rock Creek drainage would be significantly impacted. There are existing activities along FDR 150 and lower elevation habitat within the drainage and along the Clark Fork River that currently likely impart disturbance effects on grizzly bears. The best information suggests that there would initially be increased displacement effects on female grizzly bears using the Rock Creek drainage as the mine begins development and human activity levels substantively increase along FDR 150. This displacement of bears would be pronounced and long term at lower elevations in the drainage, particularly spring habitat, but would extend throughout larger portions of the drainage for some time (at least 7000 acres). Some bears may habituate to the noise and disturbance over time and regain use of summer and fall habitats at higher elevations within the Rock Creek drainage. Further, several factors moderate the impact of this displacement, as discussed under *Grizzly bear response to displacement effects* of the biological opinion. Grizzly bears have large home ranges and likely have alternative habitat to use if displace. Assuming a stable or very slowly increasing grizzly bear population over 35 years, we anticipate that the impacts of disturbance within the Rock Creek drainage on female grizzly bears would decline as time goes on in quality seasonal habitats at higher elevations and further from the roads and mine site. Disturbance related effects at levels that impair breeding, feeding or sheltering would likely decline to low levels. As analyzed in the biological opinion, grizzly bears that are displaced from areas within the Rock Creek drainage would likely have alternative available habitats within their home ranges.

The Service anticipates such 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 detect and is largely unquantifiable. Grizzly bear cub mortality or reduced reproductive success resulting from displacement from habitat usually cannot be documented. The Service is unaware of scientific or commercial information that could be used to quantify the exact level of incidental take as a result of disturbances to adult females associated with the proposed mine. Therefore, the anticipated level of incidental take of grizzly bears as a result of mine related disturbance within the Rock Creek drainage in terms of numbers of bears, is numerically 'unquantifiable'. In such instances, we use surrogate measures to determine whether anticipated levels of take 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.

The Service anticipates some level of direct mortality of grizzly bears as a result of the proposed action. The revised 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 is 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. Incidental take of grizzlies is anticipated due to habituation and food conditioning of grizzly bears or increased human-grizzly bear encounters, increasing their vulnerability to illegal shooting or legal defense of life or management control actions, and to a lesser degree, vehicle collision. 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 and increases in recreation in the area, leading to increased levels of food, garbage and other human-related attractants.

Based on the estimated number of grizzly bears in the Cabinet Mountains (fewer than 15), and considering past known, human-caused grizzly bear mortality in the Cabinet Mountains (four from 1982 through 2002) (Kasworm 2003), the Service expects the existing baseline condition of the action area related to Forest access management and the full implementation of the revised 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. The Service anticipates the take would be in the form of habituation and food conditioning resulting in mortality due to defense of life or management actions, or less likely, vehicle collision. Death or removal of a grizzly bear from the wild would constitute incidental take.

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. Vehicle collision or 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. Hunter related grizzly bear mortality would result in the Service reinitiating consultation on Montana's grizzly bear management program (MFWP 2001).

The take of one grizzly bear within the action area would trigger re-evaluation of the situation by the Service to determine if the mortality could be reasonably attributed to the effects of the Rock Creek Mine, and whether additional measures are needed to reduce the potential for future mortality. In addition, should the monitoring of the sanitation issues report indicate 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 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. Some low level of indirect incidental take may occur as a result of displacement of females from essential habitat, which would impair reproduction. Such take is unquantifiable. In cases where the amount of take is unquantifiable, the Service uses surrogate parameters to measure the impact of the take on the species and provide the threshold at which the anticipated level of incidental take is 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), the Service uses 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. Based on research and road density analysis in the CYE and Selkirks ecosystem, the baseline levels of open and total motorized route density and core area would moderate the displacement effects of the action within the Rock Creek drainage to levels that are not expected to result in jeopardy to the CYE grizzly bears. Further, the proposed action would result in improvements in these parameters as a result of road management and 2450 acres of habitat acquisition or easement, which is expected to further reduce the overall displacement effects of the mine.

The additional anticipated one direct grizzly bear mortality over the life of the mine equates to 0.03 mortalities per year. The current population estimate for the CYE is 30 to 40 grizzly bears (Kasworm 2002). Using 15 known, human-caused mortalities since 1982, the current annual rate of known human-caused mortality over the past 21 years in the CYE is approximately 0.71 mortalities per year. Based on a conservative estimate of 30 grizzly bears in the CYE, the anticipated annual known, human-caused mortality rate would increase to 0.74 grizzly bears per year, or an annual 2.27 percent, over the life of the mine. These rates are premised on the assumption that human-caused mortality in the CYE would not decline from or significantly increase over historic levels due to factors other than the mine, and that the population of 30 to 40 grizzly bears would not appreciably increase or decrease.

As detailed in this biological opinion, the current annual total (known and unknown, unreported) human-caused mortality rate, adjusted according to McClellan et al. (1999) is 1.14 mortalities per year, or 2.85 percent (based on the upper population estimate of 40 bears) to 3.80 percent (based upon the lower estimate of 30 bears). The additional levels of anticipated human-caused mortality due to the mine raise the annual adjusted mortality rate to 1.17 bears per year (1.14 plus 0.03). An additional annual 0.12 human-caused grizzly bear mortalities are anticipated due to incidental take from three ongoing actions and cumulative effects (see pages 92 and 96), and could result in 1.29 grizzly bear mortalities per year. Assuming the number of grizzly bears in the CYE remains stable at 30 to 40, and existing rates of human-caused mortality do not appreciably increase given the efforts to reduce mortality in ongoing and future recovery efforts and the mitigation plan measures, the anticipated total known and unknown human caused mortality rate would be approximately **3.23** percent (based on the upper limit of 40 bears) to **4.30** percent (based on the lower estimate of 30 bears) of the CYE grizzly bear population.

Harris (1986) suggested a grizzly bear population could sustain a human-caused mortality rate of 6.35 percent, based on specific set of demographic assumptions used in that particular model and

based on a much larger population of grizzly bears. Grizzly bear populations as small as that in the CYE are more prone to stochastic perturbations than are larger populations, and decline at lower mortality rates than larger populations (Harris 1986). The Service acknowledges the importance of these distinctions, but finds that at this time, Harris (1986) is the best available information related to sustainable mortality rates in grizzly bear populations. Further, our calculated rates of human-caused grizzly bear mortality are based on conservative assumptions. The highest rate estimated above (4.30 percent) is conservative as it is based on: the lower end of the population estimate for the CYE (30 bears); a more conservative adjustment for known to unknown, unreported mortality (1:1) than that used in the Recovery Plan; assumptions that all anticipated levels of incidental take from ongoing actions would occur, despite terms and conditions intended to reduce take; and the assumption that the grizzly bear population lower estimate of 30 bears would not appreciably increase over 35 years.

Currently, known human-caused mortality in the CYE is slightly skewed toward females (seven female mortalities compared to six male mortalities). Of the seven female mortalities, one was an adult bear, one was a cub, and five were subadults. The limited data is not sufficient to produce a meaningful rate of human-caused female grizzly bear mortality. The survival of female grizzly bears, especially adult and subadult females, is essential to the growth and persistence of the CYE grizzly bear population. At this time, the proportion of females in human-caused mortality of grizzly bears in the CYE is higher than that desired to promote recovery. Whether or not this level of female grizzly bear mortality will continue is unknown. Grizzly bear recovery efforts will continue to work toward reducing human-caused mortality.

The Service concludes that the 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 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. However, the loss of one female over a 35-year period would not appreciably reduce the long-term survival of the Cabinet Mountains grizzly bears or the grizzly bear population in the CYE. Further, the effects of the mine will impact the Cabinet portion of the ecosystem and would not be expected to appreciably reduce the numbers, distribution, or survival of those bears living predominantly in the Yaak portion of the ecosystem. The human-caused mortality rate, including known and unknown mortality, could increase to as high as 4.30 percent annually, which would prolong the length of time needed for recovery of the CYE grizzly bear population but is not within the range of human-caused mortality that would reasonably be expected to lead to imminent decline.

The potential for the levels of incidental take in each of the projects in the baseline is reduced by the terms and conditions in the incidental take statements. For the proposed action, the revised mitigation plan substantively reduces the potential for take. The revised mitigation plan may also mitigate for any take that does occur due to the mine by reducing the potential for take of grizzly bears not attributable to the mine. For instance, the law enforcement and bear specialist would result in positive impacts within the entire Cabinet portion of the ecosystem through grizzly bear education programs, working closely with the mine employees and the general public throughout

the Cabinet Mountains to foster support for grizzly bear recovery, and provide a heightened law enforcement presence over that that currently exists in the area. The mitigation plan also requires bear resistant garbage receptacles on Forest lands within the Cabinets, at the county garbage transfer station near the mine entrance, and the presence of a grizzly bear monitoring and research effort in order to avoid jeopardy. Finally, the oversight committee would be responsible to coordinate implementation of the mitigation measures, and ensure their effectiveness or make changes or revisions. It is possible, and anticipated, that such efforts would work proactively to reduce human-caused mortality of grizzly bears in Cabinets outside the action area.

### **Reasonable and Prudent Measures**

This biological opinion includes reasonable and prudent measures (RPM) 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. The Forest shall ensure no net decrease in core area, and no net increase in open or total motorized route densities occur 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 (FDR 4784) to increase core area in BMU 5 for the life of the mine.
  - d. Currently, Midas Howard Creek Road (FDR 4778) is restricted year-long; the South Fork Miller Creek Road (FDR 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 mine construction phase, the Forest and Sterling Mining Company, along with MFWP and Service grizzly bear personnel, shall assess county garbage transfer stations along the Clark Fork corridor other than the site near the mine entrance. The Forest, Sterling Mining Company and Service shall work toward providing partial funding and/or support to Sanders County to upgrade these sites to make them grizzly bear resistant at sites deemed in need of such action.
  - b. Prior to the construction of the evaluation adit, the Forest shall ensure that the Sterling Mining Company shall provide funding for the grizzly bear specialist and

the law enforcement officer for a period of no less than 5 years. This 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. After the evaluation adit, in the event that Sterling 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.

- c. 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.
- d. 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.
- e. 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 specialist and the Service to assess whether the conditions leading to the incident may also be a risk to grizzly bears in the area.
- f. The Forest shall work with the grizzly bear specialist on public outreach programs that will increase awareness of grizzly bear conservation issues among the public in and surrounding the Cabinet Mountains.
- g. The Forest shall prepare an annual report of grizzly bear and black bear sanitation incidents and corrective measures taken by April of the following year.
- h. The Forest shall prepare an annual report to the Service that summarizes actions taken to comply with the above terms and conditions implementing RPMs 1, 2, and 3.

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.

## **CONSERVATION RECOMMENDATIONS**

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1) We recommend that the Forest continue to work on the development and implementation of a proactive Forest-wide food and attractant storage order to address grizzly bear sanitation issues on national forest lands into the future.

2) Use the list of native species in Tables G-4 through G-6 of the FEIS Revegetation Plan, Appendix G and ensure that a full mix of native species is planted and established following reclamation. Avoid the use of aggressive non-native grasses such as orchard grass, foxtail and mountain brome in any reclamation mix. Require re-seeding of natives in the likely event of failure. Ensure that native shrubs and forbs, particularly fruit and nut-bearing shrubs, are cultivated from on-site sources and cultivated in the vicinity, so that seed or live plants can be acclimated and used for transplant on the reclamation lands. Plant such established individual shrubs at regular intervals throughout the reclamation lands similar to the density and clumpiness found on undisturbed habitat in the CYE. Incorporate weed controls on these lands for whatever time is necessary to stop weed invasion before native vegetation is assured. Do not authorize release from the reclamation phase of the mine until a suitable mix and distribution of native shrubs, trees, forbs, and grasses has been established and is self-perpetuating.

2) Ensure that the optional organic matter and fertilizer addressed in the EIS is required to be incorporated into all topsoil storage piles at the time it is initially removed so that when the soil is to be re-applied to reclamation sites, the soil biota and organic matter would be more thoroughly incorporated. Additional organic matter may be added at the time the topsoil is placed on the reclamation site.

3) Require that wetland mitigation acres also include enhancements to ensure the natural functioning of these important systems will occur following mitigation. Consider a mitigation ratio of at least 2:1 or 3:1.

## **REINITIATION NOTICE**

This concludes formal consultation on the proposed Sterling Corporation 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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