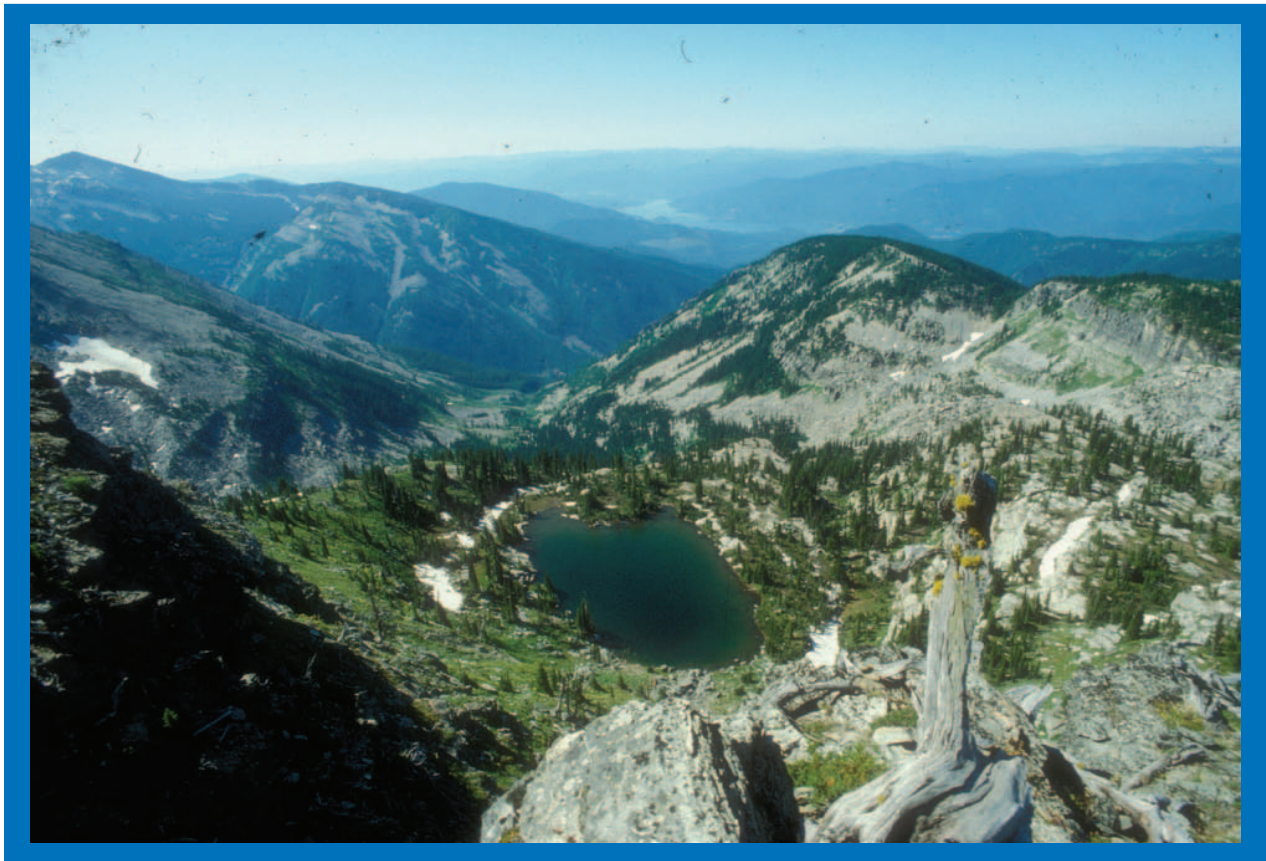


Final Record of Decision Rock Creek Project

August 2018



Cliff Lake from Saint Paul Peak

Photo by Michael Burnside



United States Department of Agriculture
Forest Service
Northern Region
Kootenai National Forest



The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice or text telephone (TTY)).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, 1400 Independence Avenue, SW, Washington, DC 20250-9410 or call (800) 795-3272 (voice) or (202) 720-5964 (TTY). USDA is an equal opportunity provider and employer.

Contents

1.1	Introduction	1
1.2	Background.....	2
1.2.1	Project History	2
1.2.1.1	Prior National Environmental Policy Act Analysis	2
1.2.1.2	Litigation History	2
1.2.1.3	SEIS Preparation.....	3
1.2.1.4	Draft ROD Preparation and Objection Review Final SEIS	4
1.2.1.4.1	Cooperating Agencies	4
1.2.1.4.2	Public Review of the SEIS	4
1.2.2	Proposed Action.....	5
1.2.3	Purpose and Need	5
1.3	Issues Considered	6
1.4	KNF Decisions and Rationale for Decisions	7
1.4.1	KNF Decisions	7
1.4.1.1	Key Requirements before Phase I Initiation	9
1.4.1.2	Data Collection and Monitoring Plan Submittal during Phase I.....	10
1.4.1.3	Review of Phase I Plans and Reports.....	10
1.4.2	Description of the Selected Alternative (Alternative V).....	11
1.4.3	Environmentally Preferred Alternative	12
1.4.4	KNF Rationale	12
1.4.4.1	Issue 1: Effects on quantity and quality of Montana and Idaho surface water and groundwater.....	12
1.4.4.2	Issue 2: Effects on fish and wildlife and their habitats and current and proposed threatened and endangered (T&E) species	14
1.4.4.3	Issue 4: Impacts on socioeconomics of surrounding communities	16
1.4.4.4	Issue 5: Effects on old-growth ecosystems	17
1.4.4.5	Issue 6: Effects on wetlands and nonwetland waters of the U.S.....	17
1.4.4.6	Issue 7: Effects on public access and traffic safety.....	17
1.4.4.7	Issue 8: Effects on aesthetic quality, including noise, visual, and wilderness experiences.....	17
1.4.4.8	Issue 9: Effects on the traditional cultural property of the Kootenai tribal people.....	18
1.4.4.9	Issue 10: Subsidence risk	18
1.5	Selected Alternative Compliance with Federal and State Laws, Regulations, and Executive Orders	25
1.5.1	Laws and Regulations Applicable to the Forest Service.....	25
1.5.1.1	Organic Administration Act.....	25
1.5.1.2	36 CFR 228 Subpart A.....	25
1.5.1.2.1	Plan of Operations (228.4)	25
1.5.1.2.2	Plan of Operations—Approval (228.5)	26
1.5.1.2.3	Availability of Information to the Public (228.6).....	26
1.5.1.2.4	Inspection and Compliance (228.7).....	26
1.5.1.2.5	Requirements for Environmental Protection (228.8)	26
1.5.1.2.6	Maintenance during Operations and Public Safety (228.9).....	29
1.5.1.2.7	Cessation of Operations and Removal of Structures and Equipment (228.10)	29
1.5.1.2.8	Prevention and Control of Fire (228.11)	30
1.5.1.2.9	Access (228.12).....	30
1.5.1.2.10	Bonds (228.13).....	30

1.5.1.2.11	Operations within National Forest Wilderness (228.15).....	30
1.5.1.3	Alaska National Interest Lands and Conservation Act	31
1.5.1.4	Clean Air Act	31
1.5.1.5	Clean Water Act.....	32
1.5.1.5.1	Surface and Groundwater	32
1.5.1.5.2	Wetlands and Nonwetland Waters of the U.S.	33
1.5.1.5.3	Finding	33
1.5.1.6	Endangered Species Act.....	34
1.5.1.6.1	Consultation	34
1.5.1.6.2	Mitigation Measures in the Selected Alternative	35
1.5.1.6.3	Finding	36
1.5.1.7	Farmland Protection Policy Act.....	37
1.5.1.8	Forest Service Manual (2670).....	37
1.5.1.9	Forest Service’s Minerals Program Policy of 1995	37
1.5.1.10	General Mining Act	38
1.5.1.11	Migratory Bird Treaty Act/Executive Order 13186—Migratory Birds	38
1.5.1.12	Mining and Minerals Policy Act.....	39
1.5.1.13	Montana Noxious Weed Act and County Weed Control Act.....	39
1.5.1.14	Montana Water Use Act and the Montana Reserved Water Rights Compact	40
1.5.1.15	National Environmental Policy Act and Regulations 40 CFR 1500-1508.....	40
1.5.1.16	National Forest Management Act/2015 Kootenai Forest Plan.....	41
1.5.1.17	Roadless Area Conservation Rule.....	41
1.5.1.18	Wilderness Act.....	42
1.5.1.19	Wild and Scenic Rivers Act.....	43
1.5.1.20	Executive Order 11988—Floodplain Management	44
1.5.1.21	Executive Order 11990—Protection of Wetlands.....	44
1.5.1.22	Executive Order 12962—Effects on Recreational Fishing	45
1.5.1.23	Executive Order 13112—Invasive Species.....	45
1.5.2	Kootenai National Forest Responsibilities to Federally Recognized Tribes	45
1.5.2.1	1855 Hellgate Treaty.....	45
1.5.2.2	American Indian Religious Freedom Act	46
1.5.2.3	National Historic Preservation Act	47
1.5.2.4	Executive Order 12898—Environmental Justice.....	48
1.5.2.5	Executive Order 13007—Consultation with Tribes on Indian Sacred Sites	49
1.5.2.6	Executive Order 13175—Government-to-Government Consultation with Tribes	49
1.6	Alternatives Not Selected and the KNF Rationale	49
1.6.1	Alternative I—No Action Alternative.....	52
1.6.1.1	Description of Alternative.....	52
1.6.1.2	Rationale for Not Selecting Alternative I.....	52
1.6.2	Alternative II—RCR’s Proposed Rock Creek Project.....	53
1.6.2.1	Description of Alternative.....	53
1.6.2.2	Rationale for Not Selecting Alternative II	53
1.6.3	Alternative III—Proposed Project with Additional Mitigation	53
1.6.3.1	Description of Alternative.....	53
1.6.3.2	Rationale for Not Selecting Alternative III.....	54
1.6.4	Alternative IV—Modified Rock Creek Project with Additional Mitigation	54
1.6.4.1	Description of Alternative.....	54
1.6.4.2	Rationale for Not Selecting Alternative IV.....	54
1.6.5	Alternatives Eliminated from Detailed Study.....	55

1.7 Permits, Licenses, and Approvals Needed to Implement the Decision 55

 1.7.1 Status of Major Permits and Approvals 58

 1.7.1.1 Exploration License 58

 1.7.1.2 Air Quality Permit..... 58

 1.7.1.3 Water Quality Permits..... 58

 1.7.1.4 Public Water Supply and Sewer Approval..... 59

 1.7.1.5 U.S. Army Corps of Engineers—404 Permit..... 59

 1.7.1.6 U.S. Fish and Wildlife Service—Biological Opinions 60

1.8 Public, Agency, and American Indian Participation 61

 1.8.1 Public Participation..... 61

 1.8.2 American Indian Consultation 62

 1.8.2.1 Interested Tribes..... 62

 1.8.2.2 Consultation Process 62

 1.8.2.2.1 FEIS (2001) and 2003 ROD 62

 1.8.2.2.2 SEIS 63

 1.8.3 Changes Suggested by Tribes, Agencies, and the Public and the KNF’s Response 64

1.9 Reclamation Bond (Financial Assurance) 65

 1.9.1 Authorities 65

 1.9.2 Reclamation Costs 66

1.10 Predecisional Administrative Review (Objection Process) 66

1.11 Additional Information 67

1.12 Approvals 68

Tables

Table 1. Comparison of the Effects of Phase I (Evaluation) Alternatives Relative to Key Scoping Issues. 19

Table 2. Comparison of Phase I Alternatives. 50

Table 3. Permits, Licenses, and Approvals Required for Phase I of the Rock Creek Project. 56

Table 4. Status of MPDES Permits Pertinent to Phase I. 59

Figures

Figure 1. Location Map, Rock Creek Project, Kootenai National Forest. 69

Figure 2. Facilities Location, Selected Alternative (Alternative V), Phase I. 70

Figure 3. Land Ownership. 71

Figure 4. Bedrock Geology and Associated Lakes, Streams, and Faults. 72

Figure 5. Wilderness, Wild and Scenic River Corridors, and Roadless Areas. 73

Attachments

- Attachment 1 - Selected Alternative
- Attachment 2 - Approved Stipulations/Mitigation Measures and Other Requirements
- Attachment 3 - Conceptual Monitoring Plans
- Attachment 4 - Rock Creek Project-Specific Plan Amendment
- Attachment 5 - KNF’s Terrestrial Threatened and Endangered Species Mitigation Plan
- Attachment 6 - USFWS Terms and Conditions in the Biological Opinion for the Grizzly Bear
- Attachment 7 - USFWS Terms and Conditions in the Biological Opinion for the Bull Trout and Bull Trout Critical Habitat
- Attachment 8 - KNF’s 2017 Bull Trout Supplemental Biological Assessment

Acronyms

Acronym	Definition
ARM	Administrative Rules of Montana
BA	Biological Assessment
BMP	best management practice
BO	Biological Opinion
CAA	Clean Air Act
CFR	Code of Federal Regulations
CMW	Cabinet Mountains Wilderness
Corps	U.S. Army Corps of Engineers
CWA	Clean Water Act
DEIS	Draft Environmental Impact Statement
DEQ	Montana Department of Environmental Quality
EIS	Environmental Impact Statement
EO	executive order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
Forest Service	USDA Forest Service
FSM	Forest Service Manual
FWP	Montana Fish, Wildlife, and Parks
IRA	inventoried roadless area
2015 KFP	Kootenai National Forest Land Management Plan
KNF	Kootenai National Forest
MAQP	Montana Air Quality Permit
MCA	Montana Code Annotated
MMRA	Metal Mine Reclamation Act
MOU	Memorandum of Understanding
MPDES	Montana Pollutant Discharge Elimination System
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act
NFS	National Forest System
RCR	RC Resources, Inc.
ROD	Record of Decision
SEIS	Supplemental Environmental Impact Statement
T&E	threatened and endangered
TCP	traditional cultural property
USC	United States Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service

USDA Forest Service Record of Decision Rock Creek Project

1.1 Introduction

This document is the U.S. Department of Agriculture (USDA), Kootenai National Forest (KNF) Record of Decision (ROD) for the Rock Creek Project. The KNF intends to approve an Amended Plan of Operations for Phase I of the Rock Creek Project, a copper and silver underground mine and associated facilities in northwestern Montana, near Noxon in Sanders County (Figure 1), consistent with Phase I of Alternative V as presented in its Final Supplemental Environmental Impact Statement (Final SEIS) (Figure 2). RC Resources, Inc. (RCR), a wholly owned subsidiary of Hecla Mining Company (Hecla), will be the project operator. RCR currently owns the mineral estate for the Rock Creek ore deposit beneath and adjacent to the Cabinet Mountains Wilderness (CMW) in the Cabinet Ranger District of the Kaniksu National Forest, which is administered by the KNF (Figure 3).

The proposed action will affect private and National Forest System (NFS) lands (Figure 3). To operate, the project will require a Plan of Operations for Phase I approved by the KNF, as well as permits and approvals from the Montana Department of Environmental Quality (DEQ), U.S. Army Corps of Engineers (Corps), and other state and local agencies. USDA Forest Service (Forest Service) authorities apply only to NFS lands and do not extend to private lands within or adjacent to the KNF.

The CMW became a unit of the National Forest Wilderness Preservation System with the passage of the Wilderness Act on September 3, 1964. The Wilderness Act requires the Forest Service to ensure that valid rights exist before approving mineral activities inside a congressionally designated wilderness area. To establish valid existing rights, mining claimants must show they have made a discovery of a valuable mineral deposit on the claim(s) before the withdrawal date and have maintained that discovery. In 1985, the Forest Service determined that RCR's predecessor-in-interest had established valid existing rights to the deposit. The Bureau of Land Management issued patents to 99 lode mining claims (1,686 acres within the CMW and 123 acres outside but adjacent to the CMW). In accordance with the Wilderness Act, RCR's predecessor-in-interest received a patent only to the minerals within the wilderness, with the federal government retaining the surface estate. For those claims outside the wilderness, RCR received title to both the surface and mineral estate. These patented mining claims contain the ore reserves RCR has proposed to mine. Holders of validly existing mining claims within National Forest Wilderness are accorded the rights provided by U.S. mining laws and must comply with the Forest Service mineral regulations. Mining operations can occur in the wilderness but may be subject to additional management requirements to those imposed on operations outside of a wilderness, provided those requirements do not prevent the operator from exercising their rights under U.S. mining laws.

This document is the KNF ROD only. DEQ and the KNF issued a joint ROD on the proposed Rock Creek Project in 2001, and DEQ's decision remains in effect (Section 1.2.1, *Project History*). Decisions by other agencies are documented in separate decision documents (Section 1.7, *Permits, Licenses, and Approvals Needed to Implement the Decision*).

This document describes the KNF decision, rationale for the decision, and alternatives considered in reaching the decision. It also includes a discussion of preferences among alternatives based on relevant

factors and how I, the KNF Supervisor, balanced those factors in the decision-making process. Key requirements for beginning Phase I are described in Section 1.4.1.1, *Key Requirements before Phase I Initiation*.

1.2 Background

1.2.1 Project History

In 1987, ASARCO submitted a Plan of Operations/Application for a Hard Rock Operating Permit for the Rock Creek Project to the KNF and the former Montana Department of State Lands (now DEQ). A Draft Environmental Impact Statement (DEIS) for the Rock Creek Project was issued in 1995, followed by a Supplemental DEIS in 1998. The focus of the Supplemental DEIS was the development and evaluation of the KNF's and DEQ's preferred alternative, Alternative V, which included improvements in wastewater treatment, pipeline construction, and paste tailings deposition as a form of tailings disposal. Alternative V was developed to address comments on the 1995 DEIS.

In 1999, Sterling Mining Company (Sterling) purchased the mine property and mining claims from ASARCO. The property was ultimately conveyed to RCR, a subsidiary of Revett Mining Company, Inc. (Revett). In June 2015, Hecla acquired Revett and all associated subsidiary organizations, as well as its assets, which include the Troy Mine and the Rock Creek Project. Soon thereafter, the name of Revett Mining Company, Inc. was changed to Hecla Montana, Inc. RCR, a wholly owned subsidiary of Hecla Montana, Inc., is the project proponent for the Rock Creek Project. RCR has indicated it intends to advance the permitting of the Rock Creek Project.

1.2.1.1 Prior National Environmental Policy Act Analysis

The KNF and DEQ issued a Final EIS (FEIS) and a joint ROD for the Rock Creek Project in 2001. The U.S. Environmental Protection Agency (EPA) and the Corps were cooperating agencies. The 2001 FEIS analyzed potential impacts of Sterling's proposed action—construction and operation of the Rock Creek Project—and four alternatives. The KNF and DEQ selected Alternative V for implementation in the 2001 ROD.

1.2.1.2 Litigation History

The adequacy of the U.S. Fish and Wildlife Service's (USFWS) 2000 Biological Opinion (BO) on the Rock Creek Project was challenged in federal court, and in 2002 the USFWS withdrew its BO as a requirement for litigation settlement (Section 1.7.1.6, *U.S. Fish and Wildlife Service—Biological Opinions*). Without a valid BO, the KNF could not demonstrate that the 2001 ROD met Endangered Species Act (ESA) requirements during the appeal review and therefore withdrew its part of the 2001 Joint KNF and DEQ ROD. The USFWS issued a new BO in 2003, followed by the KNF's issuance of a new ROD in 2003.

The KNF prepared a Supplemental EIS (SEIS) in response to a March 2010 U.S. District Court decision in *Rock Creek Alliance et al. v. USFS, Revett Silver Company, and USFWS* (CV 05–107–M–DWM and CV 08–028–M–DWM consolidated). In its May 2010 opinion, the court found deficiencies in the 2001 FEIS. The court remanded the 2001 FEIS to the Forest Service for further action and vacated the Forest Service's 2003 ROD. Deficiencies found by the court are that the Forest Service (1) failed to clearly require Revett Silver Company, now RCR, to implement the sediment source reduction measures during Phase I of the Rock Creek Project; (2) did not consider supplemental information about bull trout populations and habitat in a National Environmental Policy Act (NEPA) document; and (3) did not show Riparian Habitat Conservation Areas clearly enough to determine effects. In addition, other resource

analyses where the Forest Service identified significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts were updated in the SEIS.

The Final SEIS addresses the deficiencies found by the court by:

- Describing sediment source reduction measures, monitoring separately for Phase I and Phase II, and providing an updated analysis of potential effects of increased sediment from implementation of the alternatives and the effectiveness of sediment mitigation
- Incorporating supplemental information about bull trout populations and habitat
- Providing updated maps and descriptions of Riparian Habitat Conservation Areas and disclosing an updated analysis of Riparian Habitat Conservation Areas

Sediment source reduction measures are clarified for Phase I and Phase II in Section 2.3.1.16 and Appendix N of the Final SEIS. Monitoring of sediment mitigation is described in Section 4.7 of the updated Appendix K to the Final SEIS. Section 4.7 of the Final SEIS provides an updated analysis of potential effects of increased sediment from implementation of the alternatives and the effectiveness of sediment mitigation. In summary, as a result of new road construction, road reconstruction and improvements, road obliteration, and facility development, an estimated 66.1 tons per year in annual sediment yield at the height of construction was predicted. To compensate for a possible underestimation of effects and model inaccuracy, the mitigation requirement established for the mine project was 400 tons for the combined Phase I and Phase II activities within the Rock Creek watershed. Phase I sediment mitigations implemented simultaneous with road activities will reduce sediment delivery to streams by 234 tons per year after mitigations are implemented, which, based on the land-disturbing activities that would occur in Phase I, will be more than required to mitigate Phase I effects. Compliance with terms and conditions of the existing Montana Pollutant Discharge Elimination System (MPDES) permits for Phase I will ensure that sediment effects are minimized.

Supplemental information about bull trout populations and habitat, including current bull trout critical habitat and survey data, is provided in Final SEIS Sections 3.13 and 4.13. The analysis of effects on bull trout and its habitat in Section 4.13 also was updated to include new information since the 2001 FEIS was issued, specifically, Kootenai National Forest Land Management Plan (2015 KFP) standards and guidelines including Inland Native Fish Strategy standards and guidelines, designation of bull trout critical habitat, development of a 3D groundwater model, clarification of Phase I and Phase II sediment mitigation, and minor modifications to Phase I of Alternative V. The KNF reinitiated formal consultation with the USFWS in March 2017 following submission of a Supplemental Biological Assessment (BA) for bull trout and bull trout critical habitat. As a result, the USFWS issued a revised BO in November 2017, concluding the proposed action is “not likely to jeopardize” the continued existence of bull trout, and “would not result in the adverse modification or destruction of designated bull trout critical habitat.”

The Final SEIS provides updated maps of the project facilities and Riparian Habitat Conservation Areas. Final SEIS Section 3.11 provides an updated description of Riparian Habitat Conservation Areas, and Section 4.11 discloses an updated analysis of the effects on Riparian Habitat Conservation Areas. Less than 1 acre of Phase I surface disturbance will occur in Riparian Habitat Conservation Areas, at the borrow area in Lower Rock Creek. Potential effects on Riparian Habitat Conservation Areas of sediment generated from Phase I activities will be mitigated through implementation of the Sediment Mitigation Plan and compliance with existing MPDES permits.

1.2.1.3 SEIS Preparation

For the SEIS, the KNF’s preferred alternative (Alternative V) was clarified and refined. The analyses disclosed in the 2001 FEIS were updated or supplemented for resources that may have been significantly affected by changes in circumstances or new information. Only the specific issues associated with

supplemental information pertaining to Alternative V were addressed; therefore, not all the subsections within each resource section were included. Issues satisfactorily addressed in the 2001 FEIS were not discussed in the SEIS.

1.2.1.4 Draft ROD Preparation and Objection Review Final SEIS

The KNF prepared the Draft ROD and Objection Review Final SEIS in 2017 and completed an administrative review of the Draft ROD in accordance with the requirements of 36 Code of Federal Regulations (CFR) 218. The Objection Reviewing Officer issued a response letter on October 31, 2017, instructing the KNF Supervisor to issue a Final ROD that will approve only Phase I activities. Following completion of Phase I and based on monitoring data and analysis, the KNF will make a new decision regarding Phase II in a separate decision document.

1.2.1.4.1 Cooperating Agencies

Montana Department of Environmental Quality. Because DEQ's decision in the 2001 ROD remains in effect, DEQ did not participate in the Final SEIS.

U.S. Army Corps of Engineers. The Corps is the permitting authority for the discharge of dredged or fill material into wetlands and nonwetland waters of the U.S. The Corps was a cooperating agency for the Final SEIS.

U.S. Environmental Protection Agency. The EPA has oversight responsibility for federal Clean Water Act (CWA) programs delegated to and administered by DEQ. The EPA may also intervene to resolve interstate disputes where discharges of pollutants in an upstream state may affect water quality in a downstream state. The EPA also reviews 404 permit applications and provides comments to the Corps. The EPA has veto authority under the CWA for decisions made by the Corps on 404 permit applications. The EPA also has responsibilities under NEPA and the federal Clean Air Act (CAA) to cooperate in the preparation of EISs and to review draft EISs and federal actions potentially affecting the quality of the environment. In addition, the EPA evaluates the adequacy of information in EISs, the overall environmental impact of proposed actions, and various alternatives.

The EPA served as a cooperating agency for the Final SEIS. The EPA provided comments on the Draft SEIS during the public comment period (Section 1.8.3, *Changes Suggested by Tribes, Agencies, and the Public and the KNF's Response*). The EPA's detailed comments and the KNF's responses are in Appendix S of the Final SEIS. The EPA provided comments on the Objection Review Final SEIS and the Draft ROD, and the KNF's response letter is available in the project record.

Besides reviewing the Draft SEIS and Objection Review Final SEIS, the EPA's involvement in the SEIS related to the groundwater model used for analysis in the Final SEIS and making recommendations related to the development of the Appendix K conceptual monitoring plans (Attachment 3). Specifically, the EPA reviewed the model report and participated in several meetings and conference calls with the KNF and Hydrometrics, Inc. (Hydrometrics) (model contractor). The EPA also provided comments on the model report. Finally, the EPA provided recommendations for data collection and project mitigation and management measures that the KNF incorporated into Appendix K (Attachment 3).

1.2.1.4.2 Public Review of the SEIS

The Draft SEIS was released for a 45-day public comment period on February 19, 2016. In total, the KNF received 8,632 letters, comment sheets, and transcripts on the draft (Section 1.8.1, *Public Participation*). The Draft ROD and Objection Review Final SEIS were released for a 45-day public comment period on June 21, 2017.

The Draft and Final SEIS, the 2001 FEIS, the 2003 ROD, the 2017 Draft ROD, and other project documents are available on the KNF webpage (<https://www.fs.usda.gov/detail/kootenai/landmanagement/projects/?cid=stelprdb5327758>) or may be obtained in electronic (compact disc) format from Katelyn Miller, Project Coordinator, Supervisor's Office, 31374 U.S. Highway 2, Libby, Montana 59923; by phone at (406) 293-6211. Hard copies are available at the Laurie Hill, Lincoln County, Mansfield, Montana State, and Thompson Falls libraries, at the Trout Creek Ranger Station in Trout Creek, MT, and the Kootenai Forest Supervisor's Office in Libby, MT.

1.2.2 Proposed Action

The Rock Creek Project is a copper and silver underground mine project proposed by RCR. The proposed action is to implement the project, which will allow for the construction of an evaluation adit into the Rock Creek deposit for purposes of collecting data to refine the final mine design. RCR currently owns the mineral estate for the Rock Creek ore deposit beneath and adjacent to the CMW in the Cabinet Ranger District of the Kaniksu National Forest, which is administered by the KNF. The evaluation adit portal pad will be located within the Kaniksu National Forest, and access to the portal pad will be via NFS roads #2741 and #150.

Before construction of the evaluation adit, RCR will submit all reclamation, grading, and revegetation plans for all Phase I-related facilities not already covered in the Phase I Reclamation Plan described in the Rock Creek Evaluation Adit License Application to the KNF and DEQ for review and final approval, as described in Attachment 1. If after 5 years from initiating construction of the evaluation adit, the remaining selected alternative activities have not proceeded, the KNF will consult with RCR; DEQ; Montana Fish, Wildlife, and Parks (FWP); EPA; USFWS; tribal representatives; and other interested agencies on interim or final reclamation plans to be implemented as outlined below, and the timeframes for implementation.

If subsequent phases were not authorized and implemented, RCR would reclaim all project-related facilities in accordance with DEQ permits and approvals. Any existing monitoring well installed by RCR or its predecessors on NFS lands would be removed and plugged according to Administrative Rules of Montana (ARM) 36.21.810. The well casing would be removed below the ground surface, and the well covers removed and disposed off-site. The small area associated with the monitoring well would be regraded to blend with the natural surroundings. The area would be ripped if appropriate, and soil would be placed consistent with the general soils placement plans. All other monitoring equipment, such as electronic data collection devices, would be removed.

1.2.3 Purpose and Need

The KNF's overall purpose and need is to process RCR's proposed Plan of Operations and to follow all applicable laws, regulations, and policies pertaining to the proposal. The role of the KNF under its primary authorities in the Organic Administration Act, Locatable Minerals Regulations 36 CFR 228 Subpart A, and the Multiple Use Mining Act is to reasonably regulate mining activities to minimize adverse environmental effects on NFS surface resources and comply with all applicable environmental laws. The KNF has no authority to unreasonably circumscribe or prohibit reasonably necessary activities under the General Mining Act that are otherwise lawful.

From the perspective of the Forest Service, the need is to:

- Respond to RCR's proposed Plan of Operations for the Rock Creek copper and silver deposit

- Ensure the alternative selected in this ROD requires the operator to comply with applicable federal and state laws and regulations
- Ensure the alternative selected in this ROD, where feasible, minimizes adverse environmental impacts on NFS surface resources
- Ensure measures are included, where practicable, that provide for reclamation of the surface disturbance

1.3 Issues Considered

During initial EIS scoping, the KNF and DEQ identified the significant issues from written comments and a series of public and agency meetings. These issues were used as criteria in defining and evaluating the alternatives. Eight issues, defined as indicators of potentially significant effects, emerged from the scoping process:

- Issue 1: Effects on quantity and quality of Montana and Idaho surface water and groundwater
- Issue 2: Effects on fish and wildlife and their habitats and current and proposed threatened and endangered (T&E) species
- Issue 3: Stability of the tailings facility
- Issue 4: Impacts on socioeconomics of surrounding communities
- Issue 5: Effects on old growth ecosystems
- Issue 6: Effects on wetlands and nonwetland waters of the U.S.
- Issue 7: Effects on public access and traffic safety
- Issue 8: Effects on aesthetic quality, including noise, visual, and wilderness experiences

The descriptions of the eight issues originally defined and the means for predicting their associated impacts are found on pages 2-1 through 2-4 of the 2001 FEIS. Two new issues identified for the Final SEIS are described below. Not all issues have bearing on Phase I activities; however, the issues pertain to the project as a whole and were instrumental in defining the alternatives considered and selecting Phase I activities associated with Alternative V of the Rock Creek Project.

Issue 9: Effects on the traditional cultural property of the Kootenai tribal people

After the 2001 FEIS and ROD were issued, consultation between the KNF and the Confederated Salish and Kootenai Tribes in 2007 indicated that the development of the Rock Creek Mine may threaten an area identified by the tribes as a sacred site and a traditional cultural property (TCP). A TCP may be eligible for listing on the National Register of Historic Places because of its association with cultural practices or beliefs of a living community that (a) are rooted in the history of the community or tribe, and (b) are important in maintaining the continuing cultural identity of the community or tribe.

Issue 10: Subsidence risk

Subsidence is the sudden sinking or gradual downward settling of the earth's surface with little or no horizontal motion. In 2005, two sinkholes developed above the Troy Mine. In 2012, previously unknown evidence of trough subsidence was observed above the Troy Mine. Due in part to similarities in their geologic settings, RCR proposed an underground room-and-pillar mining method for the Rock Creek Project similar to that used at the Troy Mine. Subsidence is a concern for the Rock Creek Project because the underground mine will be beneath the CMW.

1.4 KNF Decisions and Rationale for Decisions

I, the KNF Supervisor, must make a number of decisions on RCR's proposal and its associated permits. The decisions must comply with all applicable federal environmental laws and regulations. Forest Service decision authority applies only to NFS lands and does not extend to private lands within or adjacent to the KNF.

1.4.1 KNF Decisions

The decision objective is to select an action that recognizes the legal rights of RCR, while protecting the environment in compliance with applicable laws, regulations, and policies. The EIS process was used to develop the necessary information to make an informed decision as required by NEPA, Forest Service Locatable Minerals Regulations at 36 CFR 228 Subpart A, and the Mining and Minerals Policy Act.

As the KNF Supervisor, I have determined in accordance with 36 CFR 228.5(a)(3) that changes and additions to the submitted Plan of Operations are necessary to meet the purposes of the applicable statutes and regulations. The required changes and additions to the submitted Plan of Operations are detailed in the following sections of this ROD. It is my decision to approve an amended Phase I Plan of Operations for the evaluation of the Rock Creek copper and silver deposit consistent with Alternative V of the Final SEIS as modified by this ROD. An amended Phase I Plan of Operations consistent with this decision must be submitted to me for my approval before implementation. RCR may only commence activities under the amended Plan of Operations after the KNF confirms that the requirements associated with Phase I of the Plan of Operations have been met and after RCR has received a signed approval from me to proceed.

Phase I of Alternative V, which I have selected for implementation, will subsequently be called the "selected alternative" and is summarized in Section 1.4.2, *Description of the Selected Alternative (Alternative V)*, below and described in Attachment 1.

The selected alternative includes applicable modifications, mitigations, and monitoring plans made since the 2003 ROD. This ROD includes a description of the selected alternative (Attachment 1) and revised stipulations (Attachment 2). The selected alternative includes Conceptual Monitoring Plans (Attachment 3) as well as the KNF's Terrestrial Threatened and Endangered Species Mitigation Plan (Attachment 5) and Bull Trout Mitigation Plan (Section 1.5.1.6, *Endangered Species Act*, and Attachment 1 Section 2.10, *Monitoring and Mitigation Plans*). I accept, and the KNF will implement or require RCR to implement, all terms and conditions applicable to Phase I from the USFWS BO for the grizzly bear (Attachment 6), and the terms and conditions from the USFWS 2017 revised BO for bull trout and bull trout critical habitat (Attachment 7), consistent with USFWS's 2018 letter clarifying the terms and conditions..

My decision also includes approval of an amendment to the 2015 Kootenai Land Management Plan, also known as the Kootenai Forest Plan (2015 KFP), in order to implement the selected alternative while still maintaining consistency with the 2015 KFP. Forest Service approval of mineral exploration must comply with applicable forest plan direction, and the Forest Service cannot prohibit locatable minerals operations on lands subject to the United States mining laws either directly or by regulation amounting to a prohibition. A forest plan amendment is required if proposed evaluation activities cannot comply with any applicable forest plan component after all reasonable stipulations to minimize adverse environmental impacts on NFS surface resources have been included per 36 CFR 228. The 2015 KFP amendment allows a project-specific variance suspending the requirement for full consistency with one forestwide guideline. The amendment is summarized in Section 2.11 of Attachment 1 and described fully in Attachment 4.

My decision allows RCR to disturb 10.4 acres of NFS land. The selected alternative will result in construction of the evaluation adit and support facilities. During Phase I, water from the evaluation adit

will be treated and discharged to infiltration ponds (groundwater). Environmental requirements in addition to those proposed by RCR will be incorporated to avoid (or where feasible, minimize or eliminate) environmental impacts.

Monitoring will help detect trends as well as indicate if additional measures might be needed to minimize impacts. Action levels or thresholds will be developed to determine if additional actions or modification of mitigation is needed. Contingency measures will be developed to respond to and control any unacceptable impacts that may be detected, as determined from monitoring. All plans, mitigation measures, and monitoring requirements must be submitted and approved by the KNF as sequenced and outlined in this ROD prior to the Forest Service approving RCR to proceed with those actions affecting NFS lands. All disturbances related to the evaluation activities will be fully bonded for reclamation (Section 1.9, *Reclamation Bond (Financial Assurance)*).

My decision requires RCR to:

- Agree to and submit for my approval an amended Plan of Operations for Phase I consistent with (1) this ROD; (2) the selected alternative of the Final SEIS (as described in Attachment 1 of this ROD); and (3) the stipulations, monitoring, and mitigation measures specified in Attachment 1, Attachment 2, Attachment 4, and Attachment 6.
- Commence activities associated with the amended Plan of Operations only after the KNF confirms that the terms associated with Phase I have been met and after RCR has received a signed approval from me to proceed.
- Proceed with the selected alternative as summarized below in Section 1.4.2, *Description of the Selected Alternative (Alternative V)*, and described fully in Attachment 1. Key items that RCR must complete before Phase I are summarized below in Section 1.4.1.1, *Key Requirements before Phase I Initiation*. A list of requirements for Phase I is in Attachment 2.
- Post a joint reclamation bond to ensure that both federal and state reclamation requirements are met. The KNF and DEQ will share responsibility to monitor and inspect the Rock Creek Project. As stipulated in the 1989 Memorandum of Understanding (MOU) between the Forest Service-Northern Region and the Montana Department of State Lands (now DEQ), a joint reclamation bond will be held by the KNF and DEQ to ensure compliance with the reclamation plan, associated approved Phase I Plan of Operations, and DEQ's Exploration License. If RCR defaults on its obligations, the agencies may jointly or separately collect the bond with the concurrence of the other agency. Even if the reclamation bond is collected by one of the agencies, the bond must be expended in a manner that satisfies both federal and state reclamation requirements. Financial assurance is discussed in more detail in Section 1.9, *Reclamation Bond (Financial Assurance)* and in Final SEIS Section 1.6.6, *Financial Assurance*.

DEQ's permit decision and associated conditions on MPDES permits, DEQ's decision and associated conditions on a 401 certification, and DEQ's decision and associated conditions on other state water quality permits constitute compliance with Montana water quality requirements and CWA requirements regarding water quality (Section 1.5.1.5, *Clean Water Act*). DEQ's permit decision and conditions on the air quality permit constitute compliance with CAA requirements (Section 1.5.1.4, *Clean Air Act*). Similarly, the Department of Natural Resources and Conservation's permit decision and associated conditions on any beneficial water use permit constitute compliance with Montana water use requirements (Section 1.5.1.14, *Montana Water Use Act and the Montana Reserved Water Rights Compact*).

My decision is based on a thorough review of the Final SEIS, review of public and agency concerns received on this project, consultation with cooperating and regulatory agencies, consultation with

interested tribes, and the project record. A full disclosure of impacts as a result of my decision is described in Chapter 4 of the Final SEIS for the Rock Creek Project. I considered relevant scientific information, public concerns and opposing viewpoints, scientific uncertainty, and risk, which are discussed in the Chapters 3 and 4 resource sections of the Final SEIS. I met with interested members of the public to listen to their concerns and issues to help me in formulating my decisions. My rationale for selecting Phase I of Alternative V as the selected alternative is discussed below in Section 1.4.4, *KNF Rationale*.

1.4.1.1 Key Requirements before Phase I Initiation

The KNF will use the evaluation adit data to supplement, confirm, refine, and modify, if necessary, data assumptions and analyses conducted in the Final SEIS and the 2001 FEIS. RCR will develop an evaluation adit to the Rock Creek ore body and will use the evaluation adit to:

- Evaluate a portion of the ore zone in the Chicago Peak ore block and compare this information with drill hole information in this area
- Evaluate the Copper Lake Fault (Figure 4) and collect additional information on the strike, dip, and offset of the fault
- Obtain rock mechanics data to aid underground mine design
- Obtain hydrologic and geochemical data to supplement previous data and analysis
- Obtain bulk ore samples for metallurgical testing

RCR must comply with the following key items and receive KNF approval before proceeding with Phase I (a list of requirements is in Attachment 2):

- Amend and update the Plan of Operations for Phase I to make it consistent with the selected alternative (Attachment 1) and stipulations and mitigation measures (Attachment 2).
- Develop a Monitoring Action Levels portion and the Contingency Action Plan portion of the Plan of Operations for Phase I as outlined in the agencies' conceptual monitoring plans (Attachment 3), consistent with the selected alternative, as described in Attachment 1.
- Develop Rock Mechanics Data Collection and Subsidence Monitoring Plans (Section 1.7 in Attachment 3). A detailed plan for data collection and monitoring during the Phase I evaluation adit and a preliminary monitoring plan for full mine build-out (Phase II) will be submitted for agency approval before Phase I dewatering (before the evaluation adit intercepts bedrock groundwater).
- Submit an updated mine plan before Phase I that will take into account the Troy Mine subsidence in its proposal for future pillar designs and highlight how the design accounts for and differs from failed designs at the Troy Mine. The updated plan will consist of a description of the proposed mining method, focusing on preliminary pillar sizing, height-to-width ratio, and drive sizes.
- Submit for KNF approval a detailed Explosive Handling and Blasting Plan that describes the blasting agents that will be used for various conditions, powder factors used, housekeeping practices, and other relevant information to minimize the potential for elevated nitrate or ammonia concentrations occurring in surface water.
- Amend and update the reclamation portion of the Plan of Operations for Phase I to make it consistent with the selected alternative and ROD.
- Submit a reclamation performance bond acceptable to the KNF and DEQ for Phase I.
- Submit Phase I monitoring plans consistent with (1) the agencies' conceptual monitoring plans (Attachment 3); (2) the terms and conditions in the USFWS BOs (Attachment 6 and Attachment 7), and (3) conditions of any other permit or approval, such as a beneficial water use permit.

- Summarize monitoring data collection activities and how the data will be used in a Phase I Data Evaluation Plan, to be submitted to the KNF for approval before Phase I dewatering.
- Implement the monitoring for any resource, such as water resources, required in Phase I before and after dewatering of the evaluation adit, consistent with the approved monitoring plans.
- Submit final mitigation plans consistent with the selected alternative, Threatened and Endangered Species Mitigation Plan (Attachment 5 and Section 2.10 of Attachment 1), the terms and conditions of the BOs, and other state and federal permits or approvals.
- Implement all mitigation for all resources (such as fisheries or wildlife) and modifications required before initiating Phase I, as outlined in the selected alternative described in Attachment 1.
- Implement the terms and conditions relevant to Phase I as required by the 2006 BO and 2017 revised BO (Attachment 6 and Attachment 7).
- Obtain appropriate permits and a 401 certification from DEQ, unless certification is waived by DEQ, for Phase I activities if they include a discharge into waters of the U.S.
- Commence activities associated with the evaluation (Phase I) only after the terms associated with the phase have been met and after RCR has received signed approval to proceed from the KNF Forest Supervisor.

1.4.1.2 Data Collection and Monitoring Plan Submittal during Phase I

The KNF will use the evaluation adit data to supplement, confirm, refine, and modify, if necessary, data assumptions and analyses conducted in the Final SEIS and the 2001 FEIS. Information collected during construction of the evaluation adit will be used to develop and direct monitoring programs and mine designs during operations if the project is subsequently approved and implemented. Before making a decision on the project's Phase II, the KNF will assess whether the new data will require substantial revisions to the analyses conducted in support of Phase II of the project that are relevant to environmental concerns. The KNF will conduct additional NEPA analysis for Phase II of the project if the evaluation adit data indicates the need for substantial changes that are relevant to environmental concerns or identify or constitute significant new circumstances or information relevant to environmental concerns and bearing on Phase II of the project, as required by 40 CFR 1502.9(c)(1).

Although my decision to approve an amended Phase I Plan of Operations does not require it, RCR may collect additional data on NFS lands, as necessary, to inform aspects of the Phase II monitoring and project design relevant to environmental concerns. In addition, RCR may submit monitoring plans for Phase II activities following completion of Phase I activities. Although anticipated to be negligible, any ground disturbing activities associated with data collection efforts will be required to be reviewed and approved by the KNF.

1.4.1.3 Review of Phase I Plans and Reports

The KNF may use two approaches to obtain advice on technical matters relating to the Plan of Operations: (1) hiring an expert independent third-party contractor, to be funded by RCR; or (2) forming an informal interagency Technical Advisory Group of experts. These approaches can be used separately, or in combination, to obtain this additional expertise. The KNF will determine the approach that will be used to address a particular issue on a case-by-case basis, based on the best source of expert review and the complexity and significance of the issue. RCR will fund any required third-party consultant services.

During Phase I, RCR will fund an independent technical advisor to assist the KNF and DEQ in reviewing the subsidence monitoring plan, underground rock mechanics data collection plan, and mine plan. The technical advisor will be selected and directed by the KNF and DEQ through an agreement with RCR. RCR will facilitate underground inspections of the evaluation adit by the third-party technical advisor. RCR will provide representatives of the KNF and DEQ reasonable access to the underground workings to observe data collection and evaluation adit development. RCR will provide underground access, logistical support, and all information required by the technical advisor to complete a review of underground rock mechanics data collection. Assessments of the underground workings by the technical advisor may occur as frequently as quarterly, with the results of the inspections compiled into an annual assessment report. This annual report from the technical advisor will incorporate data collected as part of the ongoing monitoring program and will be in addition to the annual report prepared by RCR. The technical advisor will have no financial interest in the Rock Creek Project. All access by KNF and DEQ representatives or their technical advisor shall comply with the applicable MSHA and any other established mine safety requirements.

One or more Technical Advisory Groups may be formed to advise the KNF deciding official on technical matters pertaining to the Plan of Operations for either Phase I or II. The Technical Advisory Groups will consist of the KNF project manager; supporting Forest Service staff or third-party contractors with expertise on specific issues involving disciplines such as geochemistry, groundwater hydrology, rock mechanics, and tailings management; and staff from local, state (including Idaho), and federal agencies the KNF invites (and who accept) with a technical background related to the issues to be addressed. The Federal Advisory Committee Act restricts the ability of the Forest Service to allow nongovernmental entities to serve on advisory committees.

The public will have the right to review permit files and monitoring reports. Monitoring reports, technical reports, and other documents related to the Rock Creek Project will be available upon request from the KNF Forest Supervisor's Office or on the KNF website. If a person or organization believes there was an unreported violation or potential for environmental harm, that person or organization may notify the KNF and DEQ.

1.4.2 Description of the Selected Alternative (Alternative V)

Phase I of Alternative V, the selected alternative, is fully described in Attachment 1. Development of the selected alternative will require construction of an evaluation adit and associated facilities. The facilities and other elements of the selected alternative are shown in Figure 2.

The selected alternative includes applicable modifications, mitigations, and monitoring plans from Alternatives III and IV, as well as components from Alternative II. The selected alternative also includes modifications resulting from more detailed design of Phase I facilities, the KNF's modifications made to address deficiencies identified by the District Court, and the KNF's evaluation of new and changed conditions since the 2003 ROD (Attachment 1). The 2003 ROD contained a list of stipulations that were required at that time for issuance of DEQ mining permits and KNF authorization. The stipulations for the selected alternative were updated and are attached to this ROD (Attachment 2).

The selected alternative incorporates the KNF's Conceptual Monitoring Plans (Attachment 3), as well as the KNF's Terrestrial Threatened and Endangered Species Mitigation Plan (Attachment 5), as modified by the terms and conditions of the 2006 BO (Attachment 6). The selected alternative also incorporates the Bull Trout Mitigation Plan (Section 2.10 of Attachment 1), consistent with the terms and conditions from the USFWS 2017 revised BO for bull trout and bull trout critical habitat (Attachment 7), as clarified by USFWS's 2018 letter.

Implementation of the selected alternative, Phase I of Alternative V, requires an amendment to the 2015 KFP for the alternative to be consistent with the 2015 KFP. The 2015 KFP amendment allows a project-specific variance suspending the requirement for full consistency with one forestwide guideline. For a brief discussion of 2015 KFP compliance, see Section 1.5.1.16, *National Forest Management Act/2015 Kootenai Forest Plan*; the complete amendments and rationale are in Attachment 4.

1.4.3 Environmentally Preferred Alternative

NEPA requires the identification of an environmentally preferred alternative (40 CFR 1508.2(b)). The environmentally preferred alternative is the alternative that has the least impact on the physical and biological environment and that best protects, preserves, and enhances historic, cultural, and natural resources. Economic, social, technical, and agency mission factors are not considered in the identification of this alternative. The No Action Alternative, Alternative I, is the alternative that best meets this definition. Mining would not occur and there would be no mining-related disturbances under this alternative at this location. Phase I of Alternative V is the environmentally preferable action alternative. This alternative meets the purpose and need for the proposal and includes feasible and practicable measures to minimize adverse environmental impacts on KNF surface resources. See Chapter 4 of the 2001 FEIS and Chapter 4 of the Final SEIS for more detail on impacts under the various alternatives.

1.4.4 KNF Rationale

My decision considered (a) how the project complies with federal and state laws and regulation and policy mandates, (b) how the project meets the objectives of the Forest Service's Minerals Program Policy of 1995, (c) how the project meets the direction of the 2015 KFP, and (d) how the project addressed the key issues identified during scoping and the public's concerns and expectations. The selected alternative provides the best balance among the 10 key scoping issues and other concerns identified during the public involvement process (see Section 1.8, *Public, Agency, and American Indian Participation*, for a discussion of the public involvement process). I have determined that the 10 issues identified in the Final SEIS and summarized in this ROD (Section 1.3, *Issues Considered*) have been addressed through the development and incorporation of the mitigation (Attachment 1, Attachment 2, and Attachment 5), stipulations (Attachment 2), and monitoring (Attachment 3) identified in the Final SEIS and this ROD; and the terms, conditions, and measures identified by the USFWS and incorporated into this ROD (Attachment 6, Attachment 7).

The 10 key scoping issues were developed for both phases of the Rock Creek project. Except for Issue 3 (stability of the tailings facility), which only pertains to Phase II, the remaining issues are relevant to my decision to approve Phase I. The sections below describe how the selected alternative addresses the pertinent scoping issues. A comparison of the components and characteristics of the selected alternative and action alternatives by scoping issue is presented in Table 1.

Section 1.6, *Alternatives Not Selected and the KNF Rationale*, discusses my rationale for not selecting the No Action Alternative (Alternative I) or other action alternatives (Alternatives II through IV). As discussed in Section 1.4.3, *Environmentally Preferred Alternative*, Alternative V (the selected alternative) is also the environmentally preferable action alternative.

1.4.4.1 Issue 1: Effects on quantity and quality of Montana and Idaho surface water and groundwater

No effects on quantity and quality of Idaho surface water and groundwater are predicted.

To determine the effects on Montana groundwater and surface water due to mine inflows, a 3D numerical hydrogeological model (3D model) of the Rock Creek Mine area was used to estimate groundwater

inflow to the mine and adits, predict where and to what degree groundwater drawdown from mine and adit dewatering could occur, and estimate changes in baseflow for drainages within the study area (see Final SEIS Section 3.7). The 3D model was configured to simulate the location of mine voids and adits proposed as part of Phase I and II of the project. The model results are the best available estimates of impacts that can be obtained using currently available data. Additional hydrologic data will be collected during Phase I evaluation to refine the existing numerical model and reduce the uncertainty of the predictions. To provide a more detailed simulation of the relationship between Cliff Lake and the regional potentiometric surface, a vertical 2-dimensional numerical model (2D model) of the area around the lake was developed. The 2D model around Cliff Lake will also be revised using data collected during Phase 1.

Phase I—Evaluation Adit. The annual average inflow to the evaluation adit is predicted to be 13 gallons per minute. Groundwater drawdown due to construction of the evaluation adit is predicted to be limited to the area adjacent to the adit and is predicted to not affect stream baseflow. During Phase I, water from the evaluation adit will be treated at the Phase I water treatment plant located at the evaluation support facilities site (Figure 2) and discharged at an estimated average rate of 13 gallons per minute to groundwater infiltration ponds located within the footprint of the proposed paste tailings facility (see Table 2-5 in Attachment 1). Among the categories or classes of activities not subject to nondegradation review is mineral exploration that does not result in a discharge to surface water and that is permitted under the Metal Mine Reclamation Act (MMRA) (75-5-317(2)(q), Montana Code Annotated (MCA)). Treated discharge will meet groundwater standards and nondegradation criteria, if applicable, at the end of the pipe prior to discharge. Treated water will be monitored before discharge to the infiltration ponds, and groundwater will be monitored near the infiltration ponds. RCR did not request, and DEQ has not granted, a mixing zone for discharges to the Phase I infiltration pond. Due to dilution and dispersion, effects on surface water quality will likely be negligible. Miller Gulch will be monitored downgradient of the infiltration ponds. Section 4.7.3 of the Final SEIS describes potential effects of Alternative V on groundwater quantity and quality in detail.

The proposed portal pad will be constructed from development or waste rock from the adit construction. Precipitation that infiltrates into the talus from the pad will be collected in the lined ditch and routed to a lined sediment basin. Two groundwater monitoring wells will be installed on the downgradient side of the lined ditch to monitor potential impacts on groundwater from underflow and/or leakage from the ditch. One surface water monitoring location will be downgradient of the evaluation adit and monitored during periods of flow. Nitrate and ammonia concentrations are expected to be higher during adit construction due to the use of explosives. The Explosive Handling and Blasting Plan, described in Section 1.5 of Attachment 3, will minimize the potential for elevated nitrate or ammonia concentrations occurring in surface water. RCR will cover stockpiles of alteration waste zone rock and ore with an impermeable material and minimize snow accumulation by plowing the portal pad to reduce infiltration of precipitation and the possibility of increasing concentrations of constituents of concern.

Stormwater runoff from the evaluation adit site will be regulated at two outfalls covered by MPDES permit MT0030287. Once ore is stockpiled at the evaluation adit site and until all stockpiled ore is removed, discharge from Outfall 006 will be subject to additional effluent limits in MPDES permit MT0030287. Stormwater runoff associated with construction of ancillary facilities at the evaluation adit site, excavation trenching to install a pipeline and power line, and improvements to roads to reduce sediment delivery to Rock Creek will be regulated at 31 outfalls covered by MPDES permit MT0031763. MPDES permits include limits on all pollutants that will cause, or have a reasonable potential to cause, an excursion of any water quality standard, including narrative standards. Implementation of Phase I sediment mitigation will reduce sediment yield to streams to less than existing conditions. The mitigation will improve streambed conditions.

1.4.4.2 Issue 2: Effects on fish and wildlife and their habitats and current and proposed threatened and endangered (T&E) species

Aquatics and Fisheries, including Bull Trout. Of the species present in the Rock Creek drainage, bull trout is federally listed as threatened, and westslope cutthroat trout is a Forest Service sensitive species and a Montana species of concern. Other species occurring in the study area include brook trout, rainbow trout, largescale sucker, mountain whitefish, slimy sculpin, and northern pikeminnow. Designated bull trout critical habitat in the study area includes Rock Creek from its mouth upstream 8.4 miles (13.5 km) to a natural barrier and the entire mainstem of East Fork Bull River, the Bull River, Cabinet Gorge Reservoir, Noxon Reservoir, and the lower Clark Fork River.

As discussed in Section 1.4.4.1, groundwater drawdown due to construction of the evaluation adit is predicted to be limited to the area adjacent to the adit and is predicted to not affect stream baseflow in study area streams, including streams supporting bull trout and designated bull trout critical habitat. Consistent with USFWS's 2018 letter clarifying the terms and conditions, before Phase II construction, RCR will submit a Phase II water resources monitoring plan (see Water Resources Monitoring Plan in Attachment 3) to the KNF, DEQ, and USFWS for approval to monitor groundwater effects as they relate to bull trout habitat requirements. As described in Attachment 3, the Water Resources Monitoring Plan includes proposed monitoring action levels and a Contingency Action Plan that will include contingency measures if effects of evaluation activity are identified by monitoring. RCR will be required to implement a stream habitat enhancement program, as described in Section 2.10 of Attachment 1, to improve the ability of bull trout to move throughout the year in Rock Creek and increase habitat availability and diversity for migratory and resident bull trout populations.

Reduction of sediment loading to streams using sediment mitigation measures will improve the health of aquatic invertebrate communities throughout the Rock Creek drainage and promote the establishment of sensitive invertebrate species. Implementation of Phase I sediment mitigation described in Attachment 1 and Attachment 2 will reduce the current sediment delivery by about 234 tons per year, which will be more than required to mitigate Phase I effects. Sediment delivery to West Fork Rock Creek and Rock Creek from Phase I activities will be avoided or minimized by sediment-control best management practices (BMPs) and MPDES permitted effluent limits, and are not anticipated to adversely affect aquatic habitat, aquatic invertebrates, or fish.

Potential sources of nutrients in streams from Phase I activities are infiltration from waste rock at the evaluation adit pad and the discharge of treated wastewater at the infiltration ponds. Nitrate residue from blasting during Phase I could be mobilized by infiltration of precipitation into the evaluation adit portal pad, potentially increasing nitrate concentrations in the unnamed tributary to West Fork Rock Creek. RCR will prepare an Explosive Handling and Blasting Plan designed to minimize residual nitrate in the waste rock. Discharge will be allowed only after a 10-year, 24-hour precipitation event, which will ensure that effluent discharges are likely to occur outside the time period when the nutrient standards apply (July 1 to September 30). If discharges do occur during July 1 to September 30, they will be during significant runoff events with high dilution and unlikely to contribute to nutrient impairment. Total phosphorus is not expected to be present in the discharge at a concentration that exceeds the nondegradation standard. The unnamed drainage will be monitored for elevated nitrate and ammonia concentrations. Treated wastewater will be discharged into infiltration ponds during Phase I. Effects on surface water quality downstream of the infiltration ponds will likely be negligible, and effects on aquatic life are not expected.

Potential sources of metals include discharge of treated wastewater, and unforeseen accidents or spills. Excess water from the evaluation adit and the stormwater containment pond overflow will be pumped to a temporary wastewater treatment system located at the support facilities site near the proposed paste tailings facility footprint, where it will be treated and discharged into infiltration ponds. Treated

discharged water will be required to meet groundwater quality standards and applicable nondegradation criteria at the end of the pipe before discharge. Treated water will be monitored before discharge to the infiltration ponds. The discharge pipeline will be buried in the existing road prism, except at the two Rock Creek crossings, where it will be bored under the stream channels, attached to existing bridge structures, or placed on trestles above the stream, minimizing the potential for pipeline ruptures. Potential for pipeline ruptures will be further minimized by requiring that the pipeline be buried at least 3 feet where slopes are greater than or equal to 10 percent and 6 feet where slopes are less than 10 percent. RCR will implement the Pipeline Spill Monitoring, Maintenance, and Emergency Response Plan described in Attachment 3. During Phase I, RCR will monitor instream sediment concentrations and metals concentrations in fish tissues and sediments (Attachment 3).

Before evaluation adit construction during Phase I, RCR will be required to submit an assessment of risk of road failure for Phase I activities to the KNF and the USFWS for evaluation and KNF approval after USFWS review and agreement (Term and Condition #10 in Attachment 7). The assessment will determine areas most at risk for bull trout and make recommendations for additional measures and responses to minimize risk. To reduce the risk of vehicles and their contents from reaching Rock Creek in the event of an accident, barriers will be installed at two bridges on Rock Creek and the culvert on West Fork Rock Creek. If any additional measures can be incorporated to minimize the risk of catastrophic failures, the KNF and the USFWS will determine the timeline and mechanism for implementation of those identified measures.

Wildlife Habitat. Under the selected alternative, 19.6 acres of primarily forest habitat will be lost during Phase I. Less than 1 acre of old growth along NFS road #150 and less than 1 acre of riparian habitat will be lost. Relative to the other action alternatives, wildlife disturbance and mortality risk will be less due to the decreased traffic on NFS road #150 resulting from busing of evaluation adit construction workers from the support facilities site to the evaluation adit. A project-specific amendment to the 2015 KFP allowing a variance from FW-GDL-WL-09 will be implemented. Phase I will disturb 5 acres of elk, white-tailed deer, and mule deer winter range at the support facilities, infiltration ponds, and nearby borrow area. Because it will not be practicable to avoid or minimize construction and operation activities during January and February, the project-specific variance will allow year-round exploration activities in elk, mule deer, and white-tailed deer winter range. With the project-specific amendment, the selected alternative will be consistent with forestwide guideline FW-GDL-WL-09 and subsequently the 2015 KFP.

Threatened and Endangered Wildlife Species. The study area provides habitat for two terrestrial threatened and endangered (T&E) species: the grizzly bear and the Canada lynx. Bull trout, which is also a T&E species, is discussed above in this subsection under *Aquatics and Fisheries, including Bull Trout*.

Grizzly Bear. The selected alternative will result in the loss of 19.6 acres of grizzly bear habitat. The selected alternative will increase levels of human activity compared to existing conditions, potentially resulting in increased displacement and disturbance of grizzly bears.

The selected alternative will not change existing conditions for core grizzly habitat, open motorized route density, or total motorized route density in Bear Management Units 4, 5, and 6.

The mitigation plan for the selected alternative will include protecting 153 acres of replacement habitat in the north-south movement corridor through conservation easements or acquisitions to mitigate for grizzly bear displacement and habitat loss and will include managing road and trail access in protected grizzly bear habitat, managing attractants, funding information and education programs, funding additional law enforcement, funding monitoring and research, implementing measures to reduce habitat fragmentation, and augmenting bear populations (see Attachment 1 and Attachment 5). In its 2006 BO, the USFWS concluded that the mitigation measures supported a finding that the proposed mine posed “no jeopardy”

to the grizzly bear because “collectively, the measures will reduce, remove or more than offset the potential adverse effects of the proposed action.” In addition, the USFWS concluded the mitigation plan “would in fact improve conditions over the long term over the existing conditions, ultimately promoting the recovery of the [local] grizzly bear population.” Potential effects of Alternative V on grizzly bears are described in detail in Section 4.13.4.2 of the Final SEIS.

Lynx. The selected alternative is consistent with all applicable objectives, standards, and guidelines of the 2015 KFP, which incorporates the Northern Rockies Lynx Management Direction. A total of 9.9 acres of lynx habitat (9.7 acres of multistory or late successional forest and 0.2 acre of other lynx habitat) will be impacted under the selected alternative, which is less than 0.1% of lynx habitat in the Rock Lynx Analysis Unit. Impacts within lynx habitat will also include upgrading about 4.4 miles of NFS road #2741 to the evaluation adit and constructing a 0.1-mile-long spur road to the adit. Land acquired for grizzly bear mitigation for the selected alternative will likely provide additional habitat for lynx prey species. Existing habitat connectivity for lynx will be maintained. Land acquired to mitigate the effects of the selected alternative for grizzly bear will potentially improve lynx habitat connectivity where management provides lynx habitat.

The study area is not within lynx critical habitat. The study area was not designated critical habitat because it does not contain habitat features essential for the conservation of lynx. Potential effects of Alternative V on lynx are described in detail in Section 4.13.4.3 of the Final SEIS.

Wolverine. Two main factors potentially impacting wolverine populations are the availability of snow and trapping mortalities. There are currently no open trapping seasons for wolverine in Forest Service Region 1. Mining was not identified as an activity likely to threaten wolverine in the USFWS’s proposed listing. The selected alternative will affect a very small proportion of wolverine habitat available in the KNF (0.0019% of high-quality habitat and 0.0049% of low-quality habitat). The selected alternative will affect about 0.017% of the contiguous block of wolverine habitat in the Cabinet Mountains and about 0.088% of areas with persistent snow in one female home range. The selected alternative grizzly bear mitigation measures also will benefit wolverines by potentially protecting wolverine habitat from development and will compensate for the slight increases in impacts. Potential effects of Alternative V on wolverines are described in detail in Section 4.13.4.4 of the Final SEIS.

Sensitive Wildlife Species. The selected alternative may impact individuals or their habitat, but will not likely contribute to a trend toward federal listing or cause a loss of viability of the population or species for American peregrine falcon, bald eagle, gray wolf, bighorn sheep, black-backed woodpecker, flammulated owl, harlequin duck, fisher, northern bog lemming, Townsend’s big-eared bat, Coeur d’Alene salamander, northern leopard frog, or western toad.

1.4.4.3 Issue 4: Impacts on socioeconomics of surrounding communities

The estimated total employment during Phase I of the project will be 131 jobs. Of these, on average, about 59 of the direct jobs will be mine employees, 4 will be associated with wildlife mitigation work, and the rest will likely be contractors. For Phase I, total labor income will be about \$9.8 million annually. About 40 workers (118 people) will move into the lower Clark Fork Valley and southern Lincoln County around Troy and Libby. Because there will be no assurance of long-term employment for these immigrants, they will likely seek rental housing, which is scarce and widely distributed. Given the relatively small number of people and their likely dispersed settlement, the Phase I activities will have a negligible effect on public services and infrastructure, fiscal conditions of local government, and housing. The Hard Rock Mining Impact Act is designed to assist local governments in handling financial impacts caused by large-scale mineral development projects. Phase I activities will not be considered a large-scale mineral development project, and the act will not apply.

1.4.4.4 Issue 5: Effects on old-growth ecosystems

The selected alternative will not affect old-growth ecosystems; therefore, this issue is not included in Table 1 below. Minor modifications to the selected alternative such as slight increases in the area of disturbance at the evaluation adit due to more detailed design will not affect old growth.

1.4.4.5 Issue 6: Effects on wetlands and nonwetland waters of the U.S.

The selected alternative will include open bottom arch culverts on two proposed crossings on a tributary to West Fork Rock Creek, avoiding 50 linear feet of impacts on jurisdictional nonwetland waters. If during final design another culvert type is proposed, authorization for impacts on the nonwetland waters will be requested from the Corps. Impacts on wetlands and other waters from pipelines and power lines will be avoided by spanning the wetland or nonwetland water, boring under streams, or burying the utility lines within the road disturbance corridor. When construction occurs near a wetland or other water of the U.S., effluent limits and BMPs required by MPDES permit MT 0031763 will minimize effects. Based on preliminary design, effects on jurisdictional wetlands within the selected alternative disturbance boundary will be avoided, and no compensatory mitigation under the CWA is required. If, after final design, effects on jurisdictional wetlands cannot be avoided, the appropriate authorization will be requested from the Corps, and any required compensatory mitigation will be implemented. Because impacts of the selected alternative on wetlands are not anticipated, Issue 6 is not summarized in Table 1.

1.4.4.6 Issue 7: Effects on public access and traffic safety

Increased traffic on Montana Highway 200 and NFS roads associated with the selected alternative will have a negligible effect on public access and traffic safety. To reduce traffic, employees will be bused from a parking lot at the support facilities near the junction of Montana Highway 200 and NFS road #150 to the evaluation adit site. Other RCR, Forest Service, and contracting personnel will be encouraged to carpool to the extent practicable. Traffic volume and delays on NFS roads during road improvement will increase temporarily. NFS road #2741J will be closed to the public until the evaluation adit site is reclaimed. Public access to the Chicago Peak Trail will be maintained. RCR will implement the Transportation Monitoring and Mitigation Plan for Phase I as described in Section 2.5.1 of Attachment 1 (called a transportation plan in Attachment 5) to minimize vehicular traffic associated with mine activities.

Improvement of NFS road #2741 will improve year-round public access to the CMW and general recreational activities.

1.4.4.7 Issue 8: Effects on aesthetic quality, including noise, visual, and wilderness experiences

In the selected alternative, blasting during adit construction will generate sounds up to 125 decibels within 900 feet of the blast. Sound mitigations, such as reducing backup beeper volumes and dampening exhaust and intake fans, will reduce the noise-related impacts on humans and mountain goats to a 100-foot radius around the adit. Busing of construction workers to the evaluation adit will reduce the frequency (but not the peak levels) of traffic-generated noise in the upper Rock Creek drainage. Power will be provided to the evaluation adit through a buried power line, minimizing noise.

Phase I support facilities will be on private land, and disturbance on NFS land will primarily occur at the evaluation adit (10.4 acres). Facility features including any permanent (life of mine) structures would be painted, stained, or modified to visually blend with the surrounding landscape and to reduce contrast with the surrounding area (Attachment 2). Effects of Phase I on scenic integrity will be negligible and will not change the mapped scenic integrity objectives of moderate and high in the 2015 KFP.

The experience of wilderness visitors may be affected by evaluation-related activities occurring outside the CMW boundary. Because the wilderness experience is highly personal and individual, the perceived effect will differ among individuals. It is likely that the visual and noise effects of the project outside the CMW will reduce the natural quality of the wilderness experience for some individuals in portions of the wilderness. No evaluation-related sounds are expected to be audible from the CMW lakes most often visited by wilderness users (i.e., those within Opportunity Class II, including Moran Basin Lakes, St. Paul Lake, and Rock Lake). Changes to air and water quality are not expected to noticeably affect wilderness values. The selected alternative will not directly affect inventoried roadless areas (IRAs). The selected alternative will not interfere with, obstruct, or otherwise modify the free-flowing characteristics of the East Fork Bull River or Bull River, and will have no effect on the Outstandingly Remarkable Values of the East Fork Bull River or Bull River, both eligible wild and scenic river segments.

1.4.4.8 Issue 9: Effects on the traditional cultural property of the Kootenai tribal people

Under the selected alternative, effects on fisheries, wildlife, and vegetation, as well as restrictions on public access for safety, could affect Salish, Kootenai, and Upper Pend d' Oreilles tribal members exercise of current treaty rights within the study area. These effects may vary in magnitude by alternative, but are common to all of the alternatives. The impacts cannot be quantified based on tribal information submitted to date. The Confederated Salish and Kootenai Tribes and the Kootenai Tribe of Idaho have identified general issues of concern to treaty rights and traditional uses in their response to comments on the original DEIS and the supplemental DEIS, as well as in meetings with the Forest Service. The tribes have chosen not to provide site-specific comments.

The Confederated Salish and Kootenai Tribes have identified an area within the study area as a sacred site and have indicated they believe the site may be eligible for listing on the National Register of Historic Places as a TCP under the National Historic Preservation Act. The specific location of the sacred site is exempt from public disclosure under Section 304 of the National Historic Preservation Act and the 2008 Food, Conservation, and Energy Act. Formal evaluation of the identified area as a TCP will be completed, and if the evaluation indicates the area is eligible and the KNF concurs, then consultation with the Confederated Salish and Kootenai Tribes on avoidance, minimization, and mitigation measures will begin.

1.4.4.9 Issue 10: Subsidence risk

The KNF completed a Failure Modes Effects Analysis of the proposed underground mine, taking into account the Troy Mine subsidence, and developed mitigations. The Failure Modes Effects Analysis specifically considered the risk of chimney subsidence of the evaluation adit due to inadequate cover. KNF concluded that the risk of adit failure, after applying compensating factors, was inconsequential.

Table 1. Comparison of the Effects of Phase I (Evaluation) Alternatives Relative to Key Scoping Issues.

Analysis Indicator or Mitigation	Alternative II	Alternative III	Alternative IV	Selected Alternative (Alternative V)
<i>Issue 1—Effects on quantity and quality of Montana and Idaho surface water and groundwater</i>				
Changes in Montana surface water quality—general	Surface water quality would not be affected by groundwater discharges.	Same as Alternative II.	Same as Alternative II.	Effects on surface water quality downgradient of the Phase I infiltration ponds will be negligible.
Changes in Montana surface water quality—nitrogen	Nitrogen concentrations (especially nitrate) may increase in the drainage below the evaluation adit portal pad.	Same as Alternative II.	Same as Alternative II.	Effects similar to Alternative II; stormwater discharges are covered by the existing MPDES permit. Implementing an Explosive Handling and Blasting Plan will reduce nitrogen in waste rock stored on the pad. The drainage below the adit pad will be monitored, and if necessary to prevent water quality degradation, groundwater or surface water will be captured and treated.
Changes in groundwater quality	Treated evaluation adit wastewater would not be discharged to groundwater; no changes in groundwater quality.	Same as Alternative II.	Same as Alternative II.	Treated Phase I wastewater discharged to infiltration ponds will meet groundwater standards and nondegradation criteria, if applicable, at the end of the pipe.
Effects on Idaho surface water	Would not be measurable due to the low concentration of constituents in the treated effluent and the relatively high flow available for dilution.	Same as Alternative II.	Same as Alternative II.	Same as Alternative II. Treated Phase I wastewater discharged to infiltration ponds will meet groundwater standards and nondegradation criteria, if applicable, at the end of the pipe.
Changes in groundwater and surface water quantity	Groundwater drawdown due to construction of the evaluation adit is predicted to be limited to the area adjacent to the adit and is predicted to not affect stream baseflow.	Same as Alternative II.	Same as Alternative II.	Same as Alternative II.
<i>Issue 2—Effects on fish and wildlife and their habitats and current and proposed threatened and endangered (T&E) species</i>				
Grizzly bear habitat removed	Direct loss of 9.6 acres of habitat based on design less detailed than Alternative V.	Same as Alternative II.	Same as Alternative II.	Direct physical loss of 19.6 acres of grizzly bear habitat.
Grizzly bear displacement influence zone (acres)	43 acres.	Same as Alternative II.	Same as Alternative II.	Same as Alternative II.
Grizzly bear core habitat (acres) impacted	Core habitat would be reduced by 321 acres.	Core habitat would not decrease.	Core habitat would not decrease.	Core habitat will not decrease.
Grizzly bear habitat quality—open motorized route density and total motorized route density	No increases in open motorized route density or total motorized route density	Same as Alternative II.	Same as Alternative II.	Same as Alternative II.

Analysis Indicator or Mitigation	Alternative II	Alternative III	Alternative IV	Selected Alternative (Alternative V)
Grizzly bear habitat mitigation	No measures to specifically address habitat loss or modification proposed.	For both Phase I and Phase II, RCR would be required to protect 2,692 acres of habitat through conservation easements, acquisitions, or other means. Habitat protection associated with Phase I not specified.	For both Phase I and Phase II, RCR would be required to protect 2,536 acres of habitat through conservation easements, acquisitions, or other means. Habitat protection associated with Phase I not specified.	Protect 153 acres of habitat in the north-south movement corridor through conservation easements, acquisitions, or other means.
Grizzly bear mortality risk	Potential increased mortality from road kills, poaching, and destruction of nuisance bears.	Similar impacts as Alternative II but somewhat reduced due to additional mitigations.	Same as Alternative III.	Similar to Alternative III, but with likely decreased mortality risk due to busing employees from the support facilities to the evaluation adit, training workers about working and living in grizzly bear habitat, and implementing a food storage order for the Bear Management Units affected by the project.
Lynx habitat removal and displacement	Lynx habitat quality reduction (especially foraging habitat) and disturbance could displace animals.	Similar to Alternative II.	Similar to Alternative II.	Impacts under the selected alternative will be less than under the other action alternatives. 9.9 acres of lynx habitat will be impacted, or less than 0.1% of lynx habitat in the Rock Lynx Analysis Unit. Selected alternative consistent with the 2015 KFP.
Changes in composition and abundances of aquatic life—bull trout habitat	Increased sediment in the mainstem and West Fork Rock Creek would decrease emergence success of bull and cutthroat trout fry.	Modifications and mitigations would reduce the amount of sediment impacting spawning habitat for bull trout in Rock Creek.	Sediment impacts on bull trout would be minimized in West Fork Rock Creek. The 300-foot buffer around the confluence mill site would reduce impacts from sediment loading downstream.	Relocation of the evaluation support facility and sediment mitigations before construction will further reduce sediment impacts in the short and long term. Additional sediment mitigation to reduce sediment sources may improve habitat in the long term.
Changes in composition and abundance of aquatic life—bull trout interbreeding and nonnative fish	Potential increase in nonnative fish species abundance and interbreeding with bull trout.	Risk of interbreeding and nonnative fish species increase would be reduced due to sediment mitigations.	Similar to Alternative III.	Sediment mitigation will further reduce the risk of interbreeding and nonnative fish species increases.
Changes in composition and abundances of aquatic life—other sensitive aquatic species	Slightly increased risk to pure strains of westslope cutthroat trout from hybridization with nonnative trout due to increased sediment loading.	Similar to Alternative II.	Similar to Alternative II.	Mitigation would reduce sediment delivery to streams in the Rock Creek drainage by 234 tons per year and will improve streambed conditions.

Analysis Indicator or Mitigation	Alternative II	Alternative III	Alternative IV	Selected Alternative (Alternative V)
Fisher and wolverine habitat removal and displacement	Fisher and wolverine habitat removal and disturbance could displace animals. Impacts would not likely contribute to a trend toward federal listing or cause a loss of viability of wolverine or fisher or their populations.	Similar to Alternative II.	Similar to Alternative II.	Same as Alternative IV, except less impact on fisher habitat. Some wolverine habitat will be removed at the evaluation adit site, but effects will be negligible because the area affected will be small in comparison to available habitat. Mortality risk to fisher and wolverines will be further controlled through mitigation measures. The selected alternative will not likely contribute to a trend toward federal listing or cause a loss of viability of wolverine or fisher or their populations.
Fisher and wolverine mortality risk	Potential increases in hunting, trapping, poaching, and traffic collision mortality would add to the overall decline of fisher and wolverine security in the Cabinet Mountains and the region.	Similar to Alternative II.	Similar to Alternative II.	Busing employees decreases risk of mortality from vehicle collisions and vehicle disturbance. Funding for Montana Fish, Wildlife, and Parks law enforcement personnel to protect wildlife, development and implementation of informational and educational programs for the public about wildlife species, and removal of carcasses killed by vehicles from roadsides will partially mitigate impacts on wildlife species by reducing the potential for poaching and harassment of wildlife and mortality risk.
Bald eagle mortality risk	Increases in road-killed deer could slightly and indirectly increase mortality risk of bald eagles along Montana Highway 200 and NFS road #150.	Similar to Alternative II.	Similar to Alternative II.	Mortality risk is lowest due to additional reductions in traffic on NFS road #150 from busing employees between the support facilities and the evaluation adit.
Gray wolf habitat availability	Transient wolf would continue to use the Clark Fork River drainage.	Same as Alternative II.	Same as Alternative II.	Same as Alternative II. Will not affect the regional upward trend in wolf populations.
Big game habitat	Minor loss of habitat for game species including travel corridors, riparian areas, and a few small elk wintering areas.	Similar to Alternative II.	Similar to Alternative II.	Impacts on these species will remain the same as described in the 2001 FEIS. A project-specific amendment to the 2015 KFP allowing a variance from FW-GDL-WL-09 will be implemented.

Analysis Indicator or Mitigation	Alternative II	Alternative III	Alternative IV	Selected Alternative (Alternative V)
Big game displacement and mortality	Displacement and possible increased mortality of animals due to increased human use and activities (including hunting and poaching).	Same as Alternative II.	Same as Alternative II.	Similar to Alternative II, except that implementation of grizzly bear mitigation measures, such as funding FWP grizzly bear management specialists and law enforcement positions, would also reduce mortality risk for other wildlife.
Collisions between big game and vehicles	Increased potential for animal-vehicle collisions.	Similar to Alternative II.	Similar to Alternative II.	Lowest increased potential for animal-vehicle collisions because busing of employees will reduce the number of vehicles on the roads and the amount of open roads where collisions could occur.
Neotropical migrant bird habitat effects and mortality risk	Minor direct and indirect losses of habitat, including old growth, riparian, and wetland habitats, would affect songbirds in those areas. Night-migrating birds may be at risk for collision mortalities with the evaluation adit because of attraction to lights.	Effects on bird habitat would be the same as Alternative II. All exterior evaluation adit lights would be shielded or baffled, reducing collision risk for night-migrating birds.	Same as Alternative III.	Similar to Alternative III.
Mountain goat habitat effectiveness	Project-related noise and disturbance would change habitat effectiveness to 85 to 91% in key summer habitat.	Similar to Alternative II, except sound mitigations would reduce the noise-related impacts on humans and goats to a 100-foot radius around the adit.	Same as Alternative III.	Similar to Alternative III, except that burying the power line will reduce noise impacts.
Mountain goat mortality risk	Increased mortality risk would occur due to increased human use of the area by recreationists, hunters, and poachers.	Similar to Alternative II.	Similar to Alternative II.	Similar to Alternative II, but mitigation will include busing employees to reduce mortality risk and increased law enforcement and monitoring to control mortality risk.
Harlequin duck habitat quality and disturbance effects	Human disturbance and habitat alteration could result in loss of harlequin duck reproduction on Rock Creek. Loss of Rock Creek breeding area would increase vulnerability of the lower Clark Fork River harlequin subpopulation.	Similar to Alternative II.	Similar to Alternative II.	Impacts on harlequin ducks and their habitat will be less than the other action alternatives because of busing employees and moving the evaluation adit support facilities site, and screening traffic from Rock Creek.
Northern goshawk habitat loss and disturbance effects	Direct habitat loss and disturbance to nesting northern goshawks.	Similar to Alternative II.	Similar to Alternative II.	Similar to Alternative II.
<i>Issue 4—Impacts on socioeconomics of surrounding communities</i>				
Changes in employment	Total employment during Phase I of the project is estimated to be 91 jobs.	Same as Alternative II.	Total employment during Phase I of the project is estimated to be 93 jobs.	Total employment during Phase I of the project is estimated to be 131 jobs.

Analysis Indicator or Mitigation	Alternative II	Alternative III	Alternative IV	Selected Alternative (Alternative V)
Changes in population and demographics	About 40 workers (118 people) would move into the local area, but effects of Phase I activities on public services and infrastructure, fiscal conditions of local government, and housing would be negligible.	Same as Alternative II.	About 40 workers (117 people) would move into the local area.	Same as Alternative IV.
<i>Issue 7—Effects on public access and traffic safety</i>				
Public access	There may be delays and temporary road closures during road improvement. Widening of NFS road #2741 would improve year-round public access to the CMW and for general recreational activities.	Same as Alternative II.	Same as Alternative II.	Similar to Alternative II. NFS road #2741J will be closed to the public until the evaluation adit site is reclaimed.
Traffic safety	Increased traffic on NFS road #150 and improvement of NFS road #2741 could increase potential for accidents.	Same as Alternative II.	Same as Alternative II.	Employees will be bused between the support facilities and the evaluation adit, reducing traffic on NFS road #150 and NFS road #2741. Implementing a Transportation Monitoring and Mitigation Plan will increase traffic safety.
<i>Issue 8—Effects on aesthetic quality, including noise, visual, and wilderness experiences</i>				
Noise	Blasting during adit construction would generate sounds up to 125 decibels within 900 feet of the blast. Construction equipment would generate sounds up to 110 decibels within 50 feet.	Similar to Alternative II except that sound mitigations to construction equipment would reduce noise levels. Sound mitigations would reduce the noise-related impacts on humans and goats to a 100-foot radius around the adit.	Same as Alternative III.	Same as Alternative III.
	Phase I operation noise levels would be lower than construction noise levels but still greater than pre-evaluation conditions and would generally be inaudible in Clark Fork River Valley.	Implementation of sound mitigations (e.g., reduce backup beeper volumes and dampen exhaust and intake fan) would reduce evaluation noise levels.	Same as Alternative III.	Similar to Alternative III, except that burying the power line will eliminate generator noise, and ventilation fans will be designed to meet the requirement for noise levels less than 82 decibels at 50 feet from the portal.
	Traffic-related noises would increase on NFS road #150.	Similar to but less than Alternative II.	Similar to but less than Alternative II.	Busing of employees will reduce the frequency of traffic-related noise compared to other action alternatives.

Analysis Indicator or Mitigation	Alternative II	Alternative III	Alternative IV	Selected Alternative (Alternative V)
Scenic quality—degree of compliance with scenic quality objectives following project life, visual contrast of facilities with landscape, and reclamation success	Impacts on the Rock Creek drainage and Clark Fork River Valley from Phase I features during construction and operation.	Similar to Alternative II; impacts would be reduced by painting or staining facilities and immediately revegetating cut slopes, shielding or baffling exterior adit lights when visible at night from viewpoints in the Clark Fork Valley, and painting the building at the adit portal to reduce reflection.	Same as Alternative III.	Same as Alternative III.
	Effects would be negligible and would not change the mapped scenic integrity objectives.	Same as Alternative II.	Same as Alternative II.	Same as Alternative II.
Wilderness experience—changes in noise and scenic quality, and changes in concentrations of air pollutants	Changes in air and water quality are not expected to affect wilderness values.	Changes in air and water quality are not expected to affect wilderness values. Sound mitigations would reduce the noise-related impacts on humans and goats to a 100-foot radius around the adit.	Same as Alternative III.	Noise impacts will be reduced by burying the power line. Minimum Requirement Decision Guide process will be used to ensure that adverse effects on wilderness character are minimized. Otherwise, similar to Alternative III.
	No effect on the free-flowing characteristics of the East Fork Bull River or Bull River, and no effect on the Outstandingly Remarkable Values of the East Fork Bull River or Bull River.	Same as Alternative II.	Same as Alternative II.	Same as Alternative II.
	Air pollution levels in all areas are expected to remain lower than state and federal ambient air quality standards, but the presence of air pollutants may be evident to some wilderness visitors on a short-term and intermittent basis.	Same as Alternative II.	Same as Alternative II.	Less than Alternative II due to air protection measures covered by the DEQ permit (Montana Air Quality Permit #2414-03) and the following mitigation measures: use of electric power versus on-site power generation, use of engines that meet Tier 4 emission standards, optimization of drill hole sizes for effective blasting to promote complete detonation/deflagration, and use of fugitive dust mitigation techniques.
Issue 9—Effects on the traditional cultural property of the Kootenai tribal people				
Issue identified after 2003 ROD. Effects from Phase I activities could occur and may vary in magnitude by alternative, but are common to all of the alternatives. The impacts cannot be quantified based on tribal information submitted to date.				
Issue 10—Subsidence risk				
Subsidence risk	Not evaluated, issue identified after 2003 ROD.	Not evaluated, issue identified after 2003 ROD.	Not evaluated, issue identified after 2003 ROD.	Mitigated subsidence risks will be inconsequential.

1.5 Selected Alternative Compliance with Federal and State Laws, Regulations, and Executive Orders

The KNF is obligated under certain laws, regulations, and 2015 KFP direction to evaluate and take action on RCR's request to construct an evaluation adit portal pad and auxiliary facilities on NFS lands and associated private lands. The applicable major laws, regulations, and executive orders (EOs) are summarized below in Section 1.5.1, *Laws and Regulations Applicable to the Forest Service*, along with findings regarding the selected alternative's compliance with those laws. Compliance with laws and EOs specific to federally recognized tribes or cultural resources is described in Section 1.5.2, *Kootenai National Forest Responsibilities to Federally Recognized Tribes*.

1.5.1 Laws and Regulations Applicable to the Forest Service

1.5.1.1 Organic Administration Act

The Organic Administration Act authorizes the Forest Service to regulate use and occupancy, such as mineral operations, on NFS lands and to develop mineral regulations. Under the authority of this act, the Forest Service's mineral regulations are promulgated at 36 CFR 228 Subpart A (Section 1.5.1.2, *36 CFR 228 Subpart A*). The regulations apply to operations conducted under the U.S. mining laws as they affect surface resources on NFS lands under the jurisdiction of the Secretary of Agriculture. Compliance with the Forest Service's mineral regulations is discussed in the next sections. If a Plan of Operations for Phase I can be approved in a manner that will comply with all applicable environmental laws, the Forest Service has no authority to prohibit or deny proposals that are reasonably necessary to mining of a private mineral estate or the use of unpatented claims on NFS lands subject to the General Mining Act (Section 1.5.1.10, *General Mining Act*).

All waters within the boundaries of national forests may be used for domestic, mining, or irrigation purposes, under applicable state laws. The selected alternative includes feasible and practicable measures to minimize adverse environmental impacts (Section 1.5.1.2.5, *Requirements for Environmental Protection* (228.8), and Attachment 1). The selected alternative expands RCR's proposed monitoring plans and will include action levels that will trigger corrective measures to be implemented by RCR (Attachment 3).

I find that the selected alternative complies with the Organic Administration Act.

1.5.1.2 36 CFR 228 Subpart A

Forest Service regulations (36 CFR 228 Subpart A) apply to locatable minerals operations conducted under the U.S. mining laws as they affect surface resources on NFS lands under the jurisdiction of the Secretary of Agriculture. Operations are defined as all functions, work, and activities in conjunction with prospecting, exploring, developing, mining, or processing of mineral resources, and all uses reasonably incident thereto, including roads and other means of access on lands subject to the regulation in this part, regardless of whether said operations take place on or off mining claims (36 CFR 228.3(a)).

1.5.1.2.1 Plan of Operations (228.4)

RCR submitted a Plan of Operations that met the informational requirements of this regulation. RCR's proposed Plan of Operations meets the requirement for the submittal of a detailed plan for the entire operations per 36 CFR 228.4 requirements. Completion of the Final SEIS fulfills the environmental analysis requirement of this regulation.

1.5.1.2.2 Plan of Operations—Approval (228.5)

Completion of the Final SEIS for this project fulfills the requirement of 36 CFR 228.5. Requiring the submittal and approval of an amended Plan of Operations consistent with the selected alternative and the modifications of this ROD complies with 36 CFR 228.5.

1.5.1.2.3 Availability of Information to the Public (228.6)

Except for specifically identified information and data submitted by RCR as confidential concerning trade secrets or privileged commercial or financial information, information and data submitted by RCR is contained in the project record and available for public review. The extent of public involvement is also summarized in this ROD (Section 1.8, *Public, Agency, and American Indian Participation*) and documented in the project record. The KNF is in compliance with 36 CFR 228.6 regarding availability of information to the public.

1.5.1.2.4 Inspection and Compliance (228.7)

My decision is to approve an amended Phase I Plan of Operations for the Rock Creek Project that is consistent with Alternative V, the selected alternative, and subject to the stipulations described in Attachment 2. Consistent with 36 CFR 228.4(e), the KNF has specified in this ROD the reasons that RCR will be required to modify the Phase I evaluation plan and to submit the changes to the KNF for approval (Attachment 1). RCR will not be allowed to proceed with activities associated with Phase I of the project that will disturb NFS surface resources until the KNF confirms in writing to RCR that RCR has amended its Plan of Operations for Phase I with all stipulations, mitigation plans, and monitoring plans consistent with the alternative selected in this ROD.

The selected alternative includes provisions to ensure that RCR will protect resources and comply with applicable laws and regulations. RCR's approved Plan of Operations for Phase I will include reporting requirements and submittal of plans and reports for agency review. The Forest Service and other agencies will conduct inspections of operations to ensure compliance with the approved Phase I Plan of Operations and applicable regulations.

1.5.1.2.5 Requirements for Environmental Protection (228.8)

Forest Service regulations at 36 CFR 228.8 require that the Forest Service ensure that "all operations will be conducted so as, where feasible, to minimize adverse environmental impacts on NFS surface resources." The KNF developed the selected alternative to include reasonable measures to reduce, minimize, or avoid impacts on air quality (36 CFR 228.8(a)), water quality (36 CFR 228.8(b)), solid wastes (36 CFR 228.8(c)), scenic values (36 CFR 228.8(d)), fisheries and wildlife habitat (36 CFR 228.8(e)), roads (36 CFR 228.8(f)), and reclamation (36 CFR 228.8(g)). The selected alternative requires RCR to comply with applicable state laws, such as the Clean Air Act of Montana and the Montana Water Quality Act. Compliance with applicable state laws will meet the conditions regarding state laws for environmental protection in the 36 CFR 228.8 regulations. The selected alternative requires reasonable mitigation measures for anticipated adverse impacts and requires reclamation of lands disturbed by proposed mining activities. Key mitigation measures are discussed in the sections below by resource. The selected alternative complies with the requirements of 36 CFR 228.8 by virtue of agency-prescribed modifications, monitoring, and mitigation measures, described in Attachment 1, Attachment 2, Attachment 3, and as stipulated in this ROD.

Air Quality

The selected alternative includes feasible measures to minimize adverse environmental impacts on NFS surface resources (36 CFR 228.8(a)) and to comply with applicable state and federal air quality standards, including the CAA. These measures, in addition to using Best Available Control Technology, will include

using primarily electric-powered equipment and ultra-low-sulfur diesel for any diesel-fueled equipment, providing power to the evaluation adit through a power line rather than using generators, and using Best Operating Practices to minimize blasting emissions and substantially reduce emissions. Other conditions and limitations on air emissions are described in Montana Air Quality Permit (MAQP) #2414-03. The selected alternative will comply with the Clean Air Act of Montana because Phase I activities will not result in exceedances of any National Ambient Air Quality Standards or Montana Ambient Air Quality Standards. Forest Service Locatable Minerals Regulations (36 CFR 228.8(h)) state that “certification or other approval issued by state agencies or other federal agencies of compliance with laws and regulations relating to mining operations will be accepted as compliance with these regulations.” DEQ’s permit decision and conditions on the air quality permit constitute compliance with CAA requirements and 36 CFR 228.8(a).

Aquatic Life and Fisheries

The selected alternative includes feasible and practicable measures to minimize adverse environmental impacts on surface water quality (36 CFR 228.8(b)) and fisheries habitat (36 CFR 228.8(e)). These measures include:

- Minimizing road disturbance areas and reducing sediment delivery by 234 tons per year
- Burying pipes in roads and sheathing pipelines at stream crossings
- Developing and implementing the Transportation Monitoring and Mitigation Plan for Phase I described in Section 2.5.1 of Attachment 1 (called a transportation plan in the mitigation plan in Attachment 5) to minimize vehicular traffic associated with mine activities before Phase I
- Implementing the Sediment Mitigation Plan and conditions of MPDES permit MT0031763 to reduce sediment and runoff from roads
- Constructing all road improvements or modifications, including stream crossings, in compliance with the 2015 KFP Inland Native Fish Strategy standards and guidelines
- Building all new culverts to accommodate a 100-year flood event
- Implementing the Aquatics and Fisheries Mitigation Plan described in Section 2.10 of Attachment 1

The selected alternative will minimize disturbance and avoid impacts to the greatest extent feasible in Riparian Habitat Conservation Areas and other riparian areas, minimizing effects on bull trout and other aquatic life.

Water Quality

DEQ discussed compliance with the Montana Water Quality Act in the Final Environmental Assessment for the Rock Creek Evaluation Adit, the 2001 ROD, and MPDES permits MT0030287 and MT0031763, or will discuss compliance in any future decisions or permits regarding the Hard Rock Operating Permit or discharges to surface water. In the selected alternative, no discharge of fill material subject to the Corps’ jurisdiction will occur. Based on preliminary design, effects on jurisdictional wetlands within the selected alternative disturbance boundary will be avoided, and no compensatory mitigation under the CWA is required. If, after final design, effects on jurisdictional wetlands cannot be avoided, the appropriate authorization will be requested from the Corps, and any required compensatory mitigation will be implemented. Any activity that may result in any discharge into waters of the U.S. cannot proceed until RCR provides the KNF a 401 certification from DEQ, unless DEQ waives its issuance.

The selected alternative includes feasible measures to minimize adverse environmental impacts on water quality. The Sediment Mitigation Plan, effluent limits, BMPs, and conditions of MPDES permits MT0030287 and MT0031763 will be implemented to minimize erosion and effects on surface water

quality. The selected alternative will comply with the USDA Nonpoint Source Water Quality Policy Directive 9500-007.

Water from the evaluation adit will be treated and discharged to groundwater infiltration ponds. Among the categories or classes of activities not subject to nondegradation review is mineral exploration that does not result in a discharge to surface water and that is permitted under the MMRA (75-5-317(2)(q), MCA). Treated discharge water will be required by DEQ to meet groundwater standards and nondegradation criteria, if applicable, at the end of the pipe.

Two groundwater monitoring wells will be installed on the downgradient side of the lined ditch to monitor potential impacts on groundwater from underflow and/or leakage from the ditch. One surface water monitoring location will be downgradient of the evaluation adit and monitored during periods of flow. The Water Resources Monitoring Plan described in the agencies' conceptual monitoring plans (Attachment 3) includes proposed action levels for specific water quality parameters in groundwater at the base of the talus slope below the evaluation adit portal pad and below the infiltration ponds. Should action levels be reached, RCR will implement measures to ensure that groundwater concentrations will not exceed water quality standards and applicable nondegradation criteria.

Scenery

Effects of Phase I on the scenic integrity of the selected alternative will be negligible and will not change the mapped scenic integrity objectives of moderate and high in the 2015 KFP. The selected alternative includes practicable measures to minimize adverse environmental impacts and harmonize evaluation activities with scenic values. Mitigation measures in the selected alternative that address visual issues include reclaiming and revegetating the portal pad, baffling or shielding night light, and painting structures to blend in with the surrounding landscape.

Soils and Reclamation

The selected alternative includes practicable measures to minimize adverse environmental impacts on soils and to ensure that surface disturbances are reclaimed (36 CFR 228.8(g)). These measures include implementing the Transportation Monitoring and Mitigation Plan for Phase I described in Section 2.5.1 of Attachment 1, consistent with the terms and conditions of the grizzly bear BO (Attachment 6), implementing the Sediment Mitigation Plan (including BMPs) and adhering to effluent limits and conditions of MPDES permits MT 0030287 and MT0031763 to minimize erosion and control runoff, increasing the salvage and replacement of suitable soil materials for reclamation, using interim reclamation to stabilize soils, and removing a majority of coniferous forest debris before soil removal. These measures will minimize erosion and ensure reclamation success.

Vegetation removal and disposition and soil salvage and handling is summarized in Section 2.9.5 of Attachment 1 and in detail in Section 3.0 of the Rock Creek Evaluation Adit License Application.

Solid Wastes

The selected alternative includes disposing of solid wastes in a manner to minimize adverse impacts on the environment and NFS surface resources. RCR will comply with Forest Service policies when disposing of demolition debris during closure. It is Forest Service policy (Forest Service Manual (FSM) 2130) to discourage the disposal of solid waste on NFS lands unless such use is the highest and best use of the land. After evaluation work is completed, all buildings, related equipment, and infrastructure at the adit site will be dismantled and removed, except if needed for mine operations, should RCR proceed with Phase II. Post-evaluation use on private land at the support facility will be commercial/industrial, and the buildings will be maintained at the site. Other structures at the support facilities will be removed after evaluation activities are completed. All other demolition materials, whether originating above or below

ground, will be disposed of off NFS lands in an approved off-site waste disposal facility. All other wastes will be removed and disposed of at a disposal facility authorized by the Sanders County Solid Waste District or recycled.

The 2015 KFP Inland Native Fish Strategy Minerals Management (MM-3) standard prohibits solid and sanitary waste facilities, including mine waste (waste rock, spent ore, and tailings), in Riparian Habitat Conservation Areas. The selected alternative complies with MM-3 by avoiding impacts on Riparian Habitat Conservation Areas in the Phase I facility disturbance area.

The selected alternative complies with 36 CFR 228.8(c).

Transportation and Roads

In the selected alternative, roads will be constructed and maintained to ensure adequate drainage and to minimize or, where practicable, eliminate damage to soil, water, and other resource values (36 CFR 228.8(f)). These measures include implementing the Transportation Monitoring and Mitigation Plan for Phase I described in Section 2.5.1 of Attachment 1 (called a transportation plan in the mitigation plan in Attachment 5) consistent with the terms and conditions of the grizzly bear BO (Attachment 6) to minimize effects on Riparian Habitat Conservation Areas, reduce total average daily traffic, and mitigate impacts on harlequin ducks and grizzly bears. All road improvements or modifications, including stream crossings, will be constructed in compliance with the 2015 KFP Inland Native Fish Strategy standards, and all new culverts will be built to accommodate a 100-year flood event. Sediment and runoff from all roads will be minimized through implementation of the Sediment Mitigation Plan, which includes the use of BMPs developed in accordance with the Forest Service's BMPs, and compliance with the effluent limits and conditions of MPDES permits MT0030287 and MT0031763.

Fisheries and Wildlife Habitat

In the selected alternative, RCR will implement practicable measures to maintain and protect wildlife habitat (36 CFR 228.8(e)). The selected alternative is not likely to jeopardize the continued existence of the grizzly bear or the bull trout, is not likely to destroy or adversely modify bull trout critical habitat, may affect but is not likely to adversely affect the Canada lynx, will have no effect on lynx critical habitat, and is not likely to jeopardize the continued existence of the Distinct Population Segment of the North American wolverine. The selected alternative may impact Forest Service sensitive species individuals or their habitat but will not likely contribute to a trend toward federal listing or cause a loss of viability of the population or species. The selected alternative will maintain viable populations of all wildlife species potentially affected by Phase I activities.

1.5.1.2.6 Maintenance during Operations and Public Safety (228.9)

Hazardous sites or conditions resulting from evaluation activities will be marked by signs or fences or otherwise identified to protect the public in accordance with federal and state laws and regulations. This requirement meets the objective of this regulation. The selected alternative complies with 36 CFR 228.9 regarding maintenance during operations and public safety.

1.5.1.2.7 Cessation of Operations and Removal of Structures and Equipment (228.10)

The requirements as outlined in the reclamation plan and the bond requirements meet the objective of this regulation. As required by 36 CFR 228.10, unless otherwise agreed to by the KNF, RCR will remove (within a reasonable time following cessation of operation) all structures, equipment, and facilities and clean up the site of operation. Other than seasonally, where operations have ceased temporarily, RCR will file an annual statement with the KNF that includes verification of intent to maintain the structures, equipment, and other facilities; an expected reopening date; an estimated time of shutdown; and the duration of extended operation.

The mitigation as outlined above meets the requirement of this regulation.

1.5.1.2.8 Prevention and Control of Fire (228.11)

RCR will be required to comply with all applicable federal and state fire laws and regulations; take all reasonable measures to prevent and suppress fires on the area of activities; and require employees, contractors, and subcontractors to do likewise within the permit boundary (Attachment 2). With this requirement, the selected alternative complies with 36 CFR 228.11 regarding prevention and control of fire.

1.5.1.2.9 Access (228.12)

Use of NFS roads to access patented mining claims must be approved in writing by the KNF Supervisor through an approved Plan of Operations for Phase I that complies with the selected alternative. As discussed previously, RCR will implement the Transportation Monitoring and Mitigation Plan for Phase I described in Section 2.5.1 of Attachment 1 consistent with the terms and conditions of the grizzly bear BO (Attachment 6). The modification to NFS roads as outlined in the 2001 FEIS, Alternative V, pages 2-129 to 2-130, and Attachment 1, Section 2.5, *Transportation*, and Section 2.10, *Monitoring and Mitigation Plans*, complies with 36 CFR 228.12 regarding access.

1.5.1.2.10 Bonds (228.13)

The Forest Service and DEQ have executed an MOU allowing the agencies to accept a joint bond that satisfies both federal and state reclamation requirements (Section 1.9, *Reclamation Bond (Financial Assurance)*). The reclamation bond amount will be calculated by KNF and DEQ engineers after the issuance of a Final ROD. The financial assurance process is summarized in Section 1.8.4 of this ROD and explained in greater detail in Section 1.6.6, *Financial Assurance*, of the Final SEIS. Before the KNF allows RCR to proceed with Phase I, RCR will be required to furnish a bond conditioned with compliance of the reclamation of NFS lands.

The selected alternative complies with 36 CFR 228.14 regarding bonds.

1.5.1.2.11 Operations within National Forest Wilderness (228.15)

The Wilderness Act allows mineral exploration and development under the General Mining Act to occur in wilderness to the same extent as before the Wilderness Act until December 31, 1983, when the Wilderness Act withdrew the CMW from mineral entry, subject to valid existing rights. The discovery of mineral deposits for the Rock Creek Project dates back to the early 1980s and is discussed in detail in the Final SEIS Section 1.4, *History of Rock Creek Project and the EIS Process*. Mining claims are shown on Figure 3 of this ROD. The surface disturbances associated with the selected alternative will occur outside of the CMW, will not physically disturb any land within the CMW, and will not directly affect any wilderness qualities or wilderness character.

Mitigation measures (see Attachment 2 and Section 2.10 of Attachment 1) and monitoring required for the selected alternative (Attachment 3) will be implemented to minimize changes in wilderness character and are consistent with the use of the land for mineral development. The following mitigations included in the selected alternative will effectively eliminate or minimize direct long-term effects on wilderness and wilderness characteristics:

- Implementing visual mitigations for the evaluation adit and support facilities
- Implementing measures to reduce noise levels at the evaluation adit such as limiting generator use (power to the evaluation adit site will be provided primarily through a power line rather than using generators), dampening exhaust and intake fans, replacing aboveground

vehicle backup beepers with alternative backup alarm systems that reduce noise impacts to wildlife, and retaining vegetative buffers

- Implementing measures to reduce traffic on access roads
- Implementing measures such as limiting generator use and using Tier 4 engines and low-sulfur diesel fuel in underground mobile equipment to minimize potential indirect air quality impacts on CMW lakes and wilderness character.

Monitoring activities associated with Phase I, such as water resources monitoring, will require the installation of some type of measuring equipment (e.g., dataloggers) in the CMW. In addition, some surveying will need to occur in the CMW, and monuments will be established. The KNF will use a Minimum Requirements Analysis to ensure that adverse effects on wilderness character are minimized. The Minimum Requirement Decision Guide is a tool to complete a Minimum Requirements Analysis (see Attachment 3 for a description of the Minimum Requirement Decision Guide process). Before any monitoring in the CMW occurs, the KNF will complete a Minimum Requirements Analysis.

The selected alternative complies with 36 CFR 228.15 regarding operations within NFS wilderness.

1.5.1.3 Alaska National Interest Lands and Conservation Act

The Alaska National Interest Lands and Conservation Act directs the KNF to provide access to nonfederally owned land (which includes patented claims and private mineral estates) within the boundaries of NFS lands, allowing landowners reasonable use and enjoyment of their property.

The access provisions of the Alaska National Interest Lands and Conservation Act state in part: “The Secretary shall provide such access to non-federally owned land within the boundaries of the National Forest System as the Secretary deems adequate to secure to the owner the reasonable use and enjoyment thereof: Provided, that such owner comply with rules and regulations applicable to ingress and egress to or from National Forest System (16 United States Code (USC) 3210).” The private mineral estate is nonfederally owned real estate subject to the access provisions of the Alaska National Interest Lands and Conservation Act. Granting access for reasonable use includes the responsible officers authorizing only “those access facilities or modes of access that are needed for the reasonable use and enjoyment of the land and that minimize the impacts on Federal resources.” What constitutes reasonable use and enjoyment of the land is “based on the contemporaneous uses made of similarly situated lands in the area and any other relevant criteria (36 CFR 251.114, Criteria, Terms and Conditions).”

In the proposed Plan of Operations, RCR requested access to develop its privately owned mineral resources located within and outside the CMW. I have determined that the KNF has met the conditions of the Alaska National Interest Lands and Conservation Act by selecting Phase I of Alternative V of the Final SEIS for implementation. The reasonable use is defined in the selected alternative, and mitigation that minimizes impacts on federal surface resources will be required, as described in Section 2.10 of Attachment 1 and listed in Attachment 2.

1.5.1.4 Clean Air Act

The Forest Service is responsible for ensuring that mine operators on NFS lands comply with applicable federal and state air quality standards, including the requirements of the CAA (Section 1.5.1.2.5, *Requirements for Environmental Protection* (228.8)). Under the federal CAA, the EPA sets National Ambient Air Quality Standards for pollutants considered harmful to public health and the environment. The State of Montana administers the federal CAA. Under Montana’s implementation of the Clean Air Act, the state has established the Montana Ambient Air Quality Standards for criteria and other pollutants. DEQ issued RCR MAQP #2414-03 in 2014 (Section 1.7.1.2, *Air Quality Permit*).

The selected alternative will implement emission controls that constitute Best Available Control Technology, as required by ARM 17.8.752(1)(a). As discussed previously, 36 CFR 228.8 requires that mining operators minimize, where feasible, adverse environmental impacts on NFS surface resources and comply with applicable state and federal air quality standards including the CAA. RCR will develop and implement a Fugitive Dust Control Plan, which will be submitted to, reviewed by, and approved by the KNF and DEQ before construction of the evaluation adit. The selected alternative incorporates feasible measures to minimize adverse environmental impacts on NFS surface resources and complies with applicable state and federal air quality standards. These measures, in addition to using Best Available Control Technology, will include using primarily electric-powered equipment and ultra-low-sulfur diesel for any diesel-fueled equipment, providing power to the evaluation adit through a power line rather than using generators, and using Best Operating Practices to minimize blasting emissions and substantially reduce emissions (as compared to the other action alternatives). Other conditions and limitations on air emissions are described in MAQP #2414-03. The selected alternative will be in compliance with the CAA and the Clean Air Act of Montana because construction activities and facility operations will not result in exceedances of any National Ambient Air Quality Standards or Montana Ambient Air Quality Standards. The selected alternative will be consistent with the 2015 KFP components pertaining to air quality.

The limits in MAQP #2414-03 are necessary to ensure that all potential sources of air pollutants from the project comply with the CAA. DEQ's permit decision and conditions on the air quality permit constitute compliance with CAA requirements. I have determined that the KNF meets the obligations of the CAA.

1.5.1.5 Clean Water Act

The Forest Service cannot authorize mining operations that do not comply with state and federal water quality regulations, including a state's antidegradation policy, and is responsible for ensuring that mine operators on NFS lands obtain the proper permits and certifications to demonstrate they comply with applicable federal and state water quality standards, including regulations issued pursuant to the CWA (Section 1.5.1.2.5, *Requirements for Environmental Protection (228.8)*).

1.5.1.5.1 Surface and Groundwater

The Montana Water Quality Act authorized the Board of Environmental Review to establish a classification of state waters, adopt water quality standards, adopt rules for granting of mixing zones, adopt rules implementing the state's nondegradation policy, and adopt rules for issuing permits for discharges to state waters. DEQ administers rules established by the Board of Environmental Review under the Water Quality Act (see Section 1.7.1.3, *Water Quality Permits*). After the Water Quality Act was passed, the EPA authorized DEQ to implement certain portions of the CWA, such as setting water quality standards and issuing discharge permits. The EPA maintains oversight over delegated programs. Treated wastewater can only be discharged if it complies with the effluent limits and conditions in DEQ's discharge permits. DEQ's discharge permits are to be protective of beneficial uses of both Montana and Idaho waters.

RCR has two MPDES permits that cover the Rock Creek Project (Table 4 in Section 1.7.1.3, *Water Quality Permits*). MT0031763 covers outfalls that will be used during Phase I to discharge stormwater related to construction of ancillary facilities at the evaluation adit site, excavation trenching to install a pipeline and power line, and improvements to roads to reduce sediment delivery to Rock Creek. MT0030287 covers two stormwater outfalls (006 and 007) that will be used during Phase I. Discharge of process water or any water resulting from mine dewatering activities is prohibited under both permits. RCR will need to apply for and receive a MPDES permit before commencing any discharges to surface water not covered by the two stormwater MPDES permits already received.

Measures in the selected alternative to minimize changes in water quality, including flow, are discussed in the Final SEIS Sections 4.7.3.3, *Groundwater Quality*, and 4.7.3.4, *Surface Water Quality*. For the selected alternative, these measures include the following:

- Implementation of the Sediment Mitigation Plan will reduce sediment delivery by 234 tons per year.
- All stormwater discharges will be regulated through MPDES permits and subject to MPDES permitted effluent limits.
- Sediment will be monitored at instream locations, and turbidity and total suspended solids, including turbidity at control sites not affected by evaluation activities, will be monitored.
- BMPs will be monitored in accordance with the Forest Service's *National Best Management Practices for Water Quality Management on National Forest System Lands* and MPDES permits.
- During Phase I, water from the evaluation adit will be treated and discharged to groundwater infiltration ponds.
- Grouting ahead of blasting will be done to minimize groundwater inflows to the evaluation adit.
- A Water Resources Monitoring Plan described in the conceptual monitoring plans (Attachment 3) will be prepared and implemented. The plan will include action levels for specific water quality parameters in groundwater at the base of the talus slope below the evaluation adit portal pad and below the Phase I infiltration ponds. Should action levels be reached, RCR will implement a Contingency Action Plan.

1.5.1.5.2 Wetlands and Nonwetland Waters of the U.S.

The Corps is the permitting authority for the discharge of dredged or fill material into wetlands and nonwetland waters of the U.S. under Section 404 of the CWA. The EPA also reviews individual 404 permit applications and provides comments to the Corps. The EPA has veto authority under the federal CWA for decisions made by the Corps on individual 404 permit applications.

Based on preliminary design, effects on jurisdictional wetlands within the selected alternative disturbance boundary will be avoided, and no compensatory mitigation under the CWA is required. In the selected alternative, no discharge of fill material subject to the Corps' jurisdiction will occur. If, after final design, effects on jurisdictional wetlands cannot be avoided, RCR will comply with and implement conditions in the 404 permit, if it is needed. Plans for avoidance, minimization, and mitigation of effects on wetlands will be required before permit issuance. Any activity that may result in any discharge into waters of the U.S. cannot proceed until RCR provides the KNF a 401 certification from DEQ, unless DEQ waives its issuance.

1.5.1.5.3 Finding

My decision to select Phase I of Alternative V as the selected alternative for implementation requires that RCR obtain all necessary CWA permits before implementing each phase of the mine development. DEQ has discussed compliance with the Montana Water Quality Act in the Final Environmental Assessment for the Rock Creek Evaluation Adit, the 2001 ROD, and MPDES permits MT0030287 and MT0031763, or will discuss compliance in any future decisions or permits regarding the Hard Rock Operating Permit or discharges to surface water. 36 CFR 228.8(h) states that "certification or other approval issued by state agencies or other federal agencies of compliance with laws and regulations relating to mining operations will be accepted as compliance with similar or parallel requirements of these regulations." DEQ's permit decision and associated conditions in these decisions or permits, and any other state water quality permits

or certification, will constitute compliance with Montana water quality requirements and CWA requirements regarding water quality.

1.5.1.6 Endangered Species Act

The KNF is required by the ESA to ensure that any actions it takes will not jeopardize the continued existence of T&E species or result in the destruction or adverse modification of critical habitat. The KNF is also required to develop and carry out conservation programs for T&E species. Grizzly bear, Canada lynx, and bull trout are currently listed as threatened under the ESA and occur within the Rock Creek Project study area.

Designated bull trout critical habitat in the study area includes Rock Creek from its mouth upstream 8.4 miles (13.5 km) to a natural barrier and the entire mainstem of the East Fork Bull River, the Bull River, Cabinet Gorge Reservoir, Noxon Reservoir, and the lower Clark Fork River. Within the study area, bull trout also occur in East Fork Rock Creek and West Fork Rock Creek, and have been recorded in Copper Gulch. Although lynx habitat occurs in the upper elevations of the study area, no lynx critical habitat occurs in the study area. All of the selected alternative activities will occur in grizzly bear habitat, specifically Bear Management Units 4, 5, and 6.

1.5.1.6.1 Consultation

The history of KNF consultation with the USFWS regarding the Rock Creek Project is summarized below in Section 1.7.1.6, *U.S. Fish and Wildlife Service—Biological Opinions*. The complete history can be found in the project record. The KNF reinitiated formal consultation with the USFWS in March 2017 following submission of a Supplemental BA for bull trout and bull trout critical habitat (Attachment 8). As a result, the USFWS issued a revised BO for bull trout and bull trout critical habitat in November 2017.

All the action alternatives, including the selected alternative, may affect and are likely to adversely affect the grizzly bear. In the USFWS 2006 BO and 2007 BO Supplement, the USFWS determined that the Rock Creek Project is not likely to jeopardize the continued existence of the grizzly bear.

All action alternatives, including the selected alternative, may affect but are not likely to adversely affect the Canada lynx. It was further determined there will be no effect on designated Canada lynx critical habitat, as none was designated within the study area. In the 2006 BO transmittal letter, the USFWS concurred with the KNF's determination that the Rock Creek Project will not likely adversely affect the Canada lynx.

Mining activities, such as those proposed in Phase I, are included in the activities that the USFWS found will not impact wolverine populations and are covered under the Programmatic BA for Forest Service Region 1. The KNF completed a Summary Sheet for Wolverine Programmatic Assessment that is included as part of the project record.

All action alternatives, including the selected alternative, may affect and are likely to adversely affect the bull trout and designated bull trout critical habitat. In its 2017 revised BO, the USFWS indicated that the Rock Creek Project, as proposed in the KNF's Preferred Alternative in the SEIS, could negatively impact some of the Primary Constituent Elements of bull trout critical habitat in the Bull River and Rock Creek drainage, resulting in adverse effects on critical habitat, but "will not appreciably reduce the value of bull trout critical habitat in the Lower Clark Fork River CHSU [Critical Habitat Subunit], and by extension it will not destroy or adversely modify bull trout critical habitat at the scale of the Clark Fork River Basin Critical Habitat Unit (Unit 31)." The USFWS also concluded the Rock Creek Project is "not likely to appreciably reduce the reproduction, numbers, or distribution of bull trout at the scale of the LPO [Lake

Pend Oreille] Core Area, and by extension in the Lower Clark Fork River Geographic Region and the Columbia Headwaters Recovery Unit. Therefore, the Service concludes that proposed action will not appreciably reduce both the survival and recovery and would not jeopardize bull trout at the range-wide scale of the listed entity, the coterminous population of the United States.”

1.5.1.6.2 Mitigation Measures in the Selected Alternative

Numerous mitigation measures have been incorporated into the selected alternative to reduce, eliminate, avoid, or minimize the potential impacts on T&E species including the grizzly bear and bull trout. These measures are summarized in Section 2.10 of Attachment 1 and are also included in the sections below.

Terrestrial Threatened and Endangered Species

The selected alternative’s mitigation plan for terrestrial T&E species consists of the Terrestrial Threatened and Endangered Species Mitigation Plan in Appendix B of the 2006 BO (Attachment 5), plus the terms and conditions in the 2006 BO (Attachment 6). Consistent with the mitigation plan, the KNF will form and lead a grizzly bear Oversight Committee, which will develop a Comprehensive Grizzly Bear Management Plan. The Oversight Committee will oversee implementation of all mitigation and monitoring requirements, and collect and review new information on grizzly bears and other information relevant to Cabinet-Yaak Ecosystem grizzly bears over the life of the mine. The Comprehensive Grizzly Bear Management Plan will include processes to ensure that access management, prevention of habituation, educational opportunities, reporting and monitoring, enforcement of easements, and management of actions are being adequately implemented. The terrestrial T&E species monitoring plan in Attachment 3 outlines the basic monitoring elements to be designed in detail by RCR, in consultation with the Oversight Committee. The final mitigation and monitoring plans must be approved by the KNF and DEQ before construction of the evaluation adit, and several components of the plan will be implemented before or during evaluation adit construction. Key elements of the Alternative V Terrestrial Threatened and Endangered Species Mitigation Plan are described in Attachment 5.

In 2006, RCR and FWP established a collection agreement for RCR to fund the three FWP positions (two FWP grizzly bear management specialists and a FWP law enforcement position). In 2009, the Forest Service, FWP, and DEQ (Oversight Committee) entered into an agreement to work cooperatively to fulfill the requirements of the Terrestrial Threatened and Endangered Species Mitigation Plan, including the development of a Comprehensive Grizzly Bear Management Plan. The MOU establishes the roles and responsibilities of all participants and outlines their commitments. The Oversight Committee will specify when all components of the plan will be finalized and implemented as required by the Reasonable and Prudent Measures and Terms and Conditions in the 2006 BO for grizzly bears. The Oversight Committee will also set timelines for development of access management plans, describe the process for approving mitigation land, specify the wording for conservation easements, provide the framework for any proposed land transfer related to mitigation acres, and outline job descriptions and work tasks for the three FWP positions.

Bull Trout and Other Aquatic Species

The Aquatics and Fisheries Mitigation Plan described in Section 2.10, *Monitoring and Mitigation Plans*, of Attachment 1 was prepared and will be implemented in cooperation with FWP, USFWS, KNF, and DEQ and will comply with the terms and conditions of the 2017 revised BO for bull trout (Attachment 7). The effects of sediment delivery on aquatic resources and fisheries will be mitigated through implementation of the Sediment Mitigation Plan and compliance with effluent limits and conditions of MPDES permits MT0030287 and MT0031763 as described above. Spill prevention measures for Phase I are provided in Appendix R, *Spill Plan*, of the Rock Creek Evaluation Adit License Application. A Pipeline Spill Monitoring, Maintenance, and Repair Plan is described in Attachment 3.

Term and Conditions 1a and 1c of the 2017 revised BO (Attachment 7) require RCR to conduct, before Phase I, a pre-project watershed assessment to (1) better define bull trout populations (distribution, densities, age class structures, genetics, growth rates, fecundity, and status of resident and migratory populations), (2) better define habitat conditions (spawning, rearing, and overwintering conditions, including temperature monitoring), and (3) identify sediment sources and potential sediment mitigation and stream habitat enhancement projects for the Rock Creek watershed. A Phase I sediment source reduction plan will be required to reduce sediment in spawning gravels. The Sediment Mitigation Plan described in the Final SEIS provides a detailed sediment source reduction plan for Phase I activities. Whenever possible, these mitigations will be coordinated with work being done by Avista Corporation or the local watershed council to avoid duplication of efforts.

RCR will be required to implement a stream habitat enhancement program to improve the ability of bull trout to move throughout the year in Rock Creek and increase habitat availability and diversity for migratory and resident bull trout populations. RCR will improve or replace the existing culvert on West Fork Rock Creek above the last bridge on NFS road #150, which has been identified as a barrier to fish migration as determined in consultation with the Forest Service.

Mitigation will include funding for personnel (the law enforcement personnel mentioned in the Terrestrial Threatened and Endangered Species Mitigation Plan above) to protect bull trout and westslope cutthroat trout through enforcing the law and informing and educating the public. Angling pressure in Rock Creek and its tributaries will likely increase due to improved access and increased use. Bull trout harvest is not allowed, but the fish is often misidentified by the public. Westslope cutthroat trout are highly susceptible to angling; therefore, harvest rate information and protection are needed.

Before evaluation and construction during Phase I, RCR will be required to submit an assessment of risk of access road failure for Phase I activities to the KNF and the USFWS for review and agreement (Term and Condition #10 in Attachment 7). The assessment shall determine areas most at risk for bull trout and make recommendations for additional measures and responses to minimize risk. If any additional measures can be incorporated to minimize the risk of catastrophic failures, the KNF and the USFWS will determine the timeline and mechanism for implementation of those identified measures.

A conceptual monitoring plan found in Attachment 3 addresses all monitoring items required by the terms and conditions of the 2017 revised BO (Attachment 7). Aquatic and fisheries monitoring will be coordinated with water quality and streamflow monitoring. RCR will monitor metals accumulations in fish tissues and sediments, increases in sediment loads, and water quality (including temperature). RCR will need to identify additional monitoring sites. Monitoring of sediment sources during construction will be conducted under the Reclamation Monitoring Plan found in Attachment 3.

To ensure early detection of any surface water reductions potentially caused by Phase I activities, there will be periodic monitoring of springs, streams, and the mouth of Rock Creek seeps as specified in the Phase I Groundwater Dependent Ecosystem Inventory and Monitoring Plan in Attachment 3.

1.5.1.6.3 Finding

I have determined that the KNF has met the obligation of the ESA. This determination is based on the review of data presented in the 2006 BO, the 2017 revised BO, and the Final SEIS, and the conclusion that the reasonable and prudent measures, terms, conditions, conservation recommendations, mitigations (as outlined in the BOs and incorporated into this decision), and stipulations (Attachment 2) attached to this ROD will protect T&E species. Alternative V will incorporate all terms and conditions from the 2006 BO and the 2017 revised BO incidental take statements for bull trout, designated bull trout critical habitat, and grizzly bear.

1.5.1.7 Farmland Protection Policy Act

The Farmland Protection Policy Act and USDA Departmental Regulation No. 9500-3 provide protection for important farmland. The USDA regulation 7 CFR 658 implements the Farmland Protection Policy Act. Phase I of Alternative V, the selected alternative, will not affect any important farmland.

I find that the selected alternative complies with the Farmland Protection Policy Act.

1.5.1.8 Forest Service Manual (2670)

Sensitive species are administratively designated by the Regional Forester (FSM 2670.5) and managed under the authority of the National Forest Management Act (NFMA). FSM 2670.22 requires that the Forest Service develop and implement management practices to ensure that sensitive species do not become threatened or endangered because of Forest Service actions and that the Forest Service maintain viable populations of all native and desired nonnative wildlife, fish, and plant species in habitats distributed throughout their geographic range on NFS lands. The NFMA's implementing regulations at 36 CFR 219.19 define a viable population as "a population of species that continues to persist over the long term with sufficient distribution to be resilient and adaptable to stressors and likely future environments." Federal law and direction applicable to sensitive species includes the NFMA (16 USC 1604(g)(3)(B)) and FSM 2670. The Regional Forester has approved the sensitive species list—those plants and animals for which population viability is a concern.

Any decision on the Rock Creek Project cannot result in a loss of sensitive species viability or create significant trends toward federal listing (FSM 2670.32). The sensitive wildlife species list for Forest Service Region 1 has been updated since the 2001 FEIS was issued, resulting in status changes for several species. American peregrine falcon (*Falco peregrinus anatum*), bald eagle (*Haliaeetus leucocephalus*), and gray wolf (*Canis lupus*) have been removed from the federal list of T&E species and are now listed as Forest Service sensitive species. The wolverine is proposed for listing as a threatened species as of May 2016 and is addressed in Section 3.13, *Threatened and Endangered Species*, of the Final SEIS. Bighorn sheep (*Ovis canadensis*) has been added to the list of sensitive species. The statuses of the black-backed woodpecker (*Picoides arcticus*), flammulated owl (*Otus flammeolus*), harlequin duck (*Histrionicus histrionicus*), fisher (*Martes pennanti*), northern bog lemming (*Synaptomys borealis*), Townsend's big-eared bat (*Corynorhinus townsendii*), Coeur d'Alene salamander (*Plethodon idahoensis*), northern leopard frog (*Rana pipiens*), and western toad (*Bufo boreas*) are unchanged and remain on the sensitive species list. The northern goshawk (*Accipiter gentilis*) is no longer a sensitive species, although it continues to be a state species of concern. Updated distribution and abundance information for sensitive species that may occur within or near the Rock Creek Project study area were disclosed in the Final SEIS in Section 3.12.3.1, *Forest Service Sensitive Wildlife Species*.

In making my decision, I have reviewed the analysis and projected effects on all sensitive species listed as occurring or possibly occurring in the KNF (2001 FEIS and Final SEIS).

The sensitive species analysis in the FEIS and Final SEIS meets the requirements for a biological evaluation as outlined in FSM 2672.42. I concur with the findings documented for these species. These findings document that the selected alternative will not likely contribute to a trend toward federal listing or loss of viability of the population or species. It is my determination that all other applicable laws and regulations are met if the Plan of Operations for Phase I is implemented as outlined in Alternative V.

1.5.1.9 Forest Service's Minerals Program Policy of 1995

The objectives of the Forest Minerals Policy are exploration, development, and production of mineral and energy resources, and reclamation of activities are part of the forest ecosystem management

responsibility. Therefore, the KNF will administer its minerals program to provide commodities for current and future generations commensurate with the need to sustain the long-term health and biological diversity of ecosystems. Accordingly, the KNF will strive to:

- Ensure that exploration, development, and production of mineral and energy resources are conducted in an environmentally sensitive manner and that these activities are integrated with the planning and management of other resources using the principles of ecosystem management
- Facilitate the orderly exploration, development, and production of mineral and energy resources within the NFS and lands open to these activities or on withdrawn lands consistent with valid existing rights
- Maintain opportunities to access mineral and energy resources that are important to sustain viable rural economies and to contribute to the national defense and economic growth
- Ensure that lands disturbed by mineral and energy activities, both past and present, are reclaimed using the best scientific knowledge and principles and returned to other productive uses

I have determined the KNF has met the objective of the minerals program policy by selecting Phase I of Alternative V of the Final SEIS for implementation. The KNF has ensured that the exploration of this mineral resource will be conducted in an environmentally sensitive manner, integrated with the 2015 KFP, and compatible with other resources. The KNF has achieved this by requiring the stipulations outlined in Attachment 2, the monitoring plans described in the revised Appendix K in Attachment 3, the 2015 KFP amendments as described in Attachment 4, the mitigation in the terrestrial BA (Attachment 5) and Section 2.10 of Attachment 1, and the terms and conditions of the USFWS BOs (Attachment 6 and Attachment 7).

1.5.1.10 General Mining Act

The General Mining Act gives U.S. citizens the right to explore, locate mining claims, make discoveries, patent claims, and develop mines on NFS lands open to mineral entry subject to other federal laws. RCR currently owns unpatented mining claims that cover proposed mine development on NFS lands, and those lands will be used for the evaluation adit. The selected alternative (Phase I of Alternative V), as described in Attachment 1, and additional stipulations (Attachment 2), mitigation (Attachment 5), and monitoring (Attachment 3), demonstrate that the claims can be developed in a manner to meet the required applicable laws. I find that the selected alternative (Phase I of Alternative V), as presented in the Final SEIS, can be developed in a manner to meet the required applicable laws. The selected alternative has met the intent of the 1872 General Mining Act.

1.5.1.11 Migratory Bird Treaty Act/Executive Order 13186—Migratory Birds

Under the Migratory Bird Treaty Act, it is illegal to take any migratory bird, their eggs, their parts, or any bird nest except as permitted (such as waterfowl hunting licenses, falconry licenses, or bird banding permits) by the USFWS. The definition of take under the act includes any attempts or acts of pursuing, hunting, shooting, wounding, killing, trapping, capturing, possessing, or collecting.

In addition, EO 13186 requires analysis of effects of federal actions on migratory birds as part of the environmental analysis process and directs federal agencies to develop a MOU with the USFWS to further implement the act and promote the conservation of migratory bird populations. Under the MOU between the Forest Service and the USFWS, the Forest Service will evaluate the effects on migratory birds, focusing first on species of management concern along with their priority habitats and key risk factors.

By evaluating the effects of federal actions on migratory birds as part of the NEPA process and promoting conservation of and minimizing adverse impacts on migratory birds, the selected alternative will comply with the Migratory Bird Treaty Act, EO 13186, and the associated MOU. The effects of the selected alternative (Phase I of Alternative V) on migratory birds are discussed on page 4-170 of the 2001 FEIS. Although the Rock Creek Project will convert 10.4 acres of forested NFS land to nonforested land, bird populations will not be measurably impacted. No known active raptor nests have been identified in the study area. The selected alternative will result in minimal impacts on the bald eagle and will be in compliance with the Bald and Golden Eagle Protection Act.

Upon review of the information regarding Neotropical migratory birds in the 2001 FEIS, Final SEIS, and project record, I find that the selected alternative complies with the Migratory Bird Treaty Act and EO 13186.

1.5.1.12 Mining and Minerals Policy Act

The Mining and Minerals Policy Act provides a national policy that the United States will administer its minerals program to provide commodities for current and future generations commensurate with the need to sustain the long-term health and biological diversity of ecosystems. The Forest Service must ensure that exploration of mineral resources is conducted in an environmentally sensitive manner and that this activity is integrated with the planning and management of other resources using the principles of ecosystem management.

I find that the KNF has met the objective of this act by selecting Phase I of Alternative V of the Final SEIS for implementation. The KNF has ensured that the exploration of this mineral resource will be conducted in an environmentally sensitive manner (Attachment 1, Attachment 2, Attachment 3, and Attachment 5) and that this activity is integrated with the 2015 KFP (Attachment 4) and compatible with other resources. The KNF has achieved this by requiring compliance with the following: the stipulations outlined in Attachment 2; the monitoring plans and reports described in Attachment 3; the mitigation plans for terrestrial species (i.e., grizzly bears) and bull trout in Attachment 5 and Section 2.10 in Attachment 1, respectively; and the terms and conditions of the grizzly bear and bull trout BOs in Attachment 6 and Attachment 7, respectively.

1.5.1.13 Montana Noxious Weed Act and County Weed Control Act

The Sanders County Weed Board administers the County Noxious Weed Control Act (7-22-2101 through 2153, MCA) for any land-disturbing activities within their jurisdiction. It is unlawful to allow noxious weeds to propagate. The Montana noxious weed list currently contains 32 species designated as noxious and an additional three species that are regulated but are not designated as noxious. The KNF has implemented an integrated weed management strategy to address noxious weeds.

RCR will implement the Weed Management Plan provided in Appendix P of the 2010 Rock Creek Evaluation Adit License Application and submitted to Sanders County in April 2007. RCR will modify their 2007 Weed Management Plan, which addresses all Phase I disturbances, and submit it to the KNF and DEQ for their approval and for subsequent approval by the Sanders County Weed Control District. RCR will coordinate with the Sanders County Weed Board, the KNF, and DEQ to determine the types of weed-control measures to be used (Section 1.5.1.23, *Executive Order 13112—Invasive Species*) and the implementation schedule of the project.

The Sanders County Weed Board's decision regarding a weed control plan for Phase I of the Rock Creek Project constitutes compliance with the Montana Noxious Weed Act and County Weed Control Act.

1.5.1.14 Montana Water Use Act and the Montana Reserved Water Rights Compact

The Montana Water Use Act requires that any person, agency, or governmental entity intending to acquire new or additional water rights or change an existing water right in the state obtain a beneficial water use permit before constructing a new or additional diversion, withdrawal, impoundment, or distribution works for appropriations of groundwater or surface water. The Montana Water Rights Bureau, within the Water Resources Division of the Montana Department of Natural Resources and Conservation, administers the Water Use Act (beneficial use permits) and assists the Water Court with the adjudication of water rights. An Application for Beneficial Water Use Permit requires proof that there is water physically and legally available at the proposed point of diversion in the amount requested (ARM 36.12.1702 and 36.12.1705). Dewatering the evaluation adit during Phase I is not a beneficial use of water; therefore, a beneficial water use permit will not be required.

The Water Use Act has a requirement that a person cannot waste water, use water unlawfully, or prevent water from moving to another person having a prior right to use the water. If a point of diversion is on NFS lands, additional requirements for obtaining a new water rights permit come from the Forest Service/State of Montana Reserved Water Rights Compact (85-20-1401 Article IV B.1., MCA). The Water Rights Compact provides that there will be sequencing of the permitting process for water appropriations under state law and the permitting for access and use of NFS lands in relation to water appropriations to avoid conflict between state and federal permitting (Section 3.8.1, *Regulatory Framework (Water Rights)*, of the Final SEIS).

Following RCR's acquisition of water rights for all surface water and groundwater appropriations, the selected alternative (Section 4.8, *Water Rights*, of the Final SEIS) will comply with the Montana Water Use Act and the Montana Reserved Water Rights Compact. Mitigations listed in Table 4-14 and Table 4-15 of the Final SEIS and described in Attachment 1, and those stipulated in Attachment 2 of this ROD, will be implemented, if necessary, to prevent adverse effects on surface water rights and groundwater rights. Any new water right issued pursuant to Montana law for water use associated with any action alternative must be consistent with the terms of any approved Plan of Operations and would terminate when the Plan of Operations terminated.

36 CFR 228.8(h) states that "certification or other approval issued by state agencies or other federal agencies of compliance with laws and regulations relating to mining operations will be accepted as compliance with similar or parallel requirements of these regulations." The Montana Department of Natural Resources and Conservation's final permit decision and associated conditions on any beneficial water use permit will constitute compliance with Montana water use requirements.

1.5.1.15 National Environmental Policy Act and Regulations 40 CFR 1500-1508

NEPA declares a national environmental policy and promotes consideration of environmental concerns by federal agencies in decision making. Procedures and regulations issued by the Council on Environmental Quality, as authorized under NEPA, direct implementation of NEPA by federal agencies. Council on Environmental Quality regulations are promulgated at 40 CFR 1500-1508, USDA NEPA regulations are at 7 CFR 1b, and the Forest Service's NEPA regulations are at 36 CFR 220. The Forest Service direction pertaining to implementation of NEPA and Council on Environmental Quality regulations is contained in the USDA Forest Service Handbook 1909.15 (National Environmental Policy Act Handbook).

To meet the requirements under NEPA and the 2015 KFP, the KNF has prepared the Rock Creek Project Final SEIS. I find that Phase I of the Rock Creek Project Final SEIS complies with the procedural and analytical requirements of NEPA.

1.5.1.16 National Forest Management Act/2015 Kootenai Forest Plan

The NFMA requires the development, maintenance, and, as appropriate, revision of land and resource management plans (forest plans) for NFS units. These forest plans provide for the multiple use and sustained yield of renewable resources in accordance with the Multiple-Use Sustained-Yield Act of 1960.

While mineral development, such as the Rock Creek Project, is not regulated by the NFMA, or by the 2015 KFP, which was developed and revised pursuant to the NFMA (16 USC 528, 16 USC 1604(e), 36 CFR 219.1), per se, an approved plan of operations cannot be inconsistent with applicable 2015 KFP standards and guidelines. However, 16 USC 478 bars the Forest Service from prohibiting locatable minerals operations on lands subject to the United States mining laws either directly or by regulation amounting to a prohibition. This means that if applicable 2015 KFP standards and guidelines would not unreasonably restrict mining operations conducted pursuant to the United States mining laws, the approved plan of operations must reflect that direction. If application of the 2015 KFP would prohibit locatable minerals operations on lands open to the United States mining laws, or if the 2015 KFP direction would effectively amount to a prohibition of operations conducted pursuant to those laws for reasons such as the technical impossibility of complying with that direction, or the prohibitive cost of complying with that direction, then the 2015 KFP standards and guidelines must give way in light of 16 USC 478.

I have carefully reviewed my decision in light of the various goals, desired conditions, objectives, standards, and guidelines in the recently revised 2015 KFP (see the project record). Based on that review, I find the decision contributes to the maintenance or attainment of several desired conditions such as “contributing to the economic strength and demands of the nation by supplying mineral and energy resources while assuring that the sustainability and resiliency of other resources are not compromised or degraded” (FW-DC-MIN-01), as well as generating outputs contributing to sustaining social and economic systems (FW-DC-SES-01), contributing to the local economy through the generation of jobs and income (FW-DC-SES-02), and contributing to community stability or growth and the quality of lifestyles in the plan area (FW-DC-SES-03). I also find the decision does not foreclose the opportunity to maintain or achieve any other goal, desired condition, or objective over the long term.

The NFMA allows for amendments to the 2015 KFP. All of the evaluation adit under the selected alternative will be on NFS lands currently managed for wildlife habitat, recreation, and commercial timber production. In 2015, the Regional Forester approved the 2015 KFP, which incorporates the 2007 Northern Rockies Lynx Management Direction and the 2011 Grizzly Bear Access Amendment and establishes new management direction. The 2015 KFP also incorporates the Inland Native Fish Strategy. The Final SEIS includes an evaluation of the consistency of Alternative V (selected alternative) with the 2015 KFP. A full assessment of consistency of Alternative V with applicable 2015 KFP direction is available in the project record.

My decision (selecting Phase I of Alternative V for implementation) requires a project-specific amendment to the 2015 KFP to allow a variance suspending the requirement for full consistency with FW-GDL-WL-09 to be consistent with the plan. The forestwide guideline suspended is described in Section 2.11 in Attachment 1. The amendment will be completed in accordance with the regulations governing forest plan amendments found in 36 CFR 219 and FSM 1921.03. The analysis disclosed in the Final SEIS and Attachment 4 satisfies the requirements for an evaluation for the amendments.

1.5.1.17 Roadless Area Conservation Rule

Inventoried roadless areas (IRAs) are areas identified by the Forest Service for consideration of their suitability for inclusion in the National Wilderness Preservation System. For NFS lands in Montana, IRAs

are those areas mapped under the 2001 Roadless Area Conservation Rule (36 CFR 294 Subpart B, 66 Federal Register 3244-3273), known as the Roadless Area Conservation Rule. This rule established prohibitions of road construction and reconstruction and timber harvesting in IRAs on NFS lands, with certain exceptions. One of the exceptions was for locatable mining activities, such as the Rock Creek Project, for which reasonable access and disturbance for mineral entry within an IRA was allowed. The intent of the Roadless Area Conservation Rule is to provide lasting protection for the roadless characteristics of IRAs within the NFS in the context of multiple-use management. IRAs are identified in the set of IRA maps contained in the Forest Service Roadless Area Conservation, Final Environmental Impact Statement Volume 2 dated November 2000 and in Appendix C of the 2013 FEIS for the 2015 KFP.

The three IRAs located within the Rock Creek Project study area (Rock Creek, McKay Creek, and Government Mountain) are designated by the 2015 KFP as Management Area 5a (backcountry—nonmotorized year-round), which, in addition to vegetation and recreation-related management direction, defers to the requirements of the Roadless Area Conservation Rule for direction regarding road construction. The Rock Creek and McKay Creek IRAs are east of the study area, while the Government Mountain IRA includes forested areas west of Government Mountain Road. All three IRAs are contiguous with the CMW (Figure 5).

The Rock Creek Project study area contains other unroaded NFS lands that contribute to the roadless expanse found in the area. The roadless expanse includes the IRAs listed above as well as other lands that are roadless and contiguous to these IRAs or the CMW. Seven unroaded tracts of land are contiguous with an IRA or the CMW.

The proposed Phase I facilities in the selected alternative, including roads, will not directly affect any of the IRAs. The experience of IRA visitors might be affected by activities outside the IRA boundaries. However, the Roadless Area Conservation Rule (36 CFR 294) does not apply to activities outside these designated areas. Mitigation included in the selected alternative, such as implementation of the Transportation Monitoring and Mitigation Plan for Phase I described in Section 2.5.1 of Attachment 1, will reduce the effects on IRAs.

I find that the selected alternative complies with the Roadless Area Conservation Rule. Road reconstruction and the cutting, sale, or removal of timber will not occur in an IRA; therefore, review by the Chief of the Forest Service is not required.

1.5.1.18 Wilderness Act

Section 4(d)(3) of the 1964 Wilderness Act pertains to mining claims within the wilderness and states that holders of unpatented mining claims validly established as of December 31, 1983, on NFS lands designated by the act as a wilderness will be accorded rights under the 1872 General Mining Act. The same section states that all patents issued on NFS lands designated as a wilderness will convey only title to the mineral deposits within the claims, and the federal government reserves all title to the surface and surface resources of the claims. The Secretary of Agriculture may prescribe reasonable stipulations “for the protection of the wilderness character of the land consistent with the use of the land for the purposes for which they are leased, permitted, or licensed.” The Secretary of Agriculture also may regulate ingress and egress consistent with the use of the land for mineral location and development. Consequently, mining operations can occur within the wilderness but may be subject to management requirements that are above and beyond those normally imposed on operations outside of a wilderness, provided those requirements do not prevent the operator from exercising rights under U.S. mining laws. Forest Service mineral regulations (36 CFR 228 Subpart A) provide direction for administering locatable minerals operations on NFS lands. Specifically, 36 CFR 228.15 provides direction for operations within the National Forest Wilderness (Section 1.5.1.2.11, *Operations within National Forest Wilderness (228.15)*).

Holders of valid existing rights within the National Forest Wilderness are accorded the rights provided by U.S. mining laws and must comply with the Forest Service mineral regulations (36 CFR 228 Subpart A). Mineral operations in the National Forest Wilderness are to be conducted to protect the surface resources in accordance with the general purpose of maintaining the wilderness unimpaired for future use and enjoyment as wilderness and to preserve the wilderness character so long as doing so is consistent with the use of the land for mineral development and production.

The Wilderness Act withdrew the lands in the CMW from mineral entry on January 1, 1984, subject to valid existing rights. Under provisions of the act, only claims within the CMW that had documented valid existing rights as of December 31, 1983, could be allowed reasonable and prudent access and development of facilities required for a mine within the wilderness boundary. RCR's predecessor established valid existing rights in the CMW as of December 31, 1983, and received a patent (deed) to 99 lode mining claims (1,686 acres of mineral estate within the CMW and 123 acres of surface and mineral estate outside but adjacent to the CMW) from the U.S. Department of the Interior in 1989 (Figure 3). RCR's predecessor-in-interest received a patent only to the minerals within the wilderness with the federal government retaining the surface estate. For those claims outside the wilderness, RCR received fee title (surface and mineral estate). These patented mining claims contain the mineral reserves RCR has proposed to mine.

Mitigation described in Section 1.5.1.2.11, *Operations within National Forest Wilderness (228.15)* will effectively eliminate or minimize direct long-term effects on wilderness and wilderness characteristics associated with the selected alternative. The experience of wilderness visitors might be affected by activities outside the CMW boundary. However, the Wilderness Act does not apply to activities outside designated wilderness. The selected alternative will be implemented in a manner that protects the surface resources in accordance with the general purpose of maintaining the wilderness unimpaired for future use and enjoyment as wilderness and preserving the wilderness character consistent with the use of the land for mineral development and production in compliance with 36 CFR 228.15 and the Wilderness Act.

I find that the selected alternative complies with the Wilderness Act.

1.5.1.19 Wild and Scenic Rivers Act

Section 7 of the 1968 Wild and Scenic Rivers Act provides for the protection of the free-flowing, scenic, and natural values of rivers designated as components or potential components of the National Wild and Scenic Rivers System from the effects of construction of any water resources project. A water resources project under the Wild and Scenic Rivers Act is any activity that may affect the free-flowing characteristics of a designated or study river. The Wild and Scenic Rivers Act affords protection to two types of rivers: designated rivers and congressionally authorized study rivers. The study area has no designated rivers or congressionally authorized study rivers.

The KNF identified three river segments of the East Fork Bull River and the entire Bull River as eligible for addition to the National Wild and Scenic Rivers System (Figure 5). River segments eligible for potential inclusion are not afforded protection under the Wild and Scenic Rivers Act. Forest Service policy for eligible river segments directs that "water resources projects proposed on a section 5(d)(1) study river [eligible river] are not subject to section 7(b), but will be analyzed as to their effect on a river's free-flow, water quality, and outstandingly remarkable values, with adverse effects prevented to the extent of existing agency authorities (such as special-use authority)." The qualities that contribute to each of the three segments' eligibility are scenic and historic values.

No Phase I facilities will interfere with, obstruct, or otherwise modify the free-flowing characteristics of the East Fork Bull River or Bull River. Flow will remain in a natural condition without impoundment,

diversion, straightening, riprapping, or other modification of the stream. Effects on streamflow or changes in water quality in the selected alternative will have no effect on the scenic and historic values of the East Fork Bull River or Bull River.

The KNF has, within its authorities, incorporated mitigations into the selected alternative to protect the values of the eligible Wild and Scenic River segments. I find that the selected alternative complies with the Wild and Scenic Rivers Act and the appropriate analysis was conducted in compliance with Forest Service policy.

1.5.1.20 Executive Order 11988—Floodplain Management

EO 11988, Floodplain Management, as amended by EO 13690, requires federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. Each agency must take floodplain management into account, consistent with the Federal Flood Risk Management Standard, when formulating or evaluating any water and land use plans and must require land and water resources use appropriate to the degree of flood hazard involved. Floodplains are defined in EO 11988 as “lowland and relatively flat areas adjoining inland and coastal waters including flood prone areas of offshore islands.” A floodplain is established using methods described in EO 13690.

No Phase I facilities will be in the Federal Emergency Management Agency–designated 100-year floodplain of the Clark Fork River.

I find that the location of Phase I facilities will constitute compliance with the requirements of EOs 11988 and 13690.

1.5.1.21 Executive Order 11990—Protection of Wetlands

EO 11990 requires federal agencies to avoid, to the extent possible, the long- and short-term adverse effects associated with the destruction or modification of wetlands. Federal agencies must find that there is no practicable alternative to new construction located in wetlands, and that the proposed action includes all practicable measures to minimize harm to wetlands. Agencies may take into account economic, environmental, and other pertinent factors in making this finding.

Impacts on wetlands and nonwetland waters will be avoided through the selected alternative’s avoidance measures described in Attachment 1, which include but are not limited to the following:

- Road crossings on streams will use the same disturbance footprint as the existing road corridor or to bridge the crossing.
- Impacts on wetlands and other waters from pipelines will be avoided by spanning the wetland or nonwetland water, constructing pipelines using directional boring, or burying the pipeline within the road disturbance corridor.
- Open bottom arch culverts will be on two proposed crossings on a tributary to West Fork Rock Creek, avoiding 50 linear feet of impacts on jurisdictional nonwetland waters. If during final design another culvert type is proposed, authorization for impacts on the nonwetland waters will be requested from the Corps.

In compliance with EO 11990, I find that the selected alternative includes all practicable measures to minimize harm to jurisdictional and isolated wetlands.

1.5.1.22 Executive Order 12962—Effects on Recreational Fishing

EO 12962 mandates disclosure of effects on recreational fishing as part of a nationwide effort to conserve, restore, and enhance aquatic systems and provide for increased recreational fishing opportunities.

The analysis in the 2001 FEIS complies with EO 12962. I find that the selected alternative complies with EO 12962.

1.5.1.23 Executive Order 13112—Invasive Species

EO 13112 directs all agencies (in part) to prevent the introduction of invasive species, to provide for their control, and to minimize economic, ecological, and human health impacts that invasive species cause. Alien species are defined in the EO as “any species, including its seeds...or other biological material capable of propagating that species that is not native to that ecosystem.” Invasive species are also defined there as “alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.”

The selected alternative requires the implementation of the Weed Management Plan provided in Appendix P of the 2010 Rock Creek Evaluation Adit License Application to reduce the establishment and spread of noxious weeds. RCR will comply with state and local laws and the KNF’s and DEQ’s guidelines for all noxious weed control activities, specifically FSM 2900 Invasive Species Management, Appendix A of the KNF Invasive Plant Management Final EIS, the 2015 KFP, and the weed control plan approved by the Sanders County Weed Board (Section 1.5.1.13, *Montana Noxious Weed Act and County Weed Control Act*). All herbicides used by RCR on NFS lands will be approved for use in the KNF and will be applied according to the labeled rates and recommendations to ensure the protection of surface water, ecological integrity, and public health and safety. Herbicide selection and application timing will be based on target species on the site and site factors (such as soil types and distance to water), and with the objective to minimize impacts on non-target species. RCR will coordinate with the KNF weed specialist for use of biocontrol agents as they become available.

The Weed Management Plan addresses the treatment and control of noxious weeds for Phase I. I find that the selected alternative complies with EO 13112.

1.5.2 Kootenai National Forest Responsibilities to Federally Recognized Tribes

The laws and EOs in the following sections outline the responsibilities that the Forest Service has to federally recognized tribes. The Confederated Salish and Kootenai Tribes and the Kootenai Tribe of Idaho have retained off-reservation treaty rights through the Hellgate Treaty of 1855 (Section 1.5.2.1, *1855 Hellgate Treaty*). The KNF has consulted with the Confederated Salish and Kootenai Tribes, the Kootenai Tribe of Idaho, the Coeur d’ Alene Tribe of Idaho, and the Kalispel Tribe. Meetings and correspondence between tribal representatives and the KNF were conducted throughout the NEPA process. Tribal representatives attended interdisciplinary team meetings and supplied verbal and written comments including recommended mitigation measures for additional environmental protection (Section 1.8.2.2, *Consultation Process*).

1.5.2.1 1855 Hellgate Treaty

While a number of tribes used the Clark Fork River corridor, the only treaty that directly encompasses the Rock Creek area is the Hellgate Treaty of 1855. The Hellgate Treaty encompasses about 28,000 square miles. Within this area, the tribes retain certain rights, including the right of taking fish at all usual and accustomed places, erecting temporary buildings for curing, hunting, gathering roots and berries, and

pasturing their horses and cattle on open and unclaimed lands along with rights of passage (Section 3.19, *American Indian Treaty Rights*, of the Final SEIS).

Three tribes signed the Hellgate Treaty: the Salish, Upper Pend d' Oreilles, and Kootenai, now known as the Confederated Salish and Kootenai Tribes. These tribes retain treaty rights in the Rock Creek Project study area. To date, only these tribes have treaty rights within the immediate study area. Treaty rights are a complex issue, and case law concerning these rights is constantly evolving. Several tribes have challenged the delineations of treaty rights and prescribed aboriginal territories across the western United States. To date, the Hellgate Treaty is the only definitive treaty in the area.

The Lower Pend d' Oreilles/Upper Kalispel Tribe was not a party to the Hellgate Treaty and therefore has no off-reservation treaty rights to the lands in question. A similar circumstance occurred with the Coeur d' Alene Tribe. The Coeur d' Alene reservation was created by EO and ratified by Congress in 1891. The Coeur d' Alene Tribe does not appear to have treaty rights in the Rock Creek drainage. However, as "down stream tribes," both the Kalispel and Coeur d' Alene Tribes assert that adverse effects on the water quality of the Clark Fork River stand to affect their interest and rights to traditional resources that may ultimately be impacted by the Rock Creek Project.

The selected alternative will directly affect 19.6 acres of ceded treaty lands. The selected alternative will not have a negative adverse effect on water quality (Section 4.7.3.4, *Surface Water Quality*, of the Final SEIS) or other resources at the mouth of the Clark Fork River. Impacts on vegetation-related treaty rights will be minimal but cannot be quantified. Phase I of Alternative V includes acquisition of 153 acres of grizzly bear habitat, which will reduce impacts. Tribal access above the confluence of the east and west forks of Rock Creek will remain at current levels. Access on NFS road #2741 may be hindered during road improvement. Employees will be bused between the support facilities and the evaluation adit, reducing traffic on NFS road #150 and NFS road #2741, a measure not included in the other action alternatives.

The KNF has consulted with tribes when management activities may impact treaty rights or cultural sites and cultural use (Section 1.8.2.2, *Consultation Process*). Although efforts were made to minimize impacts on tribal concerns about water quality, fisheries, grizzly bears, huckleberries, and medicinal plants through mitigation, mining is simply not compatible with traditional American Indian values. For a discussion of unavoidable adverse effects on Native American treaty rights, see page 4-328 of the 2001 FEIS. In the selected alternative, there will be some minor unavoidable impacts on fisheries, wildlife, and vegetation. In addition, there will be limits on public access during the life of the selected alternative. This may affect the ability of Salish, Kootenai, and Upper Pend d' Oreilles tribal members to access and use these resources during the life of the selected alternative.

1.5.2.2 American Indian Religious Freedom Act

The American Indian Religious Freedom Act of 1978 states that "it shall be the policy of the United States to protect and preserve for American Indians their inherent right for freedom to believe, express, and exercise the traditional religions of the American Indian, Eskimo, Aleut, and Native Hawaiians, including but not limited to access to site, use and possession of sacred objects, and the freedom to worship through ceremonies and traditional rites." In addition, the 2008 Food, Conservation, and Energy Act provides that "the Secretary shall ensure access, to the extent practicable, to NFS lands by Indian tribes for traditional and cultural purposes, consistent with the American Indian Religious Freedom Act."

Federal agencies must make a good-faith effort to understand how American Indian religious practices may come into conflict with other forest uses and consider any adverse impacts on these practices in their decision-making practices. The consideration of intangible, religious, ceremonial, or traditional cultural

values and concerns that cannot be tied to specific cultural sites/properties can be considered under the American Indian Religious Freedom Act. The Forest Service complies with this act by consulting with and considering the views of American Indians when a proposed land use might conflict with traditional American Indian religious beliefs or practices. The act does not require that land uses that could conflict with American Indian religious beliefs or practices be denied.

Conflicts identified for the selected alternative include visual and audible disruption from evaluation activities of some American Indian traditionalists who may be worshiping in portions of the CMW, and impacts on lands containing or supporting sacred plants and animals by intrusive activities. The Confederated Salish and Kootenai Tribes also have identified an area as a sacred site and have indicated they believe the site may be eligible for listing on the National Register of Historic Places as a TCP under the National Historic Preservation Act (Section 1.5.2.3, *National Historic Preservation Act*).

Although efforts have been made to minimize impacts on tribal concerns about water quality, fisheries, grizzly bears, huckleberries, and medicinal plants through mitigation, the land use of mining is simply not compatible with some traditional American Indian values related to traditional uses of the land. Mitigation of the impacts from mining through reclamation is viewed as unacceptable to some tribal members who may consider surface disturbance an act of desecration. While the vast majority of the Cabinet Mountains and other mountains within the area will not be impacted and will continue to be available for religious practices, residual impacts on the Rock Creek area are unavoidable even with successful reclamation.

In selecting Phase I of the preferred alternative, it is important to acknowledge these concerns while recognizing that complete avoidance of these impacts is not possible because the impact is as much spiritual as it is physical. This decision does not limit American Indians' freedom to believe, express, or exercise their traditional religious beliefs, their right to possession of sacred objects, or their freedom to worship through ceremonies and traditional rites as required by the American Indian Religious Freedom Act (Section 1.5.2.5, *Executive Order 13007—Consultation with Tribes on Indian Sacred Sites*).

1.5.2.3 National Historic Preservation Act

The National Historic Preservation Act of 1966 pertains only to tangible properties (buildings, structures, sites, or objects) that are important in history and prehistory. Section 106 of the National Historic Preservation Act requires agencies to consider the effects of undertakings on properties eligible for listing or listed on the National Register of Historic Places by following the regulatory process specified in 36 CFR 800. TCPs are also protected under Section 106 of the National Historic Preservation Act.

Sections of the act relating specifically to coordination with American Indian tribes were added in the 1992 amendments, which reflect the increased importance placed on tribal relations. A section of the act directs federal and state governments to assist in the establishment of preservation programs on American Indian lands.

All eight cultural sites identified in the study area have been determined by the State Historic Preservation Office as ineligible for nomination to the National Register of Historic Places. No prehistoric sites were documented within the surveyed areas, and no specific sites of importance to interested American Indian tribes in the area were identified at that time. The implementation of any of the action alternatives will have both direct and indirect impacts on some of these sites, but because they are ineligible for listing on the National Register of Historic Places, no mitigation is required. RCR will be required to immediately inform the KNF (and stop ground-disturbing activities) if any buried artifacts, human remains, or other undiscovered cultural resources are found during evaluation adit construction as required by the National Historic Preservation Act, Archeological Resources Protection Act, and Native American Graves Protection and Repatriation Act.

The Confederated Salish and Kootenai Tribes in 2007 indicated that the development of the Rock Creek Mine may threaten an area identified by the tribes as a sacred site that they believe may be eligible for listing on the National Register of Historic Places as a TCP under the National Historic Preservation Act. The specific location of that area is exempt from public disclosure under Section 304 of the National Historic Preservation Act and the 2008 Food, Conservation, and Energy Act. A TCP may be eligible for listing on the National Register of Historic Places because of its association with cultural practices or beliefs of a living community that (a) are rooted in the history of the community or tribe, and (b) are important in maintaining the continuing cultural identity of the community or tribe. Formal evaluation of the identified area as a TCP will be completed, and if the evaluation indicates the area is eligible for listing on the National Register of Historic Places and the KNF concurs, then consultation with the Confederated Salish and Kootenai Tribes on avoidance, minimization, and mitigation measures will begin. An assessment of the effectiveness of mitigation for impacts on TCPs will be completed following TCP analysis.

I find that the selected alternative complies with the National Historic Preservation Act.

1.5.2.4 Executive Order 12898—Environmental Justice

EO 12898 requires federal agencies to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects on minority and low-income populations when implementing their respective programs, including American Indian programs. The order directs federal agencies to take the lead role in coordinating environmental justice issues with federally recognized American Indian tribes. The KNF's analysis of environmental justice follows the Council on Environmental Quality's guidance on environmental justice, the EPA's guidance on environmental justice, and the USDA's regulation on environmental justice. The USDA's regulation indicates that an effect on a minority or a low-income population is disproportionately high and adverse if the adverse effect is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the nonminority population or non-low-income population.

Other than members of the American Indian tribes within the region, the KNF has not identified any racial minorities or impoverished populations within the study area that might be affected by the Rock Creek Project. American Indians are a minority population, and although the proposed evaluation adit is not located within or adjacent to any tribal reservations, it is located within the boundaries of land covered by the Hellgate Treaty (Section 3.19, *American Indian Treaty Rights*, of the Final SEIS). All action alternatives would restrict access to Phase I facility sites by all members of the public, including tribal members. Proposed mitigations in all action alternatives would reduce the effects of access restrictions. The access restrictions would not be disproportionately high or adverse on any minority or low-income population.

I have determined, through the review of the Final SEIS, public comments, and communication with tribal representatives, that there are no environmental justice issues relative to the selected alternative that violate or are inconsistent with the intent of EO 12898. All efforts have been made to minimize environmental impacts resulting from the selected alternative regardless of the minority status or economic status of the people in the area. Impacts on personal religious values or beliefs are not within the scope of the environmental justice initiative and cannot be resolved through environmental justice mandates. The communities within the study area, regardless of the population's minority or economic status, will experience both the economic benefits and risks of the proposed project.

I have determined, through the review of the Final SEIS, public comments, and communication with tribal representatives, that no effect on a minority or a low-income population is disproportionately high

and adverse, because no adverse effect is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the nonminority population or non-low-income population.

I find that the selected alternative complies with EO 12898.

1.5.2.5 Executive Order 13007—Consultation with Tribes on Indian Sacred Sites

EO 13007 requires federal agencies, to the extent practicable, to accommodate access to and use of sacred sites by Indian religious practitioners, and to avoid adversely affecting the physical integrity of such sacred sites.

The Confederated Salish and Kootenai Tribes have identified an area as a sacred site and have indicated they believe the site may be eligible for listing on the National Register of Historic Places as a TCP under the National Historic Preservation Act. The specific location of that area is exempt from public disclosure under Section 304 of the National Historic Preservation Act and the 2008 Food, Conservation, and Energy Act. Formal evaluation of the identified area as a TCP will be completed, and if the evaluation indicates the area is eligible for listing on the National Register of Historic Places and the KNF concurs, then consultation with the Confederated Salish and Kootenai Tribes on avoidance, minimization, and mitigation measures will begin. An assessment of the effectiveness of mitigation for impacts on TCPs will be completed following TCP analysis.

I find that my decision to select Phase I of Alternative V as the selected alternative is consistent with EO 13007.

1.5.2.6 Executive Order 13175—Government-to-Government Consultation with Tribes

EO 13175 requires federal agencies to consult with American Indian tribal representatives and traditionalists on a government-to-government basis. The KNF has consulted with the Confederated Salish and Kootenai Tribes, the Kootenai Tribe of Idaho, the Coeur d' Alene Tribe of Idaho, and the Kalispel Tribe on a government-to-government basis since 1988 (Section 1.8.2.2, *Consultation Process*).

I find that the selected alternative complies with EO 13175.

1.6 Alternatives Not Selected and the KNF Rationale

The alternatives development process used by the KNF and DEQ for the 2001 FEIS was incorporated by the KNF into the Final SEIS. Alternatives I through IV, which are summarized in the sections below, have not changed since the 2001 FEIS; full descriptions of these alternatives can be found in Chapter 2 of the 2001 FEIS. The alternatives developed were for the entire Rock Creek Project, which included both Phase I and Phase II activities. Because Phase I of Alternative V is the selected alternative for this ROD, Phase II aspects of the alternatives are not discussed. This section only pertains to the project activities related to Phase I for each of the alternatives.

The alternatives development process was designed to identify a reasonable range of alternatives for detailed analysis. The KNF and DEQ developed alternatives in accordance with the requirements of NEPA, the Montana Environmental Policy Act, and Section 404 of the CWA. To develop a reasonable range of alternatives, the KNF and DEQ separated the project into components. Components are discrete activities or facilities (e.g., evaluation adit site, facility locations) that, when combined with other components, form an alternative. The KNF and DEQ identified options for each component. An option is an alternate way of completing an activity, or an alternate geographic location for a facility (component). Options generate the differences among alternatives. An alternative is a complete project that has all components necessary to fulfill the project purpose and need.

As discussed in Section 1.3, *Issues Considered*, 10 key issues were used as criteria in developing and evaluating the alternatives and provide the basis for the KNF to select Alternative V as the selected alternative (see Section 1.4.4, *KNF Rationale*). The following sections briefly describe Alternatives I through IV and the issue-based rationale for not selecting these alternatives. A comparison of the components and characteristics of these alternatives and the selected alternative by scoping issues is presented in Table 1 in Section 1.4.4, *KNF Rationale*. A brief description of alternatives considered but eliminated from detailed consideration is provided in Section 1.6.5, *Alternatives Eliminated from Detailed Study*. Table 2 summarizes effects of Phase I for Alternative I through V.

Table 2. Comparison of Phase I Alternatives.

Project Facility or Feature	Alternative II Proposed Rock Creek Project	Alternative III Proposed Project with Additional Mitigation	Alternative IV Modified Project with Additional Mitigation	Alternative V Paste Facility, Alternative Water Treatment, and Additional Mitigation¹
Total Disturbance Area	9.6 acres.	Same as Alternative II.	Same as Alternative II.	19.6 acres. ²
Evaluation Adit Length and Grade	Portal near end of NFS road #2741 6,592 feet at -10%.	Same as Alternative II.	Same as Alternative II.	Portal near end of NFS road #2741/2741J; 6,300 feet long at -10% grade; adit will be 16 to 18 feet high by 20 feet wide.
Evaluation Adit Waste Rock	90,000 tons of waste rock and 88,000 tons of ore; unmineralized waste rock used to construct adit pad downslope of adit entrance. Ore and alteration waste zone rock selectively separated and stockpiled at the adit.	Same as Alternative II.	Same as Alternative II.	Same as Alternative II, except RCR will cover stockpiles of alteration waste zone rock and ore with an impermeable material and minimize snow accumulation by plowing the portal pad to reduce infiltration of precipitation and the possibility of increasing concentrations of constituents of concern.
Evaluation Adit Access	NFS road #150 to NFS road #2741, and a short spur road, NFS road #2741J. Upgrade NFS road #2741 for 4.6 miles and reconstruct 0.18-mile spur to 14 feet wide and gravel.	Same as Alternative II.	Same as Alternative II plus improve 2.8 miles of NFS road #150.	Similar to Alternative IV; about 2.5 miles of NFS road #150 upgraded to improve safety and reduce sediment delivery; upgrade NFS road #2741 for 4.6 miles and reconstruct 0.18-mile spur (2741J) to 14 feet wide to adit site.
Evaluation Adit Water Discharge Line	6-inch polyethylene line 8.5 miles both cross-country and along NFS road #150, laid on surface for 3 years.	Same as Alternative II.	Same as Alternative II.	6-inch high-density polyethylene (HDPE) temporary pipeline buried in access roads; two Rock Creek crossings where the pipeline will be bored under stream channels, attached to existing bridge structures, or placed on trestles above the stream.

Project Facility or Feature	Alternative II Proposed Rock Creek Project	Alternative III Proposed Project with Additional Mitigation	Alternative IV Modified Project with Additional Mitigation	Alternative V Paste Facility, Alternative Water Treatment, and Additional Mitigation¹
Evaluation Adit Power Supply	Power from two 500-kW diesel generators would provide power for the drills, pumps, vent fans, and shop. Electric power for support facilities would be supplied from an existing local distribution line.	Same as Alternative II.	Same as Alternative II.	A power line will be buried in road corridor from junction of Montana Highway 200 and NFS road #150 to evaluation adit. Generators will only be used as backup power supply.
Evaluation Adit Support Facility Location	Close to NFS road #150 and a segment of Rock Creek considered important harlequin duck habitat.	Same as Alternative II.	Same as Alternative II.	Relocation of support facilities away from Rock Creek to minimize potential disturbance of harlequin duck habitat, busing workers from the parking lot in lower Rock Creek area to the evaluation adit, and screening traffic from Rock Creek (see Figure 2).
Evaluation Adit Water Treatment	Pressure filtration, oil skimmer, and a passive biotreatment and ion exchange system. Discharge to Clark Fork River.	Same as Alternative II.	Same as Alternative II.	Pressure filtration and oil skimmer, with a pilot anoxic biotreatment system; also includes precipitation, clarification, and filtration for solids and metals; ion exchange system; and biological nitrification/denitrification system to remove inorganic nitrogen; discharge will meet groundwater quality standards and nondegradation criteria, if applicable, before discharge to groundwater infiltration ponds.
Phase I Sediment Mitigation	Reduces sediment delivery by 55 tons per year.	Not proposed.	Not proposed.	Reduces sediment delivery by 234 tons per year.
Independent Technical Advisor for Mine Plan Review	Not proposed.	Not proposed in 2001 FEIS.	Not proposed in 2001 FEIS.	Fund an independent technical advisor to assist the KNF and DEQ in review of RCR's subsidence monitoring plan, underground rock mechanics data collection, and RCR's mine plan.

Project Facility or Feature	Alternative II Proposed Rock Creek Project	Alternative III Proposed Project with Additional Mitigation	Alternative IV Modified Project with Additional Mitigation	Alternative V Paste Facility, Alternative Water Treatment, and Additional Mitigation ¹
Evaluation Adit Soil Storage	1.2 acres; 8,757 cubic yards.	Same as Alternative II.	Same as Alternative II.	0.78 acre in one stockpile with two cells; 3,318 cubic yards in lift one stockpile cell and 15,545 cubic yards in lift two stockpile cell for a total of 18,863 cubic yards.

¹Reflects more detailed design than other alternatives.

²Differs slightly from the 18.5-acre (Appendix N) and 19.8-acre (Table 7) Phase I disturbed area described in the Rock Creek Evaluation Adit License Application due to minor modifications resulting from more detailed design of Phase I facilities.

1.6.1 Alternative I—No Action Alternative

1.6.1.1 Description of Alternative

In Alternative I, the No Action Alternative, RCR would not be allowed to develop the project, and no surface-disturbing activities would occur on NFS lands. The environmental, social, and economic conditions in the study area would not be affected by Phase I activities. DEQ’s Exploration License 00663 for construction of an evaluation adit would remain in effect, and RCR could continue with the permitted activities on private land associated with the Rock Creek evaluation adit program that did not affect NFS lands. Without the evaluation adit being allowed on NFS lands, support facilities that would be located on private land would likely not be needed. Therefore, the No Action Alternative assumes the evaluation adit and support facilities would not be developed. Any existing evaluation-related or baseline collection disturbances by RCR would be reclaimed in accordance with existing laws and permits.

The No Action Alternative provides a baseline for estimating the effects of other alternatives and is required by NEPA. The effects of the No Action Alternative were evaluated. Existing baseline conditions and trends would be maintained.

1.6.1.2 Rationale for Not Selecting Alternative I

I did not select Alternative I, the No Action Alternative, because it fails to meet the KNF’s purpose of and need for the action. Alternative I fails to respond to RCR’s proposed Plan of Operations to conduct evaluation activities on NFS lands. The Wilderness Act specifically contemplated that private interests under the mining laws would be established within wilderness areas and that development could occur. As summarized above in Section 1.1, *Introduction*, and discussed in detail in Section 1.3.1 of the Final SEIS, RCR has valid mineral estate in the CMW for the Rock Creek Project.

The role of the KNF under its primary authorities from the Organic Administration Act (Section 1.5.1.1, *Organic Administration Act*), Locatable Minerals Regulations 36 CFR 228 Subpart A (Section 1.5.1.2, *36 CFR 228 Subpart A*), and the Multiple Use Mining Act is to ensure that mining activities minimize adverse environmental effects on NFS lands and comply with all applicable environmental laws. While the KNF may reasonably regulate mining activities to protect NFS surface resources, laws and regulations limit its discretion. The KNF has no authority to unreasonably circumscribe or prohibit reasonably necessary activities under the General Mining Law that are otherwise lawful.

1.6.2 Alternative II—RCR’s Proposed Rock Creek Project

1.6.2.1 Description of Alternative

Alternative II is RCR’s proposed action as described in the Application for a Hard Rock Operating Permit and proposed Plan of Operations. Implementation of Alternative II would disturb 9.6 acres. RCR would conduct evaluation activities for the Rock Creek Project as proposed in the Plan of Operations and application. The evaluation adit would be located off of NFS road #2741 via the spur road #2741J, and the support facility would be located along NFS road #150 in Section 22 of Township 26 North, Range 32 West. Treated wastewater from the evaluation adit would be discharged to the Clark Fork River. Power for the evaluation adit would be provided by two 500-kW diesel generators. Power to the support facilities would be supplied from an existing local distribution line.

1.6.2.2 Rationale for Not Selecting Alternative II

I did not select Alternative II because it did not address the scoping issues (Section 1.3, *Issues Considered*) as well as the selected alternative (see Table 1) and, as a result, would likely cause greater adverse environmental impacts when compared with the selected alternative. For some scoping issues, such as Issue 9 (effects on TCPs of the Kootenai tribal people), the effects of Alternative II would be the same as those of the selected alternative.

Meeting MPDES permitted effluent limits and groundwater quality standards would be more difficult for the proposed water treatment system than for the system in the selected alternative in meeting groundwater quality standards and nondegradation criteria (Issue 1). The proposed use of generators for evaluation power supply would increase sound levels during Phase I (Issue 8).

Implementation of RCR’s proposed mitigation plans would reduce impacts on water quality, wildlife and fisheries, T&E species, transportation, and wetlands. Additional mitigation and monitoring requirements proposed in Alternatives III, IV, and V would further reduce impacts beyond what would be accomplished in Alternative II (Issues 1, 2, 6, and 7). The evaluation adit support facilities site would be located close to NFS road #150 and to a segment of Rock Creek considered important harlequin duck habitat. Following site reclamation, public use of the site for camping and access to Rock Creek could increase, increasing disturbance to the ducks.

I believe the selected alternative minimizes the effects that would remain in Alternative II and does not increase impacts on other resources.

1.6.3 Alternative III—Proposed Project with Additional Mitigation

1.6.3.1 Description of Alternative

Alternative III incorporates modifications and mitigation measures proposed by the KNF and DEQ to address scoping issues and reduce or eliminate undesirable environmental impacts. These measures are in addition to or instead of the mitigations proposed by RCR. Proposed modifications were developed in response to the significant issues identified during the scoping process. The location of the evaluation adit and support facility would be the same as those described for Alternative II. Treatment of wastewater and discharge location would be the same as that described for Alternative II, as would the power supply. A full description of Alternative III is available in the 2001 FEIS.

Mitigations included in Alternative III are:

- Geochemical and rock testing programs (Issues 1 and 10)

- Rock mechanics studies (Issue 10)
- Measures to protect scenic resources (Issue 8)
- Changes in reclamation/revegetation plans (Issues 5 and 6)
- Measures to reduce noise levels (Issue 8)
- Additional grizzly bear mitigations (Issue 2)
- Expanded monitoring for hydrology, soils and revegetation, fisheries/aquatics, and wildlife (Issues 1 and 2)
- An aquatics/fisheries mitigation plan (Issue 2)

1.6.3.2 Rationale for Not Selecting Alternative III

I did not select Alternative III because it did not address the scoping issues (Section 1.3, *Issues Considered*) as well as the selected alternative (see Table 1) and, as a result, would likely cause greater adverse environmental impacts when compared with the selected alternative. For some scoping issues, such as Issue 9 (effects on TCPs of the Kootenai tribal people), the effects of Alternative III would be the same as in the selected alternative.

Meeting MPDES permitted effluent limits and groundwater quality standards would be more difficult for the proposed water treatment system than for the system in the selected alternative in meeting groundwater quality standards and nondegradation criteria (Issue 1). Generators used for evaluation power supply would increase sound levels during Phase I (Issue 8). Implementation of Alternative III mitigation plans would reduce impacts on water quality, wildlife and fisheries, T&E species, transportation, and wetlands, but would not be as effective as Alternative V mitigation plans in reducing impacts (Issues 1, 2, 6, and 7). The evaluation adit support facilities site would be located close to NFS road #150 and to a segment of Rock Creek considered important harlequin duck habitat. Following site reclamation, public use of the site for camping and access to Rock Creek could increase, increasing disturbance to the ducks.

I believe the selected alternative minimizes the potential effects that would remain in Alternative III and does not increase impacts on other resources.

1.6.4 Alternative IV—Modified Rock Creek Project with Additional Mitigation

1.6.4.1 Description of Alternative

Alternative IV incorporates modifications and mitigation measures proposed by the KNF and DEQ to reduce or eliminate undesirable environmental impacts that are in addition to or instead of the mitigations proposed by RCR. Modifications and mitigation measures were developed in response to the significant issues identified during the scoping process. The location of the evaluation adit and support facility would be the same as those described for Alternative II. Treatment of wastewater and discharge location would be the same as that described for Alternative II, as would the power supply. A full description of Alternative IV is available in the 2001 FEIS.

1.6.4.2 Rationale for Not Selecting Alternative IV

I did not select Alternative IV because it did not address the scoping issues (Section 1.3, *Issues Considered*) as well as the selected alternative (see Table 1) and, as a result, would likely cause greater adverse environmental impacts when compared with the selected alternative. For some scoping issues, such as Issue 9 (effects on TCPs of the Kootenai tribal people), the effects of Alternative IV would be the same as in the selected alternative.

Meeting MPDES permitted effluent limits and groundwater quality standards would be more difficult for the proposed water treatment system than for the system in the selected alternative in meeting groundwater quality standards and nondegradation criteria (Issue 1). Generators used for evaluation power supply would increase sound levels during Phase I (Issue 8). Implementation of Alternative III mitigation plans would reduce impacts on water quality, wildlife and fisheries, T&E species, transportation, and wetlands, but would not be as effective as Alternative V mitigation plans in reducing impacts (Issues 1, 2, 6, and 7). The evaluation adit support facilities site would be located close to NFS road #150 and to a segment of Rock Creek considered important harlequin duck habitat.

I believe the selected alternative minimizes the potential risks that would remain under Alternative IV and does not increase impacts on other resources.

1.6.5 Alternatives Eliminated from Detailed Study

A number of alternatives to project components or options were evaluated but were eliminated from detailed study. An in-depth discussion of these alternatives appears in Section 2.4, *Alternatives Considered but Eliminated from Detailed Study*, of the Final SEIS along with the KNF's rationale for elimination. These potential alternatives were suggested during scoping or in public, KNF, or DEQ comments. Alternatives in each of the following categories were evaluated and dismissed from detailed consideration due to technical, operational, economic, or environmental considerations: facility location, combined mine (Rock Creek and Montanore) operations, water treatment methods and wastewater plant locations, utility and road corridors, evaluation adit support facilities site, and socioeconomic alternatives.

1.7 Permits, Licenses, and Approvals Needed to Implement the Decision

In addition to the Forest Service, other federal agencies or state or local agencies require permits or have review authority for the Rock Creek Project. Federal agencies include the USFWS, EPA, and Corps. State and local agencies include DEQ, FWP, Montana Department of Natural Resources and Conservation, Montana Department of Transportation, State Historic Preservation Office, Hard Rock Impact Board, Sanders County officials, and Sanders County Weed Board. The roles and responsibilities for each of these agencies are described in Chapter 1 of the Final SEIS. Table 3 lists the permits, licenses, and approvals required from each agency for the Rock Creek Project. The statuses of major permits and approvals are discussed in greater detail in Section 1.7.1, *Status of Major Permits and Approvals*.

Table 3. Permits, Licenses, and Approvals Required for Phase I of the Rock Creek Project.

Permit, License, or Approval	Purpose	Status
Federal Agencies		
<i>Kootenai National Forest</i>		
Approval of Plan of Operations (36 CFR 228A)	To allow RCR to construct an evaluation adit and associated facilities on NFS lands. Approval incorporates management requirements to minimize or eliminate effects on other NFS surface resources, which include final design of facilities and mitigation and monitoring plans as described in this ROD. Review of the proposed plans is coordinated with DEQ and other appropriate agencies. Approval of the Plan of Operations for Phase I is contingent on RCR accepting and incorporating the stipulations and mitigations (as listed in this ROD) into the Plan of Operations.	Pending completion of the Final SEIS.
Timber Sale Contract	To allow RCR to harvest commercial timber from the study area on NFS lands. Harvesting will be conducted to clear the area for Phase I project facilities.	Not yet applied for.
<i>U.S. Fish and Wildlife Service</i>		
Biological Opinion	To protect T&E species and any designated critical habitat. Consultation with the KNF.	Grizzly bear BO issued in 2006 and supplement issued in 2007 (2007 BO Supplement). Revised bull trout and bull trout critical habitat BO and grizzly bear BO supplement issued 2017.
<i>U.S. Army Corps of Engineers</i>		
404 Permit (CWA)	To control discharge of dredged or fill material into wetlands and nonwetland waters of the U.S. Reviewed by the EPA, USFWS, and DEQ.	Based on preliminary design, effects on jurisdictional wetlands within the selected alternative disturbance boundary will be avoided, and no discharge of fill material subject to the Corps' jurisdiction will occur. In a 2006 letter to RCR, the Corps determined that Phase I activities will not affect jurisdictional wetlands and do not need a permit.
State and Local Agencies		
<i>Department of Environmental Quality</i>		
Exploration License (MMRA)	To allow exploratory activities (Phase I) including construction of an evaluation adit and testing a bulk sample. Coordinate review and analysis with the KNF.	Exploration License 00663, issued as final on October 21, 2009, for construction of an evaluation adit. RCR initiated activities approved on private land. Approval included stipulations for final designs and monitoring plans. RCR posted a portion of a reclamation bond for activities on private land with DEQ before implementation of approved activities.
Montana Air Quality Permit (CAA)	To control criteria air pollutants when the potential to emit is more than 25 tons per year.	Permit #2414-2 revised and finalized in 2003; considered invalid in 2006; new application submitted in March 2014; DEQ issued the permit (MAQP #2414-03), effective November 1, 2014.

1.7 Permits, Licenses, and Approvals Needed to Implement the Decision

Permit, License, or Approval	Purpose	Status
Stormwater Discharge Permit (Water Quality Act)	To control discharge of stormwater from the evaluation adit and associated facilities (may be incorporated into a MPDES permit) and to establish effluent limits, treatment standards, and other requirements for point source discharges to state waters including groundwater. Discharges to surface waters may not violate downstream states' water quality standards. Coordinate with the EPA and State of Idaho.	DEQ issued individual stormwater permit MT0030287, effective February 1, 2016, for Outfalls 006 and 007 at evaluation adit. DEQ issued Final Permit MT0031763, effective July 1, 2017, for outfalls associated with road reconstruction, utility line installation, and ancillary facility construction.
Public Water Supply and Sewer Permit	To allow construction of public water supply and sewer system and to protect public health.	Approval for support facilities for a public water supply was received in April 2008, and for a sewer system in August 2008; these systems were installed in 2008; approvals from the Sanders County Health Department and DEQ will be required to install a septic system, drainfield, and public water supply well at the evaluation adit site.
Short-Term Water Quality Standard for Turbidity (318 Authorization)	To allow for short-term increases in surface water turbidity during construction. Request may be forwarded from FWP.	Not authorized for Phase I because turbidity limits were set in MPDES permit for construction activities and total suspended solids limits were set in MPDES permit for stormwater outfalls at evaluation adit site
401 Certification (CWA)	To ensure that any activity requiring a federal license or permit that may result in a discharge to navigable waters complies with Montana water quality standards. May be waived under certain conditions.	No discharge of fill material subject to the Corps' jurisdiction will occur. If, after final design, effects on jurisdictional wetlands cannot be avoided, RCR will comply with and implement conditions in the 404 permit, if needed. Applicable nationwide 404 permits have 401 certification. RCR will coordinate with DEQ for certification of other discharges.
Hazardous Waste and Solid Waste Registration	To ensure safe transport of hazardous materials to and from the site and proper disposal of solid wastes.	Not yet applied for.
<i>Department of Natural Resources and Conservation</i>		
310 Permit (Montana Natural Streambed and Land Preservation Act)	To allow exploration-related activities that physically alter or modify the bed or banks of a perennially flowing stream.	Pending. 310 permit application submitted in 2007 expired; will renew when close to construction.
<i>State Historic Preservation Office</i>		
Cultural Resource Clearance (National Historic Preservation Act, Section 106 Review)	To ensure appropriate protection of cultural resources (archaeological and historic) coordinated with the KNF.	Section 106 compliance completed in 1995.
<i>Montana Fish, Wildlife, and Parks—Green Mountain Conservation District</i>		
310 Permit (Montana Natural Streambed and Land Preservation Act)	To allow construction activities by nongovernment entities within the mean high water line of a perennial stream or river.	310/318 applications submitted in 2007; permits finalized in 2008 and renewed in 2009; permits will be renewed for Phase I construction.

Permit, License, or Approval	Purpose	Status
<i>Hard Rock Impact Board/Sanders County</i>		
Fiscal Impact Plan Approval (Hard Rock Mining Impact Act)	To mitigate fiscal impacts on local government services.	Hard Rock Mining Impact Plan approved on October 23, 1997.
<i>Sanders County Weed Control District</i>		
Noxious Weed Management Plan	To prevent propagation of noxious weeds.	Submitted to Sanders County on April 7, 2007; annual reports provided thereafter as required.

1.7.1 Status of Major Permits and Approvals

1.7.1.1 Exploration License

DEQ issued Exploration License 00663 to RCR on October 21, 2009, for construction of an evaluation adit and associated activities. Approval included stipulations for final designs and monitoring plans. RCR initiated the activities approved by the Exploration License on private land. RCR posted a portion of a reclamation bond with DEQ before implementing the approved activities. The Final SEIS includes any new or updated information authorized by DEQ’s Exploration License.

1.7.1.2 Air Quality Permit

RCR submitted a new MAQP application to DEQ in March 2014, and DEQ issued the permit (MAQP #2414-03), effective November 1, 2014.

1.7.1.3 Water Quality Permits

The Montana Water Quality Act provides a framework for the classification of surface water and groundwater uses (Section 1.5.1.5, *Clean Water Act*). It also establishes water quality standards and permit programs to control the discharge of pollutants into state waters. DEQ administers MPDES permitting, including stormwater discharge permits. Evaluation activities must comply with Montana surface water and groundwater standards. The evaluation adit and support facilities must be constructed and operated to prevent water discharge, seepage, drainage, infiltration, or flow that may degrade the quality of surface water or groundwater outside of any approved mixing zone. A short-term exemption from surface water quality standards for turbidity may be required for construction at stream crossings (318 authorization). DEQ has responsibility for enforcement under the Montana Water Quality Act. Measures to minimize changes in water quality, including flow, are discussed in the Final SEIS Sections 4.7.3.3, *Groundwater Quality*, and 4.7.3.4, *Surface Water Quality*.

Table 4 summarizes the status of RCR’s MPDES permits for the Rock Creek Project. RCR obtained a water discharge (MPDES) permit (MT0030287) from DEQ in 2001. Outfalls 006 and 007 were previously permitted under the expired MPDES *General Permit for Storm Water Discharges Associated with Mining and with Oil and Gas Facilities MTR300247* and were added to the draft permit (MT0030287) issued for public comment under the July 31, 2015, public notice. Design of Outfall 007 was subsequently updated to clarify that stormwater will not be commingled with process wastewater, and a new draft permit (MT0030287) was issued for public comment on October 9, 2015. The final permit MT0030287 was issued by DEQ on December 30, 2015, with an effective date of February 1, 2016.

Discharges to groundwater from mining operations subject to operating permits under the MMRA are not subject to groundwater permit requirements (75-5-401(5), MCA). Under the DEQ Exploration License

00663, RCR has authorization to discharge treated drainage from the evaluation adit during Phase I activities to groundwater in three infiltration ponds in the tailings disposal facility. The water treatment system will include pressure filtration and an oil skimmer, with a pilot anoxic biotreatment system, precipitation, clarification, and filtration for solids and metals; an ion exchange system; and a biological nitrification/denitrification system to remove inorganic nitrogen. Treated water quality will meet groundwater standards and nondegradation criteria, if applicable, at the end of the pipe before discharge to the infiltration ponds.

RCR submitted an amendment to MT0031763 in April 2013 for outfalls related to road construction, utility installation, and construction as part of Phase I evaluation adit activities. A final permit for MT0031763 was issued by DEQ and became effective on July 1, 2016. The Final SEIS includes any new or updated information authorized by DEQ's MPDES permits. The status of RCR's MPDES permits is summarized in the Final SEIS (Table 1-2 in the Final SEIS; Figure 1-2 in the Final SEIS displays the outfall locations).

Table 4. Status of MPDES Permits Pertinent to Phase I.

Permit/ Outfall	Purpose	Phase	Status
<i>MPDES Permit MT0030287</i>			
006	Stormwater discharge from a stormwater basin below the evaluation adit site to an unnamed tributary of West Fork Rock Creek	Phase I (Evaluation)	Final permit effective February 1, 2016
007	Stormwater discharge from a stormwater basin below the evaluation adit site to an unnamed tributary of West Fork Rock Creek	Phase I (Evaluation)	Final permit effective February 1, 2016
<i>MPDES Permit MT0031763</i>			
001 - 031	Discharge of stormwater related to construction of ancillary facilities, excavation trenching to install a pipeline and power line, and improvements to roads to reduce sediment delivery to Rock Creek	Phase I (Evaluation)	Final permit effective July 1, 2016

1.7.1.4 Public Water Supply and Sewer Approval

DEQ is responsible for regulating public water supply and sewer systems that regularly serve at least 25 persons daily for a period of at least 60 calendar days per year. RCR obtained approval for a public water supply and sewer for the Phase I evaluation adit support site adjacent to NFS road #150 near Montana Highway 200. For the evaluation adit, approvals from the Sanders County Health Department and DEQ will be required to install a septic system, drainfield, and public water supply well.

1.7.1.5 U.S. Army Corps of Engineers—404 Permit

The Corps is the permitting authority for the discharge of dredged or fill material into wetlands and nonwetland waters of the U.S. (Section 3.10, *Wetlands and Nonwetland Waters of the U.S.* of the Final SEIS) and a cooperating agency for the Final SEIS (Section 1.2.1.4.1, *Cooperating Agencies*). Waters tributary to navigable and interstate waters are considered waters of the U.S. and are subject to the Corps' jurisdiction. Wetlands subject to the Corps' jurisdiction (jurisdictional wetlands) meet the Corps' definition of wetlands and are adjacent, neighboring, or have a surface tributary connection to interstate or navigable waters of the U.S. The Corps determines a water to be jurisdictional if the waterbody is a traditionally navigable water, a relatively permanent water, or a wetland that directly abuts a traditionally

navigable or relatively permanent waterbody, or, in combination with all wetlands adjacent to that waterbody, has a significant nexus with traditionally navigable waters.

In a 2006 letter to RCR, the Corps determined that Phase I would not affect jurisdictional wetlands and did not need a permit. If, after final design, effects on jurisdictional wetlands cannot be avoided, the appropriate authorization will be requested from the Corps, and any required compensatory mitigation will be implemented.

1.7.1.6 U.S. Fish and Wildlife Service—Biological Opinions

The USFWS has responsibilities under the ESA (1973) and Bald and Golden Eagle Protection Act (1940).

The KNF is required by the ESA to ensure that any action it approves is not likely to jeopardize the continued existence of a T&E species or result in the destruction or adverse modification of critical habitat. As part of the formal consultation process, the KNF submitted a final BA to the USFWS (July 31, 1998, amended for bull trout on May 13, 1999, and for lynx on April 3, 2000) that evaluated the potential effects of the preferred alternative on T&E species (Appendix A in the 2001 FEIS). In their 2000 BO (Appendix E in the 2001 FEIS), the USFWS concluded that the preferred alternative (Alternative V) was likely to jeopardize the continued existence of grizzly bears and required a reasonable and prudent alternative to be implemented to avoid the likelihood of jeopardizing the bear. The USFWS also concluded that the preferred alternative was not likely to jeopardize the continued existence of bull trout. The sequence of events regarding the USFWS BO includes the following:

- The BO (Appendix E of the 2001 FEIS) was finalized on December 15, 2000.
- The KNF and DEQ issued a FEIS and a ROD for the Rock Creek Project in 2001. As a result of the consultation process, the KNF and DEQ incorporated additional stipulations in the preferred alternative (Alternative V) description.
- In 2002, the USFWS withdrew the 2000 BO in response to a lawsuit. Without the valid BO, the Forest Service withdrew its 2001 ROD (although DEQ's 2001 ROD remained in effect).
- In December 2002, the KNF provided updated access management baseline information and the revised and clarified grizzly bear mitigation plan for the Rock Creek Project.
- In 2003, the USFWS issued a revised BO that concluded that the project was not likely to jeopardize grizzly bears, would not likely jeopardize bull trout, was not likely to destroy or adversely modify proposed bull trout critical habitat, and was likely to jeopardize Canada lynx, based on updated information. The KNF, in turn, issued a revised ROD.
- In 2005, Rock Creek Project opponents filed suit in Federal District Court against the KNF's 2003 ROD; the USFWS's BO was also litigated, which the court set aside.
- A new final BO was issued by the USFWS on October 11, 2006. The new final BO included additional information on updated grizzly bear population data, including trends, and additional mandatory terms and conditions related to grizzly bears. In the 2006 BO, the USFWS concluded that the preferred alternative is not likely to jeopardize the continued existence of the listed entities of grizzly bears or bull trout or destroy or adversely modify bull trout critical habitat. No critical habitat has been designated for grizzly bears.
- On September 27, 2007, the USFWS issued the 2007 BO Supplement regarding effects on grizzly bears from the project and amended the 2006 BO for clarification of effects on bull trout. The USFWS maintained its conclusions in the 2006 BO.
- In 2008, opponents filed suit against the USFWS 2006 BO and 2007 BO Supplement.
- The 2005 and 2008 lawsuits were consolidated, and in May 2010, the Federal District Court issued its decision. The agencies' decisions were upheld on a majority of the points, but the

court vacated the KNF's 2003 ROD and remanded the 2001 FEIS for completion of a Final SEIS to address several deficiencies.

- The plaintiffs appealed the issues regarding the USFWS 2006 BO and 2007 BO Supplement to the Ninth Circuit Court of Appeals.
- In November 2011, the Ninth Circuit Court of Appeals upheld the USFWS 2006 BO and 2007 BO Supplement on all litigated issues.

The USFWS concluded that the proposed action is “not likely to jeopardize” the continued existence of grizzly bear. The KNF reinitiated formal consultation with the USFWS in March 2017 following submission of a Supplemental BA for bull trout and bull trout critical habitat (Attachment 8). As a result, the USFWS issued a revised BO for bull trout and bull trout critical habitat in November 2017, concluding the proposed action is “not likely to jeopardize” the continued existence of bull trout, and “would not result in the adverse modification or destruction of designated bull trout critical habitat.” The USFWS clarified the terms and conditions in the 2017 revised BO in a 2018 letter to the KNF.

The 2006 BO for grizzly bear and the 2017 revised BO for bull trout and bull trout critical habitat contain Reasonable and Prudent Measures and Terms and Conditions that the KNF must either implement or require RCR to implement to minimize the likelihood of incidental take resulting from the Rock Creek Project (Attachment 6 and Attachment 7). These terms and conditions have been added to the selected alternative (Section 1.5.1.6.2, *Mitigation Measures in the Selected Alternative*), and the KNF has determined that additional bonding in the form of a trust fund will be required to ensure sufficient funds are available to implement these mitigations. RCR will be required to make a deposit to the trust fund before construction of the evaluation adit (first year of the Rock Creek Project). An inflation factor will be applied to the funds to determine actual dollars at the time of the deposits. The KNF is authorized to require bonding in addition to the agencies' joint reclamation bond (KNF's and DEQ's bonding is discussed in Section 1.9, *Reclamation Bond (Financial Assurance)*) if it determines the bond amount is insufficient according to the Forest Service or if bonding is necessary for items DEQ is not authorized to bond for (36 CFR 228.13). As mitigations are completed, funds could be withdrawn from the trust fund and returned to RCR or applied to the next required incremental deposit.

1.8 Public, Agency, and American Indian Participation

1.8.1 Public Participation

Public participation has played and continues to play an important role in project decision making. A detailed description of previous public participation opportunities was presented in the 2001 FEIS and the 2003 ROD. Additional opportunities for public participation for the Final SEIS included a website developed by the KNF, which is located at <https://www.fs.usda.gov/detail/kootenai/landmanagement/projects/?cid=stelprdb5327758>. Throughout the environmental review period, NEPA documents and other documents related to the Rock Creek Project have been posted on this website. Newsletters, press releases, and other informational updates also were sent periodically to the Rock Creek Project mailing list to keep the public informed of the project's progress.

The KNF issued the Draft SEIS for a 45-day public comment period on February 19, 2016. Public open houses were held during the middle of the comment period in Noxon and Libby, Montana. The dates of all public meetings, as well as copies of notices and news releases that invited comment, can be found in the project record, which is available for public review at the KNF Supervisor's office in Libby, Montana. A Notice of Availability was published in the Federal Register, and copies of the Draft SEIS were emailed or mailed to interested individuals and organizations.

In total, 8,632 letters, comment sheets, and transcripts were received during the public comment period for the Draft SEIS, including 8,328 form letters. Comments came from private individuals (8,322 form letters and 230 other letters or comment sheets), federal agencies (2 letters), state agencies and legislators (38 letters), tribal governments (1 letter), local government (1 form letter and 6 other letters), businesses (8 letters), and other organizations (4 form letters and 19 other letters). The responses to Draft SEIS comments are included in Appendix S of the Final SEIS.

A Draft ROD and Objection Review Final SEIS were prepared in 2017, and the KNF completed an administrative review of the Draft ROD in accordance with the requirements of 36 CFR 218. After the Draft ROD was issued, a predecisional objection process was conducted. Thirteen objections were received. The Objection Reviewing Officer issued a response letter on October 31, 2017, indicating that only Phase I activities would be approved as part of the Final ROD.

Public participation does not end with the permitting of Phase I. The public has the right to review permit files and monitoring reports. Under DEQ's mining regulations, if a person believes he or she is adversely affected by the project or believes there is an unreported violation, that person has the right to file a complaint and expect it to be investigated and addressed (ARM 17.24.129).

1.8.2 American Indian Consultation

The Forest Service has a government-to-government responsibility to all federally recognized tribes, as outlined in the Guide to USDA Programs for American Indians and Alaska Natives. American Indian tribes are afforded consideration under the National Historic Preservation Act (Section 2), NEPA, Native American Graves Protection and Repatriation Act, American Indian Religious Freedom Act, and Religious Freedom Restoration Act, among other EOs and policies (Section 1.5.2, *Kootenai National Forest Responsibilities to Federally Recognized Tribes*). Federal guidelines direct federal agencies to consult with American Indian tribal representatives regarding federal actions potentially affecting tribal interests. Consultation may involve religious practices or other traditional cultural uses, cultural resource sites, remains associated with American Indian heritage, or other issues. Any tribe whose aboriginal territory falls within an analysis area is afforded the opportunity to voice concerns over issues governed by the National Historic Preservation Act, Native American Graves Protection and Repatriation Act, American Indian Religious Freedom Act, and Religious Freedom Restoration Act.

1.8.2.1 Interested Tribes

While a number of tribes used the Clark Fork River corridor, the only treaty that directly encompasses the Rock Creek area is the Hellgate Treaty of 1855 (Section 1.5.2.1, *1855 Hellgate Treaty*).

Three tribes signed the Hellgate Treaty: the Salish, Upper Pend d' Oreilles, and Kootenai, now known as the Confederated Salish and Kootenai Tribes. These tribes retain treaty rights in the Rock Creek Project study area. The Lower Pend d' Oreilles/Upper Kalispel Tribe was not a party to the Hellgate Treaty and therefore has no off-reservation rights to the lands in question. The Coeur d' Alene Tribe also does not appear to have treaty rights in the Rock Creek drainage.

1.8.2.2 Consultation Process

1.8.2.2.1 FEIS (2001) and 2003 ROD

Documentation of tribal consultation conducted from 1988 until 2003 is available in the project record and described on page 3-145 of the 2001 Final SEIS and in Section 3.19.1.3, *Consultation with Interested Tribes*, of the Final SEIS. The KNF requested input from the tribal governments and culture committees that expressed an interest in the Rock Creek Project about any potential concerns they might have with the project. The Confederated Salish and Kootenai Tribes of Montana, the Kootenai Tribe of Idaho, the

Coeur d' Alene Tribe of Idaho, and the Kalispel Tribe of Washington all submitted comments concerning the Rock Creek Project. These comments primarily focused on water quality and a concern for adverse effects on aquatic resources and traditional use areas. Meetings took place between the Confederated Salish and Kootenai Tribes, the Kootenai Tribe of Idaho, and the Coeur d' Alene Tribe. The Kalispel Tribe declined a face-to-face meeting, indicating that their concerns were addressed in the correspondence they submitted during the comment period.

Several comprehensive cultural resource inventories conducted during the development of the 2001 FEIS located no physical evidence of aboriginal sites. In 2007, after the FEIS and ROD had been issued, the Confederated Salish and Kootenai Tribes identified a sacred site and indicated they believe the site may be eligible for listing on the National Register of Historic Places as a TCP under the National Historic Preservation Act. The specific location of the sacred site is exempt from public disclosure under Section 304 of the National Historic Preservation Act and the 2008 Food, Conservation, and Energy Act (Section 1.5.2.3, *National Historic Preservation Act*).

The Confederated Salish and Kootenai Tribes also identified traditional resources of concern including fish, medicinal and sacred herbs, grizzly bears, huckleberries, and other foods, although specific species of plants have not been identified by the tribes to date. Those resources specifically identified were addressed in the sections of the 2001 FEIS that relate directly to those resources. Both the Confederated Salish and Kootenai Tribes and the Kootenai Tribe of Idaho contend that the Rock Creek Project would violate their treaty rights under the Hellgate Treaty, as resources of interest would be affected and access to the study area would be restricted for the life of the project.

The Coeur d' Alene Tribe has also indicated that they believe the Rock Creek Project would violate their treaty rights through changes in water quality, which they believe would adversely affect downstream resources and use areas for which they maintain rights of use. While not asserting treaty rights violations, the Kalispel Tribe has stated similar concerns about the effects of water quality on downstream resources and aquatic habitats. All tribes have voiced a general concern about the effects of the Rock Creek Project on water quality and fisheries. These topics were addressed in the sections of the 2001 FEIS that relate to those resources.

1.8.2.2.2 SEIS

Following the Court's 2010 decision to vacate the Forest Service's 2003 ROD to approve the Rock Creek Project and remand the 2001 FEIS, the KNF initiated government-to-government consultation for the SEIS process with the Confederated Salish and Kootenai Tribes, the Kootenai Tribe of Idaho, the Coeur d' Alene Tribe of Idaho, and the Kalispel Tribe of Washington. In a letter dated January 12, 2011, the KNF informed the four tribes that the Forest Service determined that a Final SEIS for the Rock Creek Project was necessary. In the letter, the Forest Service also requested initiation of formal consultation to provide a briefing of the status of the project and to discuss how it could involve the tribes as participating agencies. The Draft SEIS was sent to the Confederated Salish and Kootenai Tribes, the Kootenai Tribe of Idaho, the Coeur d' Alene Tribe of Idaho, and the Kalispel Tribe of Washington on February 19, 2016.

On May 6, 2016, the KNF met with representatives of the Kootenai Tribe of Idaho to discuss tribal concerns regarding the Rock Creek Project. The Kootenai Tribe of Idaho also submitted comments on the Draft SEIS (Appendix S of the Final SEIS) to the letter and the KNF response. In its comment letter, the Kootenai Tribe of Idaho described its strong working relationship with the KNF and requested government-to-government consultation to understand the changes between the Draft SEIS and the prior proposal for the Rock Creek Project. The Kootenai Tribe of Idaho also requested a description of any changes in how the project would avoid or mitigate impacts on Kootenai treaty resources, cultural and archaeological resources, and Kootenai sacred sites and religious use areas.

Ongoing consultation between the KNF and the Kootenai Tribe of Idaho has not, to date, identified significant sacred sites or religious use areas that would be affected by the project. Historic property identification efforts have not located cultural or archaeological resources of significance to the Kootenai Tribe of Idaho. With regard to potential treaty resources, the Kootenai Tribe of Idaho does not have treaty rights within the study area (Section 1.5.2.1, *1855 Hellgate Treaty*). However, the KNF has considered the effects of the project on Confederated Salish and Kootenai Tribes treaty resources and has determined that access to those resources will not be affected by the project.

No other tribes submitted comments on the Draft SEIS. The KNF has continued to work with the Kootenai Tribe of Idaho (and other tribes as interested) during the Rock Creek Project Final SEIS process to address any concerns regarding the project.

Additional information about consultation can be found in Section 3.19, *American Indian Treaty Rights*, of the Final SEIS. Detailed correspondence is located in the project record for the Rock Creek Project, which is located in the KNF Supervisor's Office in Libby, Montana.

1.8.3 Changes Suggested by Tribes, Agencies, and the Public and the KNF's Response

Substantive comment letters received from interested tribes and federal, state, and local agencies on the Draft SEIS are included in Appendix S to the Final SEIS. This set of commenters includes the Kootenai Tribe of Idaho, EPA, FWP, and Idaho Department of Environmental Quality. The Kootenai Tribe of Idaho's comments are summarized above in this ROD under tribal consultation in Section 1.8.2.2, *Consultation Process*. The EPA's comments and the agency's role in the Final SEIS are described in Section 1.2.1.4.1, *Cooperating Agencies*. FWP's comments questioned the completeness and accuracy of the bull trout and bull trout habitat effects analyses in the Final SEIS and in the USFWS 2006 BO and 2007 BO Supplement. FWP also asserted that the 2007 BO Supplement is outdated. The Idaho Department of Environmental Quality's comments asserted that water quality data collected in anticipation of the Rock Creek Mine was compromised by the release of metals-contaminated sediment when the Milltown dam on the Clark Fork River near Missoula was removed in 2008. The Idaho Department of Environmental Quality also expressed uncertainty about the effectiveness of the infiltration pond, underdrain system, pumpback well system, and other contingency mitigation measures. The KNF's responses to each of these letters are presented alongside each comment in Appendix S. Where appropriate, the text of the Final SEIS was revised, and the section where the change was made is noted in the response to comments.

RCR's comments on the Draft SEIS were also reproduced and included in Appendix S of the Final SEIS. As with agency and tribal comments, KNF's responses are presented alongside each comment. Where appropriate, the text of the Final SEIS was revised, and the section where the change was made is noted in the response to comments.

Substantive comments received by individuals and organizations on the Draft SEIS were organized for response according to resource-specific issue codes. To reduce repetition, similar comments were grouped together and responded to collectively. An alphabetical list of individuals and organizations that provided comments along with associated issue codes can be found in Appendix S to the Final SEIS. Responses to substantive comments are organized by issue codes and can be found in the same appendix. Where appropriate, the text of the Final SEIS was revised, and the section where the change was made is noted in the response to comments.

The KNF must be responsive to all substantive comments; however, not all comments received were substantive. According to NEPA regulations, "all substantive comments received on the draft statement

(or summaries thereof where the response has been exceptionally voluminous), should be attached to the final statement whether or not the comment is thought to merit individual discussion by the agency in the text of the statement” (40 CFR 1504.5(b)). All of the original comments (substantive and nonsubstantive) on the Draft SEIS that the KNF received are available for public inspection at the KNF Supervisor’s Office in Libby, Montana. Commenters who provided substantive comments were permitted to participate in the objection process of the Objection Review Final SEIS. Additional discussion of this process is provided in Section 1.9, *Predecisional Administrative Review (Objection Process)*.

The Forest Service and DEQ executed an MOU allowing the agencies to accept a joint bond that satisfies both federal and state reclamation requirements. The reclamation bond may be collected jointly by the agencies or by one of the agencies acting without the concurrence of the other agency. Even if the reclamation bond is collected by one of the agencies, the bond must be expended in a manner that satisfies both federal and state reclamation requirements.

1.9 Reclamation Bond (Financial Assurance)

1.9.1 Authorities

Pursuant to the Organic Administration Act and regulations adopted thereunder, a mine operator is required to submit a reclamation bond to the Forest Service before the Forest Service may approve a Plan of Operations for Phase I. Similarly, pursuant to the MMRA and administrative rules adopted thereunder, an exploration operator is required to submit a reclamation bond to DEQ before DEQ may issue an Operating Permit for the exploration activity. The reclamation bond may not be less than the estimated cost to the Forest Service or DEQ to ensure compliance with the respective federal and state reclamation requirements. The federal reclamation requirements include compliance with 36 CFR 228 Subpart A. The state reclamation requirements include compliance with the Clean Air Act of Montana, Montana Water Quality Act, MMRA, administrative rules adopted under the MMRA, and Hard Rock Operating Permit. Thus, a reclamation bond represents the public’s “insurance policy” that reclamation will be performed if exploration is allowed.

The reclamation bond may be in the form of a surety bond, an irrevocable letter of credit, a certificate of deposit, or cash. The bond for larger mining operations is usually in the form of a surety or irrevocable letter of credit because of the significant financial obligation that reclamation typically represents.

Agency engineers calculate the reclamation bond amount after an alternative has been selected for implementation and a Final ROD or decision is issued by each agency. In addition, the Forest Service requires that all bonds pertaining to a Plan of Operations on NFS lands be developed or reviewed by a Certified Locatable Minerals Administrator. The training, abilities, and required knowledge of the administrator are outlined in FSM, Chapter 2890.

Pursuant to ARM 17.24.140, the total amount of the bond calculated by DEQ must be in place before the issuance of an operating permit, unless the applicable permit application identifies phases or increments of disturbance for which individual incremental bonds may be calculated. 36 CFR 228.13 requires submittal of a bond for reclaiming disturbances on NFS lands before approval of a Plan of Operations.

The Forest Service is required to review reclamation bonds annually for adequacy (FSM 2817.24b). Similarly, DEQ is required to conduct an overview of the amount of each bond annually and a comprehensive bond review at least every 5 years (82-4-338(3), MCA). To ensure administrative continuity and to conform to the intent of the MOU, the Forest Service as a co-permitting agency has adopted a 5-year schedule for reviewing the sufficiency of the reclamation bond. Guidance for Forest Service bonding can be found in the Training Guide for Reclamation Bond Estimation and

Administration. DEQ may conduct additional comprehensive bond reviews if, after modification of a reclamation or operating plan, an annual overview, or an inspection of the permit area, DEQ determines that an increase in the bond level may be necessary. When the existing bonding level of an operating permit does not represent the costs of compliance with federal and state reclamation requirements, DEQ is required to modify the bonding requirements. A complete description of the procedure is set forth in Section 82-4-338(3), MCA.

A mine operator may propose modifications to its Plan of Operations and Operating Permit. The proposed modification is reviewed by the KNF and DEQ, and the appropriate level of environmental analysis is performed. If the modification is approved, the KNF and DEQ then determine whether the modification affects the estimated cost to the Forest Service and DEQ to ensure compliance with federal and state reclamation requirements. If an increase in bond is required, the operator must submit the additional bond amount before the approved modification can be executed.

There is no specific timeframe for bond release once reclamation activities have been completed. DEQ's bond will cover water treatment for as long as necessary. Bond release is performance-based and is granted or denied based on the KNF's and DEQ's evaluation. The Forest Service may not release a bond until the reclamation requirements of 36 CFR 228.8(g) are met. Pursuant to Section 82-4-338(4), MCA, DEQ may not release a bond until the provisions of the MMRA, its associated administrative rules, and the Operating Permit have been fulfilled. In addition, pursuant to Section 82-4-338(4), MCA, DEQ is required to provide reasonable statewide and local notice of a proposed bond release or decrease. DEQ may not release or decrease a reclamation bond unless the public has been provided an opportunity for a hearing, and a hearing has been held if requested. All information regarding bond releases and decreases is available to the public upon request.

1.9.2 Reclamation Costs

The 2003 KNF ROD contained a reclamation bond estimate. Since 2004, the Forest Service in Region 1 has adopted the policy of preparing the bond for mining projects only after a ROD is issued and an amended and updated Plan of Operations has been submitted for approval, because doing so before those additional details have been submitted may provide a misleading and inaccurate assessment of the financial liability. The bond estimate in the 2003 KNF ROD provided a general sense of the level of detail and magnitude of the bond. The bond will be calculated based on a new ROD and amended Plan of Operations for Phase I using current cost estimates. Additional information on the reclamation bond and how it is calculated (direct costs, indirect costs, and other reclamation costs) can be found in Chapter 1 of the Final SEIS.

1.10 Predecisional Administrative Review (Objection Process)

Under Forest Service regulations (36 CFR 218) issued in 2013, eligible parties may seek administrative review of unresolved concerns before a project decision has been made. As outlined in 36 CFR 218 Subparts A and B, all interested and affected parties who provided specific written comments, as defined in 36 CFR 218.2, during scoping or the comment period are eligible to participate in the objection process. Federally recognized Indian tribes and Alaska native corporations are also eligible to file objections when specific written comments are provided during federal-tribal consultations.

The KNF completed an administrative review of the Draft ROD in accordance with the requirements of 36 CFR 218. After the Draft ROD was issued, a predecisional objection process was conducted. Thirteen objections were received, and an objection resolution meeting was held on October 11, 2017, between the Objection Reviewing Officer and the objectors who chose to participate in the meeting. The Objection Reviewing Officer issued a response letter on October 31, 2017, responding to the specific objection

issues raised. In the letter, the Objection Reviewing Officer instructed me to withhold approval of Phase II unless and until all requirements for Phase II initiation have been met and to sign a Final ROD that approves only Phase I project activities.

The objections and response letters are on the KNF website and provided in the project record: <https://www.fs.usda.gov/detail/kootenai/landmanagement/projects/?cid=stelprdb5327758>.

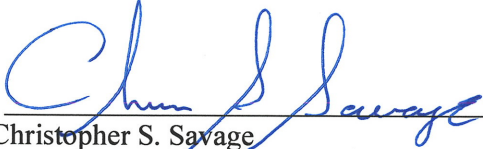
1.11 Additional Information

Copies of the Rock Creek Final SEIS are available for review at the KNF Supervisor's Office in Libby; the Montana State Library in Helena; the Mansfield Library, University of Montana in Missoula; the Lincoln County Library in Libby; the Thompson Falls Public Library; and the Laurie Hill Library in Heron. The Final SEIS may also be accessed on the internet at the KNF's and EPA's websites.


Hardcopies of this ROD and the Final SEIS will be provided to libraries (Laurie Hill, Lincoln County, Mansfield, Montana State, and Thompson Falls) for public review and to the EPA and objectors, if requested. An electronic copy of the Final SEIS and this ROD will be provided on the KNF's website for other interested parties to obtain or may be obtained in electronic (compact disc) format from Katelyn Miller, Project Coordinator, Supervisor's Office, 31374 U.S. Highway 2, Libby, Montana 59923; by phone at (406) 293-6211. The supporting project record is also available for review at the Forest Service Supervisor's Office for the Kootenai National Forest.

1.12 Approvals

This ROD is effective on signature.



Christopher S. Savage
Forest Supervisor
Kootenai National Forest



Date

For additional information on the mining, operation, and closure plan; this Record of Decision; or the Environmental Impact Statement, please contact Katelyn Miller, Project Coordinator, Kootenai National Forest, 31374 US 2 West, Libby, Montana 59923-3022, 406-293-6211.

**RECORD OF DECISION FOR THE ROCK CREEK PROJECT –
FIGURES**

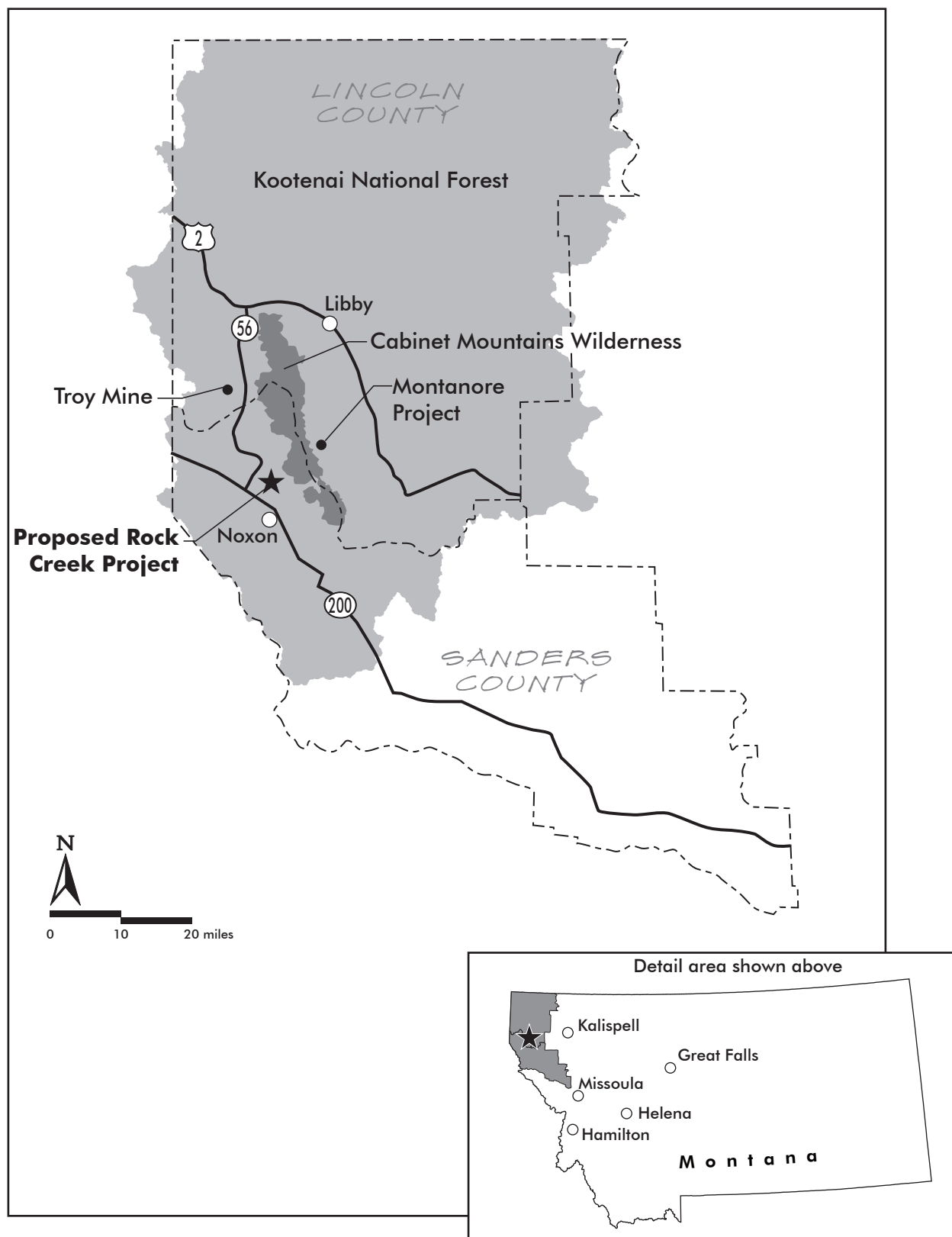
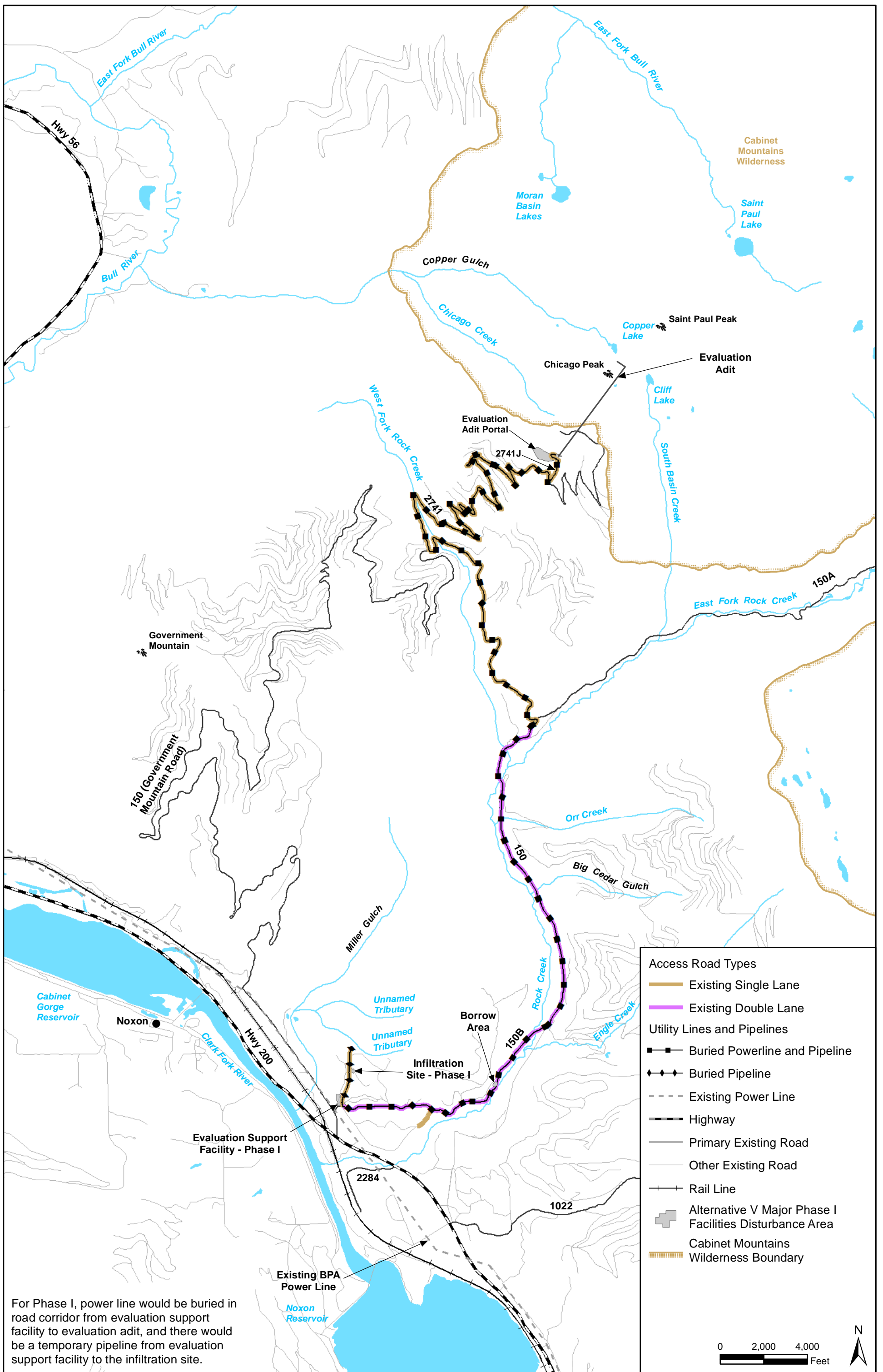


Figure 1. Location Map, Rock Creek Project, Kootenai National Forest.



For Phase I, power line would be buried in road corridor from evaluation support facility to evaluation adit, and there would be a temporary pipeline from evaluation support facility to the infiltration site.

Figure 2. Alternative V Facilities, Pipelines and Roads, Phase I

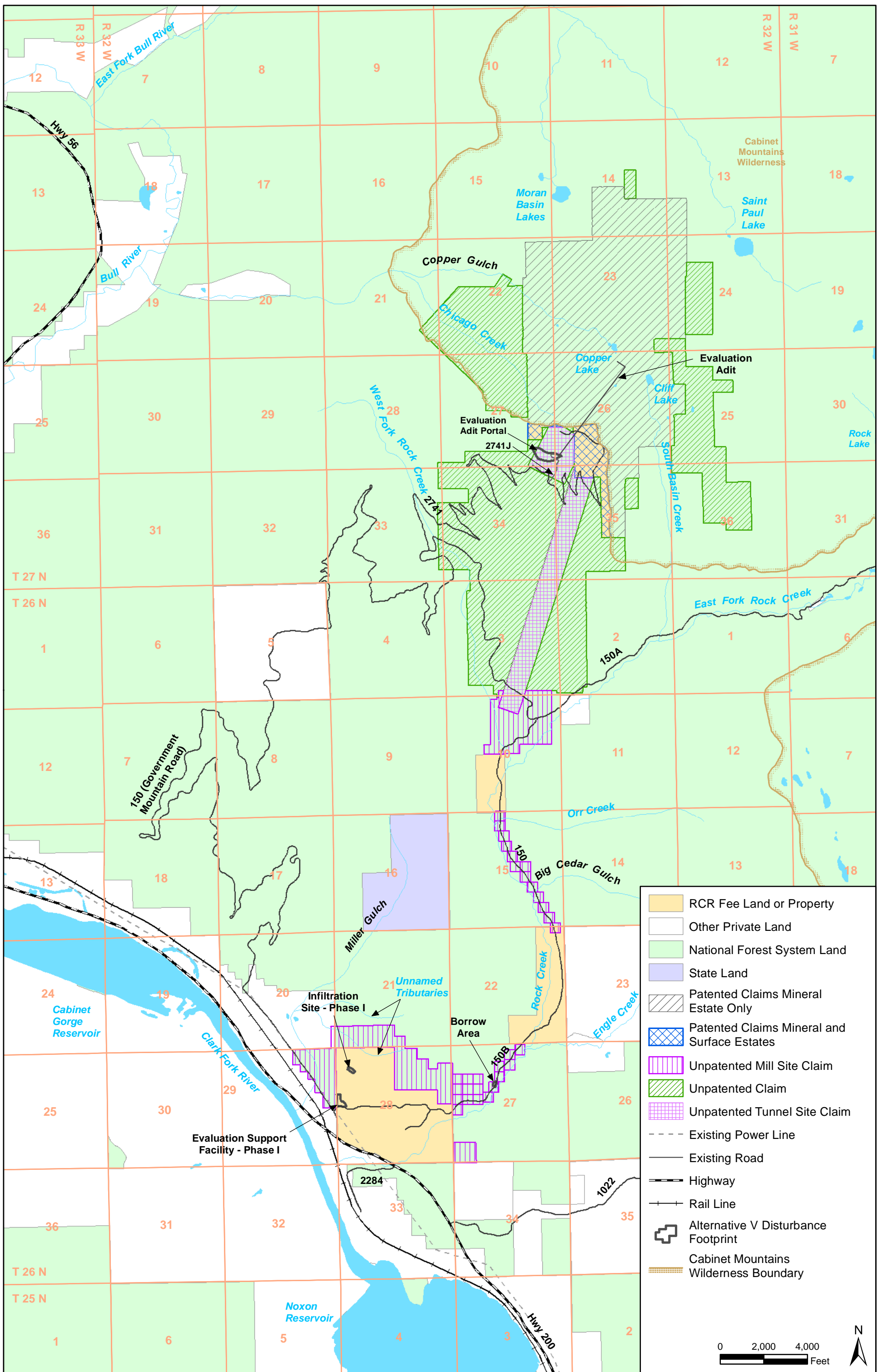


Figure 3. Land Ownership and Mining Claims in the Alternative V Study Area

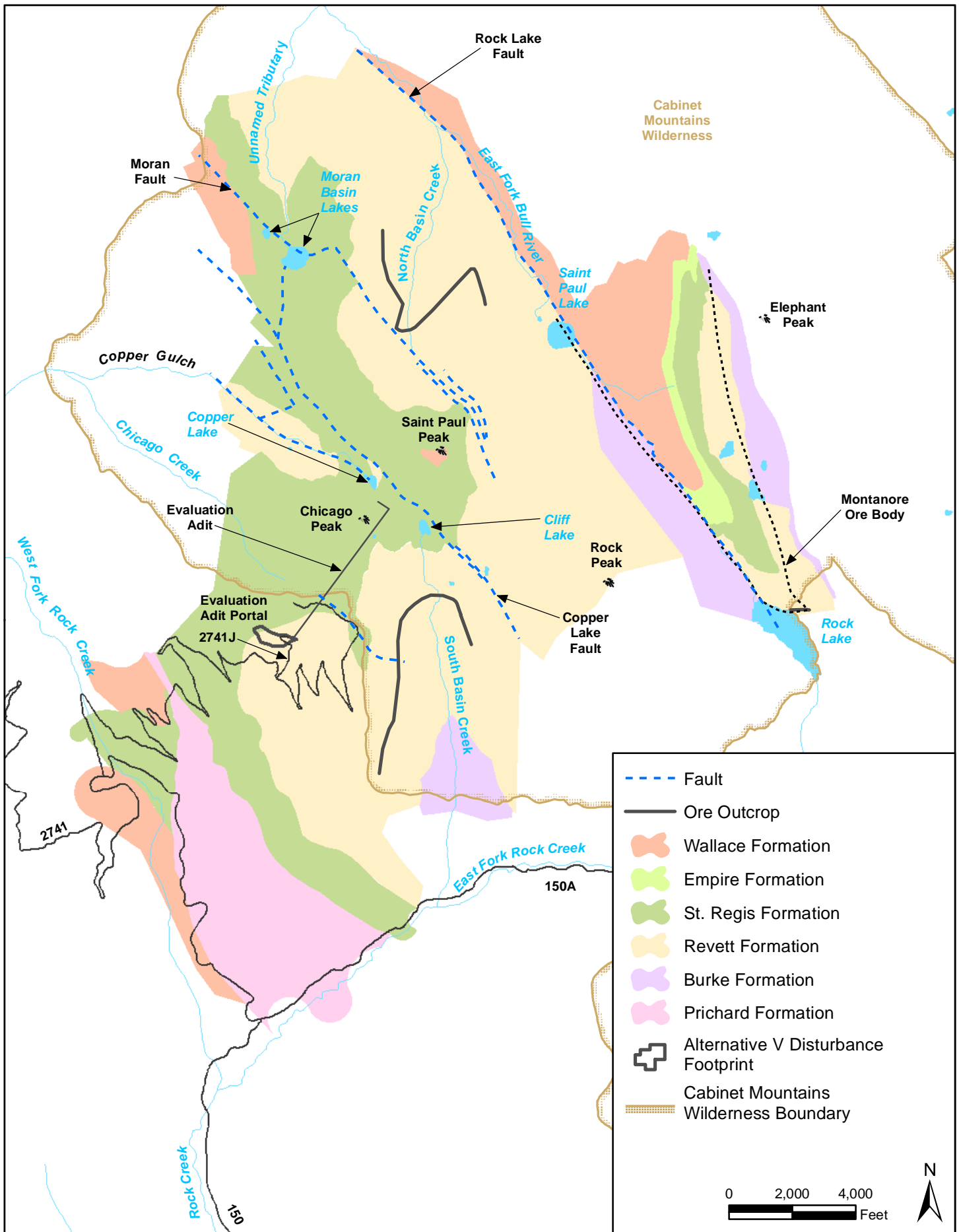


Figure 4. Bedrock Geology and Associated Lakes, Streams, and Faults

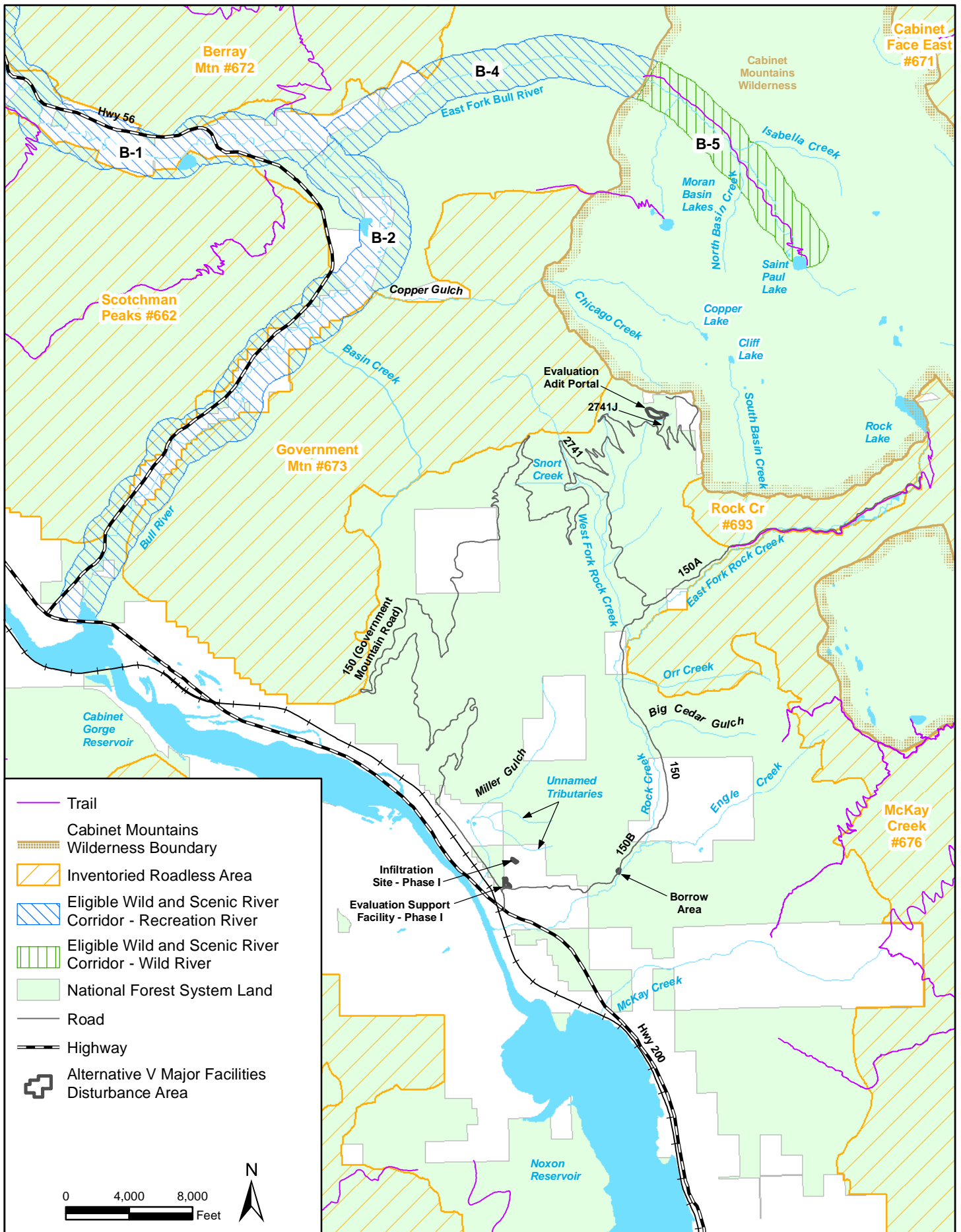


Figure 5. Wilderness, Wild and Scenic River Corridors, and Roadless Areas

Attachment 1 - Selected Alternative

Attachment 1 – Selected Alternative

Attachment 1 describes the selected alternative. The description is from Chapter 2 Sections 2.3.1 and 2.3.6 of the Final Supplemental Environmental Impact Statement (Final SEIS), which describe Alternative V. Alternative V is synonymous with the selected alternative in this attachment. Tables, figures, references, and appendices of the SEIS listed in this attachment that are not also provided in other sections of this Record of Decision (ROD) can be found in the Rock Creek Final SEIS and the project record. This attachment includes only figures pertaining to Phase I. SEIS Chapter 2 figure numbers were retained, and figures pertaining to Phase II were removed from this attachment.

Contents

Selected Alternative—Phase I of Alternative V	2-1
2.1 Overview of Phase I of Alternative V	2-1
2.2 Evaluation Adit	2-5
2.2.1 Objectives	2-5
2.2.2 Adit Development	2-6
2.2.3 Stormwater Control	2-15
2.2.4 Water Treatment	2-16
2.2.5 Data Collection and Monitoring	2-17
2.3 Data Collection and Monitoring Plan Submittal Following Phase I	2-17
2.3.1 Technical Advisory Groups	2-17
2.4 Water Use and Management	2-18
2.4.1 General Wastewater Treatment	2-21
2.5 Transportation	2-21
2.5.1 Phase I	2-21
2.6 Utilities	2-22
2.6.1 Power Supply	2-22
2.6.2 Pipelines	2-23
2.7 Erosion and Sediment Control	2-23
2.7.1 Fugitive Dust Control	2-23
2.7.2 Site Grading	2-23
2.7.3 Soil-Handling Techniques	2-24
2.7.4 Hydrologic Measures	2-24
2.7.5 Revegetation Practices	2-24
2.7.6 Soil and Erosion Control Plan	2-24
2.8 Employment	2-25
2.9 Adit Closure and Reclamation	2-25
2.9.1 Post-Mining Topography	2-26
2.9.2 Post-Mining Solid Waste Disposal and Adit Closure	2-26
2.9.3 Vegetation Removal and Disposition	2-26
2.9.4 Soil Salvage and Handling Plan	2-27
2.9.5 Revegetation	2-27
2.9.6 Soils and Erosion Control Plan	2-28
2.9.7 Pipeline Corridor Reclamation	2-28
2.10 Monitoring and Mitigation Plans	2-29
2.11 Forest Plan Amendment	2-39

Tables

Table 2-1. Rock Creek Project Alternatives Comparison	2-3
---	-----

Table 2-8. Summary of Modeled Sediment Delivery at Proposed Mitigation Sites, Phase I Rock
Creek Project. 2-33

Figures

Figure 2-1. Alternative V Facilities, Pipelines, and Roads, Phase I..... 2-9
 Figure 2-3. Land Ownership in the Alternative V Study Area..... 2-11
 Figure 2-4. Alternative V Evaluation Adit and Evaluation Phase Support Facilities..... 2-13
 Figure 2-9. Alternative V Conceptual Site Model: Facilities and Water Balance Phase I –
 Evaluation..... 2-19
 Figure 2-19. Existing In-Stream Sediment Monitoring Sites and Potential Sediment Mitigation Sites
 for Rock Creek Phase I. 2-31

Selected Alternative—Phase I of Alternative V

2.1 Overview of Phase I of Alternative V

The Rock Creek Project is a two-phased copper and silver underground mine project proposed by RC Resources, Inc. (RCR). The proposed action is to implement Phase I of Alternative V, which would allow for the construction of an evaluation adit into the Rock Creek deposit for purposes of collecting the necessary data to refine the final mine design. RCR currently owns the mineral estate for the Rock Creek ore deposit beneath and adjacent to the Cabinet Mountains Wilderness (CMW) in the Cabinet Ranger District of the Kaniksu National Forest, which is administered by the Kootenai National Forest (KNF). The evaluation adit portal pad would be located within the Kaniksu National Forest, and access to the portal pad would be via National Forest System (NFS) roads #2741 and #150. Table 2-1 provides a comparison of the alternatives developed for the Rock Creek Project and distinguishes Phase I of the modified Alternative V from Phase I of Alternatives II, III, and IV.

Phase I of Alternative V includes applicable modifications, mitigations, and monitoring plans from Alternatives III and IV, as well as components from Alternative II, and modifications made in and since the 2003 ROD. Alternative V also includes modifications resulting from more detailed design of Phase I facilities, the KNF's modifications made to address deficiencies identified by the District Court, and the KNF's evaluation of new and changed conditions since the 2003 ROD. The 2003 ROD contained a list of stipulations that were required at that time for issuance of Montana Department of Environmental Quality (DEQ) mining permits and KNF authorization to proceed with Phases I and II (U.S. Forest Service [USFS] 2003a). After the Final SEIS is issued, the KNF Supervisor will issue a decision on RCR's proposal in a new ROD for Phase I that will include revised stipulations. After issuance of the final Phase I ROD, and before Phase I implementation, RCR would be required to submit a Phase I Plan of Operations for KNF approval consistent with the description of Phase I (Evaluation) of Alternative V in the ROD and the SEIS. After Phase I was completed, and based on additional data and analysis, the KNF would make a new decision regarding Phase II.

One of the stipulations (#26) attached to the 2003 ROD required the submittal of a revised plan for the evaluation adit (Evaluation Adit Plan) before beginning construction. RCR submitted a Revised Application for Exploration License to DEQ in 2006 that incorporated elements of Alternative V and the stipulations listed in the 2003 ROD that had not been included in the proponent's proposed Plan of Operations, including modifying the location of the support facilities, revising many of the monitoring plans, and incorporating mitigation items into the Evaluation Adit Plan. DEQ issued a final Environmental Assessment (EA) on the application in 2008, approved the Evaluation Adit Plan, and issued an Exploration License to RCR for construction of an evaluation adit in 2009. RCR submitted a revised Evaluation Adit Plan (RCR 2010) to the Forest Service and DEQ with the addition of a Spill Prevention Control and Countermeasure (SPCC) Plan and Spill Contingency Plan. Before construction of the evaluation adit, RCR would submit all reclamation, grading, and revegetation plans for all Phase I-related facilities not already covered in the Phase I Reclamation Plan described in the Rock Creek Evaluation Adit License Application to the KNF and DEQ for review and final approval, as described in this attachment. If after 5 years from initiating construction of the evaluation adit, the remaining selected alternative activities have not proceeded for reasons other than litigation, the KNF would consult with RCR; DEQ; Montana Fish, Wildlife, and Parks (FWP); the Environmental Protection Agency (EPA); the U.S. Fish and Wildlife Service (USFWS); tribal representatives; and other interested agencies on interim or final reclamation plans to be implemented as outlined below, and the timeframes for implementation.

If subsequent phases were not authorized and implemented, RCR would reclaim all project-related facilities in accordance with DEQ permits and approvals. Any existing monitoring well installed by RCR or its predecessors on NFS lands would be removed and plugged according to Administrative Rules of Montana (ARM) 36.21.810. The well casing would be removed below the ground surface, and the well covers removed and disposed of off-site. The small area associated with the monitoring well would be regraded to blend with the natural surroundings. The area would be ripped if appropriate, and soil would be placed consistent with the general soils placement plans. All other monitoring equipment, such as electronic data collection devices, would be removed.

Table 2-1. Rock Creek Project Alternatives Comparison.

Project Facility or Feature	Alternative II Proposed Rock Creek Project	Alternative III Proposed Project with Additional Mitigation	Alternative IV Modified Project with Additional Mitigation	Alternative V Paste Facility, Alternative Water Treatment, and Additional Mitigation¹
Total Disturbance Area	9.6 acres.	Same as Alternative II.	Same as Alternative II.	19.6 acres. ²
Evaluation Adit Length and Grade	Portal near end of NFS road #2741 6,592 feet at -10%.	Same as Alternative II.	Same as Alternative II.	Portal near end of NFS road #2741/2741J; 6,300 feet long at -10% grade; adit would be 16 to 18 feet high by 20 feet wide.
Evaluation Adit Waste Rock	90,000 tons of waste rock and 88,000 tons of ore; unmineralized waste rock used to construct adit pad downslope of adit entrance. Ore and alteration waste zone rock selectively separated and stockpiled at the adit.	Same as Alternative II.	Same as Alternative II.	Same as Alternative II, except RCR would cover stockpiles of alteration waste zone rock and ore with an impermeable material and minimize snow accumulation by plowing the portal pad to reduce infiltration of precipitation and the possibility of increasing concentrations of constituents of concern.
Evaluation Adit Access	NFS road #150 to NFS road #2741, and a short spur road, NFS road #2741J. Upgrade NFS road #2741 for 4.6 miles and reconstruct 0.18-mile spur to 14 feet wide and gravel.	Same as Alternative II.	Same as Alternative II plus improve 2.8 miles of NFS road #150.	Similar to Alternative IV; about 2.5 miles of NFS road #150 upgraded to improve safety and reduce sediment delivery; upgrade NFS road #2741 for 4.6 miles and reconstruct 0.18-mile spur (2741J) to 14 feet wide to adit site.
Evaluation Adit Water Discharge Line	6-inch polyethylene line 8.5 miles both cross-country and along NFS road #150, laid on surface for 3 years.	Same as Alternative II.	Same as Alternative II.	6-inch high-density polyethylene (HDPE) temporary pipeline buried in access roads; two Rock Creek crossings where the pipeline would be bored under stream channels, attached to existing bridge structures, or placed on trestles above the stream.
Evaluation Adit Power Supply	Power from two 500-kW diesel generators would provide power for the drills, pumps, vent fans, and shop. Electric power for support facilities would be supplied from an existing local distribution line.	Same as Alternative II.	Same as Alternative II.	A power line would be buried in road corridor from junction of Montana Highway 200 and NFS road #150 to evaluation adit. Generators would only be used as backup power supply.
Evaluation Adit Support Facility Location	Close to NFS road #150 and a segment of Rock Creek considered important harlequin duck habitat (see Final SEIS Figure 2-23).	Same as Alternative II.	Same as Alternative II.	Relocation of support facilities away from Rock Creek to minimize potential disturbance of harlequin duck habitat (see ROD Figure 2).

Project Facility or Feature	Alternative II Proposed Rock Creek Project	Alternative III Proposed Project with Additional Mitigation	Alternative IV Modified Project with Additional Mitigation	Alternative V Paste Facility, Alternative Water Treatment, and Additional Mitigation ¹
Evaluation Adit Water Treatment	Pressure filtration, oil skimmer, and a passive biotreatment and ion exchange system. Discharge to Clark Fork River.	Same as Alternative II.	Same as Alternative II.	Pressure filtration and oil skimmer, with a pilot anoxic biotreatment system; also includes precipitation, clarification, and filtration for solids and metals; ion exchange system; and biological nitrification/denitrification system to remove inorganic nitrogen; treatment quality would meet groundwater quality standards and nondegradation criteria, if applicable, before discharge to groundwater infiltration ponds.
Phase I Sediment Mitigation	Sediment mitigation would reduce sediment delivery by 54.95 tons.	Not proposed.	Not proposed.	Sediment mitigation would reduce sediment delivery by 234 to less than existing conditions and improve streambed conditions.
Independent Technical Advisor for Mine Plan Review	Not proposed.	Not proposed in 2001 Final Environmental Impact Statement (FEIS).	Not proposed in 2001 FEIS.	Fund an independent technical advisor to assist the KNF and DEQ in review of RCR's subsidence monitoring plan, underground rock mechanics data collection, and RCR's mine plan.
Evaluation Adit Soil Storage	1.2 acres; 8,757 cubic yards (cy).	Same as Alternative II.	Same as Alternative II.	0.78 acre in one stockpile with two cells; 3,318 cy in lift one stockpile cell and 15,545 cy in lift two stockpile cell for a total of 18,863 cy.

¹Reflects more detailed design than other alternatives.

²Differs slightly from the 18.5-acre Phase I disturbed area described in the Rock Creek Evaluation Adit License Application due to minor modifications resulting from more detailed design of Phase I facilities.

RRC obtained stormwater, public water supply, and septic permits and initiated construction at the support facility site on private land in 2008 and 2009. RRC also implemented some of the Phase I monitoring and mitigation requirements that either did not require Forest Service approval or were approved by the KNF. Among the monitoring and mitigation measures implemented by RRC are continuous monitoring of Cliff Lake water levels, updating the domestic well and springs survey, completing a Memorandum of Understanding (MOU) for water monitoring, completing a collection agreement with FWP for grizzly bear mitigation, providing \$468,603 to FWP toward funding of the grizzly bear management specialist and initial funding of other grizzly bear mitigation items, acquiring 928 acres of grizzly bear habitat to be conveyed to the Forest Service or placed in a permanent conservation easement, and updating the SPCC Plan. RRC obtained two Montana Pollutant Discharge Elimination System (MPDES) permits that became effective in 2016. MPDES Permit MT0030287 covers stormwater discharges from the evaluation adit site, the paste tailings facility, and the mill site. MPDES Permit MT0031763 covers stormwater discharges related to road improvements, utility installation, and construction as part of Phase I evaluation adit activities. The status of RRC's MPDES permits is summarized in Table 4 of the ROD.

The Evaluation Adit Plan approved by DEQ includes several changes to Alternative V as presented in the 2001 Final Environmental Impact Statement (FEIS); these changes are incorporated into Phase I of Alternative V as described in the SEIS. The most significant of these changes include providing power to the evaluation adit site through a power line rather than using generators, burying the evaluation adit water pipeline in the access road rather than placing the pipeline aboveground, and discharging treated mine water from the evaluation adit to infiltration ponds (groundwater) rather than discharging to the Clark Fork River. Alternative V also includes a number of minor modifications to Phase I resulting from more detailed design of Phase I facilities, the KNF's modifications made to address deficiencies identified by the District Court, and the KNF's evaluation of new and changed conditions since the 2003 ROD, including modifying the layout and location of Phase I support facilities and associated groundwater disposal system, and developing details of mitigation associated with the access road to implement sediment reduction requirements.

Modifications to Alternative V since the 2001 FEIS are included in the descriptions of the project components provided below. The layout, facilities, and other elements of Alternative V are shown in Figure 2-1. About 19.6 acres would be disturbed under Alternative V during Phase I. Of the area disturbed, 10.4 acres would be on NFS land (Figure 2-3).

2.2 Evaluation Adit

2.2.1 Objectives

RRC would develop an evaluation adit to the Rock Creek ore body as Phase I of the project. RRC would use the evaluation adit to:

- Evaluate a portion of the ore zone in the Chicago Peak ore block and compare this information with drill hole information in this area
- Evaluate the Copper Lake Fault and collect additional information on the strike, dip, and offset of the fault
- Obtain rock mechanics data to aid underground mine design
- Obtain hydrologic and geochemical data to supplement previous data and analysis
- Obtain bulk ore samples for metallurgical testing

2.2.2 Adit Development

While most of the pertinent information about the evaluation adit is included below, more details on the evaluation adit are found in the Rock Creek Evaluation Adit License Application (RCR 2010). RCR would develop Rock Mechanics Data Collection and Subsidence Monitoring Plans (see Section 1.7 in Attachment 3). Separate plans would be required for each phase of project development. Before Phase I dewatering (before the evaluation adit intercepts groundwater), RCR would submit a detailed plan for data collection and monitoring during the Phase I evaluation adit and a preliminary monitoring plan for full mine build-out (Phase II) for agency approval. Before Phase I, RCR would submit for agency approval an updated mine plan that would take into account the Troy Mine subsidence in its proposal for future pillar designs and highlight how the design accounts for and differs from failed designs at the Troy Mine. The updated plan would consist of a description of the proposed mining method, focusing on preliminary pillar sizing, height-to-width ratio, and drive sizes. Before proceeding with Phase I, RCR would also submit for agency approval a detailed Explosive Handling and Blasting Plan that describes the blasting agents that would be used for various conditions, powder factors used, housekeeping practices, and other relevant information to minimize the potential for elevated nitrate or ammonia concentrations occurring in surface water.

Conventional mining methods would be employed during the 1.5- to 2-year evaluation adit construction period. Diesel-powered equipment would be used underground, and underground equipment would use low-emission engines and comply with Mine Safety and Health Administration (MSHA) regulations for diesel equipment. To reduce noise, exhaust and intake fans would be dampened and above-ground vehicles would be equipped with alternative backup alarm systems that reduce noise impacts to wildlife, as allowed by MSHA. RCR would adjust intake and exhaust ventilation fans in the evaluation adit to meet the MSHA regulation (30 CFR 62.101) for noise action level, which is an 8-hour time-weighted average sound level of 85 dBA. Access to the evaluation adit would be by the existing Rock Creek Road (NFS road #150) and Chicago Peak Road (NFS road #2741). About 2.5 miles of the existing road surface would be upgraded. Upgrades would include widening several corners, upgrading water bars to meet Forest Service standards, installing new culverts to meet Forest Service standards, and resurfacing to provide a smoother roadbed and decrease sediment production. Design of evaluation adit access road improvements was completed by RCR, in consultation with the Forest Service, and is described in detail in Appendix Q of the Rock Creek Evaluation Adit License Application (RCR 2010).

Estimated disturbance for the evaluation adit would be 10.4 acres at the adit site, 4.4 acres of disturbance associated with road improvements (including 1.1 acres at a borrow area), 1.0 acre at the water disposal site, 0.6 acre at a borrow area, and 3.1 acres at the support facilities for a total of about 19.6 acres with rounding. The 19.6-acre disturbed area differs slightly from the 18.5-acre Phase I disturbed area described in Appendix N of the Rock Creek Evaluation Adit License Application (RCR 2010) and the 19.8-acre Phase I disturbance area described in Table 7 of the Rock Creek Evaluation Adit License Application (RCR 2010) due to minor modifications resulting from more detailed design of Phase I facilities.

Several facilities would be constructed for the evaluation adit (Figure 2-4). Some of these facilities would be at the evaluation adit portal site. A 40-foot by 80-foot temporary steel shop building on a concrete slab would be constructed on top of the initial portal patio. This building would provide warehouse space, indoor workspace, a lunchroom, and lavatories. A 300-kW backup diesel generator would be at the adit site and would provide power only during periods when line power was not available. The generator would not operate more than 100 hours per year. Aboveground fuel tanks would be near the shop building at the adit site. All exterior lights would be shielded or baffled from viewpoints in the Clark Fork River Valley. Facility features including any permanent (life of mine) structures would be painted, stained, or modified to visually blend with the surrounding landscape and to reduce contrast with the surrounding area. Water use and management during Phase I, including sanitary waste management, is described in

Section 2.4, *Water Use and Management*. Upon completion of the evaluation adit, all facilities would either be removed from the permit area defined in DEQ's ROD, or moved to the mill site for use during mining.

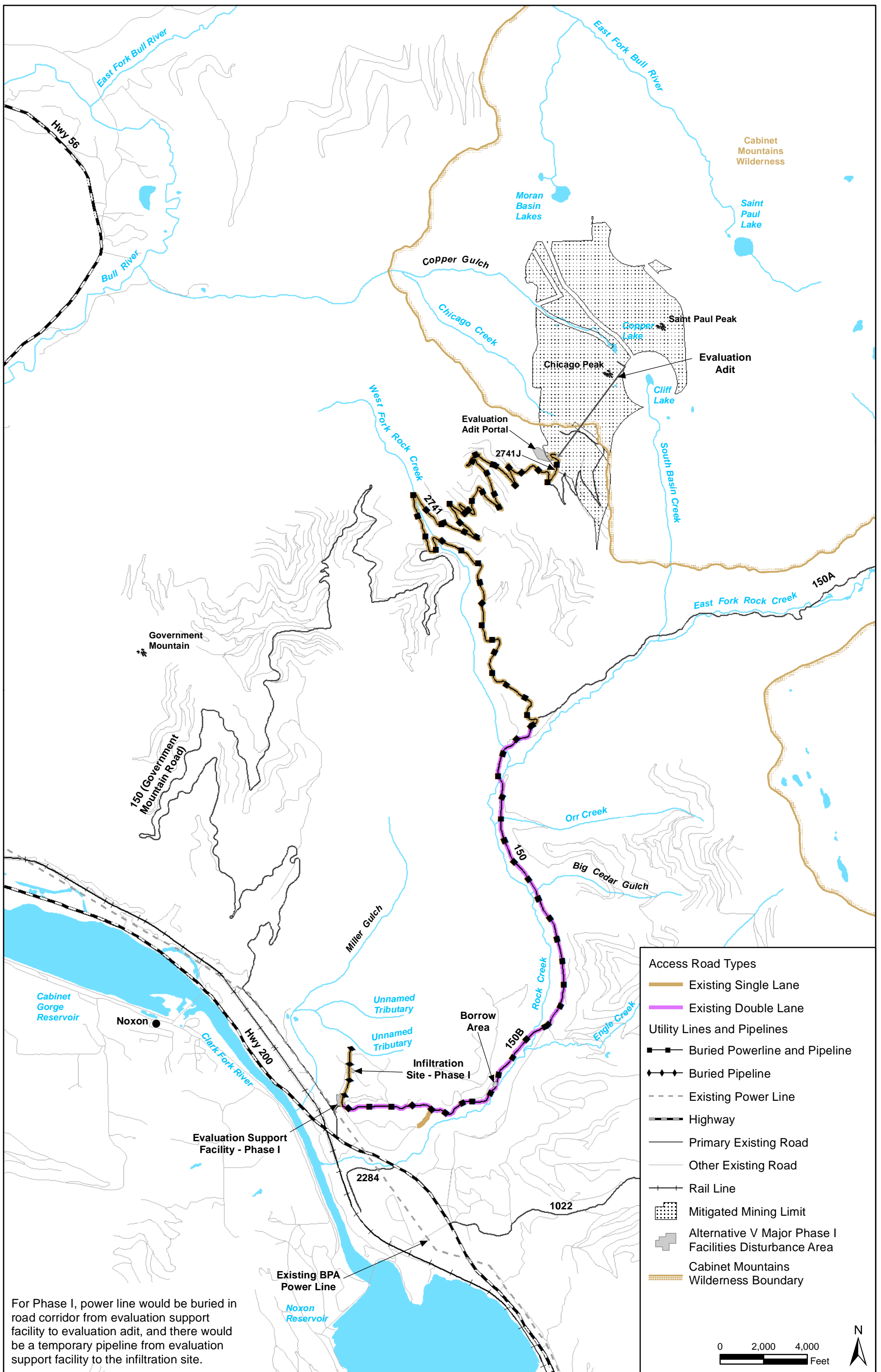


Figure 2-1. Alternative V Facilities, Pipelines and Roads, Phase I

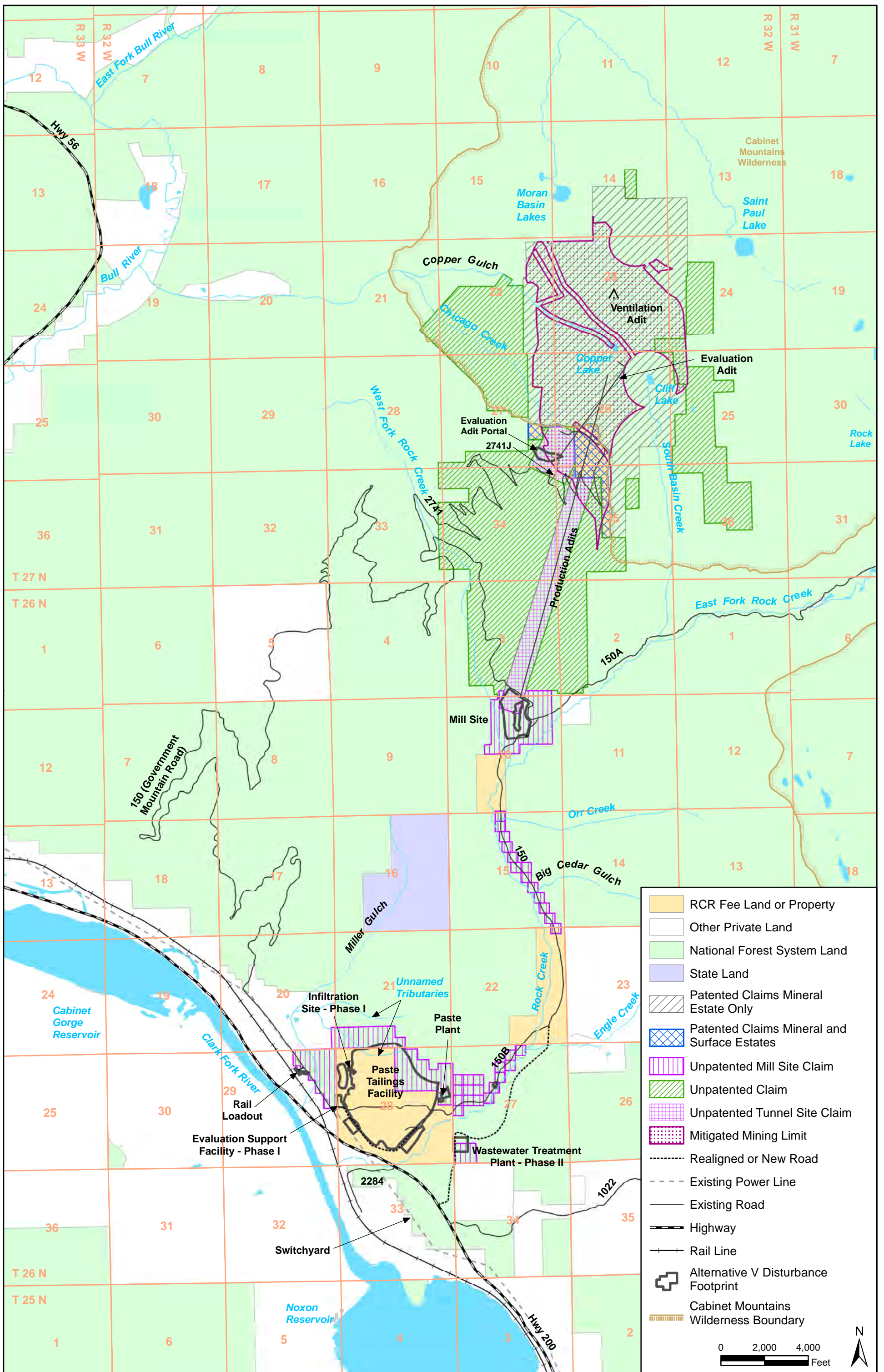


Figure 2-3. Land Ownership and Mining Claims in the Alternative V Study Area

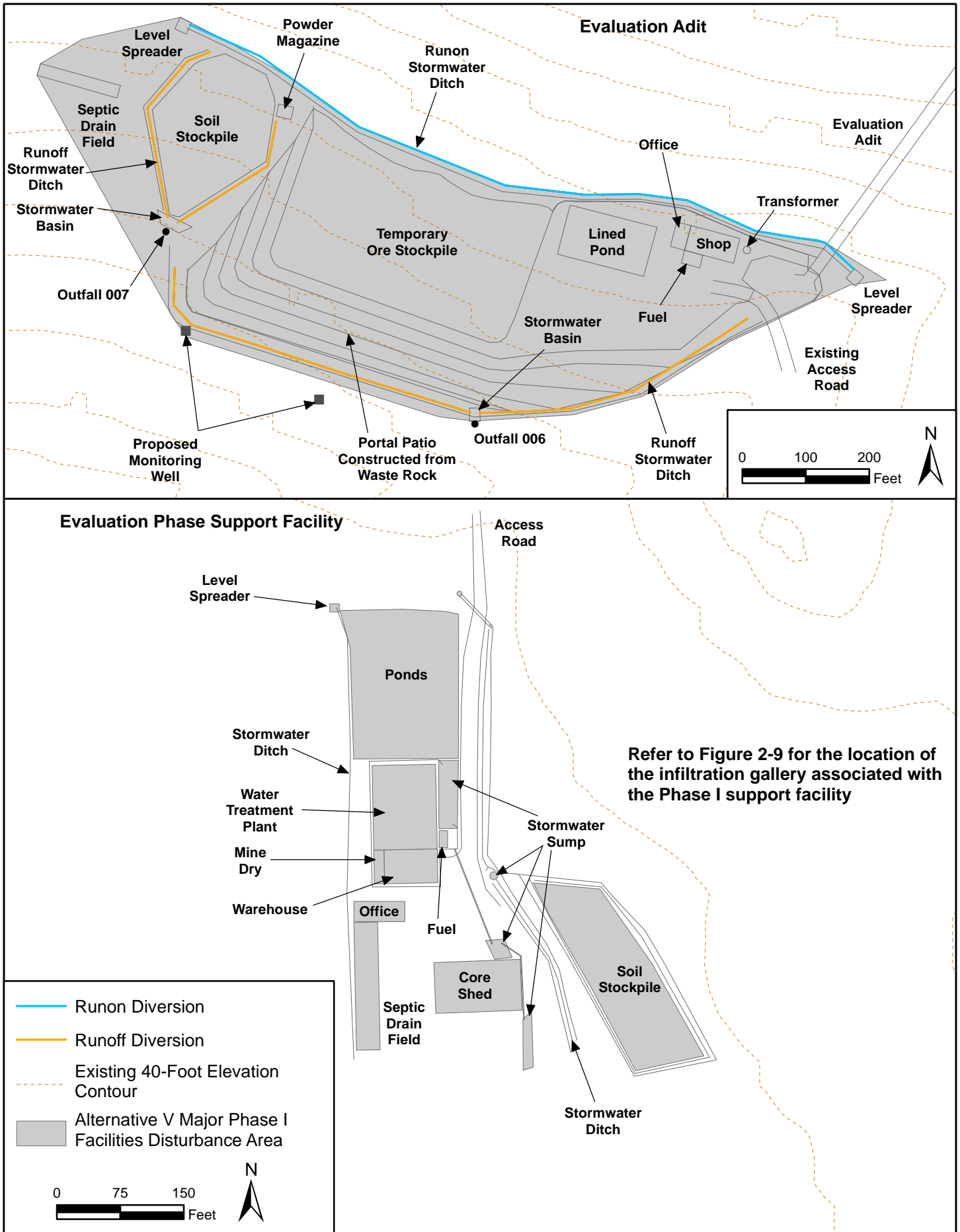


Figure 2-4. Alternative V Evaluation Adit and Evaluation Phase Support Facilities

The evaluation adit portal would be at 5,775 feet in elevation. Grouting would be used, as necessary, as the adit advanced to minimize water inflow. The adit would be 16 to 18 feet high by 20 feet wide with an estimated length of 6,300 feet at a decline of 10 percent. About 90,000 tons of waste rock and 88,000 tons of ore would be excavated from the proposed adit. Of the 90,000 tons of waste rock, an estimated 7,800 tons would be from the alteration waste zone (Erickson 2012).

Non-acid-generating waste rock would be end-dumped near the portal to form a flat-topped rock patio with angle of repose slopes. Based on uniform regional geology and mineralogy (Boleneus et al. 2005), the characteristics of rock from the evaluation adit, mostly produced from the upper and middle Revett Formation, are expected to be comparable to those of the surrounding talus. To reduce infiltration of precipitation and the possibility of increasing concentrations of constituents of concern (COCs), RCR would minimize snow accumulation by plowing the portal pad.

Due to variations in rock types within the formation, it may be necessary to stockpile quartzite material that closely resembles surface talus to blend the waste rock portal pad with the existing talus as much as possible. This material would be stockpiled on the bench or stored in the adit until ready for deposition as the final layer on the evaluation adit portal pad. Where possible, impacts on existing trees at the outer edge of the talus slope and existing pockets of trees and shrubs within the talus slope would be avoided during portal pad construction.

As described in Section 3.7, *Water Quantity*, of the Final SEIS, baseline data and the similarity of site conditions to the Troy Mine site indicate that the risk of acid drainage is low. As described in the Geochemical Characterization and Monitoring Plan in Attachment 3, RCR would characterize waste rock and ore obtained during the evaluation adit program using a Quick Test, to be developed by RCR, that would facilitate routing of waste rock and placement on the adit portal pad or in stockpiles and also by static testing laboratory analysis. RCR would implement the Explosive Handling and Blasting Plan described in Section 2.2.2, *Adit Development*, and Attachment 3 to minimize the potential for elevated nitrate or ammonia concentrations occurring in surface water. RCR would use analytical data to identify rock that must be removed from the evaluation adit site. RCR would remove rock determined to potentially increase concentrations of COCs above monitoring action levels discussed in Attachment 3, store it underground, or place it on a liner.

Lower Revett Formation rock, where ore and waste rock from alteration zones rock are most likely to be encountered, would be the last rock type removed from the evaluation adit. All ore zone and disseminated galena, pyrite, and chalcopyrite alteration zone rock would be selectively handled and stored on the portal patio pad in separate stockpiles that provide for drainage capture until project progression was determined. RCR would cover stockpiles of alteration waste zone rock and ore with an impermeable material to minimize infiltration from precipitation. After Phase I was completed, the alteration waste zone rock would be removed from the site and placed underground or placed on a liner. Some of the bulk ore collected from the evaluation adit would be used in metallurgical flotation tests as part of the evaluation of the ore body. If Phase II proceeded, the remaining ore would continue to be stored at the evaluation adit site until the mill was operational; otherwise, ore would be placed underground in the evaluation adit.

RCR would maintain the structures, equipment, and other facilities in a safe, neat, and workmanlike manner. Hazardous sites or conditions would be marked by signs, fenced, or otherwise identified to protect the public in accordance with federal and state laws and regulations. RCR also would comply with all applicable federal and state fire laws and regulations, take all reasonable measures to prevent and suppress fires on the area of operations, and require employees, contractors, and subcontractors to do likewise within the permit area boundary defined by DEQ in its 2001 ROD.

As described in Section 2.5, *Part IV: Description of Past, Present, and Reasonably Foreseeable Actions*, of the Final SEIS, Montana Department of Transportation (MDT) reconstructed a segment of Montana Highway 200 to reduce the effects of a landslide beneath and adjacent to the road. The Alternative V Phase I infiltration site is about 0.75 mile east of the landslide. MDT's District Geotechnical Engineer concluded that "the infiltration site...is not expected to significantly affect the stability of the slide. There is not positive evidence indicating that a cause and effect condition will exist between the proposed mine infiltration and groundwater levels/head at the slide area" (MDT 2008). To address concerns about the potential effects of the Phase I infiltration site on the landslide, DEQ required RCR to submit a plan to install piezometers between the proposed location of the Phase I infiltration ponds and the landslide for review and approval (DEQ 2008). In consultation with DEQ and MDT, RCR submitted a Final Work Plan in 2009 for the installation of five piezometers at specified locations (RCR 2009). DEQ approved the Work Plan in July 2009 (DEQ 2009). Following a series of delays, the Work Plan (RCR 2011) was revised and approved by DEQ (DEQ 2011). The revised Work Plan recommended installation of two piezometers just north of the drain system installed in the summer of 2011. RCR installed the two piezometers in September 2012 after the drain system was installed and collected water levels from the piezometers in October 2012 and September 2013, as well as a sample of the drain water in September 2012 for analysis of water quality parameters.

2.2.3 Stormwater Control

At the evaluation adit site, a run-on diversion ditch and berm system would prevent run-on from uphill. The run-on diversion system would divert stormwater flows around the adit site to level spreaders (Figure 2-4). The spreaders would be designed so that the discharge water would not be collected by the downslope berms or concentrated in downslope channels. During construction of the portal pad and before storage of any rock types on the surface of the pad, RCR would install a lined ditch and sediment basin at the base of the talus slope excavated to bedrock. Precipitation that infiltrated the talus and runoff from the pad during initial construction would be collected in the ditch and routed to a sediment basin designed to contain runoff from a 100-year/24-hour storm event. No discharge from Outfall 006 is permitted under MPDES permit MT0030287 unless the measured precipitation exceeded the 10-year/24-hour storm event, or equivalent amount of snowmelt runoff, in a 24-hour period. During initial construction, water in the sediment basin would infiltrate, evaporate, or discharge from Outfall 006. Any discharges from Outfall 006 would be regulated under MPDES permit MT0030287. No water resulting from mine dewatering activities would be discharged from Outfall 006.

During adit development, once ore and alteration zone waste rock were generated and placed on the portal pad, all stormwater would be captured in the lined sediment basin and pumped to a lined 600,000-gallon containment pond on the portal pad (Figure 2-4) for use in adit development, or piped from the containment pond to the Phase I water treatment plant. Once ore was stockpiled at the evaluation adit site and until all stockpiled ore was removed, discharge from Outfall 006 would be subject to additional effluent limits in MPDES permit MT0030287.

Runoff from the soil stockpile would be collected in a ditch at the base of the pile and routed to a sediment basin designed to contain runoff from a 100-year/24-hour storm event, where it would infiltrate, evaporate, or discharge from Outfall 007 permitted under MPDES permit MT0030287. No discharge from Outfall 007 is permitted unless the measured precipitation exceeded the 10-year/24-hour storm event, or equivalent amount of snowmelt runoff, in a 24-hour period. Any discharges from Outfall 007 would be regulated under MPDES permit MT0030287. No water resulting from mine dewatering activities would be discharged from Outfall 007.

Stormwater controls at the Phase I support facility would consist of a stormwater ditch on the east side of the facilities that would convey stormwater to stormwater sumps (Figure 2-4). On the west side of the

facilities, a ditch would convey stormwater to a level spreader. Stormwater at the Phase I support facility would not reach surface water, and a MPDES permit for stormwater discharges at the site would not be needed. Stormwater runoff associated with construction of ancillary facilities at the evaluation adit site, excavation trenching to install a pipeline and power line, and improvements to roads to reduce sediment delivery to Rock Creek would be regulated at 31 outfalls covered by MPDES permit MT0031763. Road improvements would include new rolling dips, gravel surfacing in selected locations, and new culverts at selected stream crossings. The majority of the activities would occur within the existing road prism except for the location where directional drilling would be used to pass the pipeline and power line under Rock Creek and two short sections of road widening or realignment. The pipeline and power line installation would occur in the vicinity of NFS roads #150 and #2741 between Montana Highway 200 and the evaluation adit site. The potential to discharge stormwater from each outfall would only occur for a few days during active construction as the project progressed toward the adit. Ancillary facility construction would consist of installing stormwater controls (diversion ditches and berms), topsoil stripping and stockpiling, grading for the adit pad, and constructing a lined water containment pond at the evaluation adit site.

RCR's Stormwater Pollution Prevention Plan (SWPPP) outlines measures to control stormwater runoff, erosion, and sediment delivery from the site using best management practices (BMPs). The document provides a description of sediment-control steps that would be taken in advance of and concurrent with construction activities to prevent sediment impacts on surface waters. These measures may include installation of fabric silt fences, coir/straw logs, straw bale dikes, outlet protection, brush and slash filter rows, rolling dips, sediment traps, and check dams in roadside ditches. BMPs would be installed, maintained, and inspected in accordance with the guidelines presented in the Forest Service's *National Best Management Practices for Water Quality Management on National Forest System Lands* (USFS 2012a), MDT's erosion and sediment control manual (2004), and any associated MPDES permit.

2.2.4 Water Treatment

A lined 600,000-gallon stormwater/mine water containment pond would be constructed on the portal pad. Excess water from the evaluation adit and the stormwater containment pond overflow would be pumped through a pipeline to a temporary wastewater treatment system at the support facilities site. Phase I pipelines are described in more detail in Section 2.6.2, *Pipelines*, and the Rock Creek Evaluation Adit License Application (RCR 2010). The wastewater treatment system would consist of precipitation, clarification, and filtration for solids and metals; an ion exchange system; and a biological nitrification/denitrification system to remove inorganic nitrogen. Treated water would be conveyed through a temporary buried pipeline and discharged to infiltration ponds located north of the wastewater treatment system at the support facilities (Figure 2-1). The infiltration ponds would be excavated to intersect basal gravel at 8 to 10 feet below ground surface. The percolation rate in the basal gravel was determined to be adequate for accommodating the anticipated discharge flows (Parker 2008). Discharges would comply with the conditions of Exploration License #00663 established by DEQ in the Final EA for the Rock Creek Evaluation Adit (DEQ 2008). Specifically, treated water would be required to comply with groundwater standards and nondegradation criteria, if applicable, at the end of the pipe before discharge to infiltration ponds. Compliance would be shown through daily grab samples and weekly or quarterly (dependent on parameter) composite sampling of adit water before and after treatment for certain parameters as specified in the Final EA. Groundwater and surface water quality downgradient of the infiltration ponds would be monitored as described in the Rock Creek Evaluation Adit License Application (RCR 2010) and Attachment 3. RCR would install the temporary mine water discharge pipeline between the evaluation adit and the discharge site by burying it in the existing road prism. This would minimize vegetation clearing and erosion on the steep hillside near the evaluation adit. The temporary wastewater treatment system and discharge pipeline are described in detail in Appendix J of the Rock Creek Evaluation Adit License Application (RCR 2010).

2.2.5 Data Collection and Monitoring

Extensive data collection, sampling, and monitoring would be required before and during construction of the evaluation adit. The data collection activities and how the data would be used would be summarized in a Phase I Data Evaluation Plan, which would be submitted to the agencies for approval before Phase I dewatering. Rock geochemical characterization, monitoring, and mitigations are discussed in the Geochemical Characterization and Monitoring Plan in Attachment 3. This plan includes provisions for waste rock handling during adit construction as well as contingency needs should project closure occur before mine construction and development began. Before proceeding with and as a condition to approval of Phase II, RCR would submit for agency approval final designs for the tailings facility and for the underground mine. The final designs would incorporate data collected during Phase I and would include updated monitoring plans that cover construction, operations, and closure. The final designs would be subject to review and approval by the agencies before Phase II could proceed. A technical advisory group (TAG) or a third-party advisor may assist the agencies with the review.

Groundwater and surface water monitoring specific to the evaluation adit portal pad would be conducted, as discussed in Attachment 3. Before storage of any rock types on the surface, RCR would install a collection ditch and sediment basin at the base of the talus slope to collect precipitation that infiltrated the talus from the pad. Two groundwater monitoring wells would be installed on the downgradient side of the evaluation adit pad at the base of the talus slope to monitor potential impacts on groundwater from the portal pad, evaluation support facilities, and stormwater control facilities. The monitoring wells would be screened at the colluvium/bedrock contact. As described in Attachment 3, a third-party contractor would monitor groundwater levels in the two wells on a quarterly basis to monitor the effectiveness of the collection ditch and to monitor water quality of any groundwater that bypassed the collection system. A third-party contractor would monitor one surface water monitoring location downgradient of the evaluation adit during periods of flow. If monitoring indicated that groundwater quality reached any of the action levels listed in Table K-9 in Attachment 3, a Contingency Action Plan would be implemented.

2.3 Data Collection and Monitoring Plan Submittal Following Phase I

As described in Attachment 3, extensive geochemical, hydrological, and geotechnical rock mechanics data would be collected during Phase I. The KNF would use the evaluation adit data to supplement, confirm, refine, and modify, if necessary, Phase II data assumptions and analyses conducted in the SEIS and the 2001 FEIS. Information collected during construction of the evaluation adit would be used to develop and direct monitoring programs and mine designs during operations. Before making a decision on the project's Phase II, the KNF would assess whether the new data would require substantial revisions to the analyses conducted in support of Phase II of the project that are relevant to environmental concerns. The KNF would conduct additional National Environmental Policy Act (NEPA) analysis for Phase II of the project if the evaluation adit data indicated the need for substantial changes that are relevant to environmental concerns or identify or constitute significant new circumstances or information relevant to environmental concerns and bearing on Phase II of the project, as required by 40 Code of Federal Regulations (CFR) 1502.9(c)(1).

Although not required, RCR may collect additional data on NFS lands, as necessary, to inform aspects of the Phase II monitoring and project design relevant to environmental concerns. In addition, RCR may submit monitoring plans for Phase II activities following completion of Phase I activities. Any ground disturbance associated with data collection efforts would be negligible.

2.3.1 Technical Advisory Groups

The KNF may use two approaches to obtain advice on technical matters relating to the Plan of Operations: (1) hiring an expert independent third-party contractor, to be funded by RCR; or (2) forming

an informal interagency TAG. These approaches could be used separately or in combination to obtain this additional expertise. The KNF would determine the approach used to address a particular issue on a case-by-case basis, based on the best source of expert review and the complexity and significance of the issue. RCR would fund any required third-party consultant services.

One or more TAGs may be formed to advise the KNF deciding official on issues pertinent to the Plan of Operations for either Phase I or II. TAGs would consist of the KNF project manager; supporting Forest Service staff or third-party contractors with expertise on specific issues involving disciplines such as geochemistry, groundwater hydrology, rock mechanics, and tailings management; and staff from local, state (including Idaho), and federal agencies the KNF invites (and who accept) with a technical background related to the issues to be addressed. The Federal Advisory Committee Act restricts the ability of the Forest Service to allow nongovernmental entities to serve on committees.

2.4 Water Use and Management

A detailed water balance estimating water use, seepage, and discharges would be submitted annually by RCR to the KNF and DEQ (Attachment 3). Actual volumes for a number of water balance variables would be measured to update previously projected calculations. These include measurements of precipitation; evaporation; adit inflow, outflow, and storage; and outflow to the treatment system. Dewatering the evaluation adit during Phase I is not a beneficial use of water; therefore, a beneficial water use permit would not be required. The Water Use Act has a requirement that a person cannot waste water, use water unlawfully, or prevent water from moving to another person having a prior right to use the water.

Evaluation Adit Water Management. A conceptual site model illustrating the water balance during the Evaluation Phase is provided in Figure 2-9. Additional water may be needed for dust control in the adit. A small amount of potable water would also be needed for the lavatory and lunchroom in the shop.

Water for drilling would initially be hauled to the site and stored in a pond at the evaluation adit site (Figure 2-9). A lined pond, with a capacity of about 600,000 gallons, would be constructed on the evaluation adit pad to receive collected site runoff and store the hauled water. A barrier would be erected around the pond to exclude wildlife. A diversion ditch would be constructed above the portal and soil stockpile to divert natural runoff around disturbed areas (Figure 2-4).

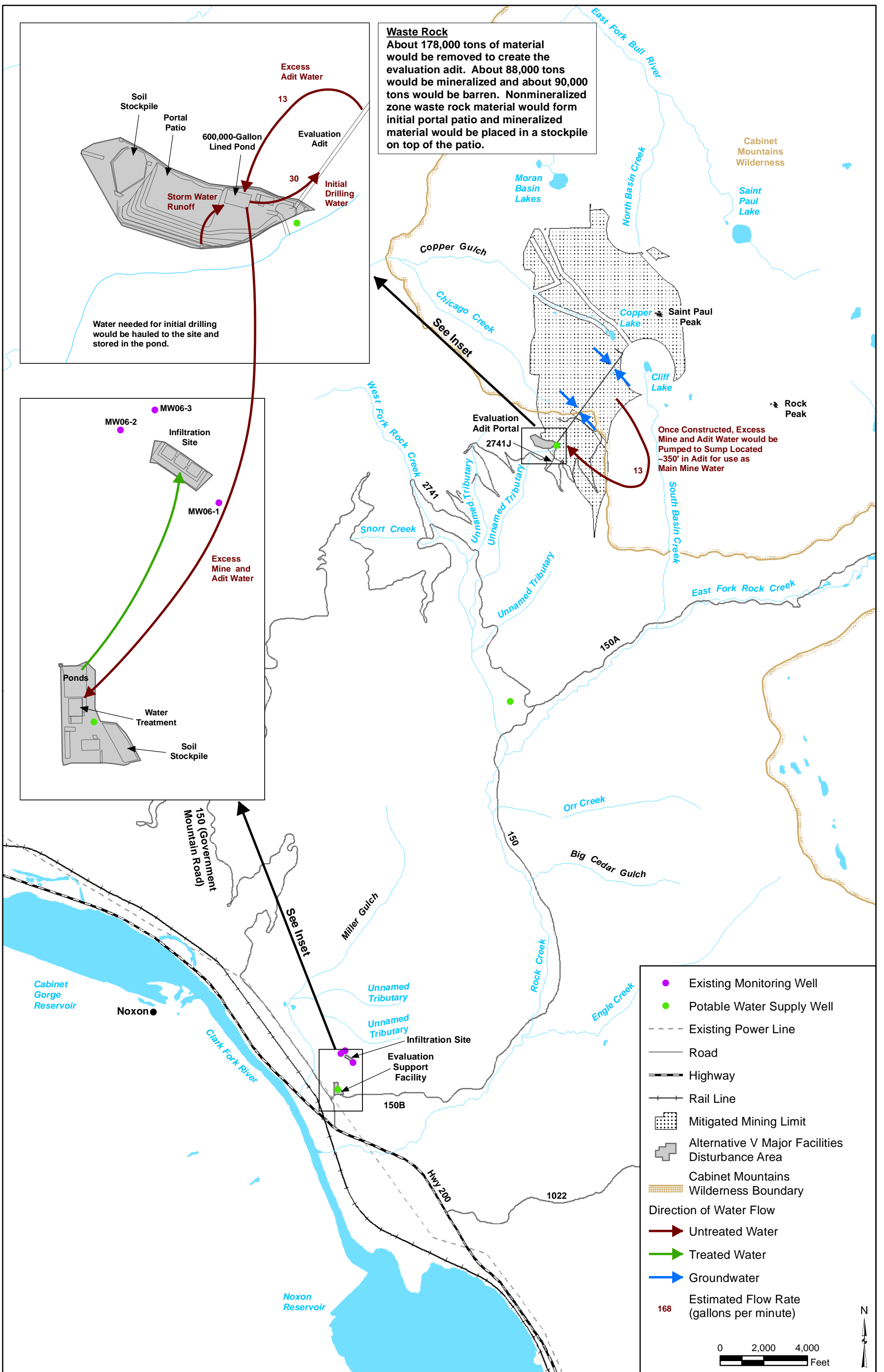


Figure 2-9. Alternative V Conceptual Site Model: Facilities and Water Balance Phase I - Evaluation

A pump in the lined pond would provide water for drilling during initial evaluation adit construction. Water encountered in the adit during this phase would be pumped to the pond. After the adit advanced about 350 feet, an 18-foot by 18-foot by 40-foot (97,000-gallon) mine sump would be excavated to function as the evaluation adit water sump. An oil skimmer and pressure filter would be used at this sump to remove oils, grease, and suspended solids from the water supply.

Excess water from the adit sump and pond overflow would be pumped through a temporary 6-inch polyethylene pipeline through a biotreatment system and an ion exchange treatment plant. The water would then be discharged in three infiltration ponds totaling 1 acre in the paste tailings facility disturbance footprint. When mine development reached the evaluation adit, evaluation adit water would be routed through the mine water drainage and collection system described below. Treated discharged water would be required to meet groundwater standards and nondegradation criteria, if applicable, at the end of the pipe before discharge (DEQ 2008). Treated water would be monitored before discharge to the infiltration ponds. RCR did not request, and DEQ has not granted, a mixing zone for discharges to the Phase I infiltration pond (Hydrometrics 2008; DEQ 2008).

Groundwater wells would be developed to supply potable water at the adit and support facility sites. If an adequate supply cannot be found at the adit site, water would be trucked to the adit site and stored in a tank in the shop until a suitable source was found in the adit. Sewage from the shop at the adit and office and mine dry at the support facilities would be piped to septic tanks and drainfield systems. The design of the Phase I sewage and septic systems is described in Appendix H and Appendix I of the Rock Creek Evaluation Adit License Application (RCR 2010).

2.4.1 General Wastewater Treatment

Phase I wastewater treatment is described in Section 2.2, *Evaluation Adit*. Phase I work would allow the collection of additional information about the geologic, hydrologic, and geochemical systems of the deposit, and RCR would use this information to complete a detailed final design and determine the needed capacity for the Phase II wastewater treatment systems.

2.5 Transportation

2.5.1 Phase I

Access to the evaluation adit would be via NFS road #150, NFS road #2741, and a short spur road, NFS road #2741J (Figure 2-1). NFS road #2741J would be closed to the public until the evaluation adit portal pad was reclaimed. Public access to the Chicago Peak Trail would be maintained. To reduce traffic on evaluation access roads and any associated increases in noise and sediment, employees would be bused from a parking lot at the support facilities near the junction of Montana Highway 200 and NFS Road #150 to the evaluation adit site. Other mine, Forest Service, and contracting personnel would be encouraged to carpool to the extent practicable.

Improvements to existing NFS road #2741 would include a minimum road width of 14 feet, improved or added road turnouts about every 1,000 to 1,500 feet, and reconditioning of the road surface for year-round use and maintenance. Two new culverts would be installed on NFS road #2741 at current stream ford locations; open bottom arch culverts may be used at these locations, if practical, to minimize stream impacts. Minor amounts of clearing may be necessary for turnouts and snowplowing. The short spur road would require a 14-foot-wide surface to accommodate equipment. This work would be done in consultation with the KNF. Design of evaluation adit access road improvements was completed by RCR, in consultation with the Forest Service, and is described in detail in Appendix Q of the Rock Creek Evaluation Adit License Application (RCR 2010). The majority of the Phase I construction activities would occur within the existing road prism, except where directional drilling would be used to pass the

pipeline and power line under Rock Creek and two short sections of road widening or realignment. Any areas to be disturbed outside of the road prism would be reviewed before construction by the KNF for potential impacts to cultural resources. A cultural resource inventory of any location to be disturbed during Phase I that had not been previously inventoried would be completed to meet the requirements of the 36 CFR 800, the guidelines in the 2011 KNF Site Inventory Strategy, and State Historic Preservation Office.

RCR would use the following measures to reduce right-of way clearing and help produce a more natural-appearing edge of timber along the road corridor. These measures would be applied to appropriate segments of the corridor during final design:

- Retaining nonhazardous trees and brush on the right-of-way
- Cutting trees at ground level to reduce visibility of stumps
- Disposing of felled material with the least possible impact on remaining vegetation
- Selective clearing of timber adjacent to the corridor to soften the edge between cleared and uncleared areas

Because of the yearlong schedule for evaluation adit construction, it would be necessary to plow snow on NFS road #2741 for one winter. Snowplowing for a portion of NFS road #150 would occur over the mine life. Sidecasting of snow or soil would be avoided and sidecasting of road material would be prohibited on road segments within or abutting Riparian Habitat Conservation Areas (RHCAs).

All road improvements, realignments, or modifications, including stream crossings, would be constructed in compliance with the 2015 KNF Land Management Plan's (2015 KFP's) Inland Native Fish Strategy (INFS) standards, and new culverts would be built to accommodate a 100-year flood event. The existing culvert on West Fork Rock Creek above the last bridge on NFS road #150 has been identified as a barrier to fish migration; RCR would improve or replace this culvert as determined in consultation with the Forest Service. To reduce the risk of vehicles and their contents reaching Rock Creek in the event of an accident, INFS guideline RF-2 requires the development and implementation of a Road Management Plan (RMP). As described in Appendix L of the Rock Creek Evaluation Adit License Application (RCR 2010), RCR would implement the Transportation Monitoring and Mitigation Plan (called a transportation plan in the terrestrial T&E species mitigation plan attached to the 2006 BO) for Phase I described, consistent with the terms and conditions of the grizzly bear BO (USFWS 2006), and barriers would be installed at the two new bridges on Rock Creek and the culvert on West Fork Rock Creek. Before initiation of Phase I, RCR would submit a conceptual transportation plan for Phase II.

2.6 Utilities

2.6.1 Power Supply

Phase I. Power would be supplied to the evaluation adit through a 13.8-kV three-phase power line beginning in the vicinity of the adit support facilities near Montana Highway 200. The 13.8-kV power line to the adit site would be buried in the same trench as the water line in the existing NFS road prism. The line would be a standard insulated shielded underground cable. The power line and pipeline would cross Rock Creek in two locations, where they would be bored under stream channels, attached to existing bridge structures, or placed on trestles above the stream. At the adit site, the line would be stepped down from 13.8 kV to 480 volts in a transformer near the portal (Figure 2-4). From the transformer location, electrical power would be supplied to the office, shop, and underground as needed. During Phase I, a 300-kW backup generator would provide power when line power was not available. The backup generator would not operate more than 100 hours per year, unless approved by the KNF due to unavoidable

circumstances encountered, and the engine would conform to 40 CFR 89 emission limits for Tier 4 engines between 130 kW and 560 kW manufactured after 2011. Aboveground fuel tanks would be near the shop building at the adit site.

2.6.2 Pipelines

Phase I. Excess water from the evaluation adit and the stormwater containment pond overflow would be pumped through a temporary 6-inch polyethylene pipeline to a temporary wastewater treatment system located at the support facilities site near the proposed paste tailings facility footprint. To minimize vegetation clearing and erosion on the steep hillside near the evaluation adit, the temporary mine water discharge pipeline between the evaluation adit and the wastewater treatment system would be buried in the existing road prism (Figure 2-1). To reduce the potential for ruptures, the pipeline will be buried at least 3 feet where slopes are greater than or equal to 10 percent and at least 6 feet where slopes are less than 10 percent. The pipelines would be bored under stream channels, attached to existing bridge structures, or placed on trestles above the stream at the two Rock Creek crossings. Treated water would be conveyed through a temporary buried HDPE pipeline and discharged to infiltration ponds near the Phase I support facility. Phase I pipelines are described in detail in the Rock Creek Evaluation Adit License Application (RCR 2010), specifically Section 2.0, *Operating Plan*, and Appendix J, *Discharge Pipeline and Water Treatment Plant for the RC Resources, Inc. Rock Creek Evaluation Adit Support Facilities Site Plan*. Spill prevention measures for Phase I are provided in Appendix R, *Spill Plan*, of the Rock Creek Evaluation Adit License Application (RCR 2010).

2.7 Erosion and Sediment Control

Wind and water erosion-control measures are described in detail in Appendix J of the Rock Creek Evaluation Adit License Application (RCR 2010) and the Montana Air Quality Permit (MAQP) Application for the Rock Creek Project (Bison Engineering [Bison] 2014), and these general measures, which are summarized below, would be used throughout the Rock Creek Project and would involve (1) mechanical practices to minimize fugitive dust, (2) grading to reduce erosion potential, (3) soil-handling techniques to enhance stability, (4) hydrologic systems to control runoff and sedimentation, and (5) revegetation practices to provide a stabilizing cover. Sediment and runoff from all disturbed areas would be minimized using BMPs developed in accordance with the Forest Service's *National Best Management Practices for Water Quality Management on National Forest System Lands* (USFS 2012a) and Forest Service soil and water conservation practices. Measures that would be used specifically during Phase I are also summarized below and described in detail in Section 3.0, and for evaluation adit pipeline construction, Appendix J of the Rock Creek Evaluation Adit License Application (RCR 2010).

2.7.1 Fugitive Dust Control

RCR would develop and implement a Fugitive Dust Control Plan that would include, at a minimum, specific elements described in the final Air Quality Permit (Appendix C; DEQ 2014a) and in Table 5-4 of the MAQP Application for the Rock Creek Project (Bison 2014). The Fugitive Dust Control Plan would be submitted to, reviewed, and approved by the KNF and DEQ before construction of the evaluation adit.

2.7.2 Site Grading

Erosion potential would be minimized in accordance with the Rock Creek Evaluation Adit License Application (RCR 2010), implementation of the requirements of the MPDES permits, and implementation of the sediment mitigation plan described in Section 2.10, Monitoring and Mitigation Plans.

2.7.3 Soil-Handling Techniques

To reduce potential erosion, soil-handling techniques would be conducted in accordance with the Rock Creek Evaluation Adit License Application (RCR 2010).

2.7.4 Hydrologic Measures

The following steps would be taken to control runoff and sedimentation:

- Drainage and diversion systems would be constructed at all disturbance sites to control runoff and sedimentation. These systems would include diversion of off-site runoff waters and containment of runoff and sediment from disturbed areas.
- A sediment containment system downstream of disturbed areas would minimize sedimentation in natural drainages in the area.
- Naturally occurring runoff from undisturbed hillsides above the evaluation adit would be diverted around the site.
- All water originating from the evaluation adit site during Phase I operations would be routed to the lined pond at the evaluation adit portal. Excess water from the evaluation adit would be pumped through a pipeline to a wastewater treatment system at the support facilities site.
- Windrows of woody debris or logs would be placed parallel to slope contours below long fill slopes.
- Numerous sediment-control and reduction measures would be utilized for NFS and other roads used to access project components, such as rolling dips, ditches, gravel or rock check dams, culverts, silt fencing, wattles, sediment catch basins, rock riprap, and hydro-seeding.

Measures that would be implemented to control runoff and sedimentation are described in detail in Section 2.10, *Monitoring and Mitigation Plans*, and RCR's MPDES permit MT0031763.

2.7.5 Revegetation Practices

Revegetation practices would be conducted in accordance with the Rock Creek Evaluation Adit License Application (RCR 2010).

2.7.6 Soil and Erosion Control Plan

The Soil and Erosion Control Plan for Phase I is described in detail in Section 3.0 and Appendix J of the Rock Creek Evaluation Adit License Application (RCR 2010). During Phase I, stored soil would be tested before respreading to identify any deficiencies or limitations in soil physical and chemical properties that may be affecting plant growth. Appropriate fertilizer, liming, organic matter, and other amendments would be determined and added as necessary.

For all the proposed pipelines, erosion-control BMPs consisting of installing silt fences across drainages downstream of disturbance areas, using diversion ditches and berms, topsoil stripping and stockpiling, and revegetating those areas would help manage stormwater erosion and minimize sediment movement related to trenching for pipeline burial. Once the reclamation grasses have established, no other permanent BMPs would be necessary, and the silt fence would be removed. Silt fencing would be installed downgradient of any disturbance in the drainageways adjacent to the highway or railroad associated with work pads constructed for horizontal boring of the pipeline.

Erosion monitoring would be conducted at the evaluation adit site, waste rock portal pad, and access roads to identify areas where slumps, rills, gullies, and sheetwash are occurring. Any identified erosion

problems would be immediately corrected. Routine long-term maintenance monitoring would be conducted during spring and fall after heavy storm events.

All reclaimed areas would be inspected regularly for erosion until they become stabilized. Evidence of erosion would be repaired and reseeded.

Revegetated areas would be protected for 2 years, where necessary, from vehicle and livestock use. Wildlife damage control would be attempted. RCR would implement the Weed Management Plan provided in Appendix P of the Rock Creek Evaluation Adit License Application (RCR 2010) and submitted to Sanders County in April 2007. RCR would modify their 2007 Weed Management Plan that addresses all Phase I disturbances and submit it to the KNF and DEQ during final design for their approval and for subsequent approval by the Sanders County Weed Control District. These measures would be applied to all Phase I permit areas. No post-operational treatments (except nitrogen fertilizer, if appropriate) would be implemented other than normal forest practices.

2.8 Employment

Development of the evaluation adit would take about 18 to 24 months. The increased length of the evaluation adit would require more time for its construction than the evaluation adit in the other alternatives.

Work on the evaluation adit would start with 16 RCR employees in the first quarter (RCR 2010) and increase to a maximum of 80 workers (USFS 2013a). Phase I would include an additional 4 employees associated with wildlife work (USFS 2013a).

2.9 Adit Closure and Reclamation

If RCR did not pursue Phase II activities (mining) after completing Phase I, excavated material stockpiled at the evaluation adit site would be backfilled in the evaluation adit, and the portal area and the patio surface reclaimed in accordance with the Rock Creek Evaluation Adit License Application (RCR 2010).

RCR would be required to submit an updated detailed reclamation plan for all Phase I facilities that would be submitted for KNF and DEQ review and approval before adit construction. Short-term reclamation objectives are to stabilize disturbed areas and prevent air and water pollution. The long-term reclamation objective is to establish a post-operational environment compatible with existing land uses and consistent with the 2015 KFP. Specific reclamation objectives include:

- Permanent protection for air, surface water, and groundwater resources
- Protection of public health and safety by removing potential hazards
- Maintenance of public access through the Rock Creek study area
- Restoration of wildlife habitat
- Design of a land configuration compatible with the watershed
- Reestablishment of an aesthetic environment allowing for visual quality and recreational opportunities
- Reestablishment of post-operation biological resources suitable for supporting vegetative cover appropriate to the area

To accomplish these objectives in Phase I Alternative V, RCR would reclaim all disturbed areas by recontouring and redistributing soil, and revegetating. Specific measures are described below.

If after 5 years from initiating construction of the evaluation adit the remaining Alternative V activities have not proceeded, the KNF would consult with RCR, DEQ, FWP, EPA, USFWS, tribal representatives, and other interested agencies on interim or final reclamation plans to be implemented as outlined below, and the timeframes for implementation.

If subsequent phases were not authorized and implemented, RCR would reclaim all project-related facilities in accordance with DEQ permits and approvals. Any existing monitoring well installed by RCR on NFS lands or its predecessors would be removed and plugged according to ARM 36.21.810. The well casing would be removed below the ground surface, and the well covers removed and disposed of off-site. The small area associated with the monitoring well would be regraded to blend with the natural surroundings. The area would be ripped if appropriate, and soil would be placed consistent with the general soils placement plans. All other monitoring equipment, such as electronic data collection devices, would be removed.

2.9.1 Post-Mining Topography

Post-mining topography for Phase I is described in detail in Section 3.0 of the Rock Creek Evaluation Adit License Application (RCR 2010). The portal patio would be backsloped at 2 percent with the fill slope remaining at the angle of repose. The edges of the fill slope face would be graded to blend with the surrounding topography. If necessary to meet visual quality objectives, waste rock surfaces that remained exposed after reclamation would be treated with oxidizing compounds to blend them with adjacent talus (Reynolds 1995). The ephemeral unnamed tributary of West Fork Rock Creek located along the east end of the portal patio would be maintained to connect drainage areas above and below the portal patio. If after consideration of the information collected during Phase I it is decided that the mine would not proceed, the ore stockpile would be backfilled into the adit.

2.9.2 Post-Mining Solid Waste Disposal and Adit Closure

Evaluation adit support facilities structures, other than buildings, would be removed. It is estimated that the support facilities would be used through exploration and the first 3 to 4 years of mine construction and operation assuming the project proceeds to Phase II. This site would either be recontoured to approximate original contours or be developed for facilities associated with the operation of the paste tailings facility. Buildings at the evaluation adit support facility on private land would remain and would be used as needed. Monitoring wells would be plugged and abandoned according to ARM 36.21.810 once monitoring was no longer required. The well casing would be removed below the ground surface and the well covers removed and disposed of off-site. The area associated with the monitoring well would be regraded to blend with the natural surroundings. Once the pipeline was no longer needed, it would be abandoned and reclaimed by removing all surface expressions (e.g., pipe, pipe connections, air release valves, and manholes) and plugging all buried open pipe ends by filling with concrete or a bentonite-cement slurry.

All wastes generated as part of closure and reclamation activities would be removed and disposed of at a disposal facility authorized by the county solid waste district or recycled.

2.9.3 Vegetation Removal and Disposition

Vegetation removal and disposition for Phase I is described in detail in Section 3.0 of the Rock Creek Evaluation Adit License Application (RCR 2010). Disturbance would be minimized during clearing and construction activities. Commercial timber would be harvested and removed in accordance with Forest Service timber removal requirements. Noncommercial timber and slash from timber-clearing operations would be salvaged for use in soil protection, physical barriers and catchments, mulch, or as an additive to stored topsoil. The remainder would be removed, burned, or chipped and stockpiled for later use. Storage

sites would be carefully selected to prevent off-site impacts from the production of low-quality organic acids as the materials decay.

2.9.4 Soil Salvage and Handling Plan

Soil salvage and handling for Phase I is described in detail in Section 3.0 of the Rock Creek Evaluation Adit License Application (RCR 2010). The suitability of soils proposed for reclamation was determined from physical and chemical data collected during the baseline soil survey. Soil salvage quantities are limited by slope, shallow depth to bedrock, and exposed bedrock at the adit site. Slopes greater than 50 percent are considered unsafe for conventional salvaging techniques. Due to a shortage of cover soil, soils containing coarse fragments in excess of 50 percent by volume would be salvaged for use in reclamation.

Soils would be salvaged from 9.07 acres at the evaluation adit site in two lifts, where soil is available and accessible, except for 0.31 acre that would be salvaged in a single lift due to a lack of suitable subsoil. The soil would be stockpiled northwest of the evaluation adit (Figure 2-4). First-lift and second-lift soils would be stored in separate stockpiles at both the adit and support facility sites. Piles would be signed. Stockpiles would be constructed with 2.5h:1v side slopes and 3h:1v ramps. The estimated life of each stockpile is the life of the adit. Soils would be stockpiled and signed separately according to erodibility to facilitate replacement of appropriate soils according to reclaimed slopes. Direct haul of topsoil would be maximized to the extent practical to retain soil structure and allow for germination of existing seeds.

Before soil redistribution, compacted areas (especially the portal patio, roads, and parking at the support facilities area) would be ripped to relieve compaction. Soil materials would be applied in lifts as thick as possible to decrease compaction. Reapplied soils would be tilled to break up the soil mass to improve water and air movement. Fifteen inches of second-lift soil followed by 5 inches of first-lift soil would be evenly spread over the 4.9-acre flat portal patio and 2.4 acres of the portal pad slope area. About 1.8 acres on the portal patio slope face would be left as talus to achieve a more natural appearance. To protect slopes from erosion, rocky soils would be used on slopes greater than 8 percent. Soil replacement at the evaluation adit support facility site would average 24 inches on areas to be resoiled.

Soil redistribution at the support facility site would occur on 1.0 acre of the site (water treatment system); the remaining area (buildings to be retained and the associated parking lot) would not require reclamation. Soil redistribution depth on the 1.0 acre of the support facility that would be resoiled and reclaimed would be a minimum of 24 inches. The infiltration ponds would disturb 1.0 acre and would be backfilled, regraded to original topography, covered with 24 inches of cover soil, and revegetated with a native grass/forb mix.

2.9.5 Revegetation

Revegetation for Phase I is described in detail in Section 3.0 of the Rock Creek Evaluation Adit License Application (RCR 2010). Revegetation would be conducted at the adit site, the adit access road from the Chicago Peak Road, and the support facilities area not retained for future use. The revegetation mixture presented in Table 10 of the Rock Creek Evaluation Adit License Application (RCR 2010) would be used to permanently revegetate the adit site and access road. The mixtures are based on agency recommendations described in the 2001 FEIS and include native species present in preoperation vegetation types as well as species typically used to reclaim sites in similar settings. Forest supervisor direction (Savage 2014) requires use of local native seed from the Forest Service Coeur d'Alene Nursery or the Kootenai Seed Mix (defined in Savage 2014). The use of palatable grasses and forbs has been emphasized to facilitate use by wildlife. Native shrubs and tree stock are included in the mixture. Trees and shrubs would be grown from locally collected seed inoculated with appropriate mycorrhiza.

Species and seeding/planting rates may be modified as needed per agency approval. Locally collected seed would be used whenever possible. Seeding would be conducted immediately following construction to maximize plant establishment and minimize erosion, weed invasion, and visual impacts. Interim seeding would use grass and forb species suited for quick stabilization.

Seedbed preparation would be conducted immediately after grading, soiling, and, if used, fertilizer application. On slopes less than 33 percent, the seedbed would be disced and harrowed along the contour to break up large clods. On slopes exceeding 33 percent, on sites too narrow to negotiate equipment, or on sites where organic debris has been respread, the soil surface would be left in a roughened condition. Seed and mulch would be applied to fresh road cuts and fills as soon after construction as possible to ensure coverage by natural sloughing.

Permanent revegetation would be coordinated with other reclamation activities to occur as soon as possible after seedbed preparation. Fall seeding is recommended, based on local soil moisture conditions and germination requirements of selected species; however, permanent seeding would be conducted as soon as areas were ready for revegetation and access was possible (the permanent mixture includes annual rye and a sterile hybrid grain to promote rapid initial establishment). Interim revegetation of topsoil stockpiles, sediment-control structures, and cut-and-fill slopes of temporary roads would occur immediately following construction, using 10 pounds of annual rye. Disturbances would be broadcast seeded or hydroseeded due to rockiness, steepness of slope, and the relatively small acreage associated with the evaluation adit and associated roads.

Trees and shrubs would be hand-planted on the adit site, on portions of road cuts and fills, and on all slopes exceeding 30 percent except the adit portal pad slope where a portion of the slope would be left as talus. Based on the ultimate tree stocking goal for 30 to 50 years after planting of 150 trees per acre, and assuming a 30 percent mortality rate, 240 trees per acre would be planted. Planting patterns would not be uniform; rather, planting would be conducted to mimic natural patterns on adjacent undisturbed ground. Netting would be used to protect trees and shrubs from wildlife browsing.

RCR would implement the Weed Management Plan provided in Appendix P of the Rock Creek Evaluation Adit License Application (RCR 2010) and submitted to Sanders County in April 2007. RCR would modify their 2007 Weed Management Plan that addresses all Phase I disturbances and submit it to the KNF and DEQ during final design for their approval and for subsequent approval by the Sanders County Weed Control District. These measures would be applied to all Phase I permit areas. RCR would coordinate with the Sanders County Weed Board and the KNF to determine the types of weed-control measures to be used and the implementation schedule.

2.9.6 Soils and Erosion Control Plan

Erosion and sediment control measures, including the Phase I Soil and Erosion Control Plan, are summarized above in Section 2.7, *Erosion and Sediment Control*, and described in detail in Section 3.0 and Appendix J of the Rock Creek Evaluation Adit License Application (RCR 2010).

2.9.7 Pipeline Corridor Reclamation

Pipeline corridor reclamation for Phase I is described in detail in Section 3.0 and Appendix J of the Rock Creek Evaluation Adit License Application (RCR 2010). The temporary adit water discharge pipeline from the portal patio to the water treatment system would be buried under access roads and would cross Rock Creek in two locations, where it would be bored under stream channels, attached to existing bridge structures, or placed on trestles above the stream. The pipeline trench area would be seeded with both fast-growing temporary grasses and slower-growing permanent grasses in accordance with RCR's Exploration License as approved by DEQ and the Forest Service. Once the pipeline was no longer

needed, it would be abandoned and reclaimed by removing all surface expressions (e.g., pipe, pipe connections, air release valves, and manholes) and plugging all buried open pipe ends by filling with concrete or a bentonite-cement slurry. The pipeline from the water treatment system to the infiltration ponds would be plugged with concrete at both ends and left buried in place.

2.10 Monitoring and Mitigation Plans

Mitigation plans for the Rock Creek Project are briefly described below. Monitoring measures are described in Attachment 3 and are not discussed in this section.

Sediment Mitigation. RCR would mitigate for unavoidable fine sediment impacts on Rock Creek resulting from construction of facilities and changes in the road system. The Sediment Mitigation Plan was developed to address predicted impacts for all phases of the entire mine project. Sediment and runoff from all disturbed areas would be minimized using BMPs developed in accordance with the Forest Service's *National Best Management Practices for Water Quality Management on National Forest System Lands* (USFS 2012a).

Methods used to estimate the amount of sediment reduction needed to mitigate the effects of Phase I (234 tons) are described in Appendix N of the Final SEIS and KNF 2018. RCR would be required to demonstrate that the estimated average reduction of 234 tons in sediment delivery remained effective until final stabilization of disturbances had occurred and the DEQ terminated MPDES permit MT0031763.

For Phase I, sediment mitigation measures would be implemented at 19 sites on NFS roads #150 and #2741 (Figure 2-19). To quantify sediment reduction from Phase I mitigation, existing sediment to Rock Creek and reduction in sediment load from implementation of mitigation measures were modeled.

Mitigation measures would include:

- Installing water diversion structures (e.g., rolling dips, open tops, or rubber flaps)
- Implementing sediment delivery mitigation in the form of slash filter windrows or settling basins installed at the outfall of each newly constructed water diversion structure
- Installing two new culverts on the Chicago Peak Road (NFS road #2741) at current stream ford locations
- Applying new 4- to 6-inch gravel surface to road segments between the new diversion structures and stream crossings
- Installing ditch relief culverts or cross drains to alleviate excess road drainage to streams

At seven sites (sites 17, 18, 31, 59, 62, 66, and 67 in Table 2-8), additional BMPs would be required and could include:

- Installing erosion-control fabric and rock-lined ditches
- Hydromulching disturbed ground to ensure quick revegetation

Table 2-8 provides the modeled sediment deliveries for the 19 sediment mitigation sites. Implementation of sediment mitigation would reduce the current sediment delivery by about 234 tons per year, which would be more than required to mitigate Phase I effects. Data collected at the sites shown in Table 2-8 would be used to help determine road improvements and other measures required to mitigate for Phase II effects. After the road improvements were completed, sediment levels at the mitigation sites would be remeasured and the estimated reduction in sediment from the improvement work reevaluated. In some instances, road BMPs and in-stream sediment monitoring (streambed core sampling) would also be used to monitor the implementation and effectiveness of the sediment mitigation program.

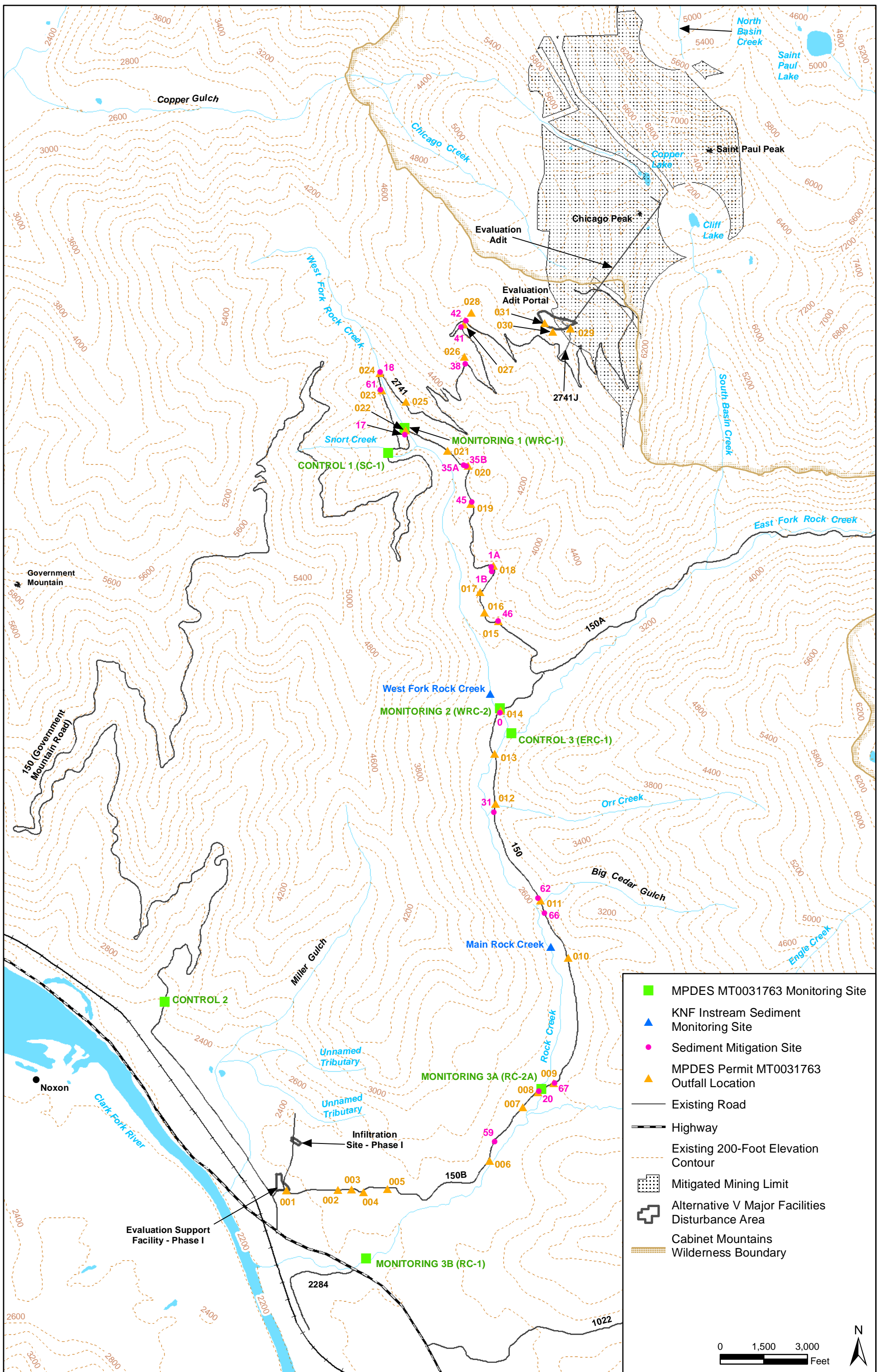


Figure 2-19. Phase I Sediment Mitigation and Monitoring Sites and MPDES Permit MT0031763 Outfalls

Table 2-8. Summary of Modeled Sediment Delivery at Proposed Mitigation Sites, Phase I Rock Creek Project.

Sediment Mitigation Site	Sub-watershed	NFS Road Number	Associated MPDES Permit MT0031763 Outfall	Mitigation Activity	Modeled Existing Sediment Delivered to Streams from Roads (tons/year)	Modeled Sediment Delivered to Streams from Roads with Mitigation ¹ (tons/year)
0	WFRC	150	014	Road BMPs	0.02	0.01
1A	WFRC	150	018	Road BMPs	32.36	10.55
1B	WFRC	150	018	Road BMPs	0.90	0.58
17	WFRC	150	022	Road BMPs	2.92	1.75
18	WFRC	2741	024	Road BMPs	1.74	1.04
35A	WFRC	150	020	Road BMPs	67.28	11.20
35B	WFRC	150	020	Road BMPs	6.61	3.85
38	WFRC	2741	026	Road BMPs	11.12	7.99
41	WFRC	2741	027	Road BMPs and New Culvert	9.1	7.81
42	WFRC	2741	028	Road BMPs and New Culvert	56.11	15.53
45	WFRC	150	019	Road BMPs	99.71	14.42
46	WFRC	150	015	Road BMPs	26.53	10.51
61	WFRC	2741	023	Road BMPs	2.54	1.72
20	Lower RC	150	008	Road BMPs and Boring Under Stream	0.38	0.10
31	Lower RC	150	012	Road BMPs	0.53	0.32
59	Lower RC	150	006	Road BMPs	0.26	0.15
62	Lower RC	150	011	Road BMPs	0.07	0.04
66	Lower RC	150	011	Road BMPs	1.85	1.11
67	Lower RC	150	008	Road BMPs	7.35	4.41
Total Sediment Delivery					327.38	93.09
Change in Sediment Delivery from Existing Conditions						-234.29

WFRC = West Fork Rock Creek; Lower RC = Lower Rock Creek excluding West Fork Rock Creek and East Fork Rock Creek. Modeled existing sediment delivered based on Traffic Factor of 5.0 (Light Truck); modeled sediment delivery from project based on a Traffic Factor increase to 27.5 (Light-Heavy Truck) on segments of NFS road #150 and NFS road #2741.

Table adapted from Table N-2, Appendix N of the Rock Creek Evaluation Adit License Application. Assumptions regarding existing and predicted sediment delivery are described in Appendix N (RCR 2010). Column “Modeled Existing Sediment Delivered to Streams from Roads (tons/year)” corresponds to Table N-2 column “Existing Load Total.” Column “Modeled Sediment Delivered to Streams from Roads with Mitigation (tons/year)” corresponds to Table N-2 column “Water Bar Upgrades, Widening at 38, 4-6” Gravel and Delivery Mitigation.”

¹Phase I sediment mitigation at sites on sections of NFS road #150 and NFS road #2741 to be used for mine-related travel includes water bar upgrades where existing conditions do not meet BMP guidelines, water diversion structures, ditch relief culverts, slash filter windrows, or settling basins at the outfall of each water diversion structure; 4 to 6 inches of gravel surface applied between new diversion structures and stream crossings; and two new culverts on NFS road #2741 at the current stream ford locations. At sites 17, 18, 31, 59, 62, 66, and 67, additional BMPs would be implemented to reduce the sediment delivery predicted by the Washington model. The values shown for sediment delivery at these seven sites in column 7 are based on the assumption that additional BMPs (ditch relief culverts, erosion-control fabric and rock-lined ditches, and hydromulching disturbed ground to ensure quick revegetation) would be implemented, and that these BMPs would reduce sediment delivery by 40 percent.

Wildlife Mitigation Plans. The Fish and Wildlife Mitigation Plan was developed to minimize or mitigate the effects of the evaluation adit. Phase I wildlife mitigation is described in Appendix K of RCR’s Rock

Creek Evaluation Adit License Application (RCR 2010). Mitigation measures for aquatics and fisheries are described separately in a later subsection.

Phase I mitigation measures include:

- Conspicuously posting all applicable federal and state hunting, fishing, trapping, and recreation regulations; and meeting with appropriate regulatory agencies (e.g., FWP and the KNF) to discuss regulations to be posted, locations of signs, and any special regulations pertinent to adjacent lands
- Developing and enforcing wildlife policy to prohibit carrying firearms in RCR vehicles, hunting within RCR property by employees or the public, and unauthorized off-road vehicle use in the Rock Creek Project study area, and discouraging wildlife harassment and littering
- Minimizing vehicular disturbance by dust suppression, speed limit enforcement, and encouragement of carpooling
- Cooperating with appropriate agencies regarding trespass, game violations, and other wildlife problems
- Maintaining access to public lands adjoining the Rock Creek Project study area

Mitigation measures to prevent or minimize disturbance to harlequin ducks during the breeding season (April 1 to July 31) include relocating the evaluation adit support facility to a lower elevation away from harlequin duck habitat, attaching screening to bridges to provide visual screening of the road, busing employees from a parking lot at the support facilities near the junction of Montana Highway 200 and NFS Road #150 to the evaluation adit site, monitoring harlequin ducks on four main tributaries of the lower Clark Fork River where there are known breeding sites (Rock Creek, Marten Creek, Swamp Creek, and Vermillion River), and monitoring water quality parameters that would be appropriate for evaluating impacts on harlequin ducks (Attachment 3).

Mitigation for several species would be accomplished concurrently with grizzly bear mitigation. Although securing private land through habitat acquisition would not create any additional habitat, it would improve habitat where road access changes occurred and would secure the sites from almost inevitable habitat alteration as a result of regional increases in human development unrelated to the Rock Creek Project. Acquired parcels would be managed for grizzly bear use in perpetuity and could improve or contribute suitable habitat for other species if the acquired parcels provided appropriate habitat characteristics and could be managed to improve habitat. Removal of carcasses killed by vehicles from roadsides would reduce mortality risks to carrion eaters other than grizzly bears.

Other mitigations would include funding for FWP law enforcement personnel to protect mountain goats and other wildlife species, and development and implementation of informational and educational programs for the public about wildlife species. This mitigation would be accomplished with the positions required under the Threatened and Endangered Species Mitigation Plan discussed below.

Terrestrial Threatened and Endangered Species Mitigation Plan. The Alternative V mitigation plan for terrestrial threatened and endangered (T&E) species consists of the Terrestrial Threatened and Endangered Species Mitigation Plan in Appendix B of the 2006 BO (see Appendix E of the SEIS), plus the Terms and Conditions in the 2006 BO. The mitigation plan requires, before Phase I, that the KNF form and lead a grizzly bear Oversight Committee, which would develop a Comprehensive Grizzly Bear Management Plan. The Oversight Committee would oversee implementation of all mitigation requirements, and collect and review new information on grizzly bears and other information relevant to Cabinet-Yaak Ecosystem (CYE) grizzly bears over the life of the mine. The final mitigation plan must be approved by the KNF and DEQ before construction of the evaluation adit, and several components of the

plan would be implemented before or during evaluation adit construction. The USFWS would advise the KNF in developing the Terrestrial Threatened, Endangered, and Proposed Species Monitoring Plan described in Attachment 3. Key elements of the Alternative V Terrestrial T&E Species Mitigation Plan are described below.

To reduce mortality risk to T&E species, RCR would:

- Develop a RMP (called a transportation plan in the mitigation plan attached to the 2006 BO), which would describe how the amount of mine-related traffic on Rock Creek Project roads, total traffic on major public roads in the Rock Creek study area, and, as described in the 2006 BO, the effectiveness of road closures would be monitored. The RMP would be based on the Transportation and Monitoring Plan developed for the Rock Creek Evaluation Adit License Application and would be in place before Phase I.
- Within 3 years of the Phase I ROD effective date, RCR would submit a recreational use plan to the KNF for approval to monitor use of the Rock Lake and St. Paul trails and to assure use levels do not exceed "high use" as defined by the Interagency Grizzly Bear Committee.
- Prohibit the use of road salt in the winter. This would reduce big game mortality that could draw bald eagles, wolves, and grizzly bears (in spring) to the road corridor and increase mortality.
- Remove road-killed animals daily from road rights-of-way within the evaluation adit permit area and along roads used for access or hauling ore. Road kills would be moved at least 50 feet beyond the right-of-way clearing and further, if necessary, to be out of sight from the road.
- Monitor the number of big game animals killed by vehicle collisions. The need for monitoring would be reevaluated after 5 years of operation.
- Monitor and report (within 24 hours) all grizzly bear, lynx, wolf, and black bear mortalities within the permit area described in Appendix A of the 2006 BO.
- Before the start of Phase I, fund a FWP grizzly bear management specialist for 5 years in the lower Clark Fork River Valley for the life of the mine that would focus on providing public information and education and a program for grizzly bear conservation. Proponents of future projects that may have adverse effects on the grizzly bear in the CYE could be required to contribute funding for this position, potentially changing the proportional funding required from RCR. RCR has provided \$468,603 to FWP toward funding of the grizzly bear management specialist.
- Before Phase I, fund a FWP law enforcement position for 5 years in the lower Clark Fork River Valley. Proponents of future projects that may have adverse effects on the grizzly bear in the CYE could be required to contribute funding for this position, potentially changing the proportional funding required from RCR.
- In coordination with the KNF and FWP, before Phase I, fund and conduct an enhanced outreach and education program to build support and understanding for the conservation of the CYE grizzly bear population. This would involve educational materials, public service announcements, newspaper ads, and billboards supporting grizzly bear conservation. The program could include installing signs at entrance roads to all grizzly bear habitats in the KNF, implementing education programs for schools and civic clubs, and offering a reward leading to arrest and conviction of people illegally killing grizzly bears in the CYE.
- Use bear-resistant containers to hold attractants at all Rock Creek Mine facilities and remove contents in a timely manner.

- Coordinate with bear specialists and provide funding for bear-resistant garbage containers for personal use by all mine employees associated with Phase I who live in or near grizzly bear habitat.
- Fund the acquisition of bear-resistant garbage containers to be placed in all developed campgrounds within Bear Management Units (BMUs) 1, 2, 3, 4, 5, 6, 7, 8, and 9 (pack in/pack out sites would not require garbage containers).
- Provide funding for and work with the USFWS and Sanders County to make the Noxon Rock Creek garbage collection site bear-resistant before the start of evaluation adit construction.
- Avoid the use of clovers or other plants attractive to black or grizzly bears in the seed mix used on open roads or any facility associated with the Rock Creek Mine (except as rehabilitation on closed roads or mitigation habitat where attracting bears would be encouraged).
- Prohibit on-duty employees from carrying firearms within the permit area described in Appendix A of the 2006 BO, except for security officers and other designated personnel.
- Prohibit employees from feeding wildlife within the permit area described in Appendix A of the 2006 BO to avoid attracting bears or other wildlife into conflicts with people and encouraging habituation.
- Require employees to attend regular training related to living and working in grizzly bear habitat before starting work and on an annual basis thereafter.

To mitigate for displacement due to disturbance (referred to as habitat effectiveness in the 2006 BO) of T&E species and address habitat constriction, before evaluation adit construction, RCR would acquire perpetual conservation easements or purchase replacement grizzly bear habitat (153 acres). Of this replacement habitat, 100 acres would enhance the north-to-south habitat corridor in the Cabinet Mountains. Details of the process for transferring these lands to the Forest Service are described in the mitigation plan in the 2006 BO. RCR has acquired 928 acres of grizzly bear habitat to be conveyed to the Forest Service or placed in a permanent conservation easement. Before transferring fee title or conservation easement on lands acquired for grizzly bear mitigation to the KNF, RCR would complete road access changes, where appropriate.

Where possible, replacement habitat would be improved through road access changes or other measures. The KNF would ensure that road or trail closures on mitigation lands that would reduce open motorized route density (OMRD) or total motorized route density (TMRD) or increase core areas would be in place within 3 years of acquisition or easement. As stipulated in the 2006 BO, at a minimum, upon acquisition or easement, where legally allowed the KNF would determine whether it would immediately close access routes temporarily to reduce OMRD. Final access route planning processes would then be conducted.

To reduce mortality risk, mitigate for displacement due to disturbance (referred to as habitat effectiveness in the 2006 BO), reduce incidental take, and avoid jeopardy for T&E species, RCR would prepare a recreation use plan within 3 years of the Phase I ROD effective date and comply with the food storage order for BMUs 4, 5, and 6 before starting the evaluation adit.

Finally, the 2006 BO requires augmentation of at least six female grizzly bears into the Cabinet Mountains and monitoring of these bears (USFWS 2006) (all six females have been augmented to date).

RCR would be required to finalize a monitoring plan to determine the effectiveness of the various mitigations on grizzly bears and their habitat. Monitoring measures are described in Attachment 3.

RCR would establish a trust fund or post a bond, before the evaluation adit construction, to cover the mitigation plan implementation costs. The amount in the fund or posted in a bond would be commensurate with projected work and associated mitigation items. See the revised mitigation plan in the 2006 BO for more detail.

In 2006, RCR and FWP established a collection agreement for RCR to fund the two FWP positions described above. In 2009, the Forest Service, FWP, and DEQ (Oversight Committee) entered into an agreement to work cooperatively to fulfill the requirements of the Terrestrial Threatened and Endangered Species Mitigation Plan, including the development of a Comprehensive Grizzly Bear Management Plan (USFS et al. 2009). The MOU establishes the roles and responsibilities of all participants and outlines their commitments. The Oversight Committee would specify when all components of the plan would be finalized and implemented as required by the Reasonable and Prudent Measures and Terms and Conditions in the 2006 BO for grizzly bears. The Oversight Committee would also set timelines for development of access management plans, describe the process for approving mitigation land, specify the wording for conservation easements, provide the framework for any proposed land exchanges related to mitigation acres, and outline job descriptions and work tasks for the three FWP positions.

Aquatics and Fisheries Mitigation Plan (Including Bull Trout). The Aquatics and Fisheries Mitigation Plan was prepared and would be implemented in cooperation with FWP, USFWS, KNF, and DEQ and would comply with the Terms and Conditions of the 2017 revised BO for bull trout (Appendix E) and any subsequent BO Supplement provided by the USFWS. The effects of sediment delivery on aquatic resources and fisheries would be mitigated through implementation of the Sediment Mitigation Plan described above. Spill prevention measures for Phase I are provided in Appendix R, *Spill Plan*, of the Rock Creek Evaluation Adit License Application (RCR 2010). A Pipeline Spill Monitoring, Maintenance, and Repair Plan is described in Attachment 3.

Term and Conditions 1, 2, and 3a of the 2017 revised BO (Appendix E) require RCR to conduct watershed assessments in affected watersheds to better define bull trout populations and habitat conditions. Before Phase I, RCR would be required to conduct a watershed assessment of Rock Creek that characterizes the bull trout population, nonnative trout distribution, habitat conditions, and sediment sources.

RCR would be required to implement a stream habitat enhancement program to improve the ability of bull trout to move throughout the year in Rock Creek and increase habitat availability and diversity for migratory and resident bull trout populations. Whenever possible, these mitigations would be coordinated with work being done by Avista or the local watershed council to avoid duplication of efforts. RCR would improve or replace the existing culvert on West Fork Rock Creek above the last bridge on NFS road #150, which has been identified as a barrier to fish migration as determined in consultation with the Forest Service.

A sediment source reduction plan would be required to reduce sediment in spawning gravels. The Sediment Mitigation Plan described above provides a detailed sediment source reduction plan for Phase I activities. The Sediment Source Reduction Plan would incorporate the BMPs described under Section 2.9.6, *Soils and Erosion Control Plan*, above. The plan also would include measures to improve in-stream sediment transport such that streambed scouring and sediment storage would be enhanced. This strategy also would result in the development of pools and stable riffles, thereby increasing habitats for fish and macroinvertebrates as required under the habitat enhancement plan described above. RCR would be responsible for:

- Identifying sediment sources within the Rock Creek watershed such as culverts, road impacts, bridges, past bank stabilization efforts, and utility right-of-way impacts (one specific site, an

eroding cutbank where Engle Creek joins Rock Creek, could be included for mitigation), focusing initially on NFS lands, then lands within the drainage acquired to mitigate impacts on grizzly bears, and then other privately owned lands.

- Developing a plan, based on modeled sediment reduction from mitigation measures, to reduce sediment levels in Rock Creek by 234 tons in the Rock Creek drainage, upstream of spawning areas, and during or before mine construction. A sediment monitoring program would be implemented throughout Phase I to ensure the sediment reduction mitigations are effective in improving stream conditions (see Appendix K of the Rock Creek Evaluation Adit License Application). If the KNF and DEQ determined, and the USFWS agreed, that the sediment reduction mitigations did not substantially reduce sediment delivery in Rock Creek, RCR would be required to submit an assessment of other measures that could be implemented in the Rock Creek drainage for KNF, DEQ, and USFWS approval.
- Installing sediment catchment basins in road ditches in areas where fine sediments could be transported to streams from application of sand during winter.
- Working with the KNF to complete a road systems analysis to define existing and future road uses and closures.

Mitigation would include funding for personnel (the law enforcement personnel mentioned under the Wildlife Mitigation Plan and the Terrestrial Threatened and Endangered Species Mitigation Plan above) to protect bull and westslope cutthroat trout through enforcing the law and informing and educating the public. Angling pressure in Rock Creek and its tributaries would likely increase due to improved access and increased use. Bull trout harvest is not allowed, but the fish is often misidentified by the public. Westslope cutthroat trout are highly susceptible to angling; therefore, harvest rate information and protection are needed.

Prior to evaluation adit construction, RCR would submit an assessment of risk of road failure for Phase I activities to the KNF and USFWS for approval. The assessment would identify areas that pose the greatest risk to bull trout and make recommendations for additional measures and responses to minimize risk. To reduce the risk of vehicles and their contents from reaching Rock Creek in the event of an accident, barriers would be installed at the two new reconstructed bridges on Rock Creek and the culvert on West Fork Rock Creek, as described in Appendix L of the Rock Creek Evaluation Adit License Application (RCR 2010).

A conceptual monitoring plan found in Attachment 3 addresses all monitoring items required by the Terms and Conditions of the 2017 revised BO (Attachment 7). Aquatic and fisheries monitoring would be coordinated with water quality and streamflow monitoring. RCR would monitor metals accumulations in fish tissues and sediments, increases in sediment loads, and water quality (including temperature). RCR would need to identify additional monitoring sites. Monitoring of sediment sources during Phase I construction would be conducted under the Reclamation Monitoring Plan found in Attachment 3.

To ensure early detection of any surface water reductions potentially caused by Phase I activities, there would be periodic monitoring of springs, streams, and the mouth of Rock Creek seeps as specified in the Phase I Groundwater Dependent Ecosystem Inventory and Monitoring Plan in Attachment 3.

RCR's reporting requirements are described in Appendix K of the Rock Creek Evaluation Adit License Application and in the 2017 revised BO, and include submitting an annual aquatic monitoring report that contained summaries of all aquatic monitoring data collected during the previous year to the KNF, DEQ, and USFWS. The KNF would also be required to submit to the USFWS annual reports of the mining year

activities as well as the activities anticipated for the next year and an annual report of bull trout taken, if any, as well as any relevant data, and summaries of all INFS compliance monitoring conducted for the Rock Creek Project.

2.11 Forest Plan Amendment

Alternative V would require a project-specific amendment to the 2015 KFP to allow a variance suspending the requirement for full consistency with forestwide guideline FW-GDL-WL-09 related to avoiding native ungulate winter range areas during the critical mid-winter period to be consistent with the plan (KNF 2015a). Because it would not be practicable to avoid or minimize construction and operation activities during January and February, the project-specific variance would allow the mine to operate yearlong in elk, mule deer, and white-tailed deer winter range.

The amendment would be completed in accordance with the regulations governing forest plan amendments found in 36 CFR 219 and Forest Service Manual 1921.03. The analysis disclosed in the SEIS satisfies the requirements for an evaluation for the amendment.

Attachment 2 - Approved Stipulations/Mitigation Measures and Other Requirements

Attachment 2 - Stipulations/Mitigation Measures and Other Requirements

RCR will proceed with Phase I (Evaluation Adit) of the Rock Creek Project according to the selected Alternative V as described in Attachment 1 of the ROD. The table of approved agency stipulations/mitigations and other requirements summarize the requirements for the Rock Creek Project, which are specified in the following attachments and/or permits:

Requirement	ROD Location
Selected Alternative	Attachment 1
Agencies' Conceptual Monitoring Plans (Final SEIS Appendix K)	Attachment 3
KNF's Terrestrial Threatened and Endangered Species Mitigation Plan	Attachment 5
KNF's Mitigation Plan for Bull Trout and Bull Trout Critical Habitat	Attachment 1, Section 2.10
USFWS Terms and Conditions in the Biological Opinion for Grizzly Bear	Attachment 6
USFWS Terms and Conditions in the revised Biological Opinion for Bull Trout and Bull Trout Critical Habitat	Attachment 7
Requirements of other permits (e.g. MPDES permit, air quality permit, 404 permit, 401 certification)	In project record

The stipulations/mitigations and other requirements table includes some requirements of other permits or authorizations under the authority of other agencies; these requirements are indicated as "Requirements of other Agencies". Actions that will be carried out before the evaluation adit intercepts bedrock groundwater are indicated by "prior to evaluation adit dewatering".

For citation purposes, each line item (stipulation, mitigation, or other requirement) in the table is assigned a unique number (first column on the left). The ROD reference (third column), and resource affected (fourth column) are also identified in the table.

The KNF's authority to impose mitigation measures and monitoring requirements as part of an approved Plan of Operations for Phase I of the Rock Creek Project are limited to activities that affect surface resources on National Forest System lands. KNF's approval of the amended Plan of Operations for Phase I requires that RCR obtain all necessary Clean Water Act permits prior to implementing Phase I.

Number	Stipulation/Mitigation Measure or Other Requirement	ROD Reference	Resource
1	Prior to evaluation adit dewatering*, RCR will submit an amended Plan of Operations for Phase I, including a monitoring plan consistent with Attachment 3, to KNF for review and approval.	Section 1.4.1.1; Attachment 3	General Permit Requirements
2	<p>Prior to evaluation adit dewatering*, RCR will submit all reclamation, grading, and revegetation plans for all Phase I-related facilities not already covered in the Phase I Reclamation Plan described in the Rock Creek Evaluation Adit License Application to the KNF and DEQ for review and final approval prior to construction of the evaluation adit, as described in Attachment 1. The plans shall also include the following items:</p> <p>a) RCR will regrade the evaluation adit waste rock dump and portal areas to eliminate benches and create a more natural landform.</p> <p>b) The plan will also address reclamation of Phase I stormwater control structures, soil stockpile sites, and access roads.</p> <p>c) When the Phase I pipelines are no longer needed, they will be removed for a distance of 15 to 20 feet from stream crossings. The pipes will be completely drained, capped, and sealed; the ends reburied; and the redisturbed section regraded, stabilized (if necessary), and revegetated. The remaining buried segments of pipelines will remain in place.</p>	Section 1.2.2; Attachment 1 – Section 2.9	Reclamation, Vegetation
3	<p>Prior to evaluation adit dewatering*, RCR will develop and submit to the KNF for approval a Phase I Data Evaluation Plan consistent with Attachment 3 to provide the KNF and DEQ with data that could not be obtained prior to construction of the evaluation adit. The Phase I Data Evaluation Plan will summarize the data collection activities and how the data will be used. The Phase I Data Evaluation Plan will consist of three components:</p> <p>a) Implementation of the components of the Geochemistry Characterization and Monitoring Plan pertinent to Phase I.</p> <p>b) Collection of hydrologic data during evaluation adit construction to better define the source of groundwater, hydrogeologic characteristics of the bedrock, and bedrock groundwater quality.</p> <p>Implementation of components of the Rock Mechanics Data Collection and Monitoring Plan pertinent to Phase I.</p>	Section 1.4.1.1; Attachment 3	Geotechnical Engineering, Geochemistry, Water Resources
4	Prior to Phase I, RCR will submit a detailed Explosive Handling and Blasting Plan for KNF and DEQ approval that describes the blasting agents that will be used for various conditions, powder factors used, housekeeping practices, and other relevant information to minimize the potential for elevated nitrate or ammonia concentrations occurring in surface water. If soluble nitrogen compounds in downgradient surface or groundwater exceed the action levels described in the Water Resources Monitoring Plan in Attachment 3, RCR will notify the KNF and DEQ within 5 working days and follow the process outlined in the Water Resources Monitoring Plan in Attachment 2. In the event of action level exceedances, RCR will submit a revised Explosive Handling and Blasting Plan to the KNF and DEQ for approval.	Section 1.4.1.1; Attachment 3	Geochemistry and Geotechnical Engineering
5	Prior to construction of the evaluation adit, RCR will submit for Agency approval an updated mine plan that will take into account the Troy Mine subsidence in its proposal for future pillar designs and highlight how the design accounts for and differs from failed designs at the Troy Mine. The updated plan will consist of a description of the proposed mining method, focusing on preliminary pillar sizing, height-to-width ratio, and drive sizes.	1.4.1.1; Attachment 2 – Section 2.2.2	Geotechnical Engineering

Number	Stipulation/Mitigation Measure or Other Requirement	ROD Reference	Resource
6	The KNF will form and lead a grizzly bear Oversight Committee, which will develop a Comprehensive Grizzly Bear Management Plan consistent with the 2006 BO. The Comprehensive Grizzly Bear Management Plan will include processes to ensure that access management, prevention of habituation, educational opportunities, reporting and monitoring, enforcement of easements, and management of actions are being adequately implemented. RCR, in consultation with the Oversight Committee, will develop and submit to the KNF for review and approval, detailed T&E species mitigation and monitoring plans consistent with the Terrestrial T&E Species Mitigation Plan (Attachment 5) and terms and conditions (Attachment 6) of the 2006 BO and Attachment 3. The final T&E species mitigation and monitoring plans must be approved by the KNF and DEQ before construction of the evaluation adit, and several components of the plan will be implemented before or during evaluation adit construction.	Section 1.4.1.1; Section 1.5.1.6.2, Attachment 3, Attachment 5, Attachment 6	Grizzly Bear
7	RCR will submit a final Phase I Water Resources Monitoring Plan consistent with Attachment 3. The final Phase I Water Resources Monitoring Plan will include, but is not limited to, the following elements: a) Action levels for specific water quality parameters in groundwater at the base of the talus slope below the evaluation adit portal pad and below the Phase I infiltration ponds. b) A contingency action plan for possible scenarios where action levels are reached or exceeded. In conjunction with this the spill contingency plan will be updated and finalized. c) An additional springs and seeps survey be conducted as part of the GDE monitoring program. d) RCR will work with DEQ and KNF to develop an MOA that will describe the process of selecting and funding a third-party contractor in amounts equal to RCR's costs for the required water resources monitoring. All RCR's required water resources monitoring will be accomplished through implementation of this agreement. Before Phase II construction, RCR will submit a plan to the KNF, DEQ, and USFWS for approval to monitor groundwater effects as they relate to bull trout habitat requirements.	Section 1.4.1.2.1, Section 1.5.1.2.5; Attachment 3	Water Resources, Bull Trout
8	RCR will submit to the KNF for approval a Phase I GDE monitoring plan consistent with Attachment 3 that specifies monitoring locations and frequency based on inventory data, the local hydrogeology, and proximity to the Phase I evaluation adit void. The plan's objective will be to effectively detect stress to flora and fauna from effects on surface water or groundwater due to evaluation adit dewatering* so that mitigation can be implemented to minimize such stress. The plan will be incorporated into an overall Water Resources Monitoring Plan and will involve monitoring springs and seeps, groundwater-dependent wetlands, fens, and riparian areas, and streams identified and measured during the Phase I GDE inventory.	Attachment 3	Water Resources
9	RCR will develop an action level and contingency/corrective action plan for water quality will be developed consistent with Attachment 3.	Section 1.4.1.1, Section 1.5.1.1; Attachment 3	Water Resources, Geochemistry

Number	Stipulation/Mitigation Measure or Other Requirement	ROD Reference	Resource
10	RCR will implement the Weed Management Plan provided in Appendix P of the 2010 Rock Creek Evaluation Adit License Application and submitted to Sanders County in April 2007. RCR will modify their 2007 Weed Management Plan that addresses all Phase I disturbances and submit it to the KNF and DEQ during final design for their approval and for subsequent approval by the Sanders County Weed Control District. These measures will be applied to all Phase I permit areas. RCR will submit an annual report to the KNF and DEQ describing weed-control efforts. RCR will implement all weed BMPs identified in Appendix A of the 2012 KNF Invasive Plant Management FEIS (available in the project record) for all weed-control measures. RCR will comply with state and local laws and the KNF's and DEQ's guidelines for all noxious weed-control activities, specifically FSM 2900 Invasive Species Management, Appendix A of the KNF Invasive Plant Management Final EIS, the 2015 KFP, and DEQ's requirement that mine operations have a weed control plan approved by the Sanders County weed control board.	Section 1.5.1.13 and Section 1.5.1.23; Attachment 1 – Section 2.7.5 and Section 2.9.5	Vegetation, Reclamation
11	RCR will develop and implement a Fugitive Dust Control Plan which will be submitted to, reviewed and approved by the KNF and DEQ prior to construction of the evaluation adit. The following procedures will be used to control emissions affecting air quality: a) All unpaved roads will be watered or a dust palliative used as needed to reduce fugitive dust. b) Waste rock, soil, and other dust forming debris will be promptly removed from roads. c) Vehicle speeds will be restricted on haul roads to reduce the amount of fugitive dust. d) Revegetation, mulching, and stabilization of road cut and fill areas will occur in the first appropriate season after construction. e) Revegetation of other disturbed soils will occur in the first appropriate season after disturbance. f) Vehicular traffic will be restricted to established roads. g) The area of land disturbance will be minimized. h) Proper maintenance will be performed to minimize gaseous emissions from internal combustion engines.	Section 1.5.1.4; Attachment 1 – Section 2.7.1	Air Quality
12	RCR will develop Rock Mechanics Data Collection and Subsidence Monitoring Plans consistent with Attachment 3. A detailed plan for data collection and monitoring during the Phase I evaluation adit and a preliminary monitoring plan for full mine build-out (Phase II) will be submitted for agency approval before Phase I dewatering (before the evaluation adit intercepts bedrock groundwater). RCR will develop the plans in conjunction with the KNF and DEQ, and the plans' details and implementation will be subject to Agency approval.	Section 1.4.1.1; Attachment 1 – Section 2.2.2; Attachment 3	Geotechnical Engineering
13	RCR will fund an independent technical advisor to assist the KNF and DEQ in review of RCR's subsidence monitoring plan, underground rock mechanics data collection, and RCR's mine plan. The technical advisor will be selected and directed by the KNF through an agreement with RCR. RCR will facilitate underground inspections by the third-party technical advisor. Assessments of the underground workings by the technical advisor may occur as frequently as quarterly, with the data collected as part of the ongoing monitoring program and results of the inspections compiled into an annual assessment report.	Section 1.4.1.2.2; Attachment 1 – Section 2.3.1	Geotechnical Engineering
14	Within 3 years of the Phase I ROD effective date, RCR will submit a recreational use plan to the KNF for approval to monitor use of the Rock Lake and St. Paul trails and to assure use levels do not exceed "high use" as defined by the Interagency Grizzly Bear Committee.	Attachment 5;	Threatened and Endangered Species (Terrestrial)

Number	Stipulation/Mitigation Measure or Other Requirement	ROD Reference	Resource
15	All ore zone and disseminated galena, pyrite, and chalcopyrite alteration zone rock will be selectively handled and stored on the portal patio pad in separate stockpiles that provide for drainage capture until project progression was determined. RCR will cover stockpiles of alteration waste zone rock and ore with an impermeable material to minimize infiltration from precipitation. After Phase I was completed, the alteration waste zone rock will be removed from the site and placed underground or placed on a liner. Some of the bulk ore collected from the evaluation adit will be used in metallurgical flotation tests as part of the evaluation of the ore body. If Phase II proceeds, the remaining ore will continue to be stored at the evaluation adit site until the mill is operational; otherwise, ore will be placed underground in the evaluation adit.	Attachment 1 – Section 2.2.2	Geochemistry, Water Resources
16	RCR will minimize snow accumulation by plowing the portal pad and divert all stormwater runoff from the portal pad.	Section 1.4.4.1; Attachment 1 – Section 2.2.2	Water Resources
17	RCR will install two groundwater monitoring wells on the downgradient side of the evaluation pad lined ditch associated with Outfall 006 of MPDES permit MT0030287 consistent with Attachment 3 to monitor potential impacts on groundwater from underflow and/or leakage from the ditch. The monitoring wells will be screened at the colluvium/bedrock contact. RCR will monitor groundwater levels in the two wells on a quarterly basis to monitor the effectiveness of the collection ditch and to monitor water quality of any groundwater that bypassed the collection system. RCR will monitor one surface water monitoring location downgradient of the evaluation adit during periods of flow.	Section 1.4.4.1, Section 1.5.1.2.5; Attachment 3	Water Resources
18	Consistent with the Geochemical Characterization and Monitoring Plan described in Attachment 3, RCR will characterize waste rock and ore obtained during the evaluation adit program using a Quick Test, to be developed by RCR, that will facilitate routing of waste rock and placement on the adit portal pad or in stockpiles and also by static testing laboratory analysis. A contingency plan will be developed and describe how rock that fails the quick test monitoring action level will be managed.	Attachment 1 – Section 2.2.2; Attachment 3	Geochemistry, Water Resources
19	RCR will continue to collect mine drainage and tailings seepage water quality data from the Troy Mine consistent with Attachment 3 for comparison purposes to help determine if there could be potential unanticipated long-term water quality impacts at Rock Creek.	Attachment 3	Water Resources
20	RCR will implement mitigation measures in the Terrestrial Threatened and Endangered Species Mitigation Plan in Appendix B of the 2006 BO, terms and conditions in the 2006 BO for grizzly bear, and terms and conditions of the 2017 revised BO for bull trout and bull trout critical habitat.	Section 1.4.1.1; Attachment 5; Attachment 6; Attachment 7	Threatened and Endangered Species
21	RCR will implement components of the Aquatics and Fisheries Monitoring Plan to be initiated prior to evaluation adit construction or during Phase I, as described in Attachment 3.	Attachment 3	Bull Trout

Number	Stipulation/Mitigation Measure or Other Requirement	ROD Reference	Resource
22	<p>To minimize sediment and runoff, RCR will implement the Sediment Mitigation Plan consistent with the description of the Selected Alternative in Attachment 1 and conduct the following steps:</p> <p>a) A drainage and diversion system will be constructed at all disturbance sites to control runoff and sedimentation. This system will include diversion of off-site runoff waters and containment of runoff and sediment from disturbed areas.</p> <p>b) Windrows of woody debris or logs will be placed parallel to slope contours below long fill slopes.</p> <p>c) Right-of-way clearing will be minimized to reduce the total area susceptible to erosion.</p> <p>d) A sediment containment system downstream of disturbed areas will prevent sedimentation in natural drainages in the area.</p> <p>e) Naturally occurring runoff from undisturbed hillsides above the evaluation adit site will be diverted around the site in a structure sized to convey a 10-year/24-hour storm event.</p> <p>f) All water originating from the evaluation adit site will be routed to the lined pond at the evaluation adit portal. Excess water from the evaluation adit will be pumped through a pipeline to a wastewater treatment system at the support facilities site near the proposed paste tailings facility area. Treated water will be discharged to infiltration ponds within the paste tailings facility footprint.</p> <p>g) Numerous sediment-control and reduction measures will be utilized for NFS and other roads used to access project components, such as rolling dips, ditches, gravel or rock check dams, culverts, silt fencing, wattles, sediment catch basins, rock riprap, and hydro-seeding.</p>	Section 1.5.1.2.5; Attachment 1 – Section 2.2.2, Section 2.10	Water Resources, Bull Trout
23	All road improvements, realignments, or modifications, including stream crossings, will be constructed in compliance with Inland Native Fish Strategy standards and new culverts will be built to accommodate a 100-year flood event.	Section 1.5.1.2.5; Attachment 1 – Section 2.5.1	Water Resources, Bull Trout
24	A cultural resource inventory of any location to be disturbed during Phase I that had not been previously inventoried would be completed to meet the requirements of the 36 CFR 800, the guidelines in the 2011 KNF Site Inventory Strategy, and State Historic Preservation Office.	Attachment 1 – Section 2.5.1	Cultural Resources
25	<p>RCR will minimize access road erosion potential by improving NFS road #2741 consistent with the description of the Selected Alternative in Attachment 1 and by using the following measures:</p> <p>a) Road grades will be designed to disrupt natural drainage patterns as little as possible.</p> <p>b) Surface drainage from unpaved roads will be routed to ensure that sediment was filtered or settled out before delivery to streams.</p> <p>c) Erosion bars or drive-through dips will be constructed on unpaved roads.</p> <p>d) Equipment will work along contours where possible to minimize creation of channels. When work on slopes must be perpendicular to contours, crawler tracking or dragging will be used to reduce the channeling effects of grading.</p> <p>e) Snow will be removed according to Forest Service guidelines.</p>	Section 1.5.1.2.5; Attachment 1 – Section 2.5.1 and Section 2.10.	Water Resources, Bull Trout
26	Prior to Phase I, RCR will submit an assessment of risk of access road failure for Phase I activities to the KNF and USFWS for review and agreement. The assessment will identify areas that pose the greatest risk to bull trout and make recommendations for additional measures and responses to minimize risk. To reduce the risk of vehicles and their contents from reaching Rock Creek in the event of an accident, barriers will be installed at two bridges on Rock Creek and the culvert on West Fork Rock Creek, as described in Appendix L of the Rock Creek Evaluation Adit License Application.	Section 1.4.4.2 and Section 1.5.1.6.2; Attachment 1 – Section 2.10	Water Resources, Bull Trout

Number	Stipulation/Mitigation Measure or Other Requirement	ROD Reference	Resource
27	The final design of erosion and sediment control BMPs will incorporate features to minimize the risk of failures of potential impacts for sedimentation from surface disturbing activities and associated impacts to bull trout. The BMPs will be developed in accordance with the Forest Service's National Best Management Practices for Water Quality Management on National Forest System Lands.	Section 1.5.1.5.1 and Section 1.5.1.6.2; Attachment 1 – Section 2.10	Water Resources, Bull Trout
28	RCR will be required to implement a stream habitat enhancement program to improve the ability of bull trout to move throughout the year in Rock Creek and increase habitat availability and diversity for migratory and resident bull trout populations. Whenever possible, these mitigations will be coordinated with work being done by Avista or the local watershed council to avoid duplication of efforts.	Section 1.5.1.6.2; Attachment 1 – Section 2.10	Bull Trout
29	To minimize vegetation clearing and erosion on the steep hillside near the evaluation adit, RCR will bury the temporary mine water discharge pipeline between the evaluation adit and the wastewater treatment system in the existing road prism. The pipelines will be bored under stream channels, attached to existing bridge structures, or placed on trestles above the stream at the two Rock Creek crossings.	Section 1.4.4.2; Attachment 1 – Section 2.6.1	Bull Trout, Water Resources
30	All pipelines will be buried at least 3 feet where slopes are greater than or equal to 10 percent and 6 feet where slopes are less than 10 percent. RCR will implement the Pipeline Spill Monitoring, Maintenance, and Emergency Response Plan described in Attachment 3.	Attachment 1 – Section 2.6.2; Attachment 3	Bull Trout, Water Resources
31	The Phase I water treatment system will be consistent with Selected Alternative as described in Attachment 1 and will include a pressure filtration and oil skimmer with a pilot anoxic biotreatment system; a precipitation, clarification, and filtration system for solids and metals; an ion exchange system; and biological nitrification/de-nitrification system to remove inorganic nitrogen. Treatment quality will meet groundwater standards and nondegradation criteria, if applicable, before discharge to infiltration ponds.	Section 1.7.1.3; Attachment 1 – Section 2.4	Water Resources
32	RCR will implement the water resources monitoring program during Phase I implementation at least 1 year prior to evaluation adit dewatering* in the area near the evaluation portal pad and in the area near the infiltration ponds where surface water or groundwater may be affected by Phase I construction and operations (Figure K-3).	Attachment 3	Water Resources
33	Prior to Phase I evaluation adit dewatering*, a third-party contractor funded by RCR will complete a Level II GDE inventory of the area potentially affected by Phase I, as described in the Water Resources Monitoring Plan in Attachment 3.	Attachment 3	Water Resources
34	Prior to Phase I road or facility construction, a third-party contractor funded by RCR will measure suspended sediments at West Fork Rock Creek and East Fork Rock Creek above the confluence of the forks, Rock Creek near the confluence with the Clark Fork River, and Miller Gulch near the confluence with the Clark Fork River as outlined in Attachment 3. If possible, continuous data recorders would be used.	Attachment 3	Water Resources, Bull Trout
35	A detailed water balance will be refined annually during evaluation adit construction consistent with Attachment 3. Prior to evaluation adit dewatering*, a third-party contractor funded by RCR will collect water balance and water budget data from Cliff and Copper lakes, as described in the Water Resources Monitoring Plan in Attachment 3.	Attachment 3	Water Resources
36	At least 1 year prior to evaluation adit dewatering*, a third-party contractor funded by RCR will monitor stream flows, stream water quality, and stormflows in the area potentially affected by Phase I, including near the Phase I infiltration ponds, as described in the Water Resources Monitoring Plan in Attachment 3.	Attachment 3	Water Resources

Number	Stipulation/Mitigation Measure or Other Requirement	ROD Reference	Resource
37	Prior to evaluation adit construction, a third-party contractor funded by RCR will inventory domestic wells and other water supplies, such as active surface water or spring water rights that could potentially be affected by water disposal at the infiltration ponds during Phase I.	Attachment 3	Water Resources
38	RCR and KNF will implement the wildlife mitigation plan consistent with the description in Attachment 1.	Section 1.5.1.2.5; Attachment 1 – Section 2.10	Wildlife
39	RCR will conspicuously post all applicable federal and state hunting, fishing, trapping, and recreation regulations; and meet with appropriate regulatory agencies (e.g., FWP, and KNF) to discuss regulations to be posted, locations of signs, and any special regulations pertinent to adjacent lands.	Attachment 1 – Section 2.10	Wildlife, Grizzly Bear
40	RCR will implement the Transportation Monitoring and Mitigation Plan for Phase I described in Appendix L of the Rock Creek Evaluation Adit License Application consistent with the terms and conditions of the 2006 BO. Consistent with the Terrestrial T&E Species Mitigation Plan (Attachment 5), before initiation of Phase I, RCR will submit a conceptual transportation plan for Phase II.	Section 1.5.1.2.5; Attachment 1 – Section 2.5.1; Attachment 5 (see “transportation plan”	Grizzly Bear, Bull Trout, Harlequin Duck
41	RCR will cooperate with appropriate agencies regarding trespass, game violations, and other wildlife problems.	Attachment 1 – Section 2.10	Wildlife
42	RCR will minimize vehicular disturbance by dust suppression, paving, speed limit enforcement, and encouragement of carpooling.	Attachment 1 – Section 2.10	Wildlife
43	RCR will develop and enforce wildlife policy to prohibit carrying firearms in within the permit area, except for security officers and other designated personnel, hunting within RCR property by employees or the public, unauthorized off road vehicle use in the Rock Creek Project study area, and discouraging wildlife harassment and littering.	Attachment 1 – Section 2.10; Attachment 5; Attachment 6	Wildlife, Grizzly Bear
44	RCR and the KNF will implement harlequin duck mitigation consistent with the description of the Selected Alternative in Attachment 1, including, but are not limited to, the following items: a) RCR will attached screening to bridges to screen traffic from the creek. b) RCR will not allow camping on their lands within 100 feet of Rock Creek in Section 10 during the harlequin duck breeding season of April 1 through July 31 ¹ . c) Workers and visitors will be bused from the parking lot in lower Rock Creek area to the evaluation adit to reduce the amount of traffic of NFS Road #150 and NFS Road #2741.	Section 1.4.4, Section 1.5.1.2.5, and Section 1.6; Attachment 1 – Section 2.5 and Section 2.10	Harlequin Duck, Wildlife
45	RCR will contribute funding to that portion of the KNF’s forest wide monitoring program for harlequin ducks that covers Rock Creek. Protective measures will be required of RCR to reduce or minimize those impacts if found to be greater than those disclosed in the 2001 FEIS.	Section 1.5.1.2.5; Attachment 1 – Section 2.10	Harlequin Duck
46	RCR will not operate the diesel emergency backup generator at the evaluation adit more than 100 hours per year. The engine will conform to 40 CFR Part 89 emission limits for Tier 4 engines manufactured after 2011 and will be sized up to 300 kW. It will provide power only during periods when line power was not available.	Section 1.4.4, Section 1.5.1.2.11; Attachment 1 – Section 2.2.2	Air Quality
47	RCR will use low emission diesel engines underground with ultralow sulfur diesel fuel. All mobile diesel equipment used in the underground mining process will comply with 40 CFR Part 89 Tier 4 emission limits for nonroad diesel engines.	Section 1.5.1.2.5, Section 1.5.1.2.11, and Section 1.5.1.4; Attachment 1 – Section 2.2.2	Air Quality

Number	Stipulation/Mitigation Measure or Other Requirement	ROD Reference	Resource
48	RCR will replace aboveground vehicle backup beepers with alternative backup alarm systems that reduce noise impacts to wildlife, as allowed by MSHA.	Section 1.5.1.2.11; Attachment 1 – Section 2.2.2	Sound, Wildlife
49	RCR will adjust intake and exhaust ventilation fans in the evaluation adit to meet the MSHA regulation (30 CFR 62.101) for noise action level, which is an 8-hour time-weighted average sound level of 85 dBA.	Section 1.5.1.2.11; Attachment 1 – Section 2.2.2	Sound, Wildlife
50	Facility features will be painted, stained, or modified to visually blend with the surrounding landscape and to reduce contrast with the surrounding area. If necessary to meet visual quality objectives, exposed rock and waste rock surfaces will be treated with oxidizing compounds to blend them with adjacent talus, if necessary, to meet long-term Visual Quality Objectives (VQOs) at the evaluation adit.	Section 1.4.4 and Section 1.5.1.2.5; Attachment 1 – Section 2.2.2, Section 2.9.1	Scenic Resources
51	RCR will use the following measures to reduce right-of way clearing and create a more natural-appearing edge of timber along the road corridor. These measures will be applied to appropriate segments of the corridor during final design: a) Retaining nonhazardous trees and brush on the right-of-way. b) Cutting trees at ground level to reduce visibility of stumps. c) Disposing of felled material with the least possible impact on remaining vegetation. d) Selective clearing of timber adjacent to the corridor to soften the edge between cleared and uncleared areas.	Attachment 1 – Section 2.5.1	Scenic Resources
52	Exterior evaluation adit lights will be shielded or baffled from viewpoints in the Clark Fork Valley and from night-migrating songbirds.	Section 1.5.1.2.5; Attachment 1 – Section 2.2.2	Scenic Resources, Wildlife
53	RCR will maintain access to public lands adjoining the Rock Creek Project study area.	Attachment 1 – Section 2.10	Recreation, Wilderness
54	RCR shall comply with all applicable Federal and State fire laws and regulations and shall take all reasonable measures to prevent and suppress fires on the area of operations and shall require employees, contractors and subcontractors to do likewise within the permit boundary.	Section 1.5.1.2.8; Attachment 1 – Section 2.2.2	Safety
55	RCR will implement the Soil Salvage and Handling Plan consistent with the description of the Selected Alternative in Attachment 1.	Section 1.5.1.2.5; Attachment 1 – Section 2.9.5	Soils, Reclamation

Number	Stipulation/Mitigation Measure or Other Requirement	ROD Reference	Resource
56	<p>RCR will implement reclamation and revegetation plans and site-specific planting designs for each project facility consistent with the description of the Selected Alternative in Attachment 1. These plans will include, but are not limited to, the following items:</p> <ul style="list-style-type: none"> a) Interim seeding will be done as soon as possible after disturbance and use a grass and forb species suited for quick stabilization. b) Trees and shrubs will be planted by hand on slopes exceeding 30%. c) RCR will obtain locally grown tree seedlings from an appropriately inoculated soil medium and may also incorporate mycorrhizai as pellets into the upper few inches of respread soil where trees and/or shrubs are to be planted. d) Legume species will be inoculated with appropriate nitrogen-fixing bacteria. e) The soil will be scarified prior to seeding. f) Any legumes used will be inoculated. g) Locally collected seeds and plants will be used whenever possible. h) The seed mixes will contain palatable forbs and grass species to facilitate use by wildlife. The use of native species will be encouraged. The KNF requires use of local native seed from the Forest Service Coeur d'Alene Nursery or the Kootenai Seed Mix. The approved seed mixes are described in Appendix J of the Final SEIS. i) Native shrubs and trees will be planted at the evaluation adit. 	Section 1.5.1.2.5; Attachment 1 – Section 2.9.5	Reclamation, Vegetation
57	<p>RCR will comply with Forest Service policies when disposing of demolition debris during closure. It is Forest Service policy (FSM 2130) to discourage the disposal of solid waste on National Forest System lands unless such use is the highest and best use of the land. Reinforced concrete foundation materials may be buried on National Forest System lands under the following conditions:</p> <ul style="list-style-type: none"> a) The concrete must be free from contaminants, such as petroleum products. b) Contaminated sections of concrete will be removed and disposed of at an approved waste disposal facility off of National Forest System lands in accordance with Montana's solid and hazardous waste regulations (ARM 17-50-101 et seq. and ARM 17-53-101 et seq.). c) The concrete must be cut or broken into sections no larger than 4 feet square and buried in a manner that will not create large voids that could lead to future settling of the materials. This may involve mixing glacial borrow material with the concrete sections during backfill operations. The rebar could remain in the concrete provided it was cut flush with the individual sections. d) The concrete will be buried with a minimum of 4 feet of glacial or other inert borrow material graded in a manner that will not concentrate surface water runoff or allow water to pond. e) If new federal regulations prohibit burying of any materials at time of mine reclamation and closure, all materials will be hauled off-site. f) All other demolition materials, whether originating above or below ground, will be disposed of off National Forest System lands in an approved, off-site waste disposal facility. 	Section 1.5.1.2.5; Attachment 1 – Section 2.9.2	Solid Waste Disposal
58	<p>RCR will not locate Phase I waste facilities in Riparian Habitat Conservation Areas. Any change to Phase I disturbance will be evaluated for consistency with Inland Native Fish Strategy standards and guidelines for Riparian Habitat Conservation Areas applicable to minerals management.</p>	Section 1.5.1.2.5	Fisheries

Number	Stipulation/Mitigation Measure or Other Requirement	ROD Reference	Resource
59	If after 5 years from initiating construction of the evaluation adit, the remaining selected alternative activities have not proceeded, the KNF will consult with RCR; DEQ; Montana Fish, Wildlife, and Parks (FWP); EPA; USFWS; tribal representatives; and other interested agencies on interim or final reclamation plans to be implemented consistent with the Selected Alternative in Attachment 1, as well as the timeframes for implementation.	Section 1.2.2.2.; Attachment 1 – Section 2.9	General Permit Requirements
Requirements of other Agencies			
60	RCR will implement the limits, emission controls, and mitigations required by its Air Quality Permit (MAQP #2414-03). Prior to Evaluation Adit construction, RCR will submit to the KNF and DEQ for review and final approval any plans relevant to Phase I required by the air quality permit MAQP #2414-03 (see above under “other permit requirements”).	Section 1.5.1.2.5, Section 1.5.1.4, and section 1.7.1.2; See project record for Air Quality Permit	Air Quality
61	RCR will comply with the limits, monitoring, and discharge locations of the MPDES Permit MT0030287 and MPDES Permit MT0031763. RCR will submit to the KNF and DEQ for review and final approval any plans relevant to Phase I required by the MPDES permits MT0031763 and MT0030287 which must be submitted to and reviewed and approved by the KNF and DEQ prior to construction of the evaluation adit and the mine unless otherwise specified in the permits (see above under “other permit requirements”).	Section 1.5.1.2.5, Section 1.7.1.3; See project record for MPDES Permits; Attachment 1 – Section 2.2.3	Water Resources
62	If, after final design, effects on jurisdictional wetlands cannot be avoided, the appropriate authorization will be requested from the Corps and any required compensatory mitigation will be implemented. RCR will abide by the conditions and requirements of any Corps-approved Section 404 permit for jurisdictional wetlands and other waters of the U.S.	Section 1.7.1.5	Wetlands
63	If, at a future date the Corps determines that an individual 404 permit is needed for the Rock Creek Project, then RCR will apply for a 401 certification from DEQ and amended Plan of Operations accordingly.	Section 1.4.1.1; Section 1.5.1.2.5	Wetlands
64	Treated discharges to the infiltration ponds near the evaluation support facilities will comply with the conditions of Exploration License #00663 established by DEQ in the Final Environmental Assessment (EA) for the Rock Creek Evaluation Adit.	Section 1.4.1, Section 1.7.1.1, and section 1.7.1.3; Attachment 1 – Section 2.2.4	Water Resources
65	All stormwater detention and retention ponds and all ponds and diversion ditches will be designed/constructed in accordance with approved MPDES permits.	Section 1.5.1.5.1, Section 1.7.1.3; Attachment 1 – Section 2.2.3 and section 2.2.4	Water Resources

* Indicates actions that will be carried out before the evaluation adit intercepts bedrock groundwater.

¹This mitigation is a recommendation only as KNF has no authority on private lands. RCR has agreed to implement this mitigation.

Attachment 3 - Conceptual Monitoring Plans

Appendix K – Agencies’ Conceptual Monitoring Plans

1.1	Introduction.....	K-1
1.2	Monitoring Report Requirements	K-1
1.3	Air Quality Monitoring Plan.....	K-2
1.4	Phase I Data Evaluation Plan.....	K-2
1.5	Geochemical Characterization and Monitoring Plan.....	K-3
1.6	Water Resources Monitoring Plan	K-16
1.7	Rock Mechanics Data Collection and Subsidence Monitoring Plan	K-37
1.8	Wildlife Monitoring Program	K-40
1.9	Aquatics and Fisheries Monitoring Plan.....	K-43
1.10	Reclamation Monitoring Plan.....	K-48
1.11	Plant Species of Special Concern Monitoring Plan	K-50
1.12	Terrestrial Threatened and Endangered Species Monitoring Plan	K-50
1.13	Wilderness Monitoring Plan	K-53
1.14	Cultural Resource Monitoring Plan	K-55
1.15	Mine Facility Construction and Operations Monitoring.....	K-57
1.16	Underground Mining Boundary Monitoring.....	K-62
1.17	References.....	K-62

Tables

Table K-1.	Elements of the Site Conceptual Model Described in the Rock Creek Project SEIS.	K-4
Table K-2.	Summary of the Proposed Rock Creek Phase I Geochemical Sample Collection, Analyses, and Relevant Monitoring Action Levels.	K-9
Table K-3.	Statistical Summary for Ore and Waste Samples from Rock Creek and Troy.	K-14
Table K-4.	Baseline ABP data for Rock Creek and Troy.	K-14
Table K-5.	Geochemical Monitoring Plan Elements, Monitoring Action Levels, and Contingencies. ..	K-16
Table K-6.	Proposed Monitoring Parameters and Required Reporting Values for Surface Water Samples.....	K-20
Table K-7.	Proposed Monitoring Parameters and Required Reporting Values for Groundwater Samples.....	K-21
Table K-8.	Groundwater Dependent Ecosystem Monitoring Options.	K-26
Table K-9.	Proposed Action Levels for Groundwater Compliance Wells.....	K-28
Table K-10.	Proposed Components of a Geotechnical Monitoring Program.	K-58

Figures

Figure K-1.	Sources, Receptors, and Pathways for the Phase I Evaluation Adit at Rock Creek.	K-6
Figure K-2.	Sources, Receptors, and Pathways for the Phase II Rock Creek Mine Operation.....	K-7
Figure K-3.	Areas Potentially Affected by Phase I and Phase II Activities	K-18
Figure K-4.	Groundwater Dependent Ecosystems Inventory and Monitoring Area.....	K-23

1.1 Introduction

This appendix contains the agency (Kootenai National Forest (KNF) and Montana Department of Environmental Quality (DEQ))-modified or -generated conceptual monitoring plans for Alternative V. RC Resources (RCR) would submit a final monitoring plan and, if appropriate, update the current plans outlined in the Rock Creek Evaluation Adit License Application (RCR 2010) for approval by the KNF and DEQ (the Agencies) prior to the start of Phase I. Not all monitoring plans or phases of the monitoring plans outlined in this conceptual plan would be required prior to Phase I (see ROD and Attachment 2 for plans required as part of Phase I). Although not required for Phase I approval, RCR may submit plans required prior to Phase II activities to the KNF and DEQ. Where applicable, all plans would identify action levels, which, when reached, would require RCR to implement a contingency action plan. Contingency action plans for the most likely scenarios would be developed by RCR and approved by the KNF and DEQ prior to project startup. Each monitoring plan would follow the Forest Services’ adaptive management approach of “implement-monitor-adapt” described in section 54.1 of the Forest Service’s National Environmental Policy Act Handbook (USFS Handbook 1909.15).

1.2 Monitoring Report Requirements

All monitoring described in the sections below would require an annual report unless otherwise specified. The format and requirement needs for reporting would be reviewed and finalized by the agencies. Reports would be submitted to other review agencies as identified by the KNF and DEQ and made available to the public.

After submittal of a monitoring report, the agencies may call a meeting with all other relevant agencies to review the monitoring plan and results, and to evaluate possible modifications to the plan or permitted operations.

1.2.1 Agency Compliance Inspections

Agency staff from the KNF and DEQ would conduct compliance inspections at the Rock Creek Mine under the authority of the Metal Mine Reclamation Act and the 1897 Organic Act and their implementing regulations. Comprehensive mine-wide inspections would consist of physical on-site examination of disturbance areas, verification sampling at water quality monitoring points, and geochemical sampling of mine products, construction materials, and reclamation materials. Annual examination of revegetation conditions would be conducted. Inspections more frequent than quarterly may be conducted during periods of intense activity in localized portions of the mine or where compliance problems have been noted and corrective measures are being implemented. Additional compliance inspections pursuant to the Montana Water Quality Act, the Clean Air Act of Montana, and 36 CFR 228 regulations would also be conducted. The results of these inspections would be documented in agency files and would be available to the public upon request.

1.2.2 Operator Monitoring Reports

The purpose of monitoring is to demonstrate compliance with the terms and conditions of approved plans or permitted operations, detect problems or unanticipated events early, and provide a basis for directing remediation of problems. Monitoring report requirements are described for each monitoring plan. Other required monitoring reports are described below. All monitoring reports would be submitted to the KNF and DEQ and would be available to the public upon request.

1.2.2.1 Annual Operating and Reclamation Status Report

The Annual Operating and Reclamation Status Report is required by the Metal Mine Reclamation Act (82-4-339, Montana Code Annotated (MCA), and Administrative Rules of Montana (ARM) 17.24.118) and describes the overall mining and reclamation status. RCR must track the status of all stipulations and conditions required by the KNF and DEQ in this report.

1.2.2.2 Hard Rock Impact Board Quarterly Survey Reports

RCR would conduct quarterly monitoring surveys of all employees during the impact period. The impact period is assumed to start 6 months prior to commencement of mine construction and last through the completion of all tax prepayments (through Year 6 of mine operation) and tax crediting (from Year 7 for approximately 5 years (20% per year)). The survey would identify the residence for each worker at the mine, the family size of the worker, how long the worker had been a resident of the area, and where his/her children (if any) were attending school. The results of each survey would be mailed to all identified potentially affected local governmental units identified in the impact plan and the Hard-Rock Mining Impact Board.

1.3 Air Quality Monitoring Plan

DEQ’s Final Determination on RCR’s Air Quality Permit (Permit # 2414-03; Appendix C of the Supplemental Environmental Impact Statement (SEIS)), does not require ambient air quality monitoring as a condition of the air quality permit for the project. DEQ determined that the emissions would be low due to the use of control technologies.

The following summarizes air quality monitoring reporting requirements described in detail in Appendix C of the SEIS, *RCR’s Air Quality Permit # 2414-03*. RCR would submit quarterly data reports and would supply DEQ with annual production information for all emission points required by the department in the annual emissions inventory request. Production information would be gathered on a calendar-year basis and submitted to DEQ by the date required in the emissions inventory request. Information shall be in units as required by the department. In addition, RCR would submit the following information annually to DEQ by March 1 of each year, as required for the annual emission inventory, as well as to verify compliance with permit limitations:

- Amount of ore produced;
- Amount of diesel fuel used;
- Amount of propane and natural gas used;
- Amount of explosives used;
- Hours of operation of the emergency diesel-fired generator;
- An estimate of company vehicle miles traveled from Highway 200 to the mine and mill access points;
- Amount of disturbed acreage (including tailings facility area); and
- Other emission related information DEQ may request (ARM 17.8.749).

1.4 Phase I Data Evaluation Plan

The Phase I Data Evaluation Plan would be developed to provide the Agencies with data that could not be obtained prior to construction of the evaluation adit. Data from the evaluation adit would be used to verify the hydrologic, geochemical, and rock mechanics data used in the analyses described in this SEIS or the 2001 FEIS.

This plan consists of three components. The first is implementation of the evaluation adit portions of the Geochemistry Characterization and Monitoring Plan described below. This plan would provide the geological and geochemical data needed to ensure that nonacid-generating and nonmetals-leaching materials were used for facility construction. The second component would require the collection of hydrologic data during Phase I implementation, as described in Section 1.6. These data would be used to better define the source of groundwater, hydrogeologic characteristics of the bedrock, and bedrock groundwater quality to reduce uncertainty associated with the 3D groundwater model and ensure the water treatment system operates as predicted and produces a discharge that would comply with any Montana Pollutant Discharge Elimination System (MPDES) permit obtained for the project. Using data collected during Phase I, the 3D model would be better able to evaluate the impacts of withdrawal of groundwater on springs, seeps, and streams. The Rock Mechanics Data Collection and Monitoring Plan in Section 1.7 describes the third component of the Phase I Data Evaluation Plan. The rock mechanics data from the evaluation adit would be used to evaluate to what extent it may be necessary to modify the initial underground mine plan to minimize the risk of subsidence. All evaluation adit data would be supplemented by data collected during mine construction and operation, which would be used to further modify and refine facility designs and operations.

After the evaluation adit is completed, RCR would be required to file a report containing an analysis of data collected through the Geochemical Characterization and Monitoring Plan, the Rock Mechanics Data Collection and Monitoring Plan, and the Water Resources Monitoring Plan as outlined below. The Phase I Data Evaluation Report would include recommendations for any changes to the approved Plan of Operations, reclamation plan, mitigation plans, and monitoring plans. If the evaluation adit data indicated significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts, as described by 40 CFR 1502.9(c)(1)(ii), additional NEPA analysis would need to be conducted and all appropriate facility designs and mine plans would need to be modified and approved by the Agencies. The modifications would be requested and processed as defined in the Metal Mine Reclamation Act (82-4-337(4 and 5) and 82-4-342 MCA) and the Forest Service’s 36 CFR 228 regulations. The project could not proceed beyond the evaluation adit construction stage without approval from the Agencies on the facility designs and mine operation plans, as modified based on evaluation adit construction data.

1.5 Geochemical Characterization and Monitoring Plan

1.5.1 Introduction

The purpose of the Geochemical Characterization and Monitoring Plan is to ensure that appropriate kinds and amounts of geochemical data are collected and evaluated during Phase I and Phase II and to ensure that water quality is protected. Geochemical data collected under this plan would supplement other monitoring programs including surface water, groundwater, and mine water quality and process solution monitoring. The following is the proposed plan; RCR would develop a final monitoring plan for agency approval using this plan as a guide.

The kinds of data collection and evaluation efforts described in this plan were guided by an understanding of the nature of the Rock Creek Mine site (Section 1.5.2.1), defining the inherent geochemical risks based on knowledge of environmental pathways and receptors (Section 1.5.2.2), and then developing data quality objectives (Section 1.5.3) to manage those risks. Sample collection, laboratory measurements, and data analysis and decisions are described in Section 1.5.4.

1.5.1.1 Differences from Acid Rock Drainage and Metals Leaching Monitoring Plan

This Geochemical Characterization and Monitoring Plan differs from Appendix D (Acid Rock Drainage and Metals Leaching Monitoring Plan) of the Rock Creek Evaluation Adit License Application (RCR

2010). This plan adds more specific statistical tests than the previous plan. A requirement was added to test Phase I pilot hole composite samples prior to placement of waste material. The pilot hole composite samples would be analyzed by a “Quick Test” (such as acid-base potential, total sulfur, or net acid generation pH) to be proposed by RCR. The approved quick test method would include a monitoring action level. Sampling frequency was also increased in this plan.

Another major difference between this Geochemical Characterization and Monitoring Plan and the RCR’s Acid Rock Drainage and Metals Leaching Monitoring Plan is that this plan would supplant the kinetic test requirements with field-scale leach tests, also known as “barrel tests.”

1.5.2 Site Background

A Site Conceptual Model, which is a description of site-specific environmental conditions, facilitates better understanding of potential interactions between surface water, groundwater, and mined rock or tailings. Description of a site conceptual model is an integral part of the overall planning process for developing monitoring programs at mines (Russell et al. 2014a). Relevant descriptions of the project, geology, and geochemistry from the Draft SEIS are included below.

1.5.2.1 Site Conceptual Model

A site conceptual model is a description of the features of a project such as Rock Creek that influence environmental behavior. In the case of Rock Creek, elements of the site conceptual model are described and analyzed in detail in the SEIS. Relevant SEIS sections are described in Table K-1.

Table K-1. Elements of the Site Conceptual Model Described in the Rock Creek Project SEIS.

Topic	SEIS Section Number	Description
Project Description	2.3.1	The project involves two phases with Phase I consisting of an evaluation adit decline and Phase II is the fully operational mine with a second production portal, a mill, and a paste tailings facility.
Hydrology	3.7	The surface and groundwater system at Rock Creek is described in this section.
Geology	3.5	Ore at Rock Creek is hosted in pre-Cambrian quartzite within the Lower Revett Formation. Ore zones are spatially associated with other styles of alteration, some of which result in elevated sulfide content in waste rock.
Geochemistry	3.6	Overall, the risk of acid generation and metal leaching is low at Rock Creek. This conclusion is predicated on the core samples collected from the Rock Creek deposit and on the inferred geologic similarities between Rock Creek and the Troy deposit.

1.5.2.2 Sources, Pathways, and Receptors

Based on the site conceptual model, the risk of acid generation and metal leaching at Rock Creek is considered low. The rock units with the highest risk of release of metals or acidity are the Prichard Formation, possibly the Burke Formation, pyritic alteration zones in the Revett Formation, or in unaltered zones in the Revett containing elevated primary pyrite. Metal releases may also occur from the galena alteration zone in the Revett. The Prichard and Burke Formations are lacking from the area of the Phase I Evaluation Adit at Rock Creek. An additional contaminant of concern is nitrate and ammonia associated with the explosives blasting.

1.5.2.2.1 Phase I

During development of the Evaluation Adit in Phase I of the proposed project, two potential sources of contact water are considered: the waste rock and ore placed in the portal pad and exposed rock in underground mine walls (Figure K-1). About 90,000 tons of waste rock are estimated to be excavated from the evaluation adit, of which 47,700 tons are estimated to come from the Upper and Middle Revett, 34,500 tons from the Lower Revett not containing mineralized zones, and 7,800 tons from waste rock in Lower Revett alteration zones (Erickson 2012).

Ore stockpiles (88,000 tons produced) and alteration waste rock (7,800 tons produced) stored in the portal pad may interact with meteoric water, and soluble constituents from the rock could potentially migrate in surface runoff from the site or could infiltrate into groundwater. Stormwater at the facility would be managed with a 600,000-gallon lined pond to minimize off-site migration of water and sediment so the groundwater pathway is the primary concern at the portal pad. Potential receptors would include humans, aquatic organisms, and terrestrial species. To reduce infiltration from precipitation, RCR would minimize snow accumulation by plowing the portal pad and cover stockpiles of alteration waste zone rock and ore with an impermeable material. RCR would also develop and implement an Explosive Handling and Blasting Plan to minimize the potential for elevated nitrate or ammonia concentrations occurring in surface water. To reduce the risk of terrestrial species encountering stored contact water, a fence would be installed around the pond (RCR 2010). Groundwater and surface water would be monitored downgradient of the portal pad. Rock used to create the portal pad would be sampled and analyzed prior to placement to ensure that acid drainage and metal leaching risk is low, as described in Chapter 2 of this Draft SEIS. Also, rock samples would be tested for soluble forms of nitrogen to determine the extent to which blasting agents may contribute to nitrogen loading in contact water.

Mine walls may interact with groundwater inflow to the adit. However, mine water would be collected and treated so potential releases would be controlled using water treatment conducted under a MPDES permit. Studies of potential release from mine walls would be conducted to better quantify potential metals and acidity loading from this source.

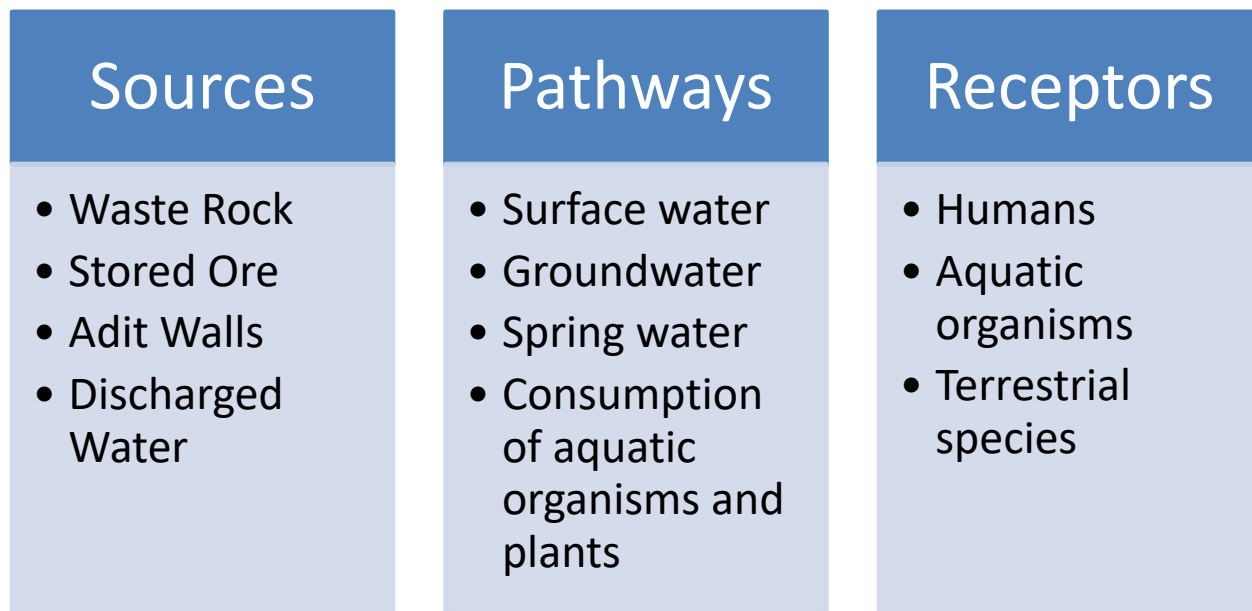


Figure K-1. Sources, Receptors, and Pathways for the Phase I Evaluation Adit at Rock Creek.

1.5.2.2.2 Phase II

During full operation at Rock Creek, a paste tailings facility would be constructed along with development of a production adit and a mill complex. During Phase II, three potential sources of contact water are considered: waste rock, paste tailings, and exposed rock in underground mine walls (Figure K-2). Geochemical sampling and analysis would continue during the operating stage but details of the plan would be finalized at the end of Phase I, once the operating plan is finalized. However, field data on the geochemical behavior of waste rock, ore, and paste tailings would be collected during the Phase I program. Field data would improve the understanding of the nature of the Phase II facilities.

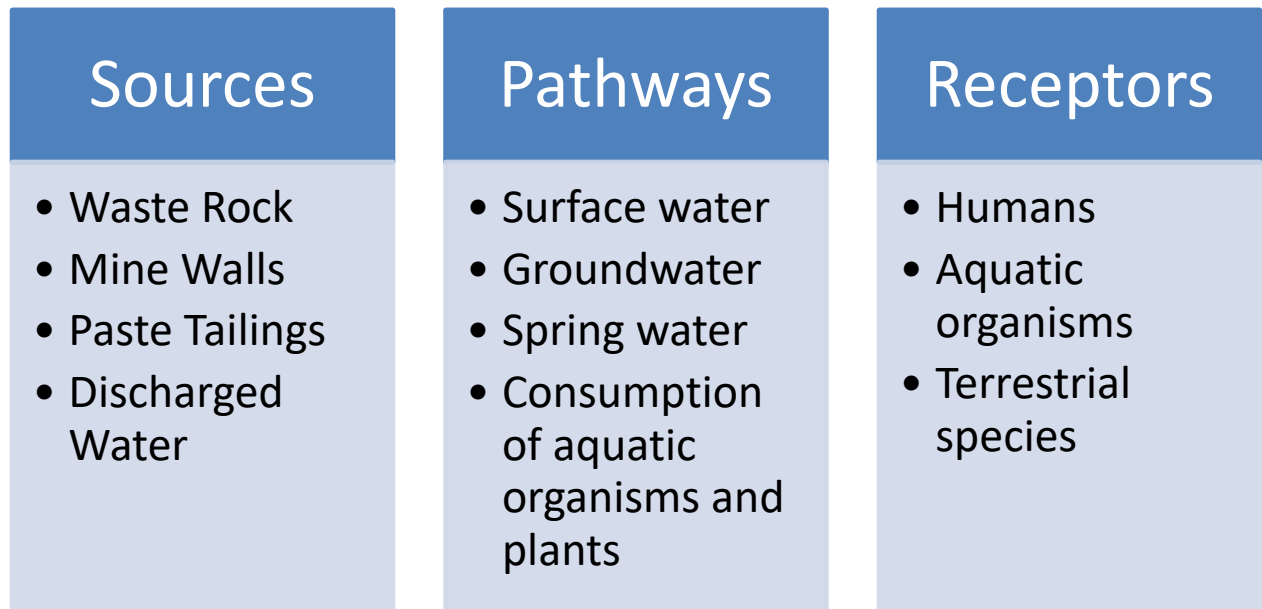


Figure K-2. Sources, Receptors, and Pathways for the Phase II Rock Creek Mine Operation.

1.5.3 Data Quality Objectives

The overall purpose of this monitoring program is to collect the amount, type, and quality of data needed to better define and manage environmental risks associated with water coming into contact with mined rock at the Rock Creek Mine. During environmental review of the project, a geochemical characterization program was developed and background hydrologic conditions at Rock Creek were described in detail. The overall risk of acid generation and metal leaching from waste rock, underground mine workings, ore stockpiles, and tailings were considered low at Rock Creek. This conclusion was based in part on the long-term conditions observed at the Troy Mine, which is considered a close analog. Conclusions in the SEIS were also predicated on results of the laboratory tests performed on representative core samples.

1.5.3.1 Geochemical Issues and Concerns

Based on the environmental site conceptual model that includes information on the proposed project, the geology and geochemistry of Rock Creek, several questions about the geochemical nature of mined rock need to be confirmed. These include:

- **Topic 1:** Is the geochemical nature of rock material mined from the adits suitable for placement in the portal pad?
- **Topic 2:** Does mined rock (e.g., ore and waste) or exposed rock (e.g., underground mine walls) at Rock Creek have greater geochemical risks, including acid generation and metal leaching risks, than defined in the SEIS using the current dataset?

- a) If geochemical risks at Rock Creek are found to be significantly greater than estimated in the SEIS, it may be appropriate to revise the definition of geochemical risks at Rock Creek accordingly.
- b) A limited number of samples were available from the Rock Creek deposit because of the difficulty of obtaining large numbers of core samples prior to development of an evaluation adit.
- c) Additional rock samples would be collected during advancement of the Phase I Evaluation Adit to compare with baseline geochemical data collected from core samples.
- **Topic 3:** Is the Troy Mine a representative analog of Rock Creek?
 - a) If geochemical risks at Rock Creek are found to be significantly greater than at Troy, then it may be appropriate to revise the definition of geochemical risks at Rock Creek accordingly.
- **Topic 4:** Will explosives introduce an unacceptable amount of soluble nitrogen into blasted rock that would cause downstream violations of water quality standards for nitrate at a compliance monitoring location?
- **Topic 5:** What are the geochemical risks associated with mine facilities at Rock Creek including exposed waste rock, ore stockpiles, exposed underground mine walls, and paste tailings?
 - a) Available baseline geochemical data were somewhat limited because of the scarcity of available core from the deposit.
 - b) All lab-scale geochemical tests present challenges when trying to scale water quality predictions from laboratory test results to field-scale behavior.
 - c) This plan includes larger scale field tests conducted on larger volume samples that are representative of waste rock, ore stockpiles, underground mine walls, and paste tailings.

1.5.3.2 Data Quality Objectives

Data quality objectives (DQO) are developed as part of the planning process for implementing monitoring strategies. The purpose of DQOs is to identify the amount, type, and quality of data needed to answer critical questions about the environmental performance of a mine (U.S. Environmental Protection Agency (EPA) 2006; Russell et al. 2014b). DQOs for the Geochemical Characterization and Monitoring Plan, include:

- **Topic 1:** Confirm predicted acid drainage risk disclosed in the SEIS. Confirmation of acid drainage risk would be based on composite samples from pilot holes drilled in advance of the Phase I adit. Pilot hole composites would be analyzed using suitable test methods. The number and type of samples would be sufficient to ensure that infiltration of meteoric water into the portal pad does not adversely affect downgradient water quality due to leaching of acidity or metals. The Phase 1 Geochemical Monitoring Plan will adopt appropriate monitoring action levels.
- **Topic 2:** Collect additional representative rock samples to facilitate a more refined statistical comparison between the geochemical conditions at Rock Creek with the current baseline geochemical data.
- **Topic 3:** Collect additional representative rock samples to facilitate a statistical comparison between the geochemical conditions at Rock Creek with available data from the Troy Mine.
- **Topic 4:** Collect data on the soluble nitrogen levels in blasted rock samples. If water quality monitoring at downgradient locations shows unacceptable levels of nitrate, the data on soluble nitrogen in blasted rock would be helpful in refining the performance of the blasting program.

- **Topic 5:** Collect additional geochemical characterization data to address metal leaching potential and to evaluate mineralogy of each rock unit mined. Also, collect field-scale data that represent possible water:rock interactions and contact water chemistry in the ore and waste stockpiles, paste tailings facility, and underground mines. Reduce uncertainty regarding scale-up from lab to field-scale, and adjustment from lab to field conditions (including surface area, temperature effects, and other factors) using larger scale field samples tested under field conditions.

1.5.4 Geochemical Testing Plan

A detailed testing plan has been developed for the Phase I Evaluation Adit and is based on the DQOs developed in Chapter 3 of the SEIS. A detailed sampling plan would be developed for Phase II Operations once geochemical data have been collected and interpreted from Phase I. The Phase II geochemical monitoring plan would be developed by RCR and would be submitted to the Agencies for review and approval.

1.5.4.1 Proposed Phase I Geochemical Sampling

A summary of the proposed sample collection, analyses, and relevant monitoring action levels is shown in Table K-2. More detailed discussion of sample collection, laboratory methods, and data analysis is provided in the following sections.

Table K-2. Summary of the Proposed Rock Creek Phase I Geochemical Sample Collection, Analyses, and Relevant Monitoring Action Levels.

Sample Type	Number of Samples	Analyses	DQO	Trigger
10–kilogram (kg) Samples	≥ 45 waste ≥44 ore	Quick test	Topic 1	Use results to route waste rock. If material exceeds trigger, do not place in portal pad. Report if >10% of cumulative tests fail trigger.
		Static tests and total metals	Topics 2 and 3	If mean ABP of Phase I waste is less than ABP in baseline Rock Creek samples, reassess ARD risk. If the proportion of Phase I waste samples with ABP<0 is greater than baseline Rock Creek samples, reassess ARD risk. Use similar criteria for comparison with the Troy Mine.
		MWMP extract – soluble nitrogen	Topic 4	If SW or GW monitoring detects nitrogen exceedance of water quality standards, may use soluble nitrogen results from MWMP test to create future trigger as performance standard for blasting program.
		MWMP extract – Nevada Profile 1 by ICP	Topic 5	MWMP metals data used to expand geochemistry dataset. Submit results and annual interpretive report.
		MWMP extract – mineralogy	Topic 5	Mineralogy data used to expand geochemistry dataset. Submit results and annual interpretive report.
Bulk Samples	~10	Barrel tests, analyze leachate for Nevada Profile 1 constituents	Topic 5	Use data to improve understanding of contact water chemistry that may develop in full-scale mine operation. Submit results and annual interpretive report.
	~8	Wall rinse tests	Topic 5	
	1 or more	Paste tailings/process water evaluation	Topic 5	

ABP = acid base potential, ARD = acid rock drainage, MWMP = Meteoric Water Mobility Procedure.

1.5.4.1.1 10-kg Samples

Collect a composite sample from a pilot hole drilled in advance of the Evaluation Adit face. One sample should be collected for approximately each 2,000 tons of rock to be mined. Assuming an 18-foot-high and 20-foot-wide drift (and an in-place rock density of 165 pounds per cubic foot or 2.65 grams (g)/centimeter (cm)³), the pilot hole should be sampled across an interval of not more than about 70 feet to represent 2,000 tons of rock.

Samples collected from the pilot hole should consist of either ore or waste and should be limited to a single rock unit. For the purposes of the Geochemistry Characterization and Monitoring Plan, rock unit classification should follow the geologic logging program developed by RCR and should include the formation, member, and mineralization. For each sample, also provide a spatial description consisting of round numbers, geographic coordinates, dates, and collection methods (core, RC, grab, or channel). Where a pilot hole crosses the ore/waste boundary or one or more rock units, the sample should be split as needed. A sample should consist of approximately 10 kg of material that is representative of the rock to be mined. Suitable material may include drill cuttings from the pilot hole, a crushed sample of split core, chips from a channel sample, or a composite sample from a muck pile. A total of not less than 45 waste and 44 ore samples should be derived from this sampling program. If a pilot hole is not drilled well in advance of the adit face, then sampling would need to be performed on shot rock material.

1.5.4.1.2 Bulk Samples

Bulk samples of selected rock types (both ore and waste) and of representative paste tailings would be required for field barrel tests (Section 1.5.4.2.4). Approximately two samples of ore, six samples of waste, and two samples of paste tailings would be required for the field barrel tests, which would consist of about 800 pounds of broken rock (at a density of 110 pounds per cubic foot) or 600 pounds for paste tailings (at a density of 80 pounds per cubic foot).

For ore samples, one sample should approximate the average ore sulfur content while the second sample should approximate the upper 90th percentile sulfur content. For waste, select one representative sample for each of the most prevalent six rock units. The two paste tailings samples may be identically sourced (e.g., from the same metallurgical test), but one test may contain additives to represent addition of cement or flyash or both. Representative process solutions may also be produced during metallurgical tests on ore, especially if a locked cycle test is performed. Process solution samples would be submitted for analysis of major ions and selected metals.

1.5.4.2 Proposed Phase I Geochemical Analyses

1.5.4.2.1 Quick Test to Determine Suitability for Rock Placement

Each 10-kg samples obtained from the pilot hole cuttings would be analyzed by a “quick test” to determine acid drainage risk. A quick test is required to facilitate decisions about rock placement based on test results. A rapid turnaround time is required to avoid production delays. Waste rock that is suitable for placement on the portal pad must have a low risk of acid drainage. At Rock Creek, materials that are consistently low in sulfur (e.g., less than about 0.3%) are also nonmineralized so would also have a low risk of metal leaching. Therefore, testing and classification of rock based on low acid drainage risk should isolate material that is also low in metal leaching risk.

A geochemical test with a rapid turnaround time would need to be used to facilitate analysis of samples from a pilot hole and subsequent placement of the mined rock based on test results. Several methods could potentially provide rapid enough turnaround time to support routing based on geochemical test results. Examples may include, but are not limited to, Acid-base accounting (Sobek et al. 1978), Leco total S only (Sobek et al. 1978), or Net Acid Generation pH (Stewart 2004). The test method selected shall include a suitable site-specific trigger level that indicates potential for acid drainage risk in the

sampled interval. Site-specific triggers for the three listed methods could be (ABP >0 ton/1,000 tons as CaCO₃; Total S less than 0.3%; or NAG pH > 4.5). The specific test method and trigger would be developed by RCR subject to Agency approval. A contingency plan would be developed and describe how rock that fails the quick test monitoring action level would be managed.

1.5.4.2.2 Static Tests

Each 10-kg sample (minimum of 45 samples of waste and 44 ore) would be analyzed using Acid-Base Accounting with Acid Generating Potential based on nonsulfate S (Sobek et al. 1978), paste pH, and total metals by ALS Chemex method ME-MS61-M or equivalent. An additional five samples of paste tailings would also be analyzed by the methods described above. If the quick test method described in the previous section is not the Sobek Acid Base Accounting method, then a method comparison between the quick test and the Sobek ABP would be performed on a minimum of 50 samples. The correlation between ABP and quick test results must be calculated and should ensure that the quick test provides accurate and consistent classification of acid generation risk.

Quality assurance samples should be submitted at a frequency of 1 in 50 samples to verify sample accuracy and precision. At least one each of CANMET KZK-1 or NBM-1 (or equivalent) for ABP or LECO S measurements and NIST 2780 (or equivalent) for total metals or equivalent should be used. Also, blind duplicate samples at a frequency of 1 in 50 for ABP and total metals analyses should be included.

1.5.4.2.3 Selected 10-kg Samples – Mineralogy, Metal Mobility Tests, and Soluble Nitrate Analysis

A selected subset of ten 10-kg samples, based on the same 10 samples used for barrel tests, would be used to characterize potential metal mobility using the MWMP (American Society for Testing and Materials 2013). The MWMP extracts would be analyzed for pH, conductivity, alkalinity/acidity, aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, calcium, chloride, chromium, cobalt, copper, fluoride, gallium, iron, lead, lithium, magnesium, manganese, mercury, molybdenum, nickel, nitrate/nitrite as N, nitrogen total as N, phosphorous, potassium, selenium, silver, sodium, sulfate, thallium, tin, vanadium, and zinc. In addition, the samples would be submitted for mineralogical analysis by x-ray diffraction.

1.5.4.2.4 Barrel Test and Wall Rinse Stations

A field barrel test (Attachment 1) would be conducted on selected samples of ore, waste, and paste tailings to determine the water quality of contact water and rate of release of constituents from bulk samples. Samples, to the extent possible, would approximate the overall size and distribution that is representative of run-of-mine material. The barrel test consists of filling a barrel or other large container with rock or paste tailings. A drain outlet is installed near the base of the container. Barrels would be placed outdoors on a pallet to elevate the base of the container to allow for fluid collection. Natural rain and snowfall would provide the source of water for leaching the rock. If water produced in the test is insufficient because of evaporation, deionized water can be added to accelerate leaching. Samples collected from the barrels would be analyzed for pH, conductivity, alkalinity/acidity, aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, calcium, chloride, chromium, cobalt, copper, fluoride, gallium, iron, lead, lithium, magnesium, manganese, mercury, molybdenum, nickel, nitrate/nitrite as N, nitrogen total as N, phosphorous, potassium, selenium, silver, sodium, sulfate, thallium, tin, vanadium, and zinc.

A wall rock rinsing test (International Network for Acid Prevention 2009) would be used to characterize potential loading from underground mine walls (Attachment 2). In general, at least one wall rinse station would be selected for each major rock unit of waste and ore in the Evaluation Adit.

To conduct the wall rock rinse tests, a prescribed area of about 1 m² that consists of exposed rock (no shotcrete) and is relatively free of foreign sediment should be designated. A gutter section below the wall should be attached using epoxy, water from backpack sprayer sprayed onto the wall, and runoff collected. Sufficient water should be applied to collect about 5 liters of water from the rinse station. Water quality in the collected water sample should be measured for pH, conductivity, alkalinity/acidity, aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, calcium, chloride, chromium, cobalt, copper, fluoride, gallium, iron, lead, lithium, magnesium, manganese, mercury, molybdenum, nickel, nitrate/nitrite as N, nitrogen total as N, phosphorous, potassium, selenium, silver, sodium, sulfate, thallium, tin, vanadium, and zinc. The test can be repeated at prescribed intervals for semikinetic evaluation.

1.5.4.2.5 Paste Tailings Evaluation

There are two purposes for evaluating paste tailings in the Phase 1 testing program: 1) evaluate process solution and interstitial water chemistry, and 2) assess the potential mobility of dissolved constituents in layers underlying the proposed paste tailings facility. RCR would prepare a study plan to submit to the Agencies describing how paste tailings would be evaluated in a field scale test that includes 1) characterization of process and interstitial water, and 2) assessment of solution migration in subsurface layers beneath the proposed tailings facility. Part of the tailings evaluation would also consist of characterization and modeling of the paste tailings disposal facility that refines the predicted migration of tailings solution and interaction with groundwater within and beneath the facility.

1.5.4.2.6 Sample Management

A 2-kg portion of each geochemical sample would be archived in case follow-up testing is needed.

1.5.4.3 Phase I Data Analysis and Reporting

1.5.4.3.1 Pilot Hole Samples

Results of the Agency-approved quick test would be used to route waste produced from the Phase I evaluation adit. The proposed plan for construction of the portal pad requires that waste rock placed in the portal pad be nonacid-generating. The approved quick test method would include a trigger level that differentiates acid-generating waste from other materials (e.g., nonacid-generating and uncertain materials). Acid-generating waste would need to be placed underground or otherwise handled according to an Agency-approved plan.

If more than 10% of measured test values from the pilot hole composite samples exceed the approved monitoring action level, then RCR must notify the Agency and reanalyze sample cuttings by intervals corresponding to individual rounds (e.g., one sample per 300 tons of waste). All sample results would be reported immediately when more than 10% of all cumulative tests results exceed trigger. A suitable management plan would be developed and implemented for placing waste to mitigate acid drainage risk. All sample results would be submitted to the Agencies in an annual report.

1.5.4.3.2 Static Test Results

The number of samples proposed for the evaluation adit was based on the goal of collecting more samples than are currently available from the Rock Creek deposit and to ensure availability of an adequate dataset to facilitate statistical comparisons between new data, baseline data, and data from the Troy Mine. An estimated 90,000 tons of waste and 88,000 tons of ore would be removed during advance of the decline and through mining in the ore zone. The proposed sampling frequency is 1 sample for each 2,000 tons mined, which would yield about 45 waste and 44 ore samples.

All static test data collected from the Phase I evaluation adit would be summarized in an annual report submitted to the Agencies. The SEIS concluded that the risk of acid generation or release of metals was

low at Rock Creek based on review of available baseline geochemistry data and based on comparison with the Troy Mine, which was considered a close analog to Rock Creek. A statistical comparison would be performed to ensure these conclusions about acid drainage risk are warranted. The statistical tests would evaluate the difference, if any, in the population average ABP for waste and ore from three populations: Phase I Rock Creek, Baseline Rock Creek, and Troy. In addition, the population proportion of samples with ABP less than zero would also be determined separately for ore and waste samples from the three populations. The Student’s t-test (equation 1) would be used to compare population means and the z-score test (equation 2) to compare population proportions. Results would be compared pair-wise for Phase I Rock Creek waste and ore to baseline geochemistry data and to Troy Mine data. Because of the scarcity of waste samples from Troy, additional waste samples from Troy may be required for this assessment.

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\left(\frac{(N_1 - 1)s_1^2 + (N_2 - 1)s_2^2}{N_1 + N_2 - 2}\right)\left(\frac{1}{N_1} + \frac{1}{N_2}\right)}} \quad [1]$$

$$Z = \frac{(\bar{p}_1 - \bar{p}_2) - 0}{\sqrt{\bar{p}(1 - \bar{p})\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}} \quad [2]$$

Where \bar{X}_1 and \bar{X}_2 , \bar{p}_1 and \bar{p}_2 are ABP means and proportions of ABP<0 for populations 1 and 2, N_1 and N_2 are the number of samples for populations 1 and 2, s_1 and s_2 are ABP standard deviations for populations 1 and 2.

The t test and z score test are commonly used statistical methods that are described in standard statistical textbooks (Witte and Witte 2013).

Statistical Analysis of Baseline Data. Statistical analyses (Table K-3) were used to compare ABP in baseline data (Table K-4) for ore at Rock Creek to ore at Troy. Troy waste sample size was too small to perform comparisons (n=2). Two metrics were used for comparison: the mean and the proportion of samples with ABP<0. The Student’s t-test was used to determine the significance of measured differences in the mean as shown in [1], which takes into account the means and standard deviations of the populations. A one-tailed distribution of p and t was used. The formula used to compare the difference between population proportions is shown in [2], which considers only the proportions and sample size. The z score that results from equation 2 is compared with a standard table of probabilities for a one-tailed distribution. Based on these statistics, Rock Creek ore has a lower average ABP and a greater proportion of ABP samples less than 0 than Troy ore.

If waste samples from the Phase I Evaluation Adit have the same standard deviation measured in baseline samples, and if the mean ABP of Phase I samples was lower by about 3.4 tons (t)/1,000 t as CaCO₃, the difference would be significant at 5% probability. The mean would need to decrease by 4.8 t/1,000 t for the difference to be significant at 1%. The z score test for waste samples would likely be even more stringent than the t test.

Table K-3. Statistical Summary for Ore and Waste Samples from Rock Creek and Troy.

Mine	Type	n	Mean ABP (t/1,000 t as CaCO ₃) ¹	Standard Error of Mean	Standard Deviation	Proportion ABP<0 (%)
Rock Creek	Waste	24	3.0	±1.4	6.8	6
Rock Creek	Ore	34	0.6	±1.1	6.1	50.0
Troy	Waste	2	NA	NA	NA	NA
Troy	Ore	28	7.2	±1.4	7.4	14

¹mean and proportion calculated from values rounded to the nearest significant integer value.

Average ABP for Rock Creek ore is significantly less than at Troy (probability=0.0002).

Proportion of ABP<0 in Rock Creek ore is greater than for Troy ore (p<0.0001).

Table K-4. Baseline ABP data for Rock Creek and Troy.

n	Rock Creek		Troy
	Ore	Waste	Ore
1	2.9	6.5	17
2	1.6	-0.3	15
3	-6.8	8.8	20
4	-0.6	-0.3	13
5	-2.1	-0.3	11
6	16.8	-0.3	9
7	-8.6	13.3	16
8	-2.8	4.2	4
9	10.0	4.1	15
10	-5.4	-11.5	14
11	1.8	3.2	0
12	5.3	3.9	0
13	-4.6	13.9	-5
14	5.0	4.5	-7
15	-4.6	12.1	-4
16	6.3	3.0	-3
17	-5.4	1.0	1
18	-2.1	4.8	1
19	8.8	1.7	3
20	-5.1	0.7	2
21	-4.2	3.0	4
22	2.5	11.1	8
23	3.4	-16.6	14
24	6.3	-0.3	13
25	8.5		12
26	-12.8		13
27	-1.4		8
28	1.3		7
29	-0.3		
30	-1.3		
31	-3.4		
32	-3.1		
33	8.8		
34	6.1		

If the average ABP of samples collected under the Phase I Monitoring Plan are significantly lower than the average ABP estimated in the Rock Creek baseline geochemistry data (at a probability that the means are equal to 5% or less), then the acid drainage risk should be revised based on the new findings. Similarly, if the proportion of samples with ABP less than zero collected under this program are significantly higher than the proportion estimated in the Rock Creek baseline geochemistry data (at a probability that the proportions are equal to 5% or less), then the acid drainage risk should be revised based on all available data.

1.5.4.3.3 Use of Other Data Collected under This Plan

Other data collected under the Geochemical Monitoring Program is meant to improve and expand the baseline geochemical characterization of the Rock Creek deposit. These data, including MWMP, mineralogy, barrel test, wall rinsing tests, and the field tailings investigation, would be summarized and interpreted in annual reports submitted to the Agencies.

1.5.4.3.4 Explosive Handling and Blasting Plan

Release of nitrogen compounds is of particular concern in underground mines because of the relatively large amounts of explosives used to break rock. Prior to Phase I, RCR would be required to submit a detailed Explosive Handling and Blasting Plan for agency approval that describes the blasting agents that would be used for various conditions (e.g., when water is present or absent), powder factors used, housekeeping practices, and other relevant information. If soluble nitrogen compounds in downgradient surface or groundwater exceed the action levels described in Section 1.6.7, RCR would notify the KNF and DEQ within 5 working days and follow the process outlined in Section 1.6.7. In the event of action level exceedances, RCR would also be required to submit a revised Explosive Handling and Blasting Plan to the KNF and DEQ for approval. Additionally, nitrate and total nitrogen data from the MWMP test may be used to develop monitoring action levels in blasted rock material for future use to ensure adequate blasting performance.

1.5.4.3.5 Integration with Surface Water and Groundwater Monitoring

As described in Section 1.6, surface water and groundwater monitoring would be used to detect potential releases of constituents from the portal pad area (in Phase I) and from all facilities in Phase II. If a chemical release is detected, then the geochemical data collected under this program may be used to better understand the potential contribution of mine contact water to the potential release and to assess ways of preventing, abating, or mitigating releases. It may be necessary to develop and implement new mine waste management procedures, expand monitoring, or set new monitoring action levels if constituent releases are caused by mine contact water.

1.5.4.3.6 Contingencies and Reporting

This Geochemical Characterization and Monitoring Plan contains a number of monitoring action levels, described in previous sections. Preliminary contingency measures associated with each monitoring action level are described in Table K-5. In addition, notification and reporting requirements are also described. An annual report would be submitted to the Agencies that provides sample results, includes the statistical comparisons described above, and integrates the results of solution monitoring (e.g., surface water, groundwater, mine water, and process solution sampling) with the geochemical observations. All analytical data collected from lab samples, as well as field barrel tests and wall rinsing tests, would be compiled in the report. The overall acid drainage and metal leaching risk would be quantified. Issues or concerns would be addressed through appropriate contingencies.

Table K-5. Geochemical Monitoring Plan Elements, Monitoring Action Levels, and Contingencies.

Monitoring Plan Element	Monitoring Action Level (MAL)	Reporting Required	Contingent Action
Topic 1: ARD risk quick test of waste rock	To be developed in coordination with test method ¹	Immediate notice if more than 10% of cumulative samples fail MAL	Place waste rock with ARD risk underground or revise surface placement/handling plan
Topic 2: Compare average ABP and proportion of ABP <0 t/1,000 t to baseline	Average ABP or proportion of ABP results <0 is significantly lower than baseline at 1% probability by t test	Results provided in annual summary report	Revise assessment of inherent acid drainage and metal leaching risk for the project based on new information; revise mining plan as appropriate
Topic 3: Compare average ABP and proportion of ABP <0 t/1,000 t to baseline	Average ABP or proportion of ABP results <0 is significantly lower than baseline at 1% probability by t test	Results provided in annual summary report	Revise assessment of inherent acid drainage and metal leaching risk for the project based on new information; develop new estimate of contact water quality that does not rely on comparison to Troy
Topic 4: Measure total nitrogen levels in waste rock	Exceed nitrate standard in groundwater or surface water monitoring	Refer to groundwater or surface water monitoring plan	Data collected in this program on total nitrogen in waste rock may be used to locate the nitrogen source, refine the Explosive Handling and Blasting Plan, or develop MAL for N in waste rock
Topic 5: Contact water chemistry in waste rock, ore, and paste tailings	None	Results provided in annual summary report	If contact water chemistry measured in field tests differs significantly from assumptions used in the SEIS, the mine plan may require modification. Also if the potential for migration of metals or acidity from facilities is substantially greater than predicted in the SEIS, the impact assessment may need to be revised and mitigation may be required.

¹Preliminary monitoring action levels for acid base potential (<0 t/1,000T and nonsulfate S >0.3%), Total sulfur (more than 0.3%), or net acid generation pH (NAG pH <4.5).

1.5.4.4 Phase II Geochemical Sampling

If Phase II of the project proceeds, Phase II testing would be determined based on the Phase I data collected. Information learned during Phase I would inform Phase II testing requirements, sampling frequency, testing methods, and trigger levels. Prior to Phase II, RCR would submit a Phase II Geochemical Characterization and Monitoring Plan to the KNF and DEQ for review by an agency Technical Advisory Group (TAG) or a third-party consultant. RCR would not be permitted to implement Phase II of the project (facility construction, mine development, and mine operation) until the KNF and DEQ approve the Phase II Geochemistry Characterization and Monitoring Plan.

1.5.5 Data Management

RCR funded the development of a geochemical database that contains all data relating to ore, waste rock, and tailings of the formations likely encountered by the Montanore Project and the proposed project, such as the Revett, Pritchard, and Burke Formations. The database is part of the Montanore Project and Rock Creek Project record. RCR would fund the maintenance and updating of the database.

1.6 Water Resources Monitoring Plan

This plan provides the conceptual framework necessary for development of a water resources monitoring program for the project. As described in the introduction to this Appendix K, only a final monitoring plan approved by the KNF, DEQ, and consistent with Bush 2018, the USFWS would be implemented and needs to contain the requirements listed below. Additional monitoring requirements are specified in

Appendix E of the Revised Rock Creek Evaluation Adit Project Application for Exploration License (RCR 2010) and would also be specified in any MPDES permits obtained for the project (see Table 1-2 in Chapter 1 of the SEIS for the status of MPDES permits). The final approved plan would contain specific information on sample location, chemical parameters for analysis, laboratory detection limits, frequency of data collection, and reporting requirements, and details of the monitoring action levels and Contingency Action Plan specified below in Section 1.6.7. As described below in Section 1.6, the USDI Fish and Wildlife Service (USFWS) would advise the KNF in developing the Water Resources Monitoring Plan as it relates to ESA objectives. Monitoring would be conducted by a third-party contractor.

The objectives of the water resource monitoring are to:

- supplement the original data collection and provide long-term monitoring for the project;
- refine and validate models used to predict environmental impacts;
- characterize benchmark sites near, but outside, the range of influence of expected mine or adit inflows;
- collect data to quantify any measurable environmental impacts accompanying construction, operation, or reclamation of the project; and
- provide information to determine required mitigation measures, if needed, to correct any impacts encountered and to ensure compliance with applicable regulatory requirements.

A comprehensive monitoring system network would be established to evaluate potential water quantity and quality impacts associated with the underground mine, mill, utility corridor, water treatment facility, and paste tailings facility. Data would be collected and evaluated in detail using standard statistical analyses to determine if differences exist between:

- pre-construction conditions and conditions during the mine development, production/operations, and closure/post-closure phases;
- potential impact area sites and benchmark sites;
- sampling locations;
- seasons; and
- high and low flows, as well as storm events such as rain-on-snow events.

The water resources monitoring program would begin during Phase I implementation at least 1 year prior to evaluation adit dewatering in the area near the evaluation portal pad and in the area near the infiltration ponds where surface water or groundwater may be affected by Phase I construction and operations (Figure K-3); this does not include monitoring for the upgrade work completed by RCR on NFS road #150 and NFS road #2741, which is covered in MPDES permit MT0031763. Phase II water resources monitoring would begin during the first year of Phase I construction and would occur for several years prior to the initiation of Phase II construction in the Rock Creek, East Fork Bull River, Bull River, Miller Gulch, and Clark Fork River watersheds where surface water or groundwater may be affected by Phase II construction and operations. The areas potentially affected by Phase I and Phase II activities shown on Figure K-3 are hereafter referred to as the Phase I and Phase II monitoring areas. Monitoring would continue through the life of the project as well as after reclamation for a period to be specified by the Agencies. RCR and its predecessors have collected and reported ambient surface and groundwater quantity and quality data within the study area through 2016.

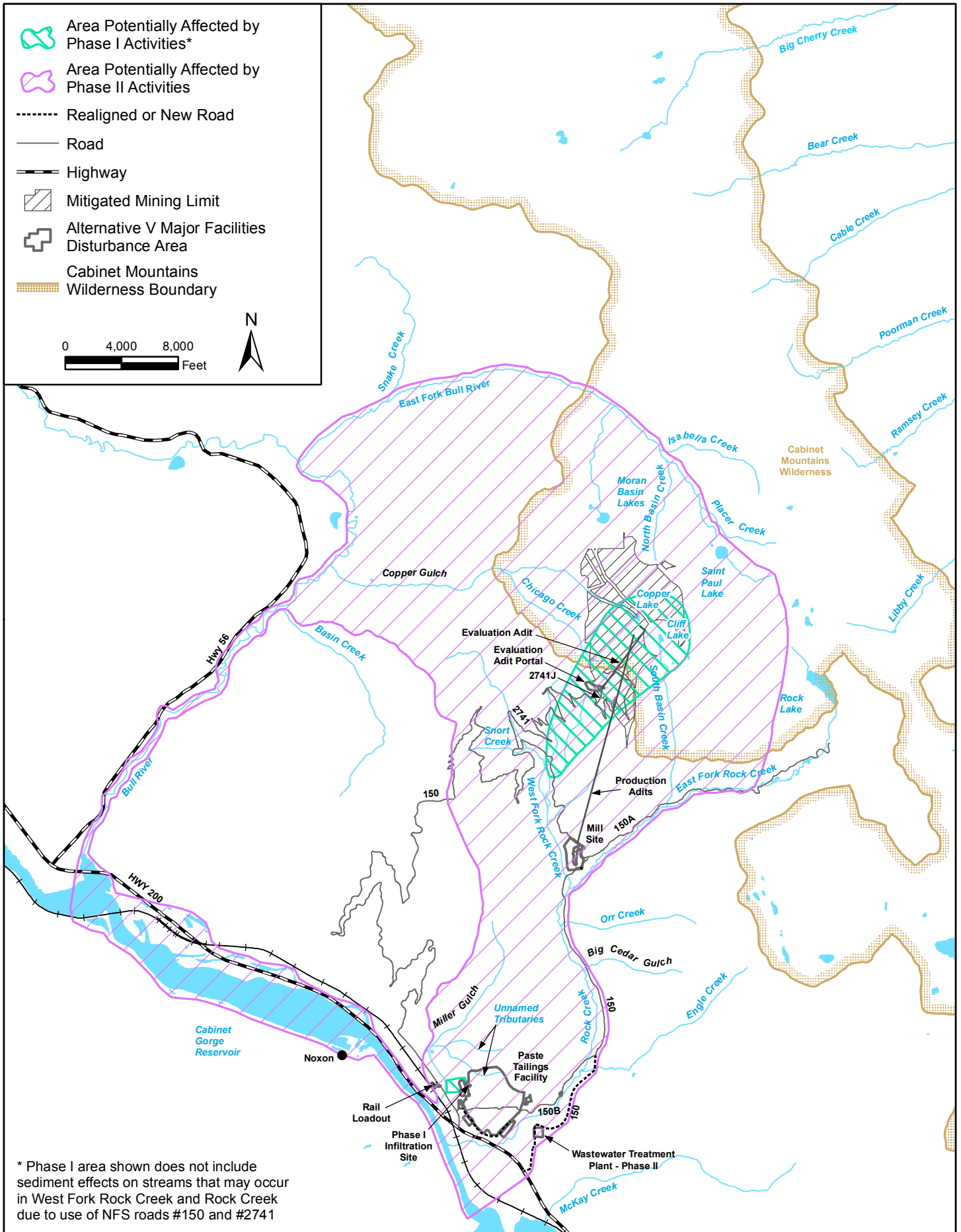


Figure K-3. Areas Potentially Affected by Phase I and Phase II Activities

RCR would work with the KNF and DEQ to develop a Memorandum of Agreement (MOA) that would describe the process of selecting and funding a third-party contractor in amounts equal to RCR’s costs for the required water resources monitoring. All of the required water-resources monitoring would be accomplished through implementation of the MOA.

The monitoring plan is divided into several elements:

- sample collection, analytical methods, and data handling;
- water quality parameters;
- monitoring during Phase I implementation;
- hydrologic data collection and review during evaluation and construction;
- surface water monitoring;
- groundwater monitoring;
- sediment monitoring;
- facility water balance and chemistry;
- a quality assurance and quality control (QA/QC) program;
- monitoring action levels;
- contingency action plans; and
- reporting requirements.

These elements are discussed in detail below.

1.6.1 Sample Collection, Analytical Methods, and Data Handling

Field procedures would follow DEQ procedures (DEQ 2014 or equivalent) and collection, storage, and preservation of water samples would follow EPA procedures (EPA 1982). Grab samples would be collected from streams and springs, and groundwater samples would be obtained with a bailer or submersible pump. Samples would be cooled immediately after collection. Metals in water samples would be preserved by adding nitric acid in the field to lower the pH to less than 2.0 or as appropriate to meet standard industry sampling protocols.

Groundwater samples for metal analyses would be field filtered through a 0.45-micron filter to allow measurement of the dissolved constituents. Chemical analysis of water samples would follow procedures described in 40 CFR 136, EPA-600/4-79-020 (EPA 1983), or methods shown to be equivalent. All field procedures would follow standard sampling protocols as demonstrated through the QA/QC documentation. Laboratory reporting limits would comply with the required reporting values listed in Table K-6 and Table K-7.

1.6.1.1 Water Quality Parameters

At a minimum, all surface water quality samples would be analyzed for the parameters evaluated in the SEIS and listed in Table K-6 and all groundwater samples would be analyzed for the parameters listed in Table K-7. If data collected under this plan were to be used for compliance purposes for any MPDES permit obtained for the project, achievement of reporting levels specified in the MPDES permit would be required. Flow measurements would be made using the most accurate site-specific method available and appropriate for the site. Subsequent to review of data collected during the initial years of the project, continued testing may be changed based on constituents present in the untreated wastewater.

Table K-6. Proposed Monitoring Parameters and Required Reporting Values for Surface Water Samples.

Parameter	Current Required Reporting Value (mg/L unless otherwise specified)	Parameter	Current Required Reporting Value (mg/L)
Physical and Biological Parameters			
Flow (cfs or gpm)	Within 10% accuracy	Total alkalinity (as CaCO ₃)	2
pH (s.u.)	0.1	Total hardness (as CaCO ₃)	1.0
Dissolved oxygen	0.3	Turbidity (NTU)	1.0
Specific conductivity (µS/cm)	1.0	Chemical oxygen demand [‡]	5.0
Temperature	-	Oil and grease [‡]	1.0
Inorganic Parameters			
Total dissolved solids	1.0	Nitrate, as N	0.02
Total suspended solids	1.0	Nitrite, as N	0.01
Sodium	0.03	Nitrate+nitrite, as N	0.02
Calcium	0.08	Ammonia, as N	0.07
Magnesium	0.02	Total inorganic nitrogen	Calculated
Potassium	0.05	Total nitrogen	0.07
Bicarbonate	1.0	Total phosphorus, as P	0.003
Chloride	0.1	Ortho-phosphate	0.003
Sulfate	0.2	Silica	0.4
Metals			
Aluminum, dissolved (0.45 µm filter)	0.03	Lead	0.0003
Antimony	0.0005	Manganese	0.005
Arsenic	0.001	Mercury	0.000005
Cadmium	0.00003	Silver	0.0002
Chromium	0.01	Thallium	0.0002
Copper	0.002	Zinc	0.008
Iron	0.02		

cfs = cubic feet per second, gpm = gallons per minute, s.u. = standard units, mg/L = milligrams per liter, µS/cm = microsiemens per centimeter, NTU = nephelometric turbidity unit

Note: Metals are total recoverable unless otherwise specified.

For parameters without a Circular DEQ-7 required reporting value, the achievable reporting limits shown are from USFS 2012a, Table 3-1 of the SEIS, and EPA 1999.

[‡]For discharges associated with stormwater runoff.

Table K-7. Proposed Monitoring Parameters and Required Reporting Values for Groundwater Samples.

Parameter	Current Required Reporting Value (mg/L unless otherwise designated)	Parameter (Dissolved Metals)	Current Required Reporting Value (mg/L)
pH (s.u.)	0.1	Aluminum	0.03
Dissolved oxygen	0.3	Antimony	0.0005
Specific conductivity ($\mu\text{S}/\text{cm}$)	1.0	Arsenic	0.001
Total dissolved solids	1.0	Cadmium	0.00003
Sodium	0.03	Chromium	0.01
Calcium	0.08	Copper	0.002
Magnesium	0.02	Iron	0.02
Potassium	0.05	Lead	0.0003
Bicarbonate	1.0	Manganese	0.005
Chloride	0.1	Mercury	0.000005
Sulfate	0.2	Selenium	0.001
Nitrate+Nitrite, as N	0.02	Silver	0.0002
Ammonia, as N	0.07	Thallium	0.0002
Total Phosphorus as P	0.003	Zinc	0.008
Ortho-phosphate	0.003		
Temperature	—		
Total alkalinity (as CaCO_3)	2		
Total hardness (as CaCO_3)	1.0		
Acrylamide [†]	0.01 or lowest possible		

[†]In groundwater downgradient of the paste tailings facility during operations.

For parameters without a Circular DEQ-7 required reporting value, the achievable reporting limits shown are from USFS 2012a, Table 3-1 of the SEIS, and EPA 1999.

1.6.1.2 Quality Assurance/Quality Control Program

Quality assurance (QA) assures the integrity and reliability of monitoring and measurement data. Quality control (QC) is the application of procedures to evaluate data acquisition techniques and analyses according to established criteria. QC procedures define whether sampling and analytical techniques are in or out of control with reference to applied standards and control limits.

As part of each plan for environmental monitoring, RCR would develop a Quality Assurance Project Plan (QAPP) and submit it to the agencies for approval. Collectively, these procedures would compose a plan that ensures the reliability and accuracy of monitoring information as it was acquired. QA/QC procedures would include both internal and external elements. Internal elements may include procedures for redundant sampling such as random blind splits or other replication schemes, chain of custody documentation, data logging, and error checking. Surface water quality sampling would follow DEQ’s *Quality Assurance Project Plan, Sampling and Water Quality Assessment of Streams and Rivers in Montana, 2005* (DEQ 2005). A specific QA/QC program would be approved by the Agencies. This program would include sample documentation, as well as sample control and data validation by an independent data reviewer.

Written reports to document the implementation of the plan would be an integral part of monitoring reports. Any variances or exceptions to established sampling or data acquisition methods during monitoring would be documented. Documentation would include a discussion of the significance of data

omissions or errors, and measures taken to prevent any occurrences. Reports would be submitted to the appropriate agencies with the annual report, unless otherwise requested.

1.6.2 Phase I Monitoring

Phase I monitoring would begin once the KNF and DEQ issued a Notice to Proceed for Phase I. Monitoring would be conducted at previously monitored sites and other sites that might be impacted by Phase I activities. Monitoring activities and their period of initiation, duration, and frequency are described in the subsections below. Monitoring during Phase I would be supplemented by monitoring specified in Appendix E of the Revised Rock Creek Evaluation Adit Project Application for Exploration License (RCR 2010). The subsections below discuss:

- Phase I benchmark stream, and spring sites
- Phase I Groundwater Dependent Ecosystems
- Phase I wilderness lake monitoring
- Phase I surface water monitoring
- Phase I sediment monitoring
- Phase I groundwater monitoring.

1.6.2.1 Phase I Benchmark Stream and Spring Sites

It may be difficult to separate the potential effects of evaluation adit dewatering on streamflow or spring flow from natural variability and the effects of climate change. For this reason, the third-party contractor would monitor springs and a stream located outside of the Phase I monitoring area. RCR, with agreement from the Agencies, would choose a benchmark stream in the Cabinet Mountains Wilderness (CMW). This would be a stream with a similar geology, water quality, watershed area, aspect, and starting altitude as at least one of the streams in the CMW predicted to be affected by Phase I evaluation (South Basin Creek, Chicago Creek, Copper Gulch, and West Fork Rock Creek) that are not on private land. A benchmark stream might be one of the tributaries to the East Fork Bull River within the CMW north of the river that would not be affected by Phase I activities. Benchmark springs would be chosen based on location, altitude, water quality, and hydrogeologic setting. It may not be possible to choose benchmark springs until springs within the Phase I monitoring area have been characterized, and springs with a bedrock groundwater source identified. Benchmark springs would then be found for those springs with a bedrock groundwater source that might be affected by mine dewatering. The number of springs to be monitored would be determined following completion of the GDE inventory. Monitoring at the benchmark stream and springs would be the same and would occur at the same time and frequency as monitoring at the analogous sites within the Phase I monitoring area. Springs would be categorized by location, altitude, and hydrogeologic setting. The benchmark stream and springs would be used to develop trend analyses to determine if flow or groundwater level changes were due to evaluation adit dewatering or other mine-related activities or to natural variability and climate change.

1.6.2.2 Phase I Groundwater Dependent Ecosystems

As part of the Phase I GDE activities, a Level II Inventory (USFS 2012b) would first be conducted. Based on the results of the inventory, a GDE monitoring plan would be developed, approved by the KNF, and then implemented. The inventory’s objective would be to determine the connection of Phase I area (Figure K-4) springs, wetlands, and streams to the regional bedrock groundwater system. The plan’s objective would be to detect stress to flora and fauna from effects on surface water or groundwater due to Phase I adit dewatering so that mitigation can be implemented to minimize such stress.

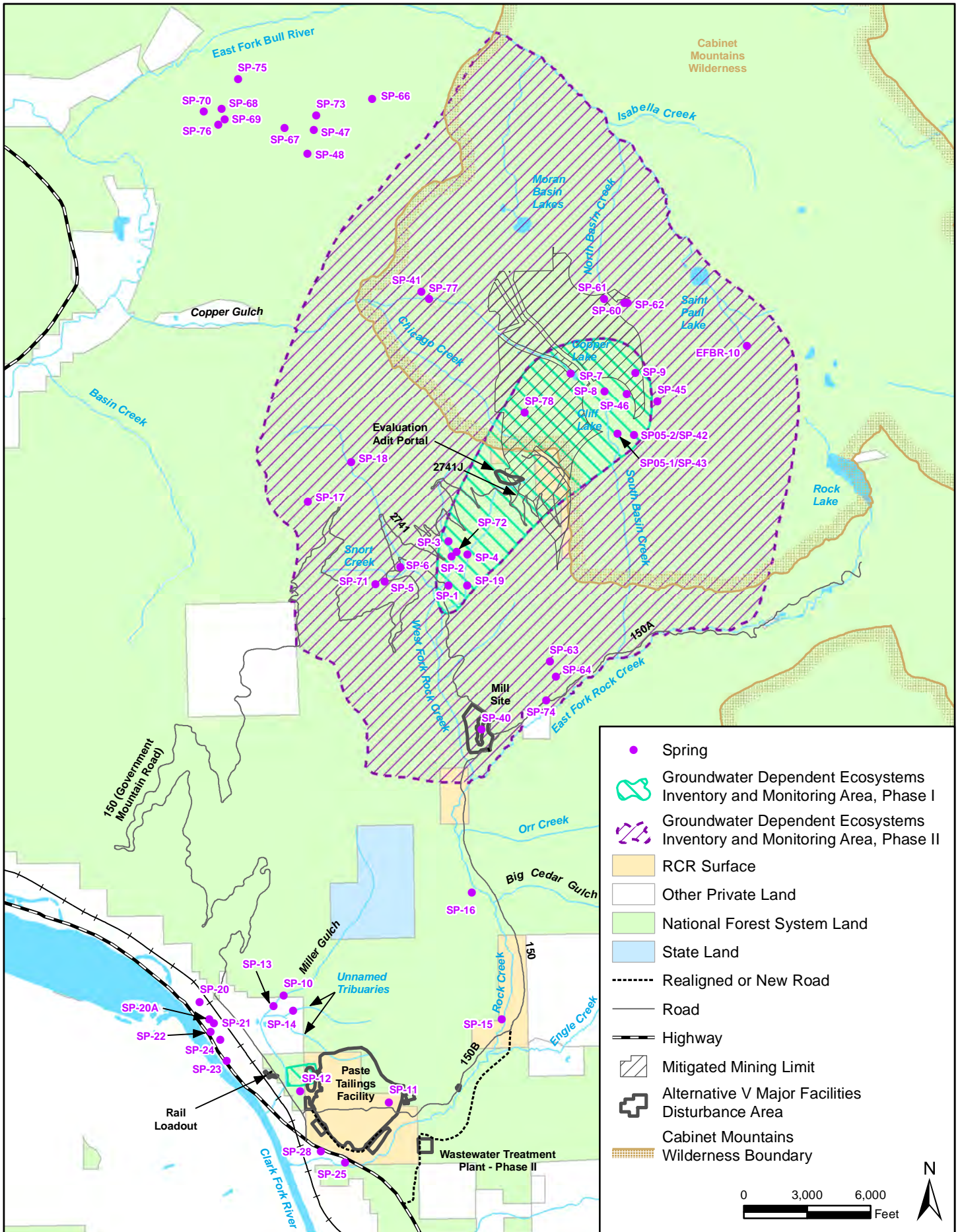


Figure K-4. Groundwater Dependent Ecosystems Inventory and Monitoring Area

1.6.2.2.1 GDE Inventory

The purpose of the Phase I GDE inventory would be to identify ground-water dependent springs, seeps, wetlands, riparian habitat, and stream ecosystems potentially affected by Phase I activities. A GDE inventory for the area potentially affected by Phase I activities (Figure K-3) was initiated by Hydrometrics in 2015 (Hydrometrics 2015) and continued by Morrison Maierle in 2016 (Morrison Maierle 2017). Information collected during the inventories is described in Section 3.7 of the Final SEIS. Prior to Phase I evaluation adit dewatering, the third-party contractor would complete a Level II GDE inventory of the area potentially affected by Phase I (Figure K-3). The inventory would be conducted in accordance with the most current version of the Forest Service’s Groundwater Dependent Ecosystems: Level II Inventory Field Guide (USFS 2012b) and would focus on areas potentially affected by evaluation adit inflows. The Phase I GDE inventory area shown in Figure K-4 is based on the maximum drawdown for Phase I predicted by the 3D model (see Figure 4-5 of the SEIS).

Before beginning a Phase I GDE inventory, RCR would conduct aerial photography and Light Detection and Ranging (LIDAR) reconnaissance of the Phase I inventory area. In addition to the wetlands or springs discussed in the SEIS, the third-party contractor would inventory any wetlands or springs newly identified during the reconnaissance.

The inventory would include the collection of water samples to determine the general water chemistry and for isotopic analyses to assist in establishing the source of the groundwater. Very steep unvegetated areas within the Phase I inventory area would not be inventoried; the KNF would approve any areas not to be surveyed before the inventory was initiated. An inventory would help identify and rank GDEs based on their importance in sustaining critical habitats or species. After RCR submitted the inventory report to the KNF, the KNF would determine which GDEs would be monitored during subsequent phases.

Springs and Seeps

The Phase I inventory area shown on Figure K-4 would be surveyed for springs and seeps. In this initial inventory, the flow of each spring would be measured twice: once between mid-August and mid-September during a time of little or no precipitation and once when the area was initially accessible in the spring or summer (June or July). Spring flow measurement would be conducted in accordance with the GDE protocol (USFS 2012b). Any spring with a measurable flow between mid-August and mid-September would be assessed for its connection to a regional groundwater system, based on flow characteristics (e.g., possible short-term sources of water supply, such as nearby late-season snowfields or recent precipitation), water chemistry including the use of isotopes, and the hydrogeologic setting (associated geology such as the occurrence or absence of colluvium or alluvium). Data collected during previous spring surveys would be incorporated where appropriate. A spring that was determined not to be connected to the regional bedrock groundwater system, based on all available data and observations, would be eliminated from additional monitoring.

Wetland and Riparian Vegetation and Other Measured GDE Characteristics

The inventory area shown on Figure K-4 would be surveyed for groundwater-dependent wetlands, fens, and riparian areas. At each potential GDE site identified from the inventory, a vegetation survey using the Forest Service Level II Sampling Protocol for GDEs (USFS 2012b) would be completed. Initial survey data would include site photos and points, Global Positioning System (GPS) site locations, basic site descriptors, and plant species composition, focusing on hydrophytes (plants that are able to live either in water itself or in moist soils). In addition to collecting flow and vegetation data, the groundwater table position would be measured, soils and peat or muck depth described, and aquatic and terrestrial fauna would be inventoried (USFS 2012b).

Streamflow

In the initial inventory, the flow of all streams in the Phase I GDE inventory area (Figure K-3 and Figure K-4) would be measured every 2 weeks starting whenever the area was initially accessible in the spring or summer through mid-October to determine where any of the streams may be connected to the regional bedrock groundwater system. The most accurate site-specific method for measuring streamflow would be used. Measurements would be taken so that gaining stream reaches could be mapped, and then monitoring locations would be refined to focus on gaining reach lengths and flow. An example of how to determine if stream segments are gaining water from the regional groundwater system is to collect synoptic flow measurements within as short a period as possible at short intervals along the stream segments within the inventory area. Streams would be assessed for their connection to a regional groundwater system based on flow measurements, water chemistry, the associated hydrogeology (such as faults or the occurrence or absence of colluvium and/or alluvium), and possible short-term sources of water supply (such as nearby late-season snowfields or recent precipitation). If the KNF determines that a stream segment is not connected to the regional bedrock groundwater system, based on all available data and observations, such locations may be eliminated from additional monitoring.

1.6.2.2 Phase I GDE Monitoring Plan

RCR would submit to the KNF for approval a Phase I GDE Monitoring Plan for the GDEs found during the Phase I inventory, including any springs, wetlands, and riparian habitat supported by the regional groundwater system, and stream segments gaining water from the regional bedrock groundwater system. The plan would be incorporated into an overall Water Resources Monitoring Plan. The Phase I GDE Monitoring Plan would specify monitoring locations and frequency based on inventory data, the local hydrogeology, and proximity to the Phase I evaluation adit void. The plan’s objective would be to effectively detect stress to flora and fauna from effects on surface water or groundwater due to Phase I adit dewatering so that mitigation can be implemented to minimize such stress. The plan would include piezometers in critical locations, a monitoring schedule, a mitigation plan, and mitigation implementation triggers. The results of the GDE monitoring would be reported in annual reports to the Agencies.

Criteria required to determine characteristics to monitor are traits that:

- 1) *have a defined relationship with groundwater levels*: there needs to be confidence that a measured response within a parameter reflects altered groundwater levels rather than other abiotic/biotic factors;
- 2) *are logistically practical*: parameters should be practical to measure within the constraints of a wilderness setting; parameters that reflect landscape responses by GDEs of wide distribution, such as remote sensing of hydrophytic vegetation health, could be considered; and
- 3) *have early warning capabilities*: it is important to consider the lag time between changed groundwater levels and environmental condition or health. The response of vegetation parameters influenced by changed groundwater levels can take a long time to become manifested and further reductions may occur before impacts of previous changes are realized; consequently, parameters with rapid responses are favored (e.g., groundwater levels in piezometers), because they provide advance warning of significant stress or degradation on the system, as well as the opportunity to determine whether intervention or further investigation is required.

Nevertheless, some GDE values may have to be measured through parameters with a greater lag time between changed groundwater levels and changes in that parameter (e.g., hydrophytic vegetation community composition).

Table K-8 identifies monitoring options for GDEs in the inventory area. After the initial survey, this table would help to establish the methods that would be used to monitor GDEs. Additional monitoring of GDEs may be required, depending on the outcome of the GDE inventory.

Table K-8. Groundwater Dependent Ecosystem Monitoring Options.

Surface Resource Component	Look For:	Using:
Springs and Streams	Flow changes	Flow monitoring
	Wetted perimeter/stage changes	Channel cross-section measurements
	Groundwater level changes	Piezometers
Wetland and Riparian Vegetation	Groundwater level changes	Piezometers
	Dieback, early desiccation, habitat decline	Photo points, field surveys, remote sensing
	Soil moisture stress	Tensiometers
	Plant water potential/ turgor pressure changes	Pressure bomb technique
Amphibians, Mollusks, Macroinvertebrates, Fish	Population decline, community composition change	Field surveys
Terrestrial Animals	Population/usage decline	Field surveys

The Phase I GDE Monitoring Plan would incorporate the *Springs and Seeps Vegetation Monitoring Plan* included in Appendix K attached to the 2003 ROD. The following guidelines would be used to develop a monitoring plan for potential vegetation changes at springs and seeps as a result of changes in water quality or flow changes due to Phase I activities. The Phase I GDE inventory included monitoring of vegetation around seeps and springs and upper tributary streams.

Potential monitoring options for wetlands (including fens) and riparian areas are listed in Table K-8. Monitoring would depend on the nature and location of the wetland or riparian area and generally would include vegetation cover (woody, herbaceous, and bryophytes); spring and seep flow measurements; and groundwater level measurements.

Information from the initial GDE inventory would be used to develop a prevalence index (U.S. Army Corps of Engineers (Corps) 2008) for monitored wetlands overlying the mine. Many plant species have been given wetland indicator status of obligate wetlands, facultative wetlands, facultative, facultative upland, or upland based on probabilities of occurring in wetlands. The Corps maintains and periodically updates a list of plants and their wetland indicator status (Corps 2016). If a drying trend were to occur at a wetland and riparian site, the composition of plants would be expected to shift from a dominance of obligate wetland and facultative wetland species to a higher percentage of facultative wetland, facultative, and facultative upland species. For example, a reduction in the cover of sphagnum moss, an obligate wetlands species, would be an indicator of slight shifts in hydrological conditions because this plant does not have roots and is dependent on water saturating the soil for all or most of the growing season. A prevalence index of 3.0 or less indicates that hydrophytic vegetation is present (Corps 2008). A prevalence index would be identified for each wetland and riparian site monitored.

1.6.2.2.3 Phase I GDE Monitoring

The third-party contractor would monitor springs and seeps, groundwater-dependent wetlands, fens, and riparian areas, and streams identified and measured during the Phase I GDE inventory and as outlined in the KNF-approved Phase I GDE Monitoring Plan. Data collected during the Phase I GDE monitoring would supplement data collected during the Phase I GDE inventory.

1.6.2.3 Phase I Wilderness Lake Monitoring

Prior to evaluation adit dewatering, the third-party contractor would collect water balance and water budget data from Cliff and Copper lakes. Lake levels and adjacent groundwater levels would be measured as described in Appendix E of the Revised Rock Creek Evaluation Adit Project Application for Exploration License (RCR 2010). A high-elevation weather station would be installed and maintained for use in the lake water balance studies.

1.6.2.4 Phase I Surface Water Monitoring

At least 1 year prior to evaluation adit dewatering, the third-party contractor would monitor stream flows, stream water quality, and stormflows in the area potentially affected by Phase I, including near the Phase I infiltration ponds. Streams would be monitored monthly, except when prevented by winter conditions. Continuous flow recorders would be installed and operated at key stream locations. The third-party contractor would monitor one surface water monitoring location downgradient of the evaluation adit during periods of flow (EP-1, Figure 3.7 of the SEIS). During low-flow periods, RCR would monitor Miller Gulch at MG-1 on a monthly basis to document water quality, and monthly during evaluation drilling through the ore body and analyzed for parameters listed in Table K-6. If the water quality at MG-1 (Figure 3-7 of the SEIS) showed a statistically significant increasing trend ($p < 0.05$) in concentration of any parameter, RCR would notify the Agencies within 5 working days. RCR would review the mitigation measures described in the Contingency Action Plan and propose to implement one or more of the measures described therein to ensure that any applicable surface water standards and nondegradation criteria would not be exceeded.

1.6.2.5 Phase I Sediment Monitoring

Prior to Phase I road or facility construction, the third party contractor would measure suspended sediments at West Fork Rock Creek and East Fork Rock Creek above the confluence of the forks, Rock Creek near the confluence with the Clark Fork River, and Miller Gulch near the confluence with the Clark Fork River. If possible, continuous data recorders would be used. Other sediment monitoring requirements for Phase I, such as McNeil core sampling, turbidity monitoring, and streambed sediment monitoring are described in MPDES Permit MT0031763 and Appendix E of the Revised Rock Creek Evaluation Adit Project Application for Exploration License (RCR 2010).

Monitoring would include short-term turbidity monitoring to ensure that the maximum daily turbidity limit of 5 NTUs above the naturally occurring turbidity in Miller Gulch, Rock Creek, and tributaries to Rock Creek would not occur as result of construction activities. Turbidity monitoring would be completed before, during, and after construction. RCR would also monitor the 19 sediment mitigation sites listed in Table N-3 (Appendix N) to ensure they were effective in reducing sediment delivery to streams by 234 tons/year during construction activities. After the Phase I road improvements were completed, sediment levels would be monitored and the estimated reduction in sediment from the improvement work would be reevaluated. Instream sediment monitoring (streambed core sampling) would also be used to evaluate the implementation and effectiveness of the sediment mitigation program.

RCR would develop and implement a final Storm Water Pollution Prevention Plan (SWPPP) for Phase I that identifies BMPs to be used to minimize or eliminate the potential for pollutants to reach surface water through stormwater runoff. The pollutants would be primarily sediment, but could include wastes or fuels that might be stored at a construction site. BMPs would be developed in accordance with the Forest Service’s National Best Management Practices for Water Quality Management on National Forest System Lands (USFS 2012c). RCR would maintain the BMPs so they remained effective. Post-construction, BMPs would be inspected at least monthly (during the snow free period) until revegetation was successful and, as during construction, within 24 hours after any precipitation event of 0.25 inch or greater or a snowmelt event that produced visible runoff. Inspection and monitoring of stormwater BMPs would

continue until the areas disturbed during construction were finally stabilized. Final stabilization is defined as when a vegetative cover has been established with a density of at least 70% of the predisturbance levels, or equivalent permanent physical erosion-control reduction methods have been employed. Final stabilization using vegetation would be accomplished using a seed mixture approved by the Agencies. The Agencies expect that final stabilization would occur within 2 years of the completed activities.

1.6.2.6 Phase I Groundwater Monitoring

Prior to evaluation adit construction and in accordance with the Rock Creek Evaluation Adit License Application (RCR 2010), the third-party contractor would inventory domestic wells and other water supplies, such as active surface water or spring water rights that could potentially be affected by water disposal at the infiltration ponds during Phase I. All water supply wells and springs would be sampled to establish pre-operational conditions, preferably for four quarters to establish seasonal variation. From the sampled locations, the third-party contractor would establish a list of wells to be sampled on a quarterly basis during Phase I. Water samples would be analyzed for the same parameters as required during the pre-operational period, and as identified in the Rock Creek Evaluation Adit License Application (RCR 2010).

Two shallow groundwater monitoring wells would be installed on the downgradient side of the evaluation adit pad at the base of the talus slope to monitor potential impacts on groundwater quality from the portal pad, evaluation support facilities, and stormwater control facilities. The monitoring wells would be screened at the colluvium/bedrock contact. A third-party contractor would monitor groundwater levels in the two wells on a quarterly basis to monitor the effectiveness of the collection ditch and to monitor water quality (Table K-7) of any groundwater that bypassed the collection system. If monitoring indicated that groundwater quality reached any of the action levels listed in Table K-9, a Contingency Action Plan would be implemented, as described in Section 1.6.7.

Groundwater would be monitored downgradient of the infiltration ponds, including at MW06-2, MW06-3, and other downgradient wells that DEQ may determine were needed, as well as MW06-1 upgradient of the infiltration ponds (Figure 3-12 of the SEIS) and analyzed for parameters listed in Table K-7. RCR would monitor the wells initially on a weekly basis upgradient and downgradient of the infiltration ponds to document water quality, and weekly during evaluation drilling through the ore body, when adit metal concentrations would be expected to be higher.

Table K-9. Proposed Action Levels for Groundwater Compliance Wells.

Parameter	Groundwater Standard (mg/L)	Action Level (mg/L) [§]	Parameter	Groundwater Standard (mg/L)	Action Level (mg/L) [§]
Nitrate, as N	10	5	Antimony	0.006	0.003
Nitrite, as N	1	0.5	Arsenic	0.01	See text above
			Cadmium	0.005	0.0025
			Chromium	0.1	0.05
			Copper	1.3	0.65
			Mercury	0.002	0.001

“—” = No applicable concentration.

mg/L = milligrams per liter. All metals are dissolved.

[§]If the ambient concentration in any individual monitoring well were to consistently exceed 50% of an action level, the action level would be increased accordingly.

1.6.3 Phase I Hydrologic Data Collection and Review

Pre-operational data collected during Phase I implementation would be used in refining and validating models or other analyses that were used to predict environmental impacts and in assessing operational compliance with an approved Plan of Operations for the KNF and an approved Operating Permit for the DEQ. The KNF would use the evaluation adit data to supplement, confirm, refine, and modify, if necessary, data assumptions and analyses conducted in this SEIS and the 2001 FEIS.

Types of hydrologic data that would be collected during Phase I from the evaluation adit include:

- Bedrock permeability (hydraulic conductivity): injection or discharge tests would be conducted in drill holes completed in bedrock within the adit.
- Pressure head: The hydraulic head would be monitored and continuously recorded at various locations within the adit.
- Mine inflows: Detailed records of groundwater inflow to the adit would be maintained.
- Mine water chemistry: The water chemistry of groundwater inflow to the adit would be characterized as the adit progresses.
- Fault zone characterization: Test holes through various fault zones would be completed and instrumented to determine various hydraulic characteristics of fault zones.
- Storativity: Extended discharge tests would be conducted at various locations within the adit to determine bedrock storativity.

Information collected during construction of the evaluation adit would be used to develop and direct monitoring programs and mine designs during Phase II operations. The KNF would assess whether the new data would require substantial revisions to the analyses conducted in support of the selected alternative that are relevant to environmental concerns.

Before the Phase II construction started, RCR would update the 3D groundwater model, incorporating the hydrologic and geologic information collected during Phase I. RCR anticipates the model’s uncertainty for predicting inflows and water resource impacts would decrease based on the empirical data obtained from underground testing. Effects on surface water resources would be reevaluated by the groundwater Technical Advisory Group (GWTAG), and other TAGs, if appropriate, based on the revised modeling.

If observable trends in flow changes and/or water quality occurred near the evaluation adit, the frequency of monitoring may be increased and new monitoring sites may be added based on discussion and approval by the Agencies. RCR would monitor surface water and groundwater for the life of the evaluation adit and for 5 years after the KNF and DEQ determined that the water within the evaluation adit met groundwater standards and treatment of the evaluation adit water was no longer needed. Monitoring wells in the Rock Creek study area (Figure 3-9 of the SEIS) could be used to monitor groundwater levels and water quality. RCR would install additional monitoring wells in the event that additional wells were needed to address possible effects to groundwater. Existing surface water monitoring sites (Figure 3-7 of the SEIS) and spring monitoring sites (Figure 3-8 of the SEIS) in the Rock Creek study area could be used to monitor spring flow, stream flow, and water quality. RCR would add additional spring and surface water monitoring sites in the event they were needed to address possible effects to springs and surface water.

The primary hydrologic issues of concern are inflow rates to the underground workings, the potential for effects on streams, springs, and nearby water supply sources, and the chemistry of water to be stored in the mine and/or discharged from the mine. These issues would be further investigated during evaluation

adit development as described in the Rock Creek Evaluation Adit License Application (RCR 2010) and below.

The evaluation adit would be a decline passing through nonmineralized rock above the ore horizon, then following the ore zone for some distance near the Copper Lake Fault. Water would be constantly pumped away from the working face of the decline during its development to keep the adit dry. The total volume of water pumped from the evaluation adit daily would be continually recorded and regularly reported. The total pumped volume per unit time would be used to calculate the average adit inflow rate in gallons per minute. The chemistry of this water would also be routinely tested. The actual evaluation adit inflow rates would be incorporated into a revised version of the 3D model. If appropriate, water management and treatment requirements for the mine would be adjusted.

Water would likely enter where the evaluation adit crossed zones of fractured bedrock. All discrete zones of inflow to the evaluation adit would be mapped and inflow rates would be documented. Field measurements of each inflow (such as pH, temperature, and specific conductance) would also be documented. Additional water chemistry data, as described in the Rock Creek Evaluation Adit License Application (RCR 2010), and including samples for isotope analysis, would be collected from selected seeps, both from segments of the adit penetrating barren rock, as well as the ore body. These data would be compared with predicted mine water chemistry (based upon sampling of the similar Troy Mine) and if significantly different, loading evaluations from mine discharges would be reexamined. Areas of fractured rock not producing inflows to the adit would also be documented. Piezometers would be installed in the Moran Fault, Copper Lake Fault, unfaulted portions of the adit, and under Cliff Lake and Copper Lake and monitored for static head, as described in the Rock Creek Evaluation Adit License Application (RCR 2010).

After completion of sampling and testing within the evaluation adit, dewatering would continue to provide access to the adit during the analysis and review period, should additional testing be required. Evaluation adit dewatering would continue until it was no longer necessary due to dewatering of other adits and the mine during Phase II, or if mining did not proceed to Phase II. If mining did not proceed to Phase II, then the evaluation adit would be allowed to flood and any required monitoring implemented.

1.6.4 Phase II Monitoring

Where surface water or groundwater may be affected by Phase II construction and operations, which includes the Phase I monitoring area (Figure K-3), Phase II data collection would begin during the first year of Phase I construction and continue for several years prior to the initiation of Phase II construction and through Phase II operations. Phase I monitoring would be incorporated into the Phase II monitoring, and would occur at previously monitored sites; sites that might be impacted by Phase II construction and mining activities; new surface water sites (streams, springs, and seeps) near the ore body that would need to be added based on the revised 3D model results (see Section 0); and benchmark sites. A Phase II GDE inventory (see Section 1.6.4.2 and Figure K-4), subject to approval by the KNF, would include parts of the Rock Creek, Miller Gulch, Copper Gulch, Chicago Creek, and East Fork Bull River watersheds that are not on private land. The subsections below describe Phase II monitoring.

1.6.4.1 Phase II Benchmark Stream, Spring, and Wetland Sites

For the reasons described in Section 1.6.2.1, the third-party contractor would monitor springs, wetlands, and a stream located outside of the Phase II monitoring area. RCR, with agreement from the Agencies, would choose a Phase II benchmark stream in the CMW during the first year of Phase I construction. This would be a stream with a similar watershed area, aspect, starting altitude, water quality, and geology as at least one of the streams in the CMW predicted to be affected by Phase II (North Basin Creek, South Basin Creek, Chicago Creek, West Fork Rock Creek, East Fork Bull River, East Fork Rock Creek, and Copper

Gulch) that are not on private land. A Phase II benchmark stream might be one of the tributaries to the East Fork Bull River within the CMW north of the river that would not be affected by mining. Monitoring at the benchmark stream, springs, and wetlands would be the same and would occur at the same time and frequency as monitoring at the analogous sites within the Phase II monitoring area. Benchmark springs and wetlands would be chosen based on location, altitude, water quality, and hydrogeologic setting. It may not be possible to choose benchmark springs and wetlands until springs and wetlands within the Phase II monitoring area have been characterized, and springs and wetlands with a bedrock groundwater source identified. Benchmark springs and wetlands would then be selected for those springs and wetlands with a bedrock groundwater source that might be affected by mine dewatering. The number of springs and wetlands to be monitored would be determined following completion of the Phase II GDE inventory. The benchmark stream, springs, and wetlands would be used to develop trend analyses to determine if flow or groundwater level changes were due to mine dewatering or other mine-related activities or to natural variability and climate change. The third-party contractor would begin monitoring the Phase II benchmark streams during the first year of Phase I construction, as soon as possible after they are selected.

1.6.4.2 Phase II Groundwater Dependent Ecosystems

1.6.4.2.1 Phase II GDE Inventory

The purpose of the Phase II GDE inventory would be to identify ground-water dependent springs, seeps, wetlands, riparian habitat, and stream ecosystems potentially affected by Phase II activities. The third-party contractor would begin the Phase II GDE inventory during the first year of Phase I construction. Data collected for the Phase II GDE inventory would supplement the Phase I GDE inventory data. The inventory would be conducted in accordance with the most current version of the Forest Service’s Groundwater Dependent Ecosystems: Level II Inventory Field Guide (USFS 2012b) and would focus on areas potentially affected by mine or adit inflows. The Phase II GDE inventory area shown in Figure K-4 is based on the maximum drawdown for Phase II predicted by the 3D model (see Figure 4-5 of the SEIS).

Before beginning a Phase II GDE inventory, RCR would conduct aerial photography and Light Detection and Ranging (LIDAR) reconnaissance of the Phase II inventory area. In addition to the wetlands or springs discussed in the SEIS, the third-party contractor would inventory any wetlands or springs newly identified during the reconnaissance. Inventory methods and data to be collected are described in Section 1.6.2.2.

1.6.4.2.2 Phase II GDE Monitoring Plan

RCR would submit to the KNF for approval a Phase II GDE Monitoring Plan for important GDEs found during the Phase II inventory. The plan would be incorporated into an overall Water Resources Monitoring Plan. Objectives and contents of the plan, including monitoring criteria, are summarized in Section 1.6.2.2.2.

1.6.4.2.3 Phase II GDE Monitoring

The third-party contractor would monitor springs and seeps, groundwater-dependent wetlands, fens, and riparian areas, and streams identified and measured during the Phase II GDE inventory and as outlined in the KNF-approved Phase II GDE Monitoring Plan. Data collected during the Phase II GDE monitoring would supplement data collected during the Phase I GDE monitoring and the Phase II GDE inventory. Any springs in the GDE inventory area would be sampled at the same frequency as the stream sites (see Section 1.6.4.4).

1.6.4.3 Phase II Wilderness Lake Monitoring

Phase II wilderness lake monitoring would begin the first year of Phase I construction and continue for several years prior to the initiation of Phase II and through Phase II construction and operations. The third party contractor would continue to measure lake levels, and collect water balance/water budget data at Cliff Lake and Copper Lake and the high-elevation weather station, as described in Section 1.6.2.3. The third party contractor would collect the same data at other lakes potentially affected by Phase II activities, such as Moran Basin lakes.

1.6.4.4 Phase II Surface Water Monitoring

Beginning the first year of Phase I construction and continuing for several years prior to the initiation of Phase II and through Phase II operation, the third-party contractor would monitor stream flows, stream water quality, and stormflows in the area potentially affected by Phase II following USFS field sampling and data analysis protocols (USFS 2012a). Surface water quality samples and flow measurements would be collected and analyzed at a frequency that would allow the evaluation of high- and low-flow conditions, storm flow events, and seasonal trends. Water samples would also be collected during temporary facility shutdowns and after mine closure. All surface water quality samples would be analyzed for the parameters listed in Table K-6 and Table K-7. Flow measurements would be made using the most accurate site-specific method available and appropriate for the site. If data collected during Phase II monitoring were to be used for compliance purposes for any MPDES permit obtained for the project, reporting levels specified in the MPDES permit would need to be achieved. If observable trends in flow changes and/or water quality occur near the adit, the frequency of monitoring may be increased, and new monitoring sites may be added based on discussion and approval by the Agencies.

Surface water monitoring sites would be located on the East Fork and West Fork Rock Creek, tributaries to the East Fork and West Fork, the mainstem of Rock Creek, Chicago Creek, Copper Gulch, North Basin Creek, South Basin Creek, Miller Gulch, the unnamed tributary to Miller Gulch northwest of the footprint of the paste tailings facility, the Clark Fork River, the East Fork Bull River and tributaries, benchmark stream, spring, and wetland sites, and other locations as determined by the Agencies. Mapping of the extent of perennial reaches and an evaluation of the timing of stream flow intermittency in Rock Creek, the East Fork Bull River and other study area streams would occur prior to Phase II. The surface water monitoring program would be coordinated with the aquatic monitoring program. The program, including the location of all monitoring sites evaluated during the pre-operational data collection program, would be finalized based on review and approval by the Agencies. The rationale and requirements for monitoring surface water resources at specific stations prior to Phase II construction and during Phase II operations and reclamation would be discussed in RCR’s final Water Resources Monitoring Plan.

1.6.4.5 Phase II Groundwater Monitoring

Groundwater monitoring data would be collected on at least a quarterly basis during the construction, and operation phases, as well as during temporary facility shutdowns. Groundwater would be monitored in the underground mine via underground monitoring wells, upgradient and downgradient of the mill, upgradient and downgradient of the proposed paste tailings facility, and from the paste tailings facility perimeter pumpback well system, if implemented. The frequency of underground monitoring of hydraulic conditions in the bedrock would be increased as designated buffer zones were approached. In addition, flow and quality of springs and seeps would be monitored, with particular emphasis on sources of water that provide recharge to Rock Creek and the East Fork Bull River.

Groundwater monitoring of the paste tailings facility would be initiated prior to placing tailings in the facility. Monitoring well locations and sampling frequency would be reviewed and finalized after consultation with the Agencies. Water samples would be analyzed for physical parameters, nutrients, common ions and metals (Table K-7), to establish pre-operational conditions. Water quality and water

level data from monitoring wells would be collected at an approved frequency. Groundwater from all existing domestic water supply wells downgradient of the proposed paste tailings facility would also be collected and analyzed.

A pumpback well system is considered a contingency mitigation, and if the system were required, the pumpback well system would be designed to capture all affected groundwater from beneath the paste tailings facility. Full capture of affected groundwater would be demonstrated by water level data and water quality results. Additional pumping wells may be required to ensure full capture.

The third-party contractor would also verify the location of all domestic wells, spring and surface water supplies with the Department of Natural Resources and Conservation (DNRC) that might be affected by the mine to determine if any new wells or spring or surface water sources had been filed with DNRC or if any had been misidentified or had information regarding them corrected. Any new domestic wells or water sources or misidentified wells would need to be sampled quarterly at least one year prior to Phase II construction to provide pre-operational data, if they had not already been sampled and would include water quality parameters, static water levels in wells, and spring flow rates.

Split samples from monitoring and domestic wells would be periodically collected and analyzed by DEQ to verify the monitoring data. Split sample results from domestic wells would be offered to well owners. The Agencies would consider the actual facility water balance data, estimates of seepage, and results of the ongoing groundwater monitoring program in determining how long monitoring of private domestic water supply wells should continue. At a minimum, groundwater quality sampling and analysis would continue at least until bond release.

Water monitoring for any portion of the development adits would be similar to what was collected during the Phase I evaluation adit development. For example, detailed records of mine/adit inflow would be maintained and pressure head in piezometers within the mine/adits would be measured and recorded.

1.6.4.6 Phase II Sediment Monitoring

Sediment monitoring that began prior to Phase I construction (see Section 1.6.2.5) would continue during Phase II construction and production/operations. Phase II sediment monitoring would occur in West Fork Rock Creek and East Fork Rock Creek above the confluence of the forks, and in Rock Creek near the confluence with the Clark Fork River. Monitoring would also occur in Miller Gulch near the confluence with the Clark Fork River. Any sediment monitoring required by an MPDES permit or any other permit or approval would be implemented as required either before or during Phase II construction. If continuous sediment monitoring were not possible at some locations, RCR would work with the Agencies to ensure adequate and appropriate sediment monitoring at all sediment monitoring locations.

Sediment mitigation sites for Phase II would be chosen late in Phase I of the project. If activity at a Phase II sediment mitigation site could result in a stormwater discharge, RCR would obtain coverage for the discharge under a MPDES permit. Monitoring and inspection requirements would be determined after the mitigation sites were identified. RCR would monitor the sediment mitigation sites to ensure they were effective in reducing sediment delivery to streams by 166 tons until final stabilization of disturbances had occurred.

1.6.5 Closure/Post-Closure Monitoring

Monitoring of surface water quality and flow and wilderness lake levels, would continue in the closure and post-closure phases. Specifics of the monitoring to be conducted during and after mine closure would depend on the closure methods used. If the adits were plugged after mine closure, when the mine void filled, groundwater would move downgradient from the mine void via fractures. If the mined area was

hydraulically connected to area springs and/or streams, then as the mine void refilled with water, those connections would be reestablished. Water quality data would be collected in each of the streams draining the mine area and in springs near the mine void after the mine was closed if the adits were plugged. If observable trends in water quality occurred in the streams or springs that could result in exceedances of surface water quality standards or nondegradation criteria, RCR would be required to mitigate to prevent such exceedances.

1.6.6 Facility Water Balance and Chemistry

A detailed facility water balance and analysis of water and wastewater chemistry would be maintained, and its details specified in the final Water Resources Monitoring Plan. The water balance would be submitted annually by RCR to the Agencies. The purpose of the facility water balance would be to assess the inflow, outflow, and general water or wastewater chemistry associated with the underground mine, water treatment facility, and paste tailings facility. Monitoring information would be used to modify, as necessary, operational water handling and to develop a post-mining water management plan. As part of this monitoring, the following aspects of the project water balance would be measured:

- the volume of excess water stored underground
- mine reservoir water quality
- mine adit discharge and water quality
- the amount and water content of tailings deposited as a paste
- the amount and source(s) of fresh makeup water to the mill
- the amount of reclaimed tailings water returned to the mill
- the water quality of tailings decant water, if any
- the amount and quality of water pumped from the seepage collection ponds
- treatment facility influent flow and water quality
- flow rate and quality of water discharged to the infiltration ponds or the Clark Fork River
- the amount and source of water used for dust suppression and irrigation
- pan evaporation and precipitation data at the paste tailings facility site

1.6.7 Monitoring Action Levels and Contingency Action Plan

As part of the Water Resources Monitoring Plan, monitoring action levels and a Contingency Action Plan would be developed for the project. This section discusses the Agencies’ preliminary monitoring action levels that would require RCR to implement a Contingency Action Plan. Final action levels would be described in RCR’s Agency-approved final monitoring plan. Elements of the Contingency Action Plan would include, but not be limited to, the following:

- Defining contingency action criteria and statistically based methods for determining if adverse impacts on surface water or groundwater resources occur during the project’s construction, operation, closure, and post-closure phases;
- Identifying key players and their respective roles and responsibilities for implementing the Contingency Action Plan;
- Providing details of the decision-making process associated with contingency actions, including schedule;
- Identifying, illustrating, and scheduling the decision-making process associated with contingency actions; and

- Preparing a list of potential action alternatives for various impact scenarios.

If monitoring action levels were reached, RCR would notify the Agencies within 5 working days. RCR would review the mitigation measures described in the Contingency Action Plan and propose to implement one or more of the measures described therein to ensure that the parameter of concern did not exceed groundwater standards. If RCR developed alternative contingency actions not described in the Contingency Action Plan, RCR would revise the Contingency Action Plan with a new or modified measure along with a proposed schedule for implementation and submit it to the Agencies for approval. Within 30 days, the Agencies would: (i) approve the plan, in whole or part; (ii) approve the plan with conditions; (iii) request clarifying information for the plan or additional review time; or (iv) disapprove the plan, in whole or in part, directing that a revised Contingency Action Plan be submitted. If the Agencies were to disapprove the plan, an explanation would accompany the disapproval. RCR would be required to implement contingency actions as specified in the original, or if applicable, revised and approved Contingency Action Plan.

A spill contingency plan would be developed by RCR for each stream in the mine area. If it were determined that the spilled material may reach a stream, mine personnel would immediately construct sumps to collect the spilled material. Accidental spills or ruptures could cause acute effects to aquatic life. RCR would monitor any surface water located in the vicinity of a spill or rupture. If water quality standards or nondegradation criteria were exceeded, the same location would be resampled, and if again exceeded, would continue to be monitored at an increased frequency during and after cleanup of the spilled material to ensure the areal and temporal extent of any acute effects to aquatic life were minimized.

1.6.7.1.1 Proposed Groundwater Quality Monitoring Action Levels

Proposed monitoring action levels for the groundwater monitoring wells at the base of the talus slope below the evaluation adit portal pad, below the Phase I infiltration ponds, below the mill site, and around the paste tailings facility are provided in Table K-9. RCR would develop final action levels in the Water Resources Monitoring Plan that would be reviewed and approved by DEQ and KNF. Action levels for selected parameters would be included in the approved plan to provide an early detection of adverse groundwater conditions and to trigger notification of the KNF and DEQ and implementation of the Contingency Action Plan. Parameters selected for action levels are based on whether the selected parameters have numeric groundwater standards and if they are present at elevated concentrations in process water but at low concentrations in the downgradient aquifers. Reaching these levels would require action by RCR, but would not be considered a violation of the Hard Rock Operating Permit, approved Plan of Operations, or groundwater quality standards.

In addition to assessing the relationship of detected concentrations to action levels, RCR would present a trend analysis of all data for the parameters listed in Table K-9 in an annual report. Because arsenic is a carcinogen and changes in ambient concentrations are not allowed under Montana’s nondegradation rules, RCR would assess if the arsenic concentration of each well was statistically significantly greater ($p < 0.05$) than the well’s ambient concentration using an appropriate statistical test. Although ammonia, sulfate, and potassium do not have action levels because numeric groundwater standards do not exist for these parameters, they are likely to be present at elevated concentrations in process water and are at low concentrations in the downgradient aquifers. Because changes in pH and increases in total ammonia, potassium, and sulfate concentrations in downgradient aquifers may be indicators of effects from mine activities, RCR would assess whether there was a statistically significant change in pH or increasing trend in ammonia, sulfate, or potassium concentrations. If there was a significant change in pH or an increasing trend in total ammonia, potassium, or sulfate concentrations, RCR would increase the frequency of monitoring to at least monthly.

For new springs and seeps monitored after the evaluation adit filled, any statistically significant increases in indicator parameters at any of the spring and seep sites would trigger review of water management and water treatment scenarios under future operational and post-closure conditions.

1.6.7.1.2 Action Levels for Groundwater Flow in the Mine Area

RCR would monitor flows from the mine and adits, as well as from individual fractures within the adits and mine void. If mine and adit inflows are greater than two times the model-predicted inflow for each phase of mining for a period of 30 days, RCR would notify the Agencies within 5 working days. RCR would then implement excess water contingency plans such as grouting or treatment and discharge at the wastewater treatment plant.

The third-party contractor would monitor groundwater levels in benchmark springs and wetlands outside of the area potentially affected by mine dewatering. Based on the monitoring, the third-party contractor would establish a relationship between groundwater levels in benchmark springs and wetlands and groundwater levels in any study area monitored spring or wetland. Water levels in all monitored springs and wetlands would be evaluated using simple linear regression or other appropriate statistical analyses. RCR would provide the analysis in the annual report. The trend analysis would follow Forest Service protocols (USFS 2012a), or another method approved by the Agencies. If the relationship in quantity between benchmark and monitored study area springs and wetlands after adit dewatering began was statistically significantly different ($p < 0.05$) than pre-mining or if the concentration of monitored parameters showed an increasing significant trend ($p < 0.05$), RCR would flag the change for Agency review. If the Agencies decided that some action was necessary, the procedures regarding a Contingency Action Plan would be implemented.

1.6.7.1.3 Surface Water Monitoring Action Levels

As required by the final MPDES permits MT0030287 and MT0031763, the following conditions would require action by RCR:

- Noncompliance with any condition of the permits
- An unauthorized release or discharge to surface water at the mine
- If DEQ or RCR became aware that stormwater control measures were not stringent enough for a discharge to meet applicable water quality standards
- If DEQ determined that modifications to stormwater control measures were needed to meet the non-numeric effluent limits at the outfalls, or
- If DEQ found that stormwater control measures were not being properly operated and maintained.

RCR would be required to review and revise the selection, design, installation, implementation, and maintenance of the stormwater control measures so that the condition is eliminated and not repeated in the future. Within 14 days of discovery of any of these conditions, RCR would be required to document any corrective actions taken or needed, and any modifications to the stormwater controls would be required to be made as soon as practicable.

Monitoring, analysis, and reporting of streamflows in benchmark streams outside of the area potentially affected by mine dewatering and in monitored study area streams would be the same for streams as described in the second paragraph in Section 1.6.4.1. The third-party contractor would monitor flows in the benchmark stream outside of the area potentially affected by mine dewatering. Based on the monitoring, the third-party contractor would establish a relationship between flows in the benchmark stream and flows in any study area monitored stream. Flows in all monitored streams would be evaluated

using simple linear regression or other appropriate statistical analyses. RCR would provide the analysis in the annual report. The trend analysis would follow Forest Service protocols (USFS 2012a), or another method approved by the Agencies. If the relationship in flow between benchmark and monitored study area streams after adit dewatering began was statistically significantly different ($p < 0.05$) than pre-mining, RCR would flag the flow change for Agency review. If the Agencies decided that some action was necessary, the procedures regarding a Contingency Action Plan would be implemented.

Procedures in the Contingency Action Plan would be implemented if the Agencies decided that some action was necessary to prevent adverse effects to surface water quality. RCR would be required to mitigate to prevent exceedances of water quality standards and applicable nondegradation criteria.

1.6.7.1.4 Wetland or Riparian Area Action Levels

If the prevalence index of any monitored wetlands is 50% greater than its baseline index (such as 1.5 to 2.3) or is above 3 for 2 consecutive years, RCR would provide the analysis in the annual report. If the Agencies decided that additional actions were necessary, the Contingency Action Plan described in Section 1.6.7 would be implemented.

If any changes in seep or spring flow, water levels, or water quality were noted that were significantly different than the measurements collected during pre-mining monitoring for an individual site or set of sites, or a trend was observed that was not observed during pre-mining monitoring, then a reevaluation of those potentially affected habitats would be conducted and documented for comparison against baseline survey information. Depending on a combination of biological or physical variables or the severity of plant indicator decline, the Agencies may require more rigorous monitoring. If the Agencies decided that additional actions were necessary, the Contingency Action Plan described in Section 1.6.7 would be implemented.

1.6.8 Reporting Requirements

RCR would prepare quarterly and annual reports to summarize information and data obtained during implementation of the water monitoring program. The report would include data tabulations, analysis of trends, statistical computations, maps, cross-sections, and diagrams needed to clearly describe hydrologic conditions. RCR would also submit data and analyses electronically in a format acceptable to the Agencies. All submitted analytical data would comply with DEQ’s minimum reporting requirements for analytical data (DEQ 2009).

1.7 Rock Mechanics Data Collection and Subsidence Monitoring Plan

A Rock Mechanics Data Collection and Subsidence Monitoring Plan has two purposes: (1) to acquire data pertinent to the site and use these data in mine planning, and (2) to monitor the surrounding physical environment’s response to mining to minimize adverse effects on surface resources. Separate plans would be required for each phase of project development. RCR would develop the plans in conjunction with the Agencies, and the plans’ details and implementation would be subject to Agency approval. A detailed plan for data collection and monitoring during the Phase I evaluation adit, as well as a preliminary data collection and monitoring plan for full mine build-out, would be submitted for Agency approval prior to implementation of Phase I. Submitting a preliminary plan would allow the Agencies to begin evaluating the scope of a full mine operation and to modify data collection and monitoring during Phase I, as needed, to better define how best to construct a long-term full build-out monitoring program. A detailed plan for full mine build-out would be submitted for Agency approval prior to implementation of Phase II.

The goals of the data collection and monitoring plans are to:

- collect site specific data on the host environment
- confirm assumptions made by RCR concerning physical parameters of the host rock
- assist in mine planning (e.g., room and pillar size and layout, types and application requirements of artificial support such as rock bolts, location of monitoring devices, and size of buffer zones)
- provide data to RCR and the Agencies that would be used in minimizing adverse impacts on NFS surface resources
- document whether subsidence has or has not occurred

The scope of the data collection and monitoring plans would evolve as the mine development progressed. Initially, the effort would concentrate on data collection during the evaluation adit phase. In time, as mine development evolved, the focus would be to enhance underground safety, assist in mine planning and design, and guard against subsidence. (Note: subsidence monitoring and rock mechanics monitoring are used interchangeably in the text.)

1.7.1 Evaluation Adit Phase (Phase I)

During the development of the evaluation adit (Phase I), data would be collected to better define in-situ rock conditions, such as faulting, jointing, and other structural features; characterize areas of known or suspected instability, such as near geologic faults; and confirm strength parameters for the surrounding rock would be the principal objectives. Stress field measurements, including principal stress magnitudes and directions, would be taken, along with rock samples for laboratory testing. A baseline survey over the ore body would be performed prior to underground development. Considering the terrain, aerial methods such as LIDAR or Interferometric Synthetic Aperture Radar (InSAR) are favored over conventional surveying of surface monuments. This type of technology can measure small deviations over large surface areas, which otherwise would be impossible or impractical to measure using standard geodetic surveying techniques. Surveys would be repeated periodically prior to production mining to (a) establish the variability of the monitoring method employed (with respect to its technical limitations and outside factors such as snow and vegetation cover, natural rockfalls, and landslides); and (b) establish a pre-mine reference surface for comparison once mining has commenced. The selection of surveying technique and the schedule for surface monitoring and reporting would be established as part of the subsidence monitoring plan developed during the final mine design phase.

1.7.2 Laboratory Testing and In-Situ Rock Characterization

Laboratory testing on representative samples collected during the evaluation phase would confirm strength parameters of the local host rock. Tests to determine material properties including, but not limited to, specific gravity, Young’s Modulus, Poisson’s ratio, cohesion, angle of internal friction, and uniaxial compressive strength would be performed. Observation and documentation of in-situ rock conditions would include faulting, jointing, and other structural features. These data would be used to develop analytical models for the Rock Creek ore body that in turn would assist in mine design and layout. If mining proceeded beyond the evaluation adit phase, RCR would continue to collect and test samples as the mine advances to confirm material properties as new areas are developed. The frequency of sampling may be either determined by changes in lithology or based on a certain number of samples per volume of material extracted.

In situ monitoring devices would also be installed during the evaluation adit development phase. These may include, but are not limited to, stress cells, strain gauges, extensometers, and microseismic monitoring devices. These instruments collect data relating to how the surrounding rock responds to mining and the excavation of cavities underground. As mining progressed, RCR would continue to install and monitor in situ devices as part of their overall environmental monitoring program. The placement of

these devices would be determined through consultation with the Agencies. Areas of known or suspected instability, such as near geologic faults, may receive a more concentrated array of devices. The frequency of monitoring would also be resolved with Agency counsel once the adit is underway; however, it is difficult to predict both placement and frequency prior to development.

1.7.3 Underground Mine Construction and Active Operations (Phase II)

During active mining, surface and underground monitoring would be ongoing. Substantial changes in ground conditions may be indicative of adverse ground reactions to mining. If such changes occurred, the Rock Mechanics Data Collection and Subsidence Monitoring Plan would have as part of its program steps and mitigations to minimize adverse effects on surface resources. Possible mitigations may include installation of supplemental supports such as rock bolts, grouting, backfilling the affected area, prohibiting mining in the affected area, or changing the room and pillar sizes to provide more underground support.

Prior to Phase II construction, RCR would submit for KNF and DEQ approval a revised detailed mine plan that minimizes the risk of subsidence. The detailed mine plan would use the data collected during Phase I. The detailed mine plan would include the physical setting of the ore body (for each ore zone, the elevation of the floor or back, the ore thickness, and depth below surface) and the planned extent of mining, including drive and pillar dimensions. Roof support analysis would be completed during final design to finalize the support plan. RCR would drill long holes beyond the advance of each regular mining round to intersect, grout, and seal water-bearing ground conditions such as faults or extensive jointing that could otherwise tap groundwater from overlying lakes, streams, and wetlands or promote underground instability. Mining would not occur in areas where adverse ground conditions could lead to surface subsidence or effects on the CMW lakes or hydrofracture at outcrops (DEQ 2001). The monitoring employed during active mining would provide advance warning of deteriorating ground conditions in response to mining.

During both Phase I and Phase II, RCR would fund an independent technical advisor to assist the KNF and DEQ in review of RCR’s mine design, and data collection and monitoring plans. The technical advisor would be selected and directed by the KNF and DEQ through an agreement with RCR. RCR would facilitate underground inspections by the third-party technical advisor. RCR would provide the KNF and DEQ and their representatives access to the underground workings to observe data collection and mine development. RCR would provide mine access, logistical support, and all information required by the technical advisor to complete a review of underground rock mechanics data and RCR’s mine plan. Assessments of the underground workings by the technical advisor may occur as frequently as quarterly, with the results of the inspections compiled into an annual assessment report. This annual report from the technical advisor would incorporate data collected as part of the ongoing monitoring program, and would be in addition to the annual report prepared by RCR. The technical advisor would have no financial interest in the Rock Creek Project. After data review, the KNF would require RCR to modify the mine plan as necessary to minimize effects on surface resources.

The specific details of the Phase II data collection and monitoring plans would be subject to approval by the Agencies. Should Phase II be approved, information from both the Phase I and II data collection and subsidence monitoring plans would be used to develop a model of rock behavior in response to underground mining. This model would help guide ongoing mine development in an environmentally safe manner. Subsidence monitoring data would be reported to the Agencies in an annual report.

The type of data collected would include logging drillholes and geologic mapping of mine workings and surface features to obtain an initial overview of the geologic profile of the site. More detailed data would include rock quality analysis, which would evaluate fracture and fault frequency, structure orientation,

laboratory testing for rock strength parameters, and in-situ geomechanical tests. Gaining a detailed understanding of rock strength, including the potential for shear failure at the pillar/roof or pillar/floor interface, and the overall mine structural setting, including faulting, jointing, bedding, and horizontal stress regime, would improve the Rock Creek mine design.

Microseismic monitoring would be used to assess rock response to underground mining both during operations and post-closure, and would include installation of sensors in operating and abandoned sections of the mine. Stress cells would be located near or on faults, barrier pillars, sill pillars, and other important mine structures. Data would be compiled, assessed, and reported to the Agencies in an annual report.

Numerical modeling would be used to evaluate pillar and sill stability between the two ore zones as the influence and interaction of stacked workings may be critical to overall pillar and sill stability. Numerical modeling would be part of the ongoing mine development during operations and would be applicable to all areas of the mine – not just where the ore horizon is thick or where rooms are stacked on one another.

All RCR designs would reference and incorporate, as appropriate, information from the Troy Mine, which has experienced pillar stability problems resulting in surface subsidence. The data collected and analyzed from the Troy Mine would aid the Agencies in their evaluation of RCR’s proposed design and monitoring plan. For example, data from the Troy Mine indicate that adverse pillar orientation with regard to bedding dip may have played a role in some of the pillar instability. Further, the Troy Mine sinkhole events appear to be related to intercepting known faults.

The data collection and monitoring plan would be in a continual process of modification throughout the course of mining as new data were collected and analyzed. Due to the variability in geologic conditions and the physical response of the underground environment to mine development, modifications to the mine plan may need to be incorporated to safeguard against adverse environmental conditions.

1.7.4 Rock Mechanics Monitoring Report and Third-Party Review

QA and QC protocols would be reviewed and authorized by the Agencies to maintain strict regulatory compliance and standards of practice. RCR would submit the results of the data collection and monitoring to the Agencies as part of the plan. These reports may be submitted on an annual, semiannual, or quarterly basis depending on what phase of development the mine is undergoing. An initial schedule for frequency of reporting would be developed as part of the Phase I Rock Mechanics Data Collection and Subsidence Monitoring Plan. Data collection and monitoring results for the adit must be submitted at 6-month intervals until the evaluation adit is completed.

Once Phase II commences, assessments of the underground workings by the Agencies’ technical advisor may occur as frequently as quarterly, with the results of the inspections compiled into an annual assessment report. This annual report from the technical advisor would incorporate data collected as part of the ongoing monitoring program and would be in addition to the annual report prepared by RCR.

1.8 Wildlife Monitoring Program

Monitoring plans would be developed for several wildlife subjects based on the conceptual plans provided below. Monitoring plans would vary depending upon the species or subject being monitored.

Monitoring of wildlife resources would occur in some cases to supplement baseline data and better estimate potential impacts or changes. Monitoring data would help determine the status of these subjects during or after mining activities but would not be compared with incomplete pre-mine data.

Currently, the Forest Service and Montana Fish, Wildlife and Parks (FWP) are developing or implementing monitoring plans or studies for some species or subjects. Where feasible and appropriate, RCR would contribute funding to current efforts rather than initiating a separate and redundant monitoring activity.

The goal of the wildlife monitoring program would be to determine project-related impacts on existing wildlife populations. If impacts were identified, then appropriate remedial action plans would be developed and implemented. This monitoring program would be started during the first quarter of evaluation adit construction and would consist of monitoring and reporting for the following elements:

- neotropical migrant birds;
- mountain goats;
- sensitive animal species; and
- effectiveness of road closures.

1.8.1 Neotropical Migrant Bird Monitoring

Neotropical migratory bird monitoring would be coordinated with current programs or initiated by state and federal agencies and private organizations. The goal of this monitoring would be to gain additional information about neotropical migrant birds, population trends, species composition changes, and their responses to mine-related impacts.

RCR could assist with funding the KNF’s ongoing monitoring of neotropical migrant birds or conduct their own surveys as approved by KNF. Funding would be proportional to the number of transects surveyed across the region for the year in question. At least one transect would be set up within the study area. These transects would be monitored on a schedule determined by the Forest Service’s Regional Office, but at least every 2 to 5 years. Reports would be produced annually by the Regional Office. Information collected, whether through an independent third-party or by KNF, would be incorporated into the regional report.

1.8.2 Mountain Goat Monitoring

Mountain goats would be monitored for their responses to mine-related impacts. Given the current baseline data for mountain goats, comparisons between pre-mine status with status during mine operations or after mine closure would be difficult; however, information gained from monitoring would be useful in determining population trends, habitat use, and to some extent, mine-related impacts. The monitoring plan would integrate aspects of a mountain goat monitoring plan/study that would be developed by FWP. The plan would specify the sampling and analysis methods to be used and, if conducted by a third-party consultant for RCR, would be reviewed and approved by the Agencies.

Mountain goat monitoring for this project would consist of three surveys per year for the life of the mine: one 2-week survey of the eastern side of the CMW in the summer, one fall aerial survey, and one winter aerial survey. Aerial surveys would be conducted using the protocol currently used by FWP. The survey schedule may be modified if the Agencies, in consultation with FWP, determined that fewer surveys would be sufficient.

Currently, FWP conducts one aerial survey every other year. RCR would either fund FWP for the additional surveys or conduct the additional surveys independently and provide the data collected to FWP and the Agencies. Mountain goat monitoring data, including number, age, and gender of animals observed and their precise location in UTM or GPS coordinates would be summarized in an annual report prepared by RCR or by FWP with funding from RCR. Reports would be submitted to FWP and the Forest Service

to help evaluate the effectiveness of the additional law enforcement provided by RCR and other mitigation measures in reducing impacts on mountain goats.

1.8.3 Sensitive Animal Species Monitoring

A forestwide monitoring program for sensitive species, including harlequin ducks, is currently being implemented by KNF. RCR would either contribute funding to this existing effort or conduct monitoring through a third-party contractor, as approved by the Agencies. The goal of the sensitive animal species monitoring would be to gain more information about sensitive species behavior, habitat use, and mine-related impacts. RCR would contribute funding to the portion of the KNF’s forestwide harlequin duck monitoring program that covers Rock Creek. If impacts on harlequin ducks are found to be greater than those disclosed in the 2001 FEIS, RCR would be required to reduce or minimize those impacts.

Information collected would be reported to the Agencies for review on an annual basis. Monitoring would continue for the life of the mine or until the Agencies, in cooperation with the FWP and USFWS, determined that monitoring intervals can be modified. Monitoring for harlequin ducks for this project involves three parts.

1. Water quality monitoring of Rock Creek. The monitoring required under the Water Quality Monitoring Plan for this project would meet the requirements for assessment of water quality impacts on the harlequin duck.
2. Monitoring of the harlequin ducks on four main tributaries of the lower Clark Fork River in which the ducks are known to have breeding sites are Rock Creek, Marten Creek, Swamp Creek, and Vermillion River. The protocols would follow those as used by Montana Natural Heritage Program (MNHP) harlequin duck monitoring program.
3. A power and sensitivity analysis is required on the data collected through the monitoring. The power analysis is used to determine the effectiveness of the proposed monitoring scheme and to identify significant population changes from natural stochastic fluctuations. The sensitivity analysis is used to determine population growth rates from data already available and from monitoring.

1.8.4 Road Closure Monitoring

Road closures would be monitored for their effectiveness in excluding motorized access. This would include assessing KNF administrative and unauthorized road use and the ultimate effectiveness of closure devices. The effectiveness of roads closed for grizzly bear mitigation, as well as currently closed roads would be monitored. The monitoring plan would be developed by RCR in coordination with KNF.

1.8.4.1 Reporting

An annual report would be filed with the Agencies stating that the appropriate information has been gathered and/or funded, as defined by the individual monitoring programs, and submitted to the appropriate agencies (FWP, USFWS, and Forest Service). Reports would also incorporate any correspondence from those agencies regarding impact trends, the need to modify mitigation plans and/or monitoring reports, or other pertinent information. The following elements would be covered:

1. Neotropical migrant birds;
2. Mountain goats;
3. Sensitive animal species – harlequin ducks are the only sensitive animal species initially identified to be monitored; and

4. Road and trail closures (may be included with the Threatened and Endangered Species Monitoring Report).

1.9 Aquatics and Fisheries Monitoring Plan

Aquatic biota would be monitored to determine if project activities were adversely affecting aquatic resources. The objectives of the Aquatics and Fisheries Monitoring Plan would be to:

- Establish pre-operational short- and long-term water quality and sediment conditions;
- Detect impacts of mine construction, operations, or closure activities on aquatic communities and fish populations; and
- Determine the effectiveness of BMPs and other mitigation.

Aquatic systems monitoring will examine fish, macroinvertebrate, or periphyton assemblages. Aquatic macroinvertebrates are one of the most widely used indicators of water quality because, among other reasons, they are usually present in streams under a wide range of conditions. Monitoring stream fish assemblages is beneficial for detecting changes in aquatic conditions that occur over longer periods, but fish are not found in all drainages, can be transient within a reach, may be excluded from areas by physical barriers (such as waterfalls), and generally have more limited habitat requirements. Benefits of monitoring periphyton communities include the ability to detect short-term changes in water quality in a biotic community that is directly affected by both water quality and physical habitat changes. Programs that combine monitoring of all three communities combine the benefits of each to provide detection of changes to aquatic resources from a wide variety of conditions and periods. As described in the subsections below, RCR would monitor benthic macroinvertebrates, fine sediments, periphyton, fish populations, and metals accumulations in fish tissues. Aquatic and fisheries monitoring would be coordinated with water quality and streamflow monitoring described above in Section 1.6. Monitoring sites would be selected to facilitate incorporation of available long-term data collected by Avista Corporation under the Clark Fork Settlement Agreement.

This conceptual aquatics and fisheries monitoring plan incorporates the fisheries and aquatics monitoring plan developed by Thomas in 1994. Prior to Phase II construction, RCR would develop and submit for Forest Service, DEQ, and consistent with Bush 2018, USFWS approval an updated Aquatics and Fisheries Monitoring Plan, including a pre-construction monitoring program. Unless otherwise indicated, monitoring would be implemented, once approved by the Agencies, prior to Phase II construction and continue through post-mining reclamation. In the event of a temporary mine closure, monitoring would continue unless the Agencies agreed to reduce or suspend monitoring requirements.

RCR would compare data collected during the Phase II construction, operations, and closure phases with pre-construction baseline data and data from study area monitoring sites to upstream benchmark monitoring sites. The Aquatics and Fisheries Monitoring Plan may be modified by the Agencies to address any concerns that may be indicated by the data. Preconstruction monitoring and the monitoring components for all phases of the project are described below.

1.9.1 U.S. Fish and Wildlife Service Role

As described in the Terms and Conditions in the 2017 revised BO for bull trout and bull trout critical habitat (USFWS 2017), as clarified in Bush (2018), The USFWS would advise the KNF in developing the Water Resources and Aquatics and Fisheries Monitoring Plans as they relate to ESA objectives, and would have final approval authority. Reinitiation of consultation with the USFWS may be necessary if monitoring data indicated changes in risks to bull trout or designated critical habitat as described in the 2017 revised BO

1.9.2 Pre-operational Monitoring

The goal of pre-operational data collection is to allow comparisons between the data collected prior to Phase II construction and data collected during Phase II construction and operations. Without adequate pre-operational data, it would be difficult to determine if changes in the aquatic community were due to mine activities or natural events unrelated to mine activities. Pre-operational data collected as described in the following subsections would supplement baseline data collected within the study area from 1985-2016.

Monitoring sites would be selected in the Rock Creek and East Fork Bull River drainages to detect potential impacts associated with the project. Monitoring components for pre-construction and all other phases are described below.

1.9.3 Benthic Macroinvertebrates

While water samples collected at a specific time may not allow detection of potential pollution events between sampling events, benthic macroinvertebrates are effective indicators of short- and long-term stream water quality and sediment conditions. Certain species of macroinvertebrates can tolerate degraded conditions, such as elevated metal concentrations and fine sediments, while others may be very sensitive to small perturbations in the environment.

RCR would maintain detailed maps and photographs of each sampling site so that the sites can be accurately identified each year. In addition, permanent markers would be installed at each study site.

Quantitative macroinvertebrate data would be collected three times per year at each monitoring site. Monitoring sites would be selected to represent a range of impacted and unimpacted conditions. To reduce variability, sampling areas would be physically similar as much as possible. It may be necessary to locate a suitable reference station outside the Rock Creek or East Fork Bull River drainage. Samples would be taken in a quantity and manner approved by the Agencies.

Macroinvertebrate collection and assessment methodologies would follow DEQ standard operating procedures (DEQ 2012). Data analysis techniques would include, but are not limited to, the following:

- Macroinvertebrate Multimetric Index
- observed versus expected taxa
- standing crop
- taxa richness
- percent dominant taxon
- ratio of functional feeding groups
- Shannon-Weaver diversity index
- equitability
- community similarity index
- pollution tolerance indices
- total mayflies, stoneflies, and caddisflies divided by total chironomids
- Mayfly, stonefly, and caddisfly abundance and richness

Data would be compiled by season and comparisons would be made between potential impact sites and reference sites. Data would also be compared with pre-operational and baseline data. In addition, bioassays would be conducted with water samples taken from locations to be specified by the Agencies.

Likely sampling locations are the mine adit wastewater, paste tailings facility seepage water, and Rock Creek water downstream of the mill site. Test species would be selected by the Agencies prior to the start of monitoring.

1.9.4 Fine Sediments

Monitoring of fine sediment and the effectiveness of sediment-reduction BMPs is described above in Section 1.6.

Fine sediment loading of spawning gravels in Rock Creek would be estimated during routine monitoring by referencing pre-operational/baseline stream sediment composition following the fine sediment assessment method outlined in *The Montana Department of Environmental Quality Western Montana Sediment Assessment Method: Considerations, Physical and Biological Parameters, and Decision Making* (DEQ 2013). The DEQ (2013) assessment method entails fine sediment measurement by riffle pebble counts and pool grid tosses, and may include additional sediment measurements by McNeil core sampling. Prior substrate sampling attempts in Rock Creek have indicated the difficulty of collecting core samples due to abundant cobbles in many areas of upper Rock Creek and its tributaries. Sampling techniques, times, and locations would be approved by the Agencies prior to the start of monitoring.

1.9.5 Periphyton and Benthic Chlorophyll-a

Similar to benthic macroinvertebrates, algae attached to submerged surfaces such as rocks or logs, known as periphyton, are effective indicators of short- and long-term stream water quality and sediment conditions. In particular, periphyton monitoring can help detect any effects of nutrient loading to a stream from blasting agent nitrate residues or other sources.

RCR would sample periphyton and benthic chlorophyll-a at all aquatic biological monitoring stations concurrent with the proposed benthic macroinvertebrate population sampling during the summer. Qualitative periphyton would be collected following DEQ’s standard operation procedure using the appropriate method for the stream type to be sampled (DEQ 2011a). At stream locations with flowing water at the time of sampling, the modified PERI-1 method would be used, which designates a specific longitudinal stream length to be sampled at each site. The sampled stream length would either be 40 times the average wetted width at the mid-point of the stream reach or a minimum of 150 meters, whichever was greater. Eleven transects would be established throughout each site reach and would be located equidistant from one another (shown on Figure 1.0 in DEQ 2011b). Algal material would be collected from each of the 11 transect locations, with all material composited into a single sample per site (DEQ 2011a). Collection methods would include using a toothbrush or knife to collect material from hard substrates and a turkey baster or spoon for soft substrates.

Quantitative benthic chlorophyll-a samples would be collected from each site sampled for periphyton following DEQ’s standard operation procedures (DEQ 2011b). Eleven transects would be established throughout the site reach as with the modified PERI-1 method. The samples collected at each transect would be kept separate rather than combining them into one composite sample as recommended for the periphyton samples. The collection method used at each transect would be based on the substrate and conditions at each location. For example, the hoop method would be used for transects dominated by the presence of filamentous algae, regardless of stream substrate. If heavy filamentous algal growth was not observed, the template sampling method would be used at transects dominated by small boulders, cobble, and gravel, while the core method would be used at those transects dominated by silt-clay substrate. The collection tools used for each method differ, but they all result in a quantifiable area of the stream substrate being sampled at each transect (DEQ 2011b). If field personnel visually assessed the site and decided that benthic algal chlorophyll-a was low (<50 mg/m²) at all transects of a stream site,

photographs of the stream substrate at all 11 transects would be taken in accordance with Section 7 of DEQ's standard operation procedures (DEQ 2011b) rather than taking chlorophyll-a samples.

Based on these methods, one composite periphyton sample and 11 chlorophyll-a samples would be collected at each site from the reach that included the Surber sample locations prior to collecting macroinvertebrates. As stated in the DEQ's standard operating procedures (DEQ 2011b), the sampling method could be modified to scrub additional delimited areas from the same location for the chlorophyll-a samples if very little material on the filter was observed after filtration or if previous sampling efforts had a high percentage of below detection limit results, provided that appropriate methods and detection limits were used. The number of additional delimited areas scrubbed at each transect would be recorded.

1.9.6 Fish Populations

Fish population monitoring would be conducted to help determine if fish were adversely affected by mine activities. Fish population monitoring would also help track any new establishment of nonnative fish species that may indicate that physical stream conditions such as temperature, habitat, and streamflow have changed from pre-mine conditions.

During pre-operational monitoring, fish populations in Rock Creek, East Fork Rock Creek, West Fork Rock Creek, and East Fork Bull River would be monitored annually in July or August to establish pre-operational conditions at sampling sites that have not been monitored annually at the same locations by Avista Corporation. Beginning at Phase II, fish populations would be monitored at 2-year intervals. RCR would coordinate with FWP and Avista Corporation to determine the appropriate sampling locations and avoid potential impacts on fish from duplicative sampling. Fish population surveys would be completed at a variety of stream reaches to represent potential fish population responses to possible water quality and habitat changes. Population densities of each fish species would be estimated, where adequate sample sizes permit, with snorkeling data, using the Seber-LeCren multiple pass method or comparable method to make population estimates. Monitoring requirements may be satisfied through cooperation with other monitoring efforts in these streams if cooperative efforts satisfy the project monitoring objectives. All fish kills would be monitored and reported within 24 hours to the KNF and DEQ.

1.9.7 Bioaccumulation of Metals in Fish Tissue

Prior to evaluation adit construction during Phase I, the KNF would require RCR to submit a plan for metals monitoring as it relates to bull trout habitat requirements to the KNF and USFWS for approval. The plan would include monitoring in water samples, sediment samples, and fish samples. Implementation of the plan would begin prior to evaluation adit construction to establish pre-evaluation conditions, and would continue through operations and post-closure as determined necessary by the KNF and the USFWS. Surface water and sediment monitoring are described in Section 1.6.2, Section 1.6.4, and Section 1.6.5 of the Water Resources Monitoring Plan.

Fish would be collected from mainstem Rock Creek and the East Fork and West Fork Rock Creek for metals analysis. Tissue samples from collected fish would be analyzed to determine concentrations of zinc, copper, mercury, cadmium, and lead, which would then be compared with baseline concentrations. RCR would begin collecting pre-operational data prior to surface disturbance activity. To reduce sampling variability and enhance detection of changes, fish tissue metals monitoring would be conducted using a single species of fish of a similar age cohort with the highest stream reach fidelity possible. Test procedures and analysis would be the same as those used during baseline data collection described in the SEIS, unless changed by the Agencies. Sampling would be done annually for 5 years and then every 3 years until reclamation was complete, unless otherwise required by the Agencies. If metal concentrations in fish tissue became elevated to a level of concern, an ecological risk assessment would be conducted at the discretion of the Agencies.

1.9.8 Bull Trout in the Clark Fork River

RCR would work with the FWP and USFWS to monitor the effects of the mine discharge from the diffuser on bull trout between Noxon Reservoir and the confluence of Rock Creek and the Clark Fork River. This would be necessary to determine if changes need to be made in diffuser design or requirements within the MPDES permit (e.g., mixing zone and effluent limits) to maintain migration of bull trout across the diffuser and ensure that aquatic life standards were met.

1.9.9 Spills and Accidents

The Pipeline Spill Monitoring, Maintenance, and Repair Plan is described in Section 1.15.2 and, for Phase I, in the Rock Creek Evaluation Adit License Application (RCR 2010). In the event of an accidental discharge of toxic or hazardous materials or sediments, supplemental monitoring may be required by the Agencies if there is a reasonable possibility that the environment could be adversely affected. RCR would be required to immediately report all such accidental discharges to permitting agencies and the USFWS. The type, frequency, and location of monitoring would be contingent on the circumstances of the accident. Mitigations and recommended monitoring for several likely spill or accident scenarios would be developed as part of an Emergency Action Plan prior to mine operation. This would facilitate the process should a spill or accidental discharge of toxic or hazardous material occur.

During mine construction and operation, RCR or the KNF would notify the USFWS within 24 hours of any mine-related emergency or unanticipated situations that may be detrimental for bull trout. RCR or the KNF would notify the USFWS within 24 hours if any dead bull trout or damaged redds are observed, as specified in the terms and conditions of the 2017 revised bull trout BO.

1.9.10 Quality Assurance/Quality Control

To provide QA/QC for monitoring of aquatic resources, RCR would maintain a permanent taxonomic reference collection that contained all benthic species and representative samples of all dominant and indicator taxa of periphyton collected from study area streams. All nondiatom taxa would be preserved in vials and representative permanent slide mounts made for diatom taxa. Taxa identification in this collection must be documented and confirmed by taxonomic experts who must be selected in concurrence with the Agencies. This reference collection would be maintained by RCR through the period of post-operational monitoring. Following this period, the collection should be transferred to a depository selected by the Agencies for permanent scientific reference.

1.9.11 Reporting

Within 1 week of completing aquatic sampling in April, August, and October, RCR would submit a brief report to the Agencies. This report would include brief statements about stream conditions observed at each monitoring station and alert the review personnel to any marked changes in monitoring data relative to the cumulative monitoring record. Within a reasonable time (5 to 7 weeks, with the exception of analyses conducted by third-party laboratories) after completing sampling, RCR would submit a report to the Agencies containing the results of all data compiled and analyses completed. A brief report would accompany this data submission, highlighting any new or unusual patterns in the data, with a brief discussion of any known or suspected causes for this pattern.

On or before March 1, RCR would submit an annual aquatic monitoring report that contained summaries of all aquatic monitoring data collected during the previous year to the KNF, DEQ, and USFWS. Each report must discuss trends in plant and animal population patterns and evaluate changes and trends in terrestrial and aquatic habitat quality, based on all data collected to date for the project. Recommendations in these reports could include modifications to increase monitoring efficiency, improve the quality of the data, or address any potential concerns indicated by the data. The KNF would also be required to submit

to the USFWS annual reports of the mining year activities as well as the activities anticipated for the next year and an annual report of bull trout taken, if any, as well as any relevant data, and summaries of all Inland Native Fish Strategy compliance monitoring conducted for the Rock Creek Project.

TheKNF, DEQ, FWP, and other relevant agencies, would meet annually within 1 month after RCR submits the annual report to review the Aquatics and Fisheries Monitoring Plan and monitoring results and to evaluate possible modifications to the plan or to mine operations.

1.10 Reclamation Monitoring Plan

This plan provides the conceptual framework necessary for development of a reclamation monitoring program for the project. RCR had included a revegetation and a soils and erosion-control monitoring plan in its application and in the approved 2010 Evaluation Adit Plan; however, the Agencies believe that those plans needed to be expanded to reduce the risk of sedimentation and revegetation failure (see Chapter 2 and Appendix J of the SEIS).

The final plan would contain specific information on vegetation removal and deposition, soil salvage and handling, sampling methods, frequency of sampling, chemical parameters and analysis methods for any soil testing, and reporting. The reclamation monitoring program would begin as soon as construction activities were initiated and would continue until the Agencies released the reclamation bond.

The overall reclamation goal is to achieve short- and long-term stability and utility of the disturbed lands. The conceptual reclamation monitoring plan contains several elements:

- monitoring soil salvage, handling, segregation, quantity, and quality;
- soil erosion and construction monitoring; and
- revegetation monitoring.

1.10.1 Monitoring of Soil Salvage and Handling

Monitoring would take place throughout mine life during soil salvaging and replacement to ensure that adequate reclamation materials were salvaged, stored, and respread according to a revised and expanded soil salvage and handling plan. Soil depths would be verified using standard U.S. Department of Agriculture methods.

Soil salvage activities would be monitored to verify depth and suitability (primarily rock content) of each lift. Monitoring would also verify that each lift was stored in appropriate locations. Soil replacement activities would be monitored to verify that lifts were replaced in the proper sequence and with sufficient depths. A 100-foot by 100-foot grid would be established on reshaped landforms at final reclamation of disturbances. After soil replacement, the grid would be resurveyed to verify proper total soil replacement depths. The average of all sample points per reclaimed unit must meet the soil replacement depth identified for each disturbance area. In addition, no sample point on the grid should have less than 50% of the required replacement depth.

Because biological, chemical, and physical changes occur in soils buried within stockpiles for prolonged periods, stored soil would be tested from samples collected deep within soil stockpiles before resspreading to identify what, if any, deficiencies or limitations in soil physical and chemical properties existed that may affect plant growth. A reclamation specialist would determine appropriate fertilizer, liming, organic matter, and other amendments.

1.10.2 Soil Erosion and Construction Monitoring

This component of the reclamation monitoring plan has two phases: monitoring of active construction and long-term maintenance monitoring. In general, monitoring would be done to identify areas where slumps, rills, gullies, and sheet wash were occurring. Any erosion problems identified would be immediately corrected.

RCR would conduct annual audits of BMPs implemented during construction of roads and other project facilities. This monitoring would be ongoing throughout road and mine construction and into the operational period for the paste tailings facility storage area. A Forest Service engineer would periodically monitor erosion-control measures to ensure they are implemented according to approved plans and are functioning properly. If deviations from BMPs were found, RCR would immediately correct the practice as well as resource damage that had occurred. In addition, sediment source surveys would be conducted in the Rock Creek and Bull River drainages. RCR would be responsible for mitigating sediment sources on NFS lands in the Rock Creek drainage equivalent to 400 tons of sediment.

Routine long-term maintenance monitoring would be conducted during spring and fall and after heavy storm events. This monitoring would focus on reclaimed and disturbed areas. If necessary, immediate erosion-control measures would be applied such as reseeding, mulching, and other appropriate BMPs.

1.10.3 Revegetation Monitoring

Revegetation would be monitored annually during the growing season to identify areas where vegetation was failing and determine the cause. Revegetation monitoring should be conducted in conjunction with the routine soil maintenance monitoring. Systematic visual inspections would be conducted to identify areas that have inadequate cover, poor seedling growth, damage, or poor nutrition.

If problem areas were identified, RCR would need to identify the cause. If the cause appeared to be related to soil infertility or toxicity, then a soil testing program would need to be implemented for the problem area. Soil chemistry tests would be conducted to ascertain macro- and micronutrient status, pH, cation exchange capacity, and potential toxicity and heavy metal problems. Problems could also be caused by inadequate watering or inappropriate species or varieties being planted. Appropriate remedial actions would be taken to correct the problem.

Revegetation success of tree seedlings would be critical to mitigate the visual impacts of project facilities. A sampling design for monitoring tree stocking would be specified in the plan and approved by the Agencies. Other parameters such as ground cover, production or biomass, and plant density could be proposed by RCR to quantitatively evaluate the revegetation success of grasses, shrubs, and forbs. The minimum vegetation cover required after reclamation would be 80% of the total plant cover of a specific control site after a 3- to 5-year monitoring period. Tree establishment surveys are recommended at Years 1, 3, and 5 after planting.

Post-closure monitoring of trees should be conducted for up to 20 years after mining to determine if visual mitigations and densities have been achieved. Fifteen years after planting, survival rates must number at least 400 trees per acre and 200 shrubs per acre. Frequency and amount of monitoring would be approved by the Agencies.

1.10.4 Reporting

Monitoring of soil loss rate and remediation activities, precipitation infiltration, and revegetation conditions would be conducted concurrent with operations and reclamation. RCR shall submit an annual

report to the Agencies that describes any reclamation problems that were identified and remedial measures taken. This report would consist of three main components:

1. Soil salvage activities would be monitored to verify depth, suitability, and proper storage of each lift. Soil replacement depths would be verified and tested to identify any physical or chemical problems that might affect plant growth.
2. RCR would conduct annual monitoring of BMP implementation during road and mine construction and during construction and operation of the paste tailings facility to identify areas where slumps, rills, gullies, and sheet wash is occurring. Any erosion problems identified would be immediately corrected. Routine long-term maintenance monitoring would be conducted during spring and fall and after heavy storm events and would focus on reclaimed and disturbed areas.
3. Revegetation would be monitored annually during the growing season to identify areas where vegetation is failing to become established and to determine the cause. Tree establishment surveys are recommended at Years 1, 3, and 5 after planting and every 5 years thereafter unless otherwise determined by the Agencies. Post-closure monitoring of trees would be conducted for up to 20 years after mining to determine if visual mitigation has been achieved.

1.11 Plant Species of Special Concern Monitoring Plan

1.11.1 Monitoring of Plant Species of Special Concern

Monitoring pertains to all lands within the permit boundary for threatened and endangered plants but only to NFS lands within the permit boundary for sensitive plants. Additional on-site verification studies would be performed during development of final facility designs to precisely locate any additional KNF sensitive plant populations as well as populations of MNHP plant species of special concern for avoidance. Whenever the KNF sensitive species list was updated, the KNF would alert RCR with the updated list. RCR would be responsible for ensuring that various plant surveys are revisited and conform to KNF standards within the study area to determine whether newly listed species, as well as any new MNHP plant species of special concern, had been identified. Reporting timeframes for the resurveys would be determined at the time KNF informs RCR of the updates.

1.11.2 Plant Species of Special Concern Monitoring Report

Reports would include data collected during on-site verification studies performed during final design development to precisely locate KNF sensitive plant populations and populations of MNHP plant species of special concern identified in the 2001 FEIS or the SEIS, as well as when any new sensitive plant species lists are updated. The monitoring report should also identify any changes that may be needed to avoid disturbance of these plants. Reports should be submitted prior to facility design review by the Agencies and again prior to surface disturbance for those facilities to re-verify population locations.

1.12 Terrestrial Threatened and Endangered Species Monitoring Plan

As described in Section 2.3.1.16 of the SEIS, the Threatened and Endangered Species Mitigation Plan requires the KNF to form and lead a grizzly bear Oversight Committee, which would develop a Comprehensive Grizzly Bear Management Plan. The Comprehensive Grizzly Bear Management Plan would include processes to ensure that access management, prevention of habituation, educational opportunities, reporting and monitoring, enforcement of easements, and management of actions are being adequately implemented. The monitoring plan outlines the basic monitoring elements to be designed in detail by RCR, in consultation with the Oversight Committee. The monitoring elements are connected to required mitigation items from the Reasonable and Prudent Measures, Terms and Conditions, and the Threatened and Endangered Species Mitigation Plan in the 2006 BO (USFWS 2006). Monitoring would

be conducted by RCR and the KNF as indicated below. Monitoring elements below are cross-referenced with the relevant mitigation item from the 2006 BO.

1.12.1 Reporting Interval

The results of all monitoring efforts would be reported annually, unless specified otherwise. RCR would prepare an annual monitoring report and submit it to the KNF by February 15 of each year.

1.12.2 Monitoring Elements (RCR Responsibility)

RCR would be responsible for the following monitoring elements related to threatened and endangered species:

- RCR would fund, for the life of the mine, monitoring and research efforts aimed at the Cabinet Mountains grizzly bear population, including the monitoring of grizzly bears augmented into the region over time (mitigation items A-7 and E-3).
- Prior to the start of the construction phase, RCR would contribute funding for bear monitoring in the area along Highway 2 between the Cabinet Mountains and the Yaak area. The linkage identification work would involve 3 years of monitoring movements of grizzly and black bears along the highway to identify movement patterns and key movement sites (mitigation item C-6).
- Following RCR development and KNF approval of the Road Management Plan (RMP; called a transportation plan in the mitigation plan attached to the 2006 BO), RCR would monitor the effectiveness of reducing mine-related traffic by busing employees to the mill site. RCR would provide traffic counts (summarized by month) and traffic type (to the extent possible - commercial, employee personal, bus, company vehicle, agency, and nonmine-related traffic) (mitigation item A-1).
- During mine construction and the first three years of full operation, RCR would monitor the number of big game animals killed along NFS road #150, NFS road #150A, and new roads built for the project and report findings annually. RCR would also monitor and report (within 24 hours) all grizzly bear, bald eagle, lynx, wolf, and black bear mortalities (mitigation item A-3). Any grizzly bear mortality within the action area, as defined in the 2006 BO, would be investigated by the USFWS, KNF, and FWP. If deemed attributable to the effects of the mine, additional measures as needed and as approved by the USFWS would be taken to prevent additional grizzly bear mortality (Term and Condition 2e).
- RCR would monitor timely service of bear-resistant containers at all mine facility sites (mitigation item A-7c). Problems in timely service would be corrected immediately.
- RCR would monitor results of seed application to assure compliance with mitigation item A-8. RCR would immediately remove preferred bear foods found in the seed mix and resulting plants.
- Monitoring of mitigation item A-9 (no firearms) would be done by RCR and the results reported to the Agencies.
- RCR would conduct random checks to assure feeding of wildlife (mitigation item A-10) is not occurring and include the number of violations in the annual report to the KNF.
- RCR would assure that all employees complete training on living in bear country on an annual basis (mitigation item A-12) and would provide a current (dated) list of employees along with an attendance sheet with employees' original signatures.
- All road closures implemented as part of the mitigation plan (mitigation item C-1, Term and Condition 1g) would be monitored by RCR to assure that closures are effective, and RCR would provide monitoring results in an annual report submitted to the KNF.

- RCR would fund monitoring of the Rock Lake and St. Paul trails to assure use levels do not exceed "high use" as defined by the IGBC. Monitoring visitor use on these trails would begin within 3 years of the effective date of the ROD (mitigation item C-3).

1.12.3 Monitoring Elements (KNF Responsibility)

The KNF would be responsible for the following monitoring elements related to threatened and endangered species:

- The traction mixture used during winter operations would be monitored by the KNF to assure salt is not used (mitigation item A-2).
- The KNF would monitor compliance with the food storage order (mitigation item C-2).
- The KNF would monitor RCR's efforts to remove animals killed by vehicles traveling along routes used for the evaluation, construction, and operation of the mine (mitigation item A-3). This would be done by random inspections along those routes. When animals were found that were not removed in the time frames specified in the mitigation plan, the KNF would immediately notify RCR.
- The KNF would establish and maintain (through coordination with the three grizzly bear personnel: 2 grizzly bear specialists and 1 law enforcement officer) a mandatory reporting system to ensure that RCR and KNF employees are required to immediately report any black bear or grizzly bear incidents, observations, or mortalities to grizzly bear personnel to ensure that preemptive management, hazing, or removal of food attractants would occur to avoid further risks of habituation, mortality, or displacement of grizzly bears (mitigation item A-8h).
- The KNF would ensure that administrative use levels on restricted roads in Bear Management Units (BMUs) 2, 4, 5, 6, 7, and 8 were limited to no more than 57 round trips per year divided by spring, summer, and fall seasons (Term and Condition 1f).
- The KNF would incorporate the results of RCR's monitoring of effectiveness of access changes in the KNF's annual monitoring reports (Term and Condition 1g).
- The KNF would monitor construction of powerlines according to criteria specified in the mitigation plan (mitigation item A-4) to assure compliance. Compliance would be recorded in the annual monitoring report until powerline construction was completed.
- The KNF and RCR would ensure that all conflicts between people and grizzly bears, and people and black bears would be recorded and monitored (Reasonable and Prudent Measure 3).
- The KNF would monitor grizzly bear and black bear sanitation incidents in BMUs 2, 4, 5, 6, 7, and 8 and take corrective action if necessary (Term and Condition 2f).
- The KNF would review the Travel Management Plan to determine if mine-related traffic levels are greater than projected levels. Adjustments to traffic levels may be determined following completion of the construction phase, but prior to full operation (mitigation item A-1).
- The KNF would ensure that RCR funding for monitoring was available on an annual basis, 2 months in advance of the fiscal year (October) if to be used for the life of the mine (based on monitoring item E-3).

1.12.4 Threatened and Endangered Species Monitoring Report

The results of all monitoring efforts would be reported annually and submitted to the USFWS by April of each year. The following elements are required to be included in the report:

1. Grizzly bear and black bear sanitation incidents and corrective measures taken during the previous year;
2. A Transportation Monitoring Report or summary of that report (see Section 1.12.5 below);
3. The number of vehicle-killed deer, elk, and other species on project-related roads. After 5 years of full operation, the KNF, in consultation with the USFWS, would reevaluate the mortality risk to these animals to determine the need to continue, remove, and monitor the number of road-killed animals;
4. The number of grizzly bear, bald eagle, wolf, or lynx mortalities within the permit area, as described in Appendix A of the 2006 BO;
5. Documentation of timely service of bear-proof containers at all mine facility sites;
6. Results of monitoring of effectiveness of seed application to locate and remove preferred bear foods (such as clovers) and documentation of any necessary plant removals;
7. The number of wildlife feeding violations;
8. Documentation of annual employee training on living in bear country;
9. Results of monitoring the effectiveness of road closures required by the 2006 BO Terms and Conditions;
10. Results of monitoring of recreation use levels on the Rock Lake and St. Paul trails; and
11. A summary and statement of compliance with all requirements of the Threatened and Endangered Species Mitigation Plan (Appendix E of the SEIS) and the 2006 BO Terms and Conditions.

1.12.5 Transportation Monitoring Report.

RCR would report the total vehicle count per road (summarized by month) and traffic type (to the extent possible) for NFS road #150 above and below the mill site, NFS road #150B, and NFS road #2741 above and below the evaluation adit access road to determine average daily traffic. The report should also define any necessary changes to the Traffic Management Plan. This report may be included with the annual Threatened and Endangered Species Monitoring Report.

1.13 Wilderness Monitoring Plan

1.13.1 Objective

The objective of monitoring for wilderness is to determine if activities approved within the CMW boundary, such as the required monitoring described in this appendix, are in conformance with mitigation and special provisions, and if management is minimizing impacts on wilderness values.

1.13.2 Locations, Parameters, and Frequency

1.13.2.1 Approval of Final Monitoring Plans

The KNF would use a Minimum Requirements Analysis (MRA) to ensure that adverse effects on wilderness character are minimized. The Minimum Requirements Decision Guide (MRDG; Arthur Carhart National Wilderness Training Center 2016) is a tool to complete a minimum requirement analysis. The MRDG has two parts: 1) determine if administrative action is necessary and, if necessary, 2) determine the minimum activity necessary. Prior to Phase I, the KNF would conduct a MRDG on the conceptual monitoring plan through Step 1. Step 2, which is the determination of the minimum activity necessary, would be used to evaluate final plans as they are submitted.

RCR would clearly identify any activities (e.g., monitoring, equipment, and transport) that would occur within the CMW boundary in submitted plans (e.g., maps, tables, and monitoring locations). The KNF would complete Step 2, determination of the minimum activity necessary, of the MRDG. The MRDG would be completed for final plans and updated as the project progresses.

1.13.2.2 National Wilderness Stewardship Performance

The Forest Service issued the National Wilderness Stewardship Performance Guidebook in 2016 (USFS 2016). Two elements that apply to the Rock Creek Project are described below:

- **Other Special Provisions** - includes a management plan and monitoring of the special provisions for the protection of wilderness values for the project. Special Provisions of the Wilderness Act Sec. 4(d)(3) allow for “*Mineral leases, permits, and licenses covering lands within national forest wilderness areas designated by this Act shall contain such reasonable stipulations as may be prescribed by the Secretary of Agriculture for the protection of the wilderness character of the land consistent with the use of the land for the purposes for which they are leased, permitted, or licensed.*”

The KNF would develop a Special Provision Monitoring Plan, covering both management and monitoring within the CMW boundary. The Rock Creek Final Monitoring Plan would be used as a basis for the Forest Service Special Provision Monitoring Plan. The Special Provision Monitoring Plan would be interactive and collaborative with RCR in determining priority management issues. If monitoring of the special provisions indicates resources are not in conformance with the plan, corrective actions would be taken.

- **Wilderness Character Baseline** - establishes a baseline and provides foundation for evaluating trends in wilderness character. These trends indicate the outcome of stewardship actions and success at “preserving wilderness character,” as directed by the Wilderness Act. National protocol for monitoring wilderness character is currently under development. The KNF would develop a wilderness character narrative, select measures for each indicator, and gather data to establish a baseline. Once a baseline is established, wilderness character monitoring would be conducted on a 5-year cycle.

The Forest Service has developed a National Minimum Protocol for Monitoring Outstanding Opportunities for Solitude (USFS 2014). The KNF would implement solitude monitoring one year prior to the start of mining activity to establish pre-operation baseline information in areas identified with possible “*increased visibility of mine disturbances as well as increased noise from mining facilities.*”

1.13.3 Reporting

RCR would submit the Final Monitoring Plan with activities (e.g., monitoring, equipment, and transport) within the CMW boundary clearly identified. The Forest Service would complete Step 2 of the MRDG and determination of minimum activity.

RCR would submit all activities (e.g., monitoring, equipment, and transport) occurring within the CMW annually on the Administrative and Special Provisions Authorization to the Forest Service by October 1 of every year. This form tracks motorized equipment/mechanical transport use authorizations to facilitate post-season data entry into Infra-WILD, which is part of the Natural Resource Manager, a system of database tools used by the Forest Service for managing agency data.

The KNF would complete a Special Provisions Monitoring Plan annually (starting the year the Final Monitoring Plan was approved) by October 1 of every year.

1.14 Cultural Resource Monitoring Plan

1.14.1 Cultural Resources Monitoring

Monitoring would be required during any land-disturbing activity that has potential to adversely impact unidentified sites. The areas to be monitored for Alternative V are identified in Figure 4-8 of the SEIS. Monitoring must be completed by a qualified archaeologist meeting the *Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation* (48 Federal Register 44716) and all tribes would be afforded an opportunity to monitor the activity. If a site is discovered during project implementation, activity would stop until the site is formally recorded and evaluated for eligibility to the National Register of Historic Places (NRHP).

Should a historic site (nonaboriginal) be discovered on private lands during project implementation, that activity would stop and the on-site archaeologist would notify the Montana State Historic Preservation Officer (SHPO). Should a prehistoric site (aboriginally affiliated) be discovered on private lands during project implementation, activities would immediately stop and the on-site archaeologist would notify the KNF, the Montana SHPO and the tribes.

If a historic or prehistoric site were discovered on federal lands during project implementation, activities would immediately stop and the on-site archaeologist would notify the KNF, the Montana SHPO, and the tribes (if the site were a prehistoric site). In addition, if the site were prehistoric, the tribes would also be notified. All sites would be formerly recorded and evaluated for eligibility to the NRHP.

Evaluations should consider traditional tribal history. Should a site be determined to be eligible (in consultation with the tribes and formal review of the Montana SHPO, consideration of effects of continuing with the project activities should be characterized (36 CFR 800.5). A determination of adverse effect should result in the design of mitigation measures. Mitigation measures would be described in a plan for site protection or data recovery. Mitigation plans require consultation with the tribes and formal review by the Montana SHPO and the Advisory Council on Historic Preservation, resulting in a Memorandum of Understanding (MOU). Failure to stop work and notify the proper authorities may result in criminal and civil penalties as prescribed by state and federal law. A determination of adverse effect would result in the design of mitigation measures. If a site is found, RCR would not be permitted to disturb or affect the site until it is formally recorded, the eligibility is resolved, a determination of effect is completed, a mitigation plan is approved by the Agencies, and the mitigation measures are implemented.

A MOU would be drafted to outline a protocol to follow when aboriginally affiliated cultural materials are encountered during monitoring. The MOU would include a specific process for site evaluation, data collection, and curation of artifacts. This protocol must be in place prior to surface-disturbing activities as identified for monitoring areas in Figure 4-8 of the SEIS.

In Montana, when human remains are found on nonfederal lands, the Montana State Burial Law comes into effect. First, the local coroner is called and then the Montana State Burial Board. The Montana State Burial Board is made up of tribal representatives, representatives of the Montana SHPO, the State Coroners Association, physical anthropologists, and archaeologists.

In the event that human remains are discovered on federal lands during monitoring, the Native American Graves Protection and Repatriation Act (NAGPRA) and its implementing regulations take effect. All land-disturbing activities must stop until the steps described below are taken. The federal process for meeting the intent of NAGPRA (Public Law 101-601 November 16, 1990) and its implementing regulations (43 CFR 10) for inadvertent discoveries of human remains, funerary objects, sacred objects, and/or objects of cultural patrimony on federal land includes the following:

1. The KNF archaeologist or a designated representative would send a certified receipt notification of the inadvertent discovery to all four tribal officials, including the type of remains found, the status of law enforcement involvement, and the location of the discovery. This would take place no later than 3 working days after discovery [43 CFR 10.4(d)(i)]. The KNF archaeologist or a designated representative would also telephone each tribal official immediately, but no later than 3 working days after discovery [43 CFR 10.4(d)(iii)].
2. The KNF archaeologist or a designated representative would follow up with a letter of consultation [43 CFR 10.5(b)(iv)(3)] to each designated tribal NAGPRA specialist detailing:
 - a. A time and place for further consultation [43 CFR 10.5(b)(iv)(2)].
 - b. A list of tribes that have been notified [43 CFR 10.5(c)(1)].
 - c. Intent to forward any additional documentation [10.5(c)(2)].
3. The tribal NAGPRA specialist would coordinate the identification of all lineal descendants and would keep of list of who has been contacted [43 CFR 10.5(d)(2)].
4. The tribal NAGPRA specialist would document the specific information used to determine custody (geographical, kinship, biological, archaeological, linguistic, folklore, oral tradition, and historical) [43 CFR 10.5(e)(2)]. The first priority for custody would be given to the lineal descendant [43 CFR 10.6(a)(1)] and then to the tribe with the closest cultural affiliation [43 CFR 10.6(a)(2)(ii)].
5. The KNF archaeologist would prepare reports [43 CFR 10.5(d)(8)] to include:
 - a. location of discovery
 - b. description of discovery
 - c. dates, times, and nature of consultation with the tribes
 - d. analysis reports
 - e. archaeological records
 - f. treatment and storage of human remains, funerary objects, sacred objects, or objects of cultural patrimony recovered
 - g. the custody and disposition of human remains, funerary objects, sacred objects, or objects of cultural patrimony
6. The KNF would publish a notice of the proposed disposition of human remains, funerary objects, sacred objects, or objects of cultural patrimony at least two times at least 1 week apart in the Federal Register and tribal papers [43 CFR 10.6(c)]. The notice would provide information as to the nature and affiliation of the human remains, funerary objects, sacred objects, or objects of cultural patrimony, and would solicit further claims to custody.

Consultation with each tribe would determine procedures on a case-by-case basis [43 CFR 10.5(d)(3-9)].

1. Planned treatment, care, and handling of human remains, funerary objects, sacred objects, or objects of cultural patrimony recovered.
2. Planned archaeological recording of human remains, funerary objects, sacred objects, or objects of cultural patrimony recovered.
3. Planned analysis of human remains, funerary objects, sacred objects, or objects of cultural patrimony recovered.
4. The kind of traditional treatment to be afforded by the tribes for human remains, funerary objects, sacred objects, or objects of cultural patrimony recovered.

1.14.2 Cultural Resources Monitoring Report

An annual report that describes monitoring activities for the year would be submitted to the Agencies. If a site is found, the site form, determination of effect, and mitigation plan would be submitted to the appropriate state and/or federal agencies within 30 days of completion of the site recordation fieldwork.

1.15 Mine Facility Construction and Operations Monitoring

1.15.1 Paste Tailings Facility and Paste Plant Monitoring

The intent of the construction and operations monitoring plans for the paste tailings facility, the paste production plant, and associated tailings pipelines, would be to assure the facilities are constructed and operated in a manner consistent with the design specifications and to ensure the facilities meet all performance objectives. RCR plans to construct an evaluation adit to further assess the Rock Creek ore deposit. This limited underground evaluation project is referenced as Phase I. Phase II of the project refers to full mine build-out. All final design and monitoring plans would be submitted to the Agencies for approval before Phase II could begin.

Specific monitoring requirements such as information needs, monitoring location, instrument type, monitoring frequency, reporting requirements, and threshold values for remedial action would be finalized in a stand-alone geotechnical monitoring plan developed during the final design process for the tailings facility. The plan would identify monitoring requirements for pre-construction, construction, operations, and closure. The plan would be submitted for Agency approval prior to the Agencies authorizing Phase II.

The objectives of the geotechnical monitoring program as it pertains to the paste tailings facility and appurtenances would be to:

- Collect additional analytical data for use in ongoing paste tailings facility design and operations
- Identify previous unknown site conditions
- Confirm critical design assumptions
- Monitor site conditions during construction and operations
- Monitor paste performance during construction and operations
- Assist in assessing material used in dam construction
- Estimate tailings quantities and physical characteristics
- Establish requirements and a schedule for annual reporting.

A geotechnical monitoring plan adopted for Alternative V would incorporate many, if not all, of the monitoring elements listed in Table K-10. The exact type of monitoring technique used for data collection, location of monitoring devices, and frequency of data collection would be finalized during the final tailings facility design process and incorporated into a monitoring plan presented to the Agencies prior to Phase II. The monitoring plan would require RCR to submit an annual tailings facility construction and performance report.

The use of piezometers to monitor interstitial pore pressures is an industry-accepted practice, and the array of available instrumentation for this purpose is extensive. Devices have been adapted for continuous recording and for monitoring from off-site locations. At Rock Creek, piezometers would be installed in the foundation to measure pore pressures during construction, with particular attention given to areas where there may be glaciolacustrine clay present. Appropriate pore pressure “trigger” levels would be

established based on stability analyses to provide a management tool to respond to higher than predicted pore pressures if encountered. Piezometers would also be installed in the compacted paste shell as it is constructed to monitor pore pressure build-up.

Table K-10. Proposed Components of a Geotechnical Monitoring Program.

Monitoring Location	Item	Monitoring Parameters	Frequency	Comments
Embankment Foundation	Piezometers	Pore pressures	Monthly	Simple standpipe, and electronic pressure transducers; monitoring during construction and operations; visual inspections by mine personnel
Paste Facility Embankment	Piezometers	Pore pressures	Monthly	Simple standpipe and electronic pressure transducers; monitoring during construction and operations; monitoring of potential pore pressures and phreatic surface in the embankment and paste; visual inspections by professional engineer
	Inclinometers	Deformation (inches)	Monthly	Measure embankment deflection and movement
	Material quantities: Paste, borrow, or mine waste used for construction	Tons, and cubic yards per year	Annually	Annual reconciliation of paste and any fill material; visual inspections by professional engineer
	Material Properties	Paste density and moisture content	Weekly	A QA/QC program would be implemented to measure and monitor in-situ paste density and moisture content; visual inspections by professional engineer
Paste Facility Interior	Material Properties	Paste density and moisture content	Weekly	A QA/QC program would be implemented to measure and monitor in-situ paste density and moisture content; visual inspections by professional engineer

The piezometer cables would be buried and lead to a common readout station at the toe of the paste embankment where continuous data reading equipment would be installed.

Inclinometers would be used to monitor potential deformation of the paste embankment, which could be an indication of foundation or embankment failure. Inclinometers would be replaced as needed.

Visual observation would be a critical component of the monitoring program. Mine personnel would be assigned inspection responsibilities to be conducted as part of their assigned duties. A quarterly inspection report would be submitted to the Agencies as part of the monitoring requirements. Items such as embankment seepage, cracks or slumps in the embankment, evidence of slope failure, erosion features along the embankment face, and changing trends in seepage quantities, piping, and wet spots, are representative of the kinds of observational features that could be indicative of potential problems with the paste facility and the kinds of features that would be noted and documented during a visual inspection.

During construction and operation of the impoundment, QA/QC of embankment and paste placement construction activities would be carried out by a qualified third-party engineering consultant. Prior to the commencement of construction, the responsibilities of the third-party consultant would be detailed in an Agency-approved field manual and would include standard field and laboratory QC tests.

During the Operations Phase of the facility construction, geotechnical monitoring would continue at the locations and frequency established in the monitoring plan. Of particular interest for monitoring during operations would be pore pressures in the embankment and foundation as the embankment is constructed. In-situ paste consolidation within the interior of the facility would also be monitored to assist with closure

planning. The monitoring program would continue into the Closure Phase, although the frequency of monitoring would likely be reduced as steady-state conditions within the facility and embankment were approached. The following type of monitoring could be incorporated into a closure monitoring program:

- Installation of piezometers within the facility interior to monitor phreatic surface build-up.
- Installation of settlement plates and in-situ pressure transducers within the paste to monitor the consolidation and settlement of the tailings to help confirm the predicted consolidation behavior of the paste at closure.
- Visual inspections.

The monitoring plans for the Alternative V paste tailings facilities can generally be divided into four segments:

- Final Design Phase
- Preproduction Construction Phase
- Operations Phase
- Interim Facility Shutdown/Closure

Following is a general outline of the scope of monitoring:

Final Design Phase. The Agencies would require review and approval of final designs for the paste tailings facility, the paste plant, tailings pipelines, and associated tailings facilities before construction of Phase II could begin. In addition to design details, supporting data, and assumptions associated with the final designs, RCR would be required to submit detailed construction and operations monitoring plans for all paste-related facilities. These plans, once approved, would become a component of the approved Plan of Operations.

The final design of the paste tailings facility would be reviewed by the Paste Tailings TAG (PTTAG), which would be comprised of agency experts in geotechnical, geochemical, and water quality issues related to the construction and operation of modern tailings facilities. The PTTAG would provide an assessment of the final design, provide independent interpretation and analysis of existing and new laboratory test results and assumptions used in the design, provide objective QA/QC oversight on the final design and its components, and make recommendations for changes to the final design as appropriate. Areas of particular interest would include the soft clay areas of the paste tailings foundation, paste (physical) properties as it leaves the paste production facility, and how the paste properties change over time once placed in the paste tailings facility. The PTTAG would also review and make recommendations for construction monitoring, and operations monitoring and maintenance. Possible PTTAG members could include the Forest Service, DEQ, EPA, Corps, Idaho Department of Water Resources, Idaho Department of Lands, the Confederated Salish and Kootenai Tribes, and officials of Sanders County, Montana.

Preproduction Construction Phase. The Construction Monitoring Plan would establish standard-of-care construction implementation, testing, and reporting guidelines. The plan would outline construction QA/QC protocols to ensure that any constructed facility was being constructed to the design and performance standards set forth in RCR's approved Plan of Operations and the design documents.

Standard inspection and QA/QC procedures would be outlined with specific requirements for monitoring, testing, and reporting. Specific construction items that would be monitored include the identification and removal of areas of glaciolacustrine clay, pore pressure monitoring of foundation clays if left in place,

construction of foundation shear keyways, and installation of foundation underdrains. A schedule for material testing would be a required, and a final as-built construction report would be submitted and approved by the Agencies prior to operations start-up. This report would include at a minimum a summary of work completed, descriptions of field changes to the design with all approvals clearly annotated, QC test summaries, appendices with documentation of changes, all test data, and as-built drawings.

Operations Phase. Monitoring would continue throughout project life and would include ongoing monitoring, data collection, and review through the life of the project as well as routine inspections and reports of facility geometry, material specifications, embankment drainage, foundation pore pressure, and observational performance. Operational data collected would concentrate on the paste tailings facility and include routine measurements using standard geotechnical instruments (e.g., piezometers, inclinometers, and pore pressure transducers) installed in the paste tailings disposal facility, daily production data from the paste plant to monitor paste characteristics such as moisture content, and in-place paste parameters such as moisture content, saturation, consolidation, and density. This kind of data collection would enable ongoing modeling of saturation levels in the paste tailings facility, which is an important component of a stability assessment. Data would also be collected on the paste production facility to monitor and track paste parameters during production. These types of data collection and reporting requirements are consistent with the risk management plan recommendations contained in the Failure Modes Effects Analysis, summarized in Appendix P of the 2001 FEIS.

Quarterly summaries and annual reports would be prepared to document construction completed, data collected, and inspections conducted. The annual report would be reviewed by the PTTAG for conformance with design and operational performance and stability and to provide a means for recommendations or modifications to facilities operation.

Protocols would be established to alert operations managers of changed conditions that would impact the performance or stability of the paste tailings disposal facility, which could require immediate attention for resolution. RCR would be required to prepare a maintenance plan addressing items such as diversion ditches, repair of areas to minimize erosion or areas where the paste may require reinforcement, and control of surface water to minimize water from infiltrating into the paste. The tailings line would also require a monitoring and maintenance plan to ensure proper functioning. An emergency response plan for all paste-related facilities addressing emergency response protocols and contingency plans for system upsets would also be prepared and, once approved, would become a component of the approved Plan of Operations.

Interim Facility Shutdown/Closure. A plan would be developed addressing temporary facility shutdown due to unforeseen circumstances. The intent of the plan would be to ensure all facilities were maintained in a manner that would not jeopardize or compromise the facilities' near and long-term performance and stability. An interim facility shutdown monitoring program could also form the basis for the final closure monitoring program. Other than seasonally, where operations cease temporarily, RCR would file an annual statement with the KNF that includes: verification of intent to maintain the structures, equipment and other facilities; an expected reopening date; and an estimated time of shut-down and duration of extended operation.

Reporting and Third-Party Review. During the final design process, and during Operations and Closure, RCR would fund an independent technical advisor to assist the Agencies in ongoing oversight and review of the paste facility impoundment and associated appurtenances. The duties of the third-party technical advisor would be similar to those of consultants retained by the KNF as part of the review of the final tailings design. The technical advisor would be selected by, directed by, and report to the Agencies

through an agreement with RCR. RCR would provide site access, logistical support, and all information required by the technical advisor to complete ongoing reviews of the paste facility.

RCR would submit an annual paste facility construction and performance report to the Agencies. It would detail facility construction, monitoring, and performance.

1.15.2 Pipeline Spill Monitoring, Maintenance, and Repair

RCR prepared a Pipeline Monitoring, Maintenance, and Emergency Response Plan for the Evaluation Adit (RCR 2010). This plan would be resubmitted to the Agencies to include the information described below. The pipeline emergency response plan would address emergency response protocols and contingency plans for system upsets.

Spill monitoring of the pipelines would consist of weekly scheduled inspections of the pipeline route. This would consist of inspection of aboveground steel/synthetic discharge pipeline for physical signs of corrosion and vandalism, air valves for signs of leaks, and the pipeline for visual signs of a pipeline leak as evidenced by the appearance of wet spots or springs along the buried portion of the pipeline alignment, and surface erosion and/or springs on sloped portions of the alignment. If visual indications of a pipeline leak were observed, mine personnel would partially excavate a small shallow portion of the trench to confirm whether a leak or spill is actually originating from the trench.

If a leak or spill originating from the trench is confirmed, mine personnel would notify appropriate government agencies (Noxon Volunteer Fire Department, Sanders County Sheriff, Sanders County Emergency Management Coordinator, MDHES Water Quality Bureau, FWP, Forest Service, and National Response Center, as appropriate); the pump would be shut off; the pipeline would be allowed to drain; the trench would be opened up so the pipe can be thoroughly inspected; and the ground surface around the leak would be inspected to determine if pipeline contents are reaching a stream. Once the location of the leak is determined, that portion of the pipeline would be repaired and the trench would be backfilled using the same construction specifications used during pipeline construction.

If it is determined that the spilled material may be reaching a stream, mine personnel would immediately construct sumps to collect the material. Material from the sumps would be pumped into tanks and transported for proper disposal or to the water treatment plant. If it is determined that material reached a stream, water quality samples would be taken in the stream downgradient from the spill location using approved sampling and analytical protocols. A material recovery plan would be developed for each individual stream. RCR would store on-site the materials and supplies required to conduct the appropriate level of first response such as silt fence, oil booms, contamination supplies, and excavation equipment.

Due to the materials used for pipeline construction and the length of time the pipelines are anticipated to be in service, RCR does not expect the need to replace the pipelines due to age. However, it is possible that certain segments of the pipelines may need to be replaced due to some unforeseen material defect or failure. In that instance, flow through the pipeline would be shut down until the pipeline has been repaired.

1.15.3 Water Treatment Plant Construction and Operation Monitoring Plans

The intent of the Water Treatment Plant Construction and Operation Monitoring Plan is to establish QA/QC practices and operational standards for the water treatment plant and associated activities. The operating plan would include operating protocols, water quality treatment standards, and contingency plans for system upset or malfunction. These plans would be submitted to the Agencies for approval prior to plant construction.

1.15.4 Mine, Mill, and Associated Facilities Construction and Operation Monitoring Plans

All mine and mill facilities would have construction and operation monitoring plans. These plans would outline standard of care construction practices for these facilities and would include information on testing, monitoring, and reporting. The site location of certain facilities may encroach on sensitive habitat and construction practices would be clearly defined with regard to building in these areas so as to minimize impacts.

The intent of the operation monitoring plans is to establish protocols for the operation of all facilities to ensure standardized performance. The operating plans would address daily operations, contingency plans, system upsets, and performance criteria. The plans would be submitted to the Agencies for approval prior to construction and, once approved, would become a component of the approved Plan of Operations.

1.15.5 Engineering Construction and Operational Quality Assurance Reports

RCR would submit to the KNF and DEQ Engineering Construction and Operational Quality Assurance Reports for the paste tailings facility and paste plant, mill site, wastewater treatment plant, rail loadout, and pipelines. Interim construction reports would be submitted monthly during construction of the key buttresses of the paste tailings facility. A final construction report would be submitted prior to operation and would contain as-built drawings. During mine operation, monitoring would include routine inspections and biannual reports of facility geometry, material specification, tailings seepage, foundation pore pressure, and observational performance. As-built reports would be submitted for all other facilities prior to operation of the facilities. Operational monitoring of all other facilities would be appropriate for the facility involved.

1.16 Underground Mining Boundary Monitoring

To ensure RCR only mined ore within its valid existing rights and that the underground mine development adhered to required buffer zone boundaries, the KNF would require underground monitoring of boundaries of final buffer zones and RCR's valid existing rights. RCR would fund and facilitate biannual surveys of the underground workings that would be completed by an independent qualified mine surveyor. The surveyor would be selected and directed by the Agencies through an agreement with RCR. The surveyor would have no financial interest in the project. The Agencies may also require more frequent surveys and/or as-built drawings if discrepancies arose. RCR would provide mine access, logistical support, and all information required by the surveyor to complete independent inspections and resulting documentation for the identified tasks. This would include all company-conducted mine surveys of the underground workings. After completing the monitoring survey, the independent surveyor would submit maps of the workings to the Agencies and would report any ground disturbances that were outside of RCR's valid existing rights, entered into designated buffer zones, or deviated from Agency-approved mine design.

1.17 References

- Arthur Carhart National Wilderness Training Center. 2016. Minimum Requirements Decision Guide, 2016 Revision. Available at: <http://www.wilderness.net/MRA>.
- American Society for Testing and Materials. 2013. Standard Test Method for Column Percolation Extraction of Mine Rock by the Meteoric Water Mobility Procedure. ASTM E2242 – 13.
- Bush, J. 2018. Office Supervisor. Response to Kootenai National Forest Supervisor's Request for Clarification on elements of the November 1, 2017 revised Biological Opinion for the Rock Creek Mine Project. U.S. Fish and Wildlife Service, Montana Field Office, Helena, MT. 4 pp.

- Erickson, L. RC Resources. 2012. RC Resources Rock Creek Project Tonnage Calculations for the Evaluation Adit – Phase I. December 12.
- Hydrometrics, Inc. (Hydrometrics). 2015. 2015 Water Monitoring Water Resources Monitoring Report For The Rock Creek Project. Prepared for RC Resources, Inc. December. 104 pp.
- International Network for Acid Prevention. 2009. Global Acid Rock Drainage Guide.
http://gardguide.com/index.php/Main_
- Montana Department of Environmental Quality (DEQ). 2001. Bonding Procedures Manual. pp. 43.
- Montana Department of Environmental Quality (DEQ). 2005. Quality assurance project plan (QAPP) sampling and water quality assessment of streams and rivers in Montana. Standard Operating Procedure WQP/QAP-02. Water Quality Planning Bureau, Helena, MT. Available at:
<https://deq.mt.gov/Portals/112/Water/WQP/QAProgram/Documents/PDF/WQP/QAP-02.pdf>
- Montana Department of Environmental Quality (DEQ). 2009. Minimum reporting requirements for analytical data (chemistry) for the Water Quality Planning Bureau. Standard Operating Procedure WQP/DMS-010. Water Quality Planning Bureau, Helena, MT. Available at:
https://deq.mt.gov/Portals/112/Water/WQInfo/Documents/datamgmt/Information_for_Laboratories/WQP/DMS-010_Rev2.pdf
- Montana Department of Environmental Quality (DEQ). 2011a. Periphyton standard operating procedure. Standard Operating Procedure WQP/BWQM-010. Water Quality Planning Bureau, Helena, MT. Available at: <http://deq.mt.gov/Water/WQP/qaprogram/sops>
- Montana Department of Environmental Quality (DEQ). 2011b. Sample collection and laboratory analysis of chlorophyll-a. Standard Operating Procedure WQP/BWQM-011. Water Quality Planning Bureau, Helena, MT. Available at: <http://deq.mt.gov/Water/WQP/qaprogram/sops>
- Montana Department of Environmental Quality (DEQ). 2012. Sample Collection, Sorting, taxonomic Identification, and Analysis of Benthic Macroinvertebrate Communities Standard Operating Procedure WQP/BWQM-009, Water Quality Planning Bureau, Helena, MT. Available at:
<http://deq.mt.gov/Water/WQP/qaprogram/sops>
- Montana Department of Environmental Quality (DEQ). 2013. The Montana Department of Environmental Quality Western Montana sediment assessment methodology: considerations, physical and biological parameters, and decision making. Water Quality Planning Bureau, Helena, MT. Available at: <http://deq.mt.gov/Water/WQP/qaprogram/sops>.
- Montana Department of Environmental Quality (DEQ). 2014. Montana 2014 Final Water Quality Integrated Report. Helena, MT: Montana Dept. of Environmental Quality.
- Morrison Maierle. 2017. Rock Creek Mine Field Investigation 2016. Prepared for Hecla Mining – Revett Silver Company. January.
- RC Resources, Inc. (RCR). 2010. Rock Creek Evaluation Adit Project Revised Application for Exploration License. Prepared for Montana Department of Environmental Quality. March.
- Russell, C.C., K.S. Smith, and V.T. McLemore. 2014a. Chapter 5 The Planning Process. *In: McLemore, V.T., K.S. Smith and C.C. Russell (ed.). Management Technologies for Metal Mining Influenced Water: Sampling and Monitoring for the Mine Life Cycle. Vol. 6. Society for Mining, Metallurgy, and Exploration. Denver, CO.*
- Russell, C.C., K.S. Smith, and V.T. McLemore. 2014b. Chapter 4 Decision Making, Risk, and Uncertainty. *In: McLemore, V.T., K.S. Smith and C.C. Russell (ed.). Management Technologies for Metal Mining Influenced Water: Sampling and Monitoring for the Mine Life Cycle. Vol. 6. Society for Mining, Metallurgy, and Exploration. Denver, CO.*

- Sobek A.A., W.A. Schuller, J.R. Freeman, and R.M. Smith. 1978. Field and Laboratory Methods Applicable to Overburdens and Minesoils. Prepared for U.S. Environmental Protection Agency, EPA-600/2-78-054. Cincinnati, Ohio.
- Stewart W. 2004. Development of Acid Rock Drainage Prediction Methodologies for Coal Mine Wastes. Ian Wark Research Institute, University of South Australia. Ph.D. dissertation. November.
- U.S. Army Corps of Engineers (Corps). 2008. Regulatory Guidance Letter 06-3. Minimum monitoring requirements for compensatory mitigation projects involving creation, restoration, and /or enhancement of aquatic resources.
- U.S. Army Corps of Engineers 2016. National Wetland Plant List, version 3.3
http://wetland_plants.usace.army.mil/ . U.S. Army Corps of Engineers Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory, Hanover, NH.
- U.S. Environmental Protection Agency (EPA). 1982. Handbook for sampling and sample preservation of water and wastewater. EPA-600/4-82-029. Cincinnati, OH.
- U.S. Environmental Protection Agency (EPA). 1983. Methods for chemical analysis of water and wastewater. EPA-600/4-79-020. Washington DC.
- U.S. Environmental Protection Agency (EPA). 1999. Carbonate, Bicarbonate, and Total Alkalinity Standard Methods 2320. November.
- U.S. Environmental Protection Agency (EPA). 2006. Guidance on Systematic Planning Using the Data Quality Objectives Process. EPA QA/G-4. February.
- USDA Forest Service (USFS). 2012a. Forest Service National Protocols for Sampling Air Pollution-Sensitive Waters. General Technical Report RMRS-GTR-278WWW. Available at:
<http://www.fs.fed.us/air/documents/FS%20Water%20Sampling%20Protocols.pdf>.
- USDA Forest Service (USFS). 2012b. Groundwater Dependent Ecosystems: Level II Inventory Field Guide. General Technical Report W-86b. Available at:
http://www.fs.fed.us/biology/resources/pubs/watershed/groundwater/GDE_Level_II_FG_final_March2012.pdf.
- USDA Forest Service (USFS). 2014. U.S. Forest Service National Minimum Protocol for Monitoring Outstanding Opportunities for Solitude: Element 5 of the 10-Year Wilderness Stewardship Challenge. Available at:
http://www.wilderness.net/toolboxes/documents/WC/National_Minimum_Protocol_Solitude.pdf.
- USDA Forest Service (USFS). 2016. Wilderness Stewardship Performance Guidebook Version 2016.1.
- U.S. Fish and Wildlife Service (USFWS). 2006. Biological Opinion on the Effects to Grizzly Bears, Bull Trout, and Bull Trout Critical Habitat from the Implementation of Proposed Actions Associated with Plan of Operation for the Revett RC Resources Incorporated 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. October 11. p. 130.
- U.S. Fish and Wildlife Service (USFWS). 2017. Revised Biological Opinion on the Effects of the Rock Creek Mine Project on Bull Trout and Bull Trout Designated Critical Habitat and Supplement No. 2 to the 2006 Biological Opinion on the Effects to Grizzly Bears from the Rock Creek Mine Project. U.S. Fish and Wildlife Service Montana Ecological Services Office. 114 pp. November 1.
- Witte R.S. and J.S. Witte. 2013. Statistics. 10th Edition. Publisher, John Wiley and Sons, New York. November.

Attachment 4 - Rock Creek Project-Specific Plan Amendment

Rock Creek Project-Specific Plan Amendment

Table of Contents

Introduction.....	2
Purpose of the Amendment (§ 219.13(b)(1))	2
Providing Opportunities for Public Participation (§ 219.4) and Providing Public Notice (§ 219.16) (§ 219.13(b)(2))	2
Amend Consistent with FS NEPA Procedures (§ 219.13(b)(3))	3
Substantive Requirements of the Rule (§ 219.13(b)(5)).....	3
Scope and Scale of the Amendment	3
Application of Substantive Requirements	3
Using the Best Scientific Information to Inform the Amendment (§ 219.3):.....	4
Effective Date (§ 219.17(a)(3))	4
Objection Opportunity (§ 219.57(b)).....	4

Introduction

Per the National Forest Management Act and its implementing regulations at 36 CFR 219 (2012 Planning Rule), a plan may be amended at any time. Plan amendments may be broad or narrow, depending on the need for the change. I have the discretion to determine whether and how to amend the 2015 Kootenai Land Management Plan (2015 KFP) and to determine the scope and scale of any amendment. Although the 2015 KFP was developed using the 1982 Planning Rule procedures, I prepared this project-specific amendment under the 2012 Planning Rule. The following sections describe how I applied the procedural requirements of the 2012 Planning Rule to the amendment.

Purpose of the Amendment (§ 219.13(b)(1))

The Forest Service cannot prohibit locatable mineral operations reasonably incident to mining activities on lands subject to the United States mining laws either directly or by regulation amounting to a prohibition when those operations are otherwise in compliance with applicable laws. This means that if the operations would not comply with a forest plan guideline or standard even after all reasonable stipulations to minimize adverse environmental impacts on National Forest surface resources have been included per 36 CFR 228 Subpart A, and after the Forest Service determined the operations would comply with applicable laws, a forest plan amendment would be required. After applying all reasonable stipulations to minimize adverse effects and to insure compliance with applicable laws, I find there is a need for a project-specific amendment to the 2015 KFP.

The purpose of the plan amendment is to provide a project-specific variance suspending the requirement for full consistency with one forest-wide guideline. This includes suspending FW-GDL-WL-09 related to avoiding native ungulate winter range areas during the critical mid-winter period. Suspending FW-GDL-WL-09 is needed because the Phase I of the Rock Creek Project would operate yearlong in elk, mule deer, and white-tailed deer winter range, and it would not be practicable to avoid or minimize construction and operation activities during January and February.

Section 4.2.2 and 4.2.4 of the Final SEIS along with the 2015 KFP consistency worksheet and supporting memorandums described the effects of Rock Creek activities related to the need for the plan amendment.

Providing Opportunities for Public Participation (§ 219.4) and Providing Public Notice (§ 219.16) (§ 219.13(b)(2))

The Draft SEIS for the Rock Creek Project disclosed the need for the amendment (Sections 4.2.2.1 through 4.2.2.3), the substantive requirements related to the amendment (Section 4.2.4), and the environmental effects of the amendment (Section 4.2.4). The Draft SEIS was issued for public comment on February 19, 2016, with a 45-day comment period that ended on April 4, 2016. A Notice of Availability was published in the Federal Register and a notice was placed in the legal publication section of several local newspapers. The project documents were made available on the KNF website, and copies were available for review at select public libraries in Libby, Thompson Falls, Heron, Helena, and Missoula.

The Final Supplemental EIS includes responses to comments on the Draft Supplemental EIS regarding KFP consistency (Appendix S) and incorporates changes based on those responses.

The KNF completed an administrative review of the draft record of decision in accordance with the requirements of 36 CFR 218. After the Draft ROD was issued, a predecisional objection process was conducted. The Objection Reviewing Officer issued a response letter on October 31, 2017, responding to the specific objection issues raised. Section 1.10 of the final record of decision describes the objection process in detail.

Amend Consistent with FS NEPA Procedures (§ 219.13(b)(3))

The effects of the plan amendment is documented in Section 2.3.6 of the Final EIS pursuant to FS NEPA regulations at § 220. As an amendment that applies to only this project, it is not considered a significant change to the plan for purposes of the NFMA.

Substantive Requirements of the Rule (§ 219.13(b)(5))

Scope and Scale of the Amendment

The suspension of the guideline applies only to this Rock Creek Project decision.

Regarding suspension of FW-WL-GDL-09: the area of elk, mule deer, and white-tailed deer winter range that would be disturbed by construction and operations (4.5 acres on NFS land and 0.6 acres on non-NFS land) would be minimal relative to the amount of elk, mule deer, and white-tailed deer winter range available forestwide (367,465 acres, 354,883 acres, and 284,173 acres, respectively; KNF 2015a). Given available habitat and current human activity, additional disturbance to wintering elk and deer would likely be minimal when compared with existing disturbance in the area. The scope and scale of the amendment is limited to mapped ungulate winter range in the Rock Creek Project area, thus a project-specific amendment, rather than a programmatic amendment, is appropriate.

Application of Substantive Requirements

The plan amendment process requires determining which substantive requirements are directly related to project-specific variance and apply the requirements within the scope and scale of the amendment. The determination must be made based on the purpose for the amendment and the effects (beneficial or adverse) of the amendment.

Considering the scope and scale described above, I have determined there are two related substantive requirements based on the purpose and effects of the amendments as follows:

For the suspended guideline, I have determined the requirements of § 219.10(a)(2) *Renewable and nonrenewable energy and mineral resources* is directly related to the purpose of the amendment as the purpose and need for the Rock Creek Project to conduct mineral development activities after applying all reasonable stipulations to minimize adverse environmental impact. The 2015 KFP includes FW-DC-MIN-01 *to contribute to the economic strength and demands of the nation by supplying mineral and energy resources while assuring that the sustainability and resiliency of other resources are not compromised or degraded*. The Rock Creek Project contributes to attainment of this desired condition. No additional plan direction is necessary to apply this substantive requirement to the amendment.

I have determined that the requirements of § 219.10(a)(5) *Habitat conditions, subject to the requirements of 219.9, for wildlife, fish, and plants commonly enjoyed and used by the public* is directly related to the effects of suspending FW-GDL-WL-09 as it is a fine-filter big game habitat component. FW-GDL-WL-09 is one of several fine filter and many coarse filter plan components that address habitat conditions for big game (e.g., the suite of vegetation and wildlife habitat desired conditions for vegetation structure, composition, and function; and other guidelines that address habitat security). As

disclosed in the SEIS section 4.12.2.2, activities in ungulate winter range would not measurably affect elk or other wildlife populations, and would therefore not substantially affect the structure, function, or connectivity of the terrestrial ecosystems at a forestwide, or even a local scale. The plan area would continue to provide well-distributed habitat for native ungulates across the landscape to provide prey for carnivores per FW-DC-WL-08. Therefore, no change to the amendment or additional plan direction is necessary to apply this substantive requirement to the amendment.

Based on the NEPA analysis in the Final EIS as summarized here, I have determined that the proposed amendment does not have substantial adverse effects and does not substantially lessen protections for any resource or use. I reviewed the evidence put forth by respondents to rebut that conclusion, but after considering that evidence and evidence in the NEPA analysis supporting the position that effects would not be substantial I conclude that the effects will not be substantially adverse.

Using the Best Scientific Information to Inform the Amendment (§ 219.3):

The project-specific amendment considered the best available scientific information to inform the amendment. Winter range data from Montana Fish Wildlife and Parks and the 2015 KFP analysis were used to determine overlap between winter range and project activities and assess forest-wide winter range distribution and abundance.

Effective Date (§ 219.17(a)(3))

A plan amendment that applies to only one specific project or activity is effective on the date the project may be implemented in accordance with administrative review regulations at §§ 215 and 218.

Objection Opportunity (§ 219.57(b))

As a plan amendment that only applies to this project, the amendment decision is being made concurrent with the project decision and was subject to the administrative review process of § 218 subpart A. See ROD Section 1.10 for the description of the opportunity to object.

Attachment 5 - KNF's Terrestrial Threatened and Endangered Species Mitigation Plan

TERRESTRIAL THREATENED and ENDANGERED SPECIES MITIGATION PLAN
for the
PROPOSED REVETT ROCK CREEK MINE

This mitigation plan displays the specific items identified that are required to reduce, eliminate, or compensate for environmental consequences to species federally listed as threatened or endangered. It covers implementing alternative five as displayed in the final environmental impact statement and Record of Decision (2003) for the Rock Creek Mine project and supports requirements from the U.S. Fish and Wildlife Service (here after FWS) Biological Opinion. This mitigation plan will be implemented by the Revett Mining Company and appropriate state and federal agencies. Timing of completion of this plan is tied to three phases of mine activity (evaluation adit, construction, and operation with each requiring a letter from the Forest Service prior to proceeding).

This plan includes requirements for Revett to provide funding for a number of conservation measures that are needed long-term. Should future projects be proposed, that have adverse effects on grizzly bear in the Cabinet-Yaak ecosystem, funding for some of these measures could be required of the proponents, thus potentially changing the proportional funding required by Revett. Those items are marked with an asterisk (*) at the end of the measure description.

A. To reduce mortality risk (avoid incidental take) to Threatened and Endangered species Revett Mining Company will comply with the following, under the direction of the Forest:

1. Develop a transportation plan designed to minimize mine related vehicular traffic, traveling between state highway 200 and the mill site, and minimize parking availability at the plant site. Busing employees to the mill site will be a part of the plan. Forest Service approval required. The plan will be in place prior to starting the evaluation adit.
2. NOT use salt when sanding during winter plowing operations to reduce attracting big game, which can result in vehicles killing them. That in turn could draw bald eagles, wolves and grizzly to the road corridor and increase mortality.
3. Daily remove vehicular killed deer and elk from road rights-of-way within the permit area and along roadways used for access or hauling ore (FDR 150, 150A and new roads built for the project). Road kills would be moved at least 50 feet beyond the right-of-way clearing or as far as necessary to be out of sight from the road. During construction and the first three years of full operation, the Revett Mining Company would monitor the number of big game animals killed on these roads and report findings annually. They would also monitor and report (within 24 hours) all grizzly bear, bald eagle, lynx, wolf and black bear mortalities within the permit area. If a T&E species mortality occurs, and the grizzly bear specialists or law enforcement officer feel it is necessary to avoid grizzly bear or other T&E species mortality, the Revett Mining Company would be required to haul the road kill to a dumping location approved by Montana Fish, Wildlife and Parks (MFWP).

4. Construct power lines following criteria outlined by Olendorff, Miller and Lehman (1981) to reduce potential for electrocution of bald eagles.
5. Fund a local MFWP grizzly bear management specialist (with focus on public information and education) position to aid in grizzly bear conservation for the life of the mine. Funding would be provided prior to starting the evaluation adit to cover the first 5 years. The position would be stationed in the lower Clark Fork valley. The purposes are to reduce mortality risk through (1) education of the public on the law and penalty for violation (illegal killing of T&E species); (2) education of hunters on bear identification to reduce accidental killing of grizzly and (3) educate the public on biological needs of the grizzly so that an understanding exists that reduces "social jeopardy" and 4) educates the public on storage of human and pet (animal) food in bear habitat to prevent and correct sanitation problems. The position description and an initial list of work items will be developed jointly by the agencies (including but not limited to Forest Service, FWS, MFWP) and Revett Mining Company representatives. The Forest Service will request review and advice from the FWS on the position description and list of work items. (*)
6. Fund a local MFWP law enforcement position for the life of the mine. Funding would be provided prior to starting the evaluation adit to cover the first 5 years. The position would be stationed in the lower Clark Fork valley. The position description and an initial list of work items will be developed by the agencies (Forest Service and Montana Fish, Wildlife and Parks) and Revett representatives. The Forest Service will request review and advice from the FWS on the position description and list of work items. (*)
7. Prior to construction of the evaluation adit Revett will:
 - a) In order to proceed with the evaluation adit, agree to defer the construction phase of the mine until at least six female grizzly bears have been augmented into the Cabinet Mountains portion of the Recovery Zone (south of Highway 2). Female grizzly bears placed in the Cabinet Mountains on or after 10/01/2005 count toward this requirement. As of 9/19/2006 two female bears have been placed in the Cabinets.
 - b) In coordination the Kootenai Forest and Montana Fish, Wildlife, and Parks (MFWP) fund and/or conduct an enhanced outreach and education program to build support and understanding for the conservation of the Cabinet-Yaak grizzly population. This would involve educational materials, public service announcements, newspaper ads, and billboards supporting grizzly conservation. Examples could be signs at entrance roads to all grizzly habitats on the national forest, education programs for schools and civic clubs, and offering a reward leading to arrest and conviction of people illegally killing grizzly bears in the Cabinet-Yaak ecosystem. (*)
 - c) Coordinate with bear specialist to provide funding for bear resistant garbage containers for personal use, by all mine employees associated with the evaluation adit phase, who live in or near grizzly bear habitat.

8. Prior to starting the construction phase Revett will:

- a) Provide funding for a second bear specialist in Libby for life of mine, similar to position described in #5 above. Initial funding to cover first 5 years of the position provided prior to construction start-up. (*)
- b) Coordinate with bear specialists and provide funding for bear-resistant garbage containers for personal use by all mine employees associated with the construction and operation phases who live in or near grizzly bear habitat.
- c) Provide funding for an additional 100 bear resistant garbage containers plus an additional 20 per year, after the first year of construction phase, for distribution to the community at large by the grizzly bear management specialists.
- d) Coordinate with bear specialists, FWS, and the Counties to prioritize and provide funding for fencing and electrification of garbage transfer stations in grizzly habitat in the Cabinet Yaak ecosystem. Revett will provide funding for and work with the FWS and Sanders County to make the Noxon Rock Creek garbage collection site bear resistant prior to start of evaluation adit construction. (*)
- e) Fund an initial 10 electric fencing kits for use at bear problem sites that can be installed by MFWP bear specialists, and then 2 replacements per year, for use as needed. (*)
- f) Agree that all mortality reduction measures would be subject to modification based on adaptive management, where new information supports changes. Modifications would be reviewed and approved by the oversight committee.

The Forest shall ensure that the law enforcement and information and education positions (grizzly bear personnel) required in the revised mitigation plan comply with the following :

- a. Positions shall be located in the Clark Fork River side of the ecosystem.
- b. Grizzly bear personnel shall be new positions with Montana Fish Wildlife and Parks.
- c. Funding intended for the grizzly bear personnel positions will not be used to support already existing positions with Montana Fish Wildlife and Parks.
- d. Duties for the law enforcement position shall be designed at a State grade determined by MFWP (recommend at least a grade 14) and will be primarily directed at wildlife issues in the southern Cabinet Mountains of the CYE.
- e. Duties for the bear specialist positions shall be designed as a grizzly bear management specialist at a State grade determined by MFWP (recommend at least a grade 14) and will be specifically tied to bear activities in the southern Cabinet Mountains of the CYE.

- f. Grizzly bear personnel shall be fully-funded for the life of the mine through the reclamation period and including shut-down periods to provide for long-term consistency, the establishment of relationships with the resident public, familiarity with issues and potential problems in the area, and to address the large number of people who may remain in the area even in the event of temporary mine shut-downs.
 - g. Grizzly bear personnel will be operational, with all supportive equipment, vehicles and gear, prior to the letter to proceed on the evaluation adit.
 - h. Establish and maintain (through coordination with the three grizzly bear personnel: 2 specialists and 1 LEO) a mandatory reporting system to ensure that the Revett Mining Company and U.S. Forest Service employees are required to immediately report any black bear or grizzly bear incidents, observations or mortalities to both grizzly bear personnel to ensure that pre-emptive management, hazing, or removal of food attractants would occur to avoid further risks of habituation, mortality or displacement of grizzly bears. The reporting system would also be coordinated with the MFWP grizzly bear management specialist in Libby and would provide a mechanism to collect reliable information from the public on such incidents, although such reporting could not be required.
7. Use bear-resistant containers to hold attractants at all Rock Creek facilities. Remove contents in a timely manner (weekly unless a problem develops or grizzly bear personnel recommend a more frequent schedule). Containers will be in place at each mine facility site prior to starting any work on each site.
 8. Avoid the use of clovers or other plants attractive to black or grizzly bears in the seed mix used on open roadways or any facility associated with the Rock Creek Mine (except as rehabilitation on closed roads or mitigation habitat where attracting bears would be encouraged).
 9. Prohibit employees from carrying firearms within the permit area, except for security officers and other designated personnel. Identify consequences for violations in the an employment contract so employees will be aware of consequences prior to beginning their employment.
 10. Prohibit employees from feeding wildlife (including dropping food stuffs from lunches etc.) within the permit area to avoid attracting bears or other wildlife into conflicts with people and encouraging habituation. Identify consequences for violations in an employment contract so employees will be aware of consequences prior to beginning their employment.
 11. Fund the acquisition of bear resistant garbage containers to be placed in all developed campgrounds within Bear Management Units 1, 2, 3, 4, 5, 6, 7, 8 and 9 (pack in/pack out sites will not require garbage containers). The Forest shall ensure that the Revett Mining Company provide bear resistant garbage receptacles for all U.S. Forest Service camp

grounds and sites where garbage facilities are normally provided within the Cabinet portion of the CYE recovery zone (in BMUs 1-9). This includes those in MS-3 habitat, which often serve as the greatest risk to habituate bears and increase risk of bear removal through defense of life or property incidents or management action. (*)

12. Require mine employees (including all management staff) to attend training related to living and working in grizzly bear habitat prior to starting work and on an annual basis thereafter or as scheduled by the grizzly bear management personnel.

B. To maintain habitat effectiveness for Threatened and Endangered species, the Revett Mining Company will, under the direction of the Forest:

1. Secure or protect (through conservation easement, including road closures, or acquisition in fee with conveyance of fee or perpetual conservation easement to the Forest Service) from development (including but not limited to housing, motorized access) and use (timber harvest, grazing, mining) replacement habitat to compensate for acres lost by physical alterations, or acres with reduced habitat availability due to disturbance. Replacement acres for Alternative Five are: 2350. The "in kind" replacement acres must provide 2.61 early (6133.5 total), 1.61 late (3783.5 total) for an overall 2.11 habitat unit value (4958.5 total overall HUs). Replacement habitat will be provided using the following schedule:

Activity Area	Replacement Acres	Timing
Evaluation Adit	53	Prior to Eval. Adit
Tailings & AF	806	Prior to Construction
Mill & AF	248	Prior to Construction
Ventilation Adit	10	Prior to Construction
New Roads	102	Prior to Construction
Existing Roads (Reconstruction)	565	Prior to Construction
Existing Roads (Increased Influence)	566	Prior to Operations
Total Alternative 5	2350	Prior to Operations

AF = Associated Features

This schedule will have all replacement habitat (except ventilation adit) in place prior to starting full operations (end of year 5). Replacement habitat for the ventilation adit will be in place prior to its construction, if the adit becomes necessary.

Either fee title or conservation easements are acceptable. Conservation easements will be in perpetuity and transferred to the Forest Service. If fee lands are retained in private (non-Forest Service ownership) a conservation easement protecting the land in perpetuity must be conveyed to the Forest Service. Fee title lands may be considered for donation or land exchange with the Forest Service. Costs of processing land exchanges, and preparing and accepting conservation easement by the Forest Service for these acres will be funded by the Revett Mining Company. Land exchanges would be for equal valued lands as determined by a federal land appraisal. Any exchange must be beneficial to the Forest Service. First choice

for replacement habitat is within the disturbed BMUs (4,5,6). If adequate replacement acres are not available in those BMUs then acres may be found in other BMUs (1, 2, 7 & 8) within the Cabinet Mountains. See the Replacement Habitat Assessment for acceptable lands to consider **(Not available to public until replacement habitat mitigation completed)**.

The FWS will be consulted with and asked advice on the mitigation acres and associated conservation easements as they relate to the requirements included in the Biological Opinion on the Rock Creek Mine, at an early stage in the acquisition negotiations. Forest Service will have final approval of mitigation acres and associated conservation easements prior to closing and recording.

The Forest shall ensure that the 2350 acres of mitigation properties be managed for grizzly bear habitat in perpetuity. Properties acquired in fee by the Revett Mining Company must either be transferred to the U.S. Forest Service or must be protected by perpetual conservation easement transferred to the U.S. Forest Service. Easement properties acquired by the Revett Mining Company must be transferred to the U.S. Forest Service. The 2350 acres of mitigation properties must meet the following requirements:

- a) The FWS shall be requested to advise the Forest Service if it believes the proposed mitigation properties meet one or more of the following:
 - i restores or improves bear security habitat (HE and core) in the Southern Cabinet Mountains, particularly in the constricted north-south grizzly bear movement corridor;
 - ii improves habitat conditions related to established access standards (open motorized route density, total motorized route density) in BMUs 4,5, and 6,
 - iii reduces existing threats of development, food attractants or mortality risks in the Southern Cabinets,
 - iv reduces potential threats of development, food attractants or mortality risks in the Southern Cabinets,
 - v protect seasonally important habitats, with an primary emphasis on spring, and secondary emphasis on fall habitats
 - vi would maintain or increase MS-1 habitat (including the potential of acquiring and converting MS-3 properties or lands adjacent to the CYE recovery zone that have high mortality risks to MS-1 if those risks could be eliminated under Federal ownership).

- b) Fee-title properties or transfers (trades) of NFS lands must meet standards,

requirements and legal processes for Federal acquisition or trade, including, but not limited to:

- i approval by the Office of General Counsel,
- ii be a Warranty Deed conveyance
- iii comply with Department of Justice standards,
- iv be free of hazardous materials, or develop an agreement among MOU signers as to appropriate remedy prior to acquisition
- v include all surface and sub-surface rights including rights-of-ways, mineral claims, and/or other easements, unless otherwise advised by the FWS
- vi be acquired in priority order. Lower priority acquisitions may be allowed, after approval of the Forest Service and when consistent with advice from the FWS to ensure that such a property would contribute to meeting the requirements of the biological opinion.
- vii meet fair market appraised value, according to U.S. Forest Service appraisal processes with the allowance that Revett Mining Company could contribute additional funds to facilitate unequal appraised value trades, as approved by the Management Plan. Advanced approval by the Forest Service, after consultation with the FWS regarding the ability of the proposed lands to meet the requirements of the biological opinion, is required.
- viii be acquired and recorded prior to the letter to proceed on the associated phase of the mine, with total acquisitions completed prior to the letter to proceed on the construction phase of the mine.

c) Conservation easements must include language approved in the Management Plan and meet standards, requirements and legal processes for Federal acquisition or trade, including, but not limited to:

- i approval by the Office of General Counsel,
- ii have the conservation easement be attached to the Warranty Deed
- iii comply with Department of Justice standards,
- iv be free of hazardous materials, or develop an agreement among MOU signers as to appropriate remedy prior to acquisition

- v Include all surface and sub-surface rights including rights-of-ways, mineral claims, and/or other easements, unless otherwise advised by the FWS
- vi be acquired in priority order. Lower priority acquisitions may be allowed, when consistent with advice from the FWS to ensure that such a property would contribute to avoiding jeopardy.
- vii meet fair market appraised value, according to U.S. Forest Service appraisal processes with the allowance that the Revett Mining Company could contribute additional funds to facilitate unequal appraised value trades, as approved by the Management Plan if the affected parcels are consistent with advice from the FWS as being important to avoid jeopardy
- viii be acquired and recorded prior to the letter to proceed on the associated phase of the mine, with all mitigation habitat acquired and recorded prior to the letter to proceed on the construction phase of the mine, excepting the mitigation habitat that may be necessary in the event the ventilation adit is required. Mitigation habitat for the ventilation adit would be acquired prior to the letter to proceed on development of the ventilation adit, should it be necessary.

The Forest shall implement access management improvements on lands acquired in the revised mitigation plan. The FWS requires specific mitigation properties to be acquired to improve habitat security, core area, total motorized route density and open motorized route density and will assess other areas prior to acquisition to ensure these lands will be sufficient to avoid jeopardizing the CYE grizzly bear population. These specific areas will be withheld from public disclosure due to their sensitive nature until acquisitions have been finalized.

The FWS agrees to work with the Forest in determining how road management associated with that property can improve access standards, with the goal of managing BMU 4,5 and 6 above levels in the Access Ammendment FEIS (March 2002). The FWS believes that 35 years of 24 hour disturbances as expected with Rock Creek Mine necessitate access management at a conservative level while the disturbance is ongoing. The acquisition of mitigation habitat may provide opportunities to manage access management at these levels in BMU s 4,5, and/or 6. Should mitigation property be acquired that would enable access management at these levels, the FWS expects that the Forest will provide the bears using BMU's 4,5 and 6 the optimum level of access management to reduce displacement and mortality risks during the life of the mine.

2. Fund habitat enhancement, commensurate with loss of habitat effectiveness. Enhancements include, but are not limited to, prescribed fire to restore whitebark pine, road closures and obliterations. Enhancements are preferred in the affected BMUs, however if opportunities are not available, then work may be done in BMUs in the southern portion of the Cabinet Mountains. Generally enhancements would occur in relation to replacement habitat acres.

Enhancements associated with replacement acres will occur in a timely manner as agreed to by the agencies.

BMU	% H.E. Change	Acres H.E. Mitigation
4	+ 1.0	0
5	- 1.1	348
6	- 0.3	136

C. To reduce mortality risk, maintain habitat effectiveness, reduce incidental take and avoid jeopardy for Threatened and Endangered species the Kootenai National Forest, with Revett Mining Company funds, will:

1. Close the following roads prior to the start of construction phase (see maps):

Road Number	Road Name	Closure Miles	Closure Period	Closure Method
2285	Orr Creek	1.61	Yearlong	Barrier
2741X	unnamed	0.18	Yearlong	Barrier
2741A	unnamed	0.51	Yearlong	Barrier
150	Rock Creek	2.92	Yearlong	Gate *

* 2.5 miles gated (south end), 0.42 miles obliterated (north end) - see map

2. Implement a mandatory food storage order for Bear Management Units 4, 5 and 6 prior to allowing the Revett Mining Company to start the evaluation adit, and implement same order throughout the CYE within 5 years of evaluation adit construction.
3. Monitor use on the Rock Lake and St Paul Lake trails to assure use levels do not exceed "high use" as defined by the IGBC. Monitoring visitor use on these trails would begin within 3 years of ROD. Methods used to monitor will be determined by a technical team led by the Forest Service. A recreational use management plan will be developed to assure high use does not occur. The plan will be implemented when monitoring indicates high use has occurred during one bear season. The plan will be prepared within 3 years of the start of the evaluation adit and must be signed by the involved agencies (Forest Service, FWS).
4. In coordination with the FWS the Forest Service will prioritize lands for conservation easement or acquisition in key linkage areas identified by research and monitoring along Highway 2 between the Cabinets and the Yaak.
5. The Forest Service will coordinate with the FWS and MFWP on release sites for augmentation of grizzly bears on National Forest lands.

6. Prior to the start of the construction phase Revett will: Provide funding for bear monitoring in the area along Highway 2 between the Cabinets and the Yaak. The linkage identification work would involve 3 years of monitoring movements of grizzly and black bears along the highway to identify movement patterns and key movement sites. Funding would cover 10 GPS collars, collar rebuilds each year for 3 years, salary for one seasonal worker for 6 month per year for 3 years and salary for one GIS technician for 6 months per year for 3 years. (*)

D. To address habitat constriction that reduces the potential to achieve CYE grizzly bear recovery goals (by impacting individuals in the Cabinet Mountains) and to avoid Jeopardy, Revett Mining Company will:

1. Secure or protect (through conservation easement, including road closures) or acquisition in fee with conveyance of fee or perpetual conservation easement to the Forest Service from development (including but not limited to housing, motorized access) and use (timber harvest, grazing, mining) 100 acres of replacement habitat that will enhance the north to south habitat corridor in the Cabinet Mountains. These lands are in addition to those identified under mitigation item B-1. All acres of replacement habitat for the constriction impact will be secured prior to starting the evaluation adit. See the Corridor Replacement Habitat Assessment for acceptable lands to consider **(Not available to public until corridor replacement habitat mitigation completed)** Fee title lands within the corridor would be placed in public ownership either through donation or land exchange. Costs of processing land exchanges, and preparing and accepting conservation easement by the Forest Service for these acres will be funded by the Revett Mining Company. Land exchanges would be for equal valued lands as determined by a federal land appraisal. Any exchange must be beneficial to the Forest Service. All land interest conveyed to the Forest Service must be acceptable and approved by the Office of General Counsel. Fee title land must be conveyed by Warranty Deed in accordance with Department of Justice standards. All property, or interest in property, shall be inspected for hazardous substances in accordance with law, regulation and policy. If hazardous substance are found an agreement needs to be reached on removal and remedial action.

The Forest shall ensure that, the 100 acres of mitigation habitat required to enhance the north-south corridor in the Cabinet Mountains:

- a. the fee title or perpetual conservation easement to the 100 acres of mitigation property, be acquired by or transferred to the U.S. Forest Service;
- b. include the specific properties identified by the FWS to avoid jeopardy (which will be released to the public when acquisition has been completed and recorded);
- c. the U.S. Forest Service will request that the FWS advise the agency as to whether the proposed acres meet the requirements of the biological opinion, and once confirmed, will be acquired and recorded prior to the letter to proceed on the evaluation adit;

- d. be managed as grizzly bear security habitat (core) throughout the life of the mine, including the reclamation period and any temporary or extended shutdown periods, and thereafter managed in a manner consistent with grizzly bear conservation requirements;
- e. maintain or improve existing baseline core requirements (or other goals affiliated with Alternative E of the FEIS for Access Amendment on the Forest, Lolo and Panhandle National Forests, USDA 2002b); and
- f. have any habitat enhancement activities needed to improve the mitigation properties, such as road closures or restoration, be planned and funded prior to the letter to proceed on the associated phase of the mine. Implementation will occur as soon as feasible (e.g. upon completion of any required NEPA process).

E. To assure compliance with the T&E species mitigation plan, and effectiveness of the management plan the Forest Service or Revett Mining Company will:

1. Prior to the Evaluation adit,
 - a) Revett will establish a trust fund and/or post a bond, to cover the mitigation plan implementation costs. The amount in the fund or posted in a bond will be commensurate with projected work and associated required mitigation items. The oversight committee will determine the amount of trust fund deposits, to be made in five year increments over the life of the mine.
 - b) Forest Service will lead a stakeholders information annual meeting. Stakeholders may include, but not limited to state and federal agency, county commissioners, mining company, local citizen, and NGO group representatives. The objectives of the meetings are to review a) management objectives, b) implementation of mitigation measures and c) monitoring and research results.
 - c) Forest Service would agree to adopt management actions in response to new information from monitoring to assure that on going management meets the objectives for grizzly bears in the Cabinet-Yaak ecosystem.
2. Participate in the development of and be a signer on a Memorandum of Understanding (MOU) that

The Forest shall develop an M.O.U. with FWP, the Revett Mining Company and other parties deemed appropriate by the Forest. The MOU must be completed prior to the Forest issuing the Revett Mining Company the letter to proceed with the evaluation adit. The MOU shall establish roles, responsibilities and time lines of an Oversight Committee comprised of members of the Forest, Montana Department of Fish, Wildlife and Parks, and other parties deemed appropriate by the parties named. The FWS shall be an ex-officio, non-voting member of the Oversight Committee, with only advisory responsibilities.

The Oversight Committee shall be responsible for the development of a Comprehensive Grizzly Bear Management Plan and its implementation. The Comprehensive Grizzly Bear Management

Plan shall focus on the Cabinet portion of the CYE and would fully include all provisions of the Forest's mitigation plan for grizzly bears, except where superseded by the FWS's Biological Opinion. It would also include provisions for adaptive management. The plan would be developed in detail by the parties to assure that human access to grizzly bear habitat, grizzly bear habitat quality, grizzly bear mortality, and habitat fragmentation issues shall be addressed to the extent that jeopardy would be avoided. Advice and comments on the plan from the FWS shall be requested and fully considered, including advice on whether the plan would meet the requirements of the biological opinion.

The Oversight Committee, led by the Forest, shall over the 35-year life of the mine:

- a) assume responsibility for coordinating various aspects of the Management Plan;
- b) assume responsibility for maintaining effective communication among all Committee members, stake holders, and interested public;
- c) integrate the principles of adaptive management; collect, disseminate where needed, and review new information on grizzly bears, the results of implementation of the Comprehensive Grizzly Bear Management Plan over time, and other information related to CYE grizzly bears. If information or relevant data indicate appropriate, ensure the needed analysis and development of recommendations for changes or additions to the mitigation plan over the 35 year life of the mine, if such action is needed to ensure the proposed action is not likely to jeopardize the CYE grizzly bear population. The FWS would be asked to review proposed revisions to the Comprehensive Grizzly Bear Management Plan under appropriate section 7 provisions, if required.

The FWS shall be an advisor in the development of the MOU and subsequent Comprehensive Grizzly Bear Management Plan, and the Forest Service will request that the FWS advise, in writing, that the plan would meet the requirements of the biological opinion.

The MOU shall be completed prior to the letter to proceed on the evaluation adit and require the Forest to:

- 1) Ensure the Management Plan is completed prior to the construction phase of the mine.
- 2) Establish time frames for mitigation and implementation of other management to occur prior to the letter to proceed on the phase of the mine associated with that mitigation or management activity.
- 3) Ensure adequate funding, from the Revett Mining Company, to implement the revised mitigation plan according to the time frames.
- 4) Comply with legal guidelines or processes in as timely manner as possible in order to meet the mitigation plan and/or Comprehensive Grizzly Bear Management Plan implementation schedule.

5) Ensure that the FWS is consulted on the mitigation properties and the Comprehensive Grizzly Bear Management Plan and the FWS is requested to advise the Forest Service if the properties and the Plan meet the requirements in the biological opinion. All mitigation properties not specifically mentioned shall have undergone all necessary procedures for procurement including recordation, prior to the letter to proceed on the associated phase of the mine.

6) Establish language and legal procedures to ensure that mitigation properties acquired through fee title, land transfer or conservation easement:

- a. are perpetual;
- b. meet federal policies and regulations regarding such realty actions;
- c. have the FWS advise whether they would meet the biological opinion requirements;
- d. would be implemented and recorded in advance of the phase of the mine with which they are associated;
- e. would increase or at least maintain a no net loss of MS-1 CYE habitat;
- f. would be adequately funded such that enforcement of easement terms is assured;
- g. would be selected on a priority basis with biologically justifiable rationale and the FWS advice that they meet the requirements included in the biological opinion;
- h. would ensure management in support of grizzly bear survival and recovery if in public ownership.

The Comprehensive Grizzly Bear Management Plan shall include the measures in the mitigation plan, except where the mitigation plan has been superceded by the FWS's Biological Opinion. In addition, processes shall be established to ensure that access management, prevention of habituation, educational opportunities, reporting and monitoring, enforcement of easements, and management actions are being adequately implemented. Further, the Comprehensive Grizzly Bear Management Plan will establish processes to revise management, access, education or habitat enhancement strategies as new research or policies, such as revised IGBC guidelines.

3. Contribute funding to support monitoring of bear movements and population status in the Southern Cabinet Mountains to confirm the effectiveness of mitigation measures implemented to provide a secure north to south movement corridor. The Forest shall ensure that adequate funding, provided by the Revett Mining Company, is available to monitor bear movements and use of the Southern Cabinet Mountains to confirm the effective implementation of mitigation measures. Information gained would be useful in determining whether the mitigation plan is working as intended. If not, the information would help in developing new management strategies that would be incorporated in the Biological Opinion through appropriate ammendments. Funding would supplement ongoing research and monitoring activities in the CYE, would be conducted or coordinated by the FWS's grizzly bear researcher in Libby or his equivalent and would focus on grizzly bears in the Cabinet Mountains. Funding would include money for the following (but not limited to): trapping, hair sampling and analysis, radio collars, flight time, monitoring native and augmented grizzly bears, and data analysis, including all equipment and support materials needed for such monitoring. The Forest shall ensure that funding, provided by the Revett Mining Company, is available on an annual basis, two months in advance of the fiscal year (October) of the year it is to be used for the

life of the mine. Details of the monitoring activities and budget would be outlined in the Management Plan. Funding would be provided prior to the letter to proceed on the evaluation adit and would continue throughout the life of the mine through the reclamation phase. (*)

APPENDIX C (data from Kasworm et al. in litt. 2006a)

Table 1. (DRAFT 10/4/06) Known grizzly bear mortality in or near the Cabinet-Yaak recovery zone and the Yahk grizzly bear population unit in British Columbia, 1949-05 (from Kasworm et al. in litt. 2006a).

YEAR	LOCATION	TOTAL	SEX / AGE	MORTALITY CAUSE
1949	COPPER CR. MT	1	ADULT FEMALE	HUMAN, HUNTER KILL
1950	SQUAW CR. MT	1	SUBADULT	UNKNOWN
1951	PETE CR. MT	1	ADULT MALE	HUMAN, MANAGEMENT REMOVAL
1951	PAPOOSE CR. MT	2	SUBADULTS	UNKNOWN
1951	GOAT CR. MT	1	SUBADULT MALE	UNKNOWN
1952	FELIX CR. MT	6	2 ADULT FEMALES, 4 YEARLINGS	HUMAN, MANAGEMENT REMOVAL
1953	OBRIEN CR. MT	1	SUBADULT MALE	HUMAN, HUNTER KILL
1953	KENELTY MT. MT	1	UNKNOWN	HUMAN, HUNTER KILL
1953	20-ODD MT. MT	1	UNKNOWN	HUMAN, HUNTER KILL
1953	BURNT CR. MT	1	UNKNOWN	HUMAN, HUNTER KILL
1953	17-MILE CR. MT	1	UNKNOWN	HUMAN, HUNTER KILL
1954	N F BULL R. MT	1	UNKNOWN	HUMAN, HUNTER KILL
1954	S F BULL R. MT	1	UNKNOWN	HUMAN, HUNTER KILL
1954	CEDAR LK. MT	1	UNKNOWN	HUMAN, HUNTER KILL
1954	CEDAR LK. MT	1	UNKNOWN	HUMAN, HUNTER KILL
1954	TAYLOR PK. MT	1	UNKNOWN	HUMAN, HUNTER KILL
1954	SILVERBUTTE CR. MT	1	UNKNOWN	HUMAN, HUNTER KILL
1954	SILVERBOW CR. MT	1	ADULT FEMALE	HUMAN, HUNTER KILL
1955	WOLF CR. MT	1	ADULT MALE	HUMAN, MANAGEMENT REMOVAL
1955	MT HEADLEY, MT	1	SUBADULT	HUMAN, MANAGEMENT REMOVAL
1955	BAREE LK. MT	1	ADULT MALE	UNKNOWN
1955	BAREE LK. MT	1	ADULT FEMALE	UNKNOWN
1955	BEAR CR. MT	1	SUBADULT MALE	HUMAN, HUNTER KILL
1958	SQUAW CR. MT	1	ADULT FEMALE	HUMAN, MANAGEMENT REMOVAL
1959	E F ROCK CR. MT	2	ADULT FEMALE, 1 CUB	HUMAN, HUNTER KILL
1959	W F THOMPSON R. MT	4	ADULT FEMALE, 3 CUBS	UNKNOWN
1959	CLIFF CR. MT	1	UNKNOWN	UNKNOWN
1960	PROSPECT CR. MT	2	ADULT FEMALE, 1 CUB	UNKNOWN
1964	GRAVES CR. MT	2	SUBADULTS	UNKNOWN
1964	WANLESS LK. MT	3	SUBADULTS (ADULT WOUNDED)	UNKNOWN
1965	SNOWSHOE CR. MT	2	SUBADULTS	UNKNOWN
1965	PINKHAM CR. MT	1	UNKNOWN	UNKNOWN
1967	SOPHIE LK. MT	1	UNKNOWN	UNKNOWN
1968	BEAR CR. MT	1	ADULT FEMALE	HUMAN, ILLEGAL KILL
1968	GRANITE CR. MT	1	SUBADULT MALE	HUMAN, MANAGEMENT REMOVAL
1969	PRISCILLA PK. MT	1	ADULT FEMALE	UNKNOWN
1970	THOMPSON R. MT	1	UNKNOWN	UNKNOWN
1970	CAMERON CR. MT	1	SUBADULT MALE	UNKNOWN
1970	SQUAW CR. MT	2	ADULT FEMALE, SUBADULT FEMALE	HUMAN, MANAGEMENT REMOVAL
1971	MURR CR. MT	1	ADULT FEMALE	UNKNOWN
1972	ROCK CR. MT	1	SUBADULT	HUMAN, MISTAKEN IDENTITY (Black Bear)
1974	SWAMP CR. MT	1	ADULT MALE	HUMAN, HUNTER KILL
1977	RABBIT CR. MT	1	ADULT MALE	HUMAN, DEFENSE OF LIFE BY HUNTER
1978	MOYIE LAKE, BC	1	SUBADULT MALE	HUMAN, MANAGEMENT
1982	GROUSE, ID	1	ADULT MALE	HUMAN, ILLEGAL KILL
1984	HARVEY CR. ID	1	UNKNOWN	HUMAN, MISTAKEN IDENTITY (Black Bear)
1985	LYONS CR. MT	1	ADULT MALE	HUMAN, DEFENSE OF LIFE BY HUNTER
1986	BURNT CR. MT	1	CUB	UNKNOWN (NATURAL)
1987	FLATTAIL CR. MT	1	FEMALE CUB	HUMAN, MISTAKEN IDENTITY (Eik)
1988	LEWISBY CR. BC	1	ADULT MALE	HUMAN, HUNTER KILL (BC)
1988	N F 17-MILE CR. MT	1	ADULT FEMALE	HUMAN, DEFENSE OF LIFE BY HUNTER
1989	BURNT CR. MT	1	SUBADULT FEMALE	HUMAN, RESEARCH TRAP (Predation)
1990	POVERTY CR. MT	1	SUBADULT MALE	HUMAN, ILLEGAL
1992	TRAIL CR. MT	1	ADULT FEMALE	UNKNOWN
1993	LIBBY CR. MT	2	ADULT FEMALE AND CUB	UNKNOWN (NATURAL)
1994	JIM CR. BC	1	SUBADULT MALE	HUMAN, MANAGEMENT
1994	SOUTHWEST CRANBROOK, BC	3	2 FEMALES AND 1 MALE	HUMAN, MANAGEMENT
1995	RYAN CR. BC	1	ADULT MALE	HUMAN, MANAGEMENT REMOVAL
1996	DODGE CR. MT	1	SUBADULT MALE	HUMAN, UNDER INVESTIGATION

YEAR	LOCATION	TOTAL	SEX / AGE	MORTALITY CAUSE
1996	GOLD CR. BC	1	ADULT MALE	HUMAN, UNDER INVESTIGATION
1997?	LIBBY CR. MT	1	ADULT MALE	HUMAN, ILLEGAL
1997	PLUMBOB CR. BC	1	MALE	HUMAN, MANAGEMENT
1997	WARDNER. BC	1	ADULT FEMALE	HUMAN, MANAGEMENT
1997	MAYOOK. CR,BC	1	SUBADULT MALE	HUMAN, ILLEGAL KILL
1999	17 MILE CR. MT	3	ADULT FEMALE. 2 CUBS	NATURAL MORTALITY (Predation)
1999	W FK YAHK R. BC	1	SUBADULT FEMALE	HUMAN, DEFENSE OF LIFE BY HUNTER
1999	E FK YAAK R. MT	1	ADULT MALE	HUMAN, MANAGEMENT REMOVAL
2000	HAWKINS CR. BC	2	2 CUBS	UNKNOWN (NATURAL)
2000	FOWLER CR. MT	1	1 CUB	UNKNOWN (NATURAL)
2000	PETE CR. MT	1	SUBADULT FEMALE	HUMAN, UNDER INVESTIGATION
2001	COLD CR. BC	2	2 CUBS	UNKNOWN (NATURAL)
2001	SPREAD CR. MT	1	SUBADULT FEMALE	HUMAN, MISTAKEN IDENTITY (Black Bear)
2001	ELK CR. MT	1	ADULT FEMALE	HUMAN, TRAIN COLLISION
2002	MARTEN CR. MT	1	SUBADULT FEMALE	NATURAL
2002	PORCUPINE CR. MT	1	SUBADULT FEMALE	HUMAN, UNDER INVESTIGATION (Illegal)
2002	YAAK R. MT	4	ADULT FEMALE. 3 CUBS	HUMAN, ILLEGAL
2002	BLOOM CR. BC	1	UNKNOWN	HUMAN, BLACK BEAR HOUND HUNTERS
2002	KOOTENAY R. BC	1	FEMALE	HUMAN, DEFENSE OF LIFE
2004	WEST FORT STEELE. BC	1	MALE	HUMAN, DEFENSE OF LIFE AT DUMP
2004	JIM CR. BC	1	ADULT MALE	HUMAN, MISTAKEN IDENTITY
2004	NEWGATE. BC	1	ADULT FEMALE	HUMAN, MANAGEMENT REMOVAL
2005	RUSSELL CR. BC	1	ADULT MALE	HUMAN, HUNTER KILL (BC)
2005	GOVERNMENT CR. MT	1	SUBADULT FEMALE	HUMAN, TRAIN COLLISION
2005	PIPE CR. MT	1	SUBADULT FEMALE	HUMAN, ILLEGAL
2005	YAAK R. MT	1	SUBADULT MALE	HUMAN, ILLEGAL

Table 2. (DRAFT 10/4/06) Credible grizzly bear sightings, credible female with young sightings, and known human caused mortality by bear management unit (BMU) or area, 2005 (from Kasworm et al. in litt. 2006a).

BMU or Area	2005 Credible Grizzly Bear Sightings	2005 Female with Cub sightings (Unduplicated)	2005 Sightings of Females with Yearlings or 2-year-olds ²	2005 Human Caused Mortality
3	1	0	0	0
4	1	0	0	1
5	6	1	2	0
6	5	0	4	0
10	4	0	0	0
11	4	0	0	1
12	3	0	0	0
13	1	0	0	0
14	1	0	0	0
15	5	0	0	0
16	1	0	0	1
17	2	0	2	0
20	1	0	0	0
British Columbia ¹	2	0	1	0
Cabinet Face ¹	2	0	0	0
Tobacco ¹	8	0	2	0
West Kootenai ¹	3	0	0	0
2005 TOTAL	50	1	11	3

¹ Areas are outside of Cabinet-Yaak recovery zone.

² Sightings may duplicate the same animal in different locations

Table 3. (DRAFT 10/4/06) Annual Cabinet-Yaak recovery zone (excluding Canada) grizzly bear minimum unduplicated counts of females with cubs and known human-caused mortality, 1988-2005 (from Kasworm et al. in litt. 2006a).

YEAR	ANNUAL FWC'S	ANNUAL HUMAN CAUSED ADULT FEMALE MORTALITY	ANNUAL HUMAN CAUSED ALL FEMALE MORTALITY	ANNUAL HUMAN CAUSED TOTAL MORTALITY	4% TOTAL HUMAN CAUSED MORTALITY LIMIT ¹	30% ALL FEMALE HUMAN CAUSED MORTALITY LIMIT ¹	TOTAL HUMAN CAUSED MORTALITY 6 YEAR AVERAGE	FEMALE HUMAN CAUSED MORTALITY 6 YEAR AVERAGE
1988	1	1	1	1	0	0		
1989	0	0	1	1	0	0		
1990	1	0	0	1	0	0		
1991	1	0	0	0	0	0		
1992	1	0	0	0	0	0		
1993	2	0	0	0	0.9	0.3	0.5	0.3
1994	1	0	0	0	0.9	0.3	0.3	0.2
1995	1	0	0	0	0.9	0.3	0.2	0
1996	1	0	0	1	0.7	0.2	0.2	0
1997	3	0	0	1	1.2	0.4	0.3	0
1998	0	0	0	0	0.9	0.3	0.3	0
1999	0	0	0	1	0.7	0.2	0.5	0
2000	2	0	1	1	0.5	0.1	0.7	0.2
2001	1	1	2	2	0.5	0.1	1.0	0.5
2002	4	1	4	5	1.2	0.4	1.7	1.2
2003	2	0	0	0	1.2	0.4	1.5	1.2
2004	1	0	0	0	1.4	0.4	1.5	1.2
2005	1	0	2	3	0.9	0.3	1.8	1.5

¹ Presently grizzly bear numbers are so small in this ecosystem that the mortality goal shall be zero known human-caused mortalities.

Table 4. (DRAFT 10/4/06) Status of the Cabinet-Yaak recovery zone during 2000-2005 in relation to the demographic recovery targets from the grizzly bear recovery plan (USFWS 1993) (from Kasworm et al. in litt. 2006a).

Recovery Criteria	Target	2000-2005
Females w/cubs (6-yr avg)	6.0	1.8 (11/6)
Human Caused Mortality limit (4% of minimum estimate)	0.9	1.8 (6 yr avg)
Female Human Caused mortality limit (30% of total mortality)	0.3	1.5 (6 yr avg)
Distribution of females w/young	18 of 22	12 of 22

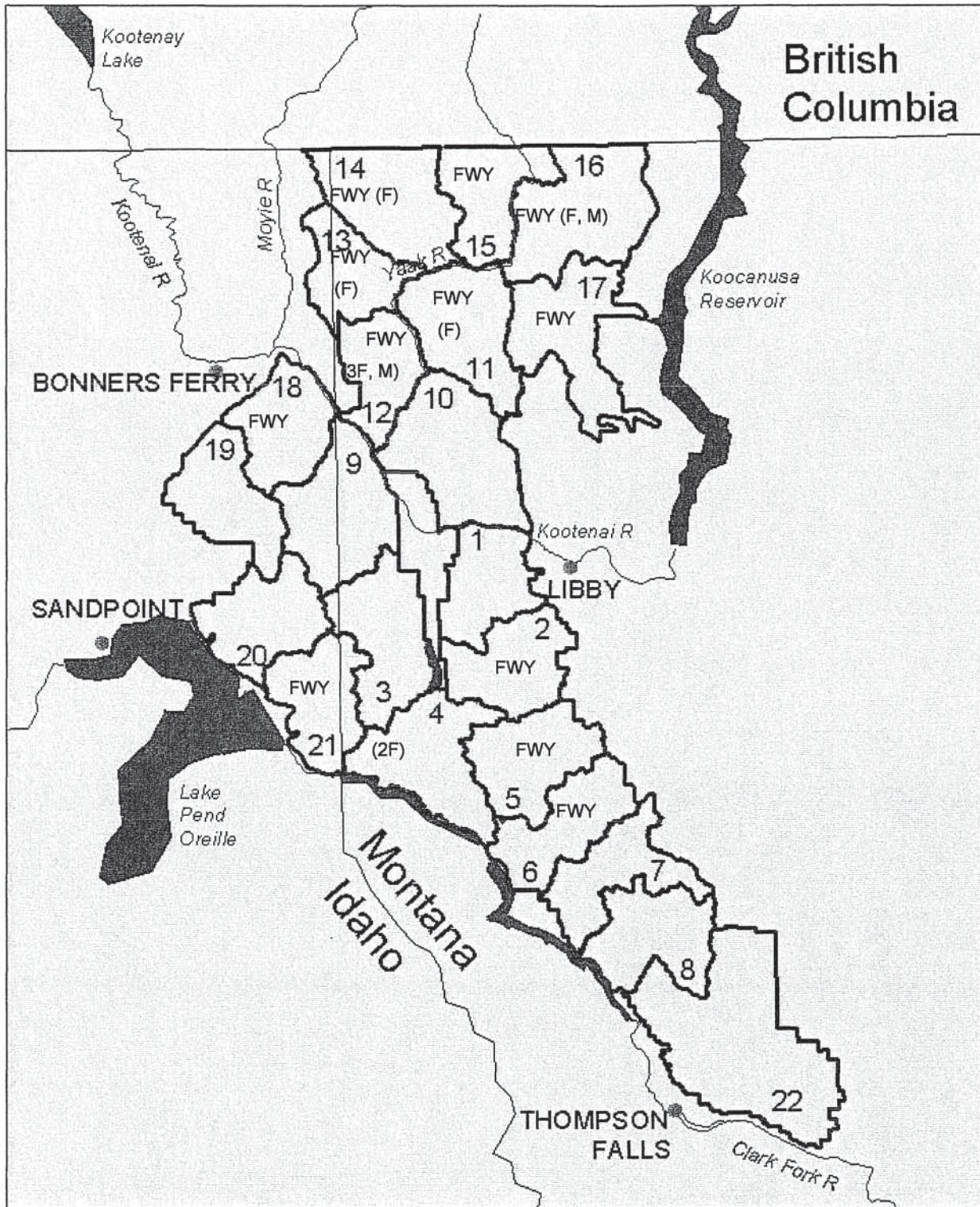


Figure 1. (DRAFT 10/4/06) Female with young occupancy and mortality by Bear Management Units (BMUs) within the Cabinet-Yaak recovery zone 2000-2005. (FWY indicates occupancy of a female with young and the sex of any mortality is indicated within parentheses).

Table 5. (DRAFT 10/4/06) Credible observations of females with young in or within 10 miles of the Cabinet-Yaak recovery zone, 1988-2005. Observations from Canada shown in parentheses (from Kasworm et al. in litt. 2006a).

Year	Total credible sightings females with young	Unduplicated females with cubs	Unduplicated females with yearlings or 2-year-olds	Minimum probable adult females
1988	3	1	1	2
1989	13	0	3	3
1990	9	1	2	3
1991	4	1	1	2
1992	8	1	5	6
1993	6	2	1	3
1994	5	1	2	3
1995	8	1	2	3
1996	5	1	1	2
1997	14 (1)	3	4	7
1998	6 (1)	0	2 (1)	2 (1)
1999	2	0	2	2
2000	6 (1)	2 (1)	1	3 (1)
2001	5 (2)	1 (1)	3	4 (1)
2002	10 (1)	4 (1)	1	5 (1)
2003	11	2	4	6
2004	11	1	4	5
2005	9 (1)	1	4 (1)	5 (1)

Table 6. (DRAFT 10/4/06) Occupancy of bear management units by grizzly bear females with young in the Cabinet-Yaak recovery zone 1988-2005 (from Kasworm et al. in litt. 2006a).

BMU	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
1 CEDAR	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
2 SNOWSHOE	No	No	Yes	No	No	No	No	No	No	Yes	No	No	No	No	Yes	Yes	Yes	No
3 SPAR	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
4 BULL	No	Yes	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No
5 ST. PAUL	No	No	No	No	No	Yes	No	No	No	No	No	No	Yes	No	No	Yes	Yes	Yes
6 WANLESS	No	No	No	No	Yes	Yes	No	No	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes
7 SILVER BUTTE	No	Yes	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No
8 VERMILION	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
9 CALLAHAN	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
10 PULPIT	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
11 RODERICK	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	No
12 NEWTON	No	No	Yes	No	No	No	No	No	Yes	No	No	No	No	No	Yes	No	No	No
13 KENO	No	Yes	No	No	Yes	No	No	No	Yes	No	No	No	No	Yes	Yes	Yes	No	No
14 NORTHWEST PEAK	No	Yes	Yes	No	Yes	No	Yes	Yes	No	Yes	No	No	No	No	Yes	No	No	No
15 GARVER	No	Yes	Yes	No	No	No	Yes	Yes	No	Yes	Yes	Yes	No	No	Yes	No	No	No
16 EAST FORK YAAK	No	No	No	No	No	No	No	No	No	Yes	Yes	No	No	No	No	Yes	No	No
17 BIG CREEK	No	No	No	Yes	Yes	Yes	No	No	No	No	No	No	Yes	Yes	Yes	No	Yes	Yes
18 BOULDER	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No
19 GROUSE	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
20 NORTH LIGHTNING	No	No	No	No	Yes	No	Yes	No	No	No	No	No	No	No	No	No	No	No
21 SCOTCHMAN	No	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	Yes	No	No
22 MT HEADLEY	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

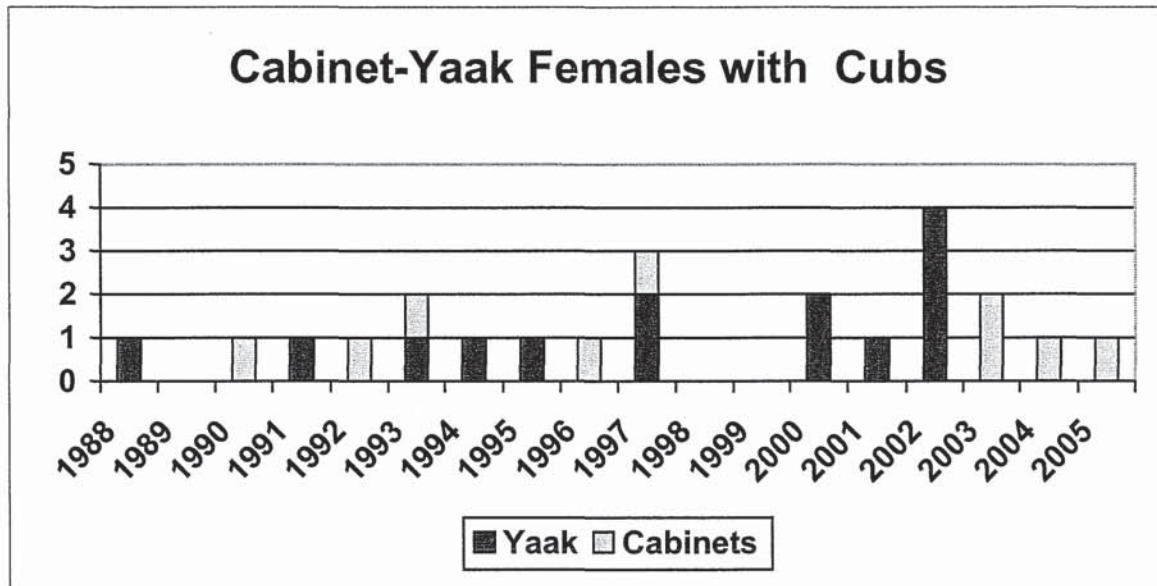


Figure 5. (DRAFT 10/4/06) Credible observations of females with cubs in or within 10 miles of the Cabinet-Yaak recovery zone (excluding Canada), 1988-05 (from Kasworm et al. in litt. 2006a.).

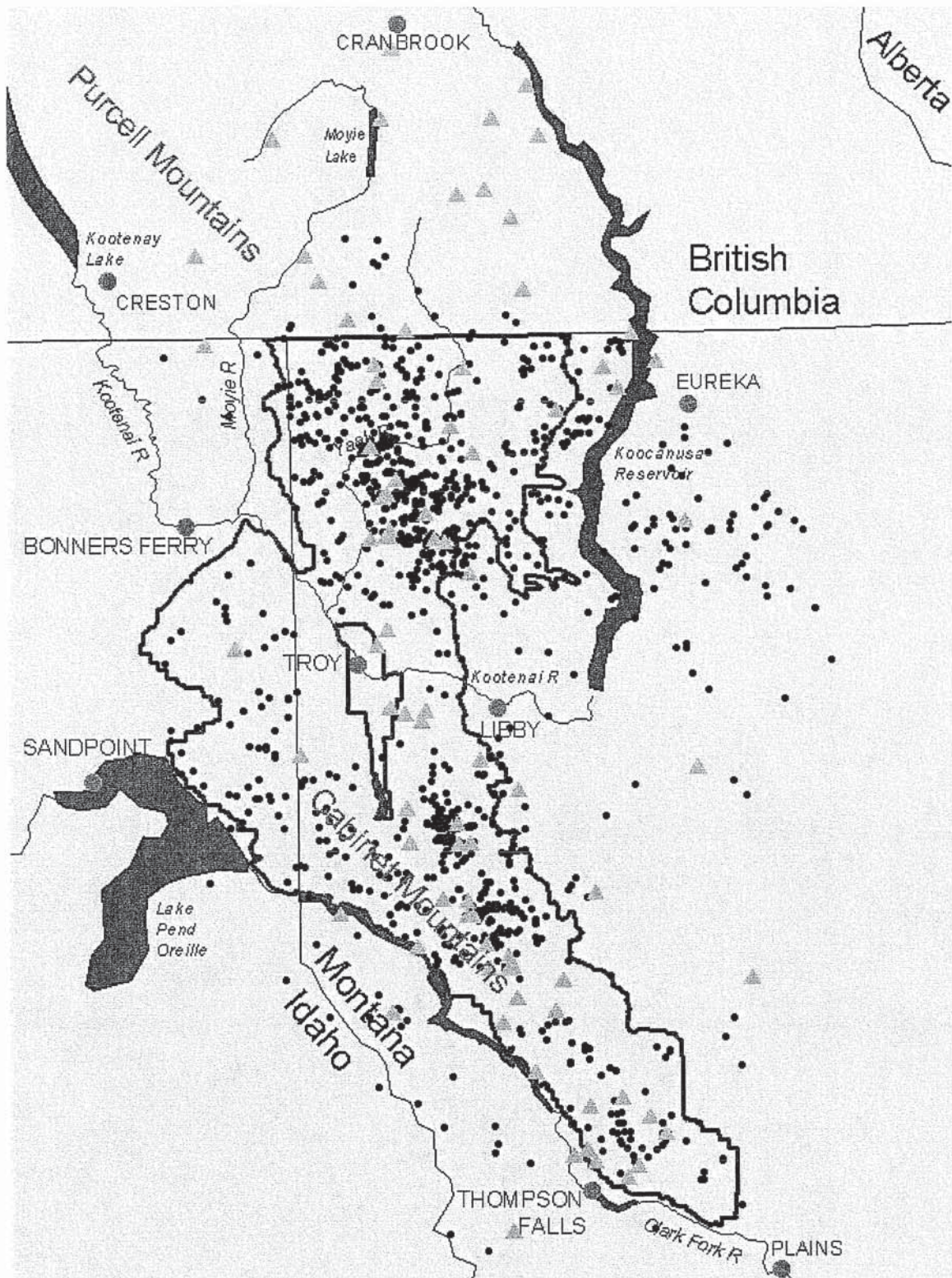


Figure 2. (DRAFT 10/4/06) Grizzly bear observations (1959-2005, circles) and mortality (1949-2005, triangles) in the Cabinet-Yaak recovery area. (from Kasworm et al. in litt. 2006).

Attachment 6 - USFWS Terms and Conditions in the Biological Opinion for the Grizzly Bear

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

Reasonable and Prudent Measures

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

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

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

Terms and Conditions

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

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

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

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

Reporting Requirements

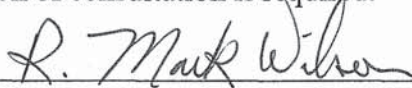
- a) By April of the each year, the Forest shall prepare an annual report of grizzly bear and black bear sanitation incidents and corrective measures taken during the previous year.

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

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

REINITIATION NOTICE

This concludes formal consultation on the proposed Revett Silver Company Rock Creek mine as proposed by the Kootenai National Forest. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded ; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. The Service retains the discretion to determine whether the conditions listed in (1) through (4) have been met and reinitiation of formal consultation is required. In instances where the amount or extent of incidental take is exceeded, reinitiation of consultation is required.



R. Mark Wilson, Field Supervisor
Montana Ecological Services Field Office



Date

Attachment 7 - USFWS Terms and Conditions in the Biological Opinion for the Bull Trout and Bull Trout Critical Habitat

- e. Identify sediment sources currently impacting Rock Creek and plan, design, and implement sediment abatement measures to reduce sediment input to the stream prior to initiation of any ground disturbing activities not related to adit exploration and development. This plan shall identify existing sediment sources such as culverts, road impacts, bridges, past bank stabilization efforts, and utility right of way impacts. Complete a road systems analysis to define existing and future road uses and closures.
- f. Implement a sediment monitoring program to document the ongoing condition of Rock Creek and the effect of mitigation activities on sediment levels, and the actual effect of project activities and proposed mitigation actions on sediment levels in the drainage.

RPM # 2: Evaluate the operation and location of the effluent outfall discharge pipe to eliminate potential impacts to bull trout in Rock Creek.

RPM # 3: Implement a metals monitoring program that includes monitoring levels of metal concentrations in groundwater, surface water, sediments, macroinvertebrates, and fish tissues. This could be incorporated in several conceptual monitoring plans including, but not limited to, the Aquatics and Fisheries Monitoring and Mitigation Plan.

RPM # 4: Identify key spawning areas and implement a monitoring program of changes in groundwater influence for spawning and rearing bull trout. This would be incorporated into the groundwater monitoring program.

RPM #5: Complete a risk assessment of road failure related to haul routes and mine related vehicle traffic. Incorporate any additional measures identified to minimize the risk of road failures and the associated impacts to bull trout.

RPM #6: Incorporate any additional measures identified to minimize the risk of failure of the paste pile or facility and the associated impacts to bull trout.

RPM #7: Implement reporting and consultation requirements as outlined in the following terms and conditions.

4. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the Forest must comply with the following terms and conditions that implement the reasonable and prudent measure described above and outline reporting and monitoring requirements. In the following terms and conditions the term “applicant” is used to describe the company operating the Rock Creek Mine, which is Hecla at the time this BO was written. These terms and conditions are non-discretionary:

To fulfill RPM #1, the following terms and conditions shall be implemented:

1. Upon the of issuance of the letter of approval for the Rock Creek Mine, the KNF shall require the applicant to initiate baseline studies for use in complete watershed assessments of Rock Creek and the Bull River. The KNF shall require the applicant to complete and submit these comprehensive watershed assessments to the KNF and Service prior to surface disturbance activity not related to the evaluation adit stage of the project.
2. The comprehensive watershed assessment shall include a characterization of the Rock Creek and Bull River bull trout populations, and instream and riparian habitat conditions. The Rock Creek assessment shall also include existing sediment sources in the basin. The watershed assessments shall include the following for Rock Creek and the Bull River:
 - a. A monitoring plan to document the prevalence of bull trout. That monitoring plan shall include studies to define bull trout distribution, densities, age class structures, genetics, and status of resident and migratory (adfluvial) bull trout.
 - b. An assessment and subsequent monitoring plan to define the prevalence and distribution of non-native trout. In conjunction with Montana Fish, Wildlife and Parks, determine the feasibility of removing non-native trout using accepted methodology. The assessment shall also include an evaluation of the potential reduction of hybridization and competition risk by non-native species, and the benefit to bull trout.
 - c. If determined feasible and needed, subject to consultation with Montana Fish, Wildlife and Parks, a plan to remove non-native trout using accepted methodology.
 - d. An assessment of current instream and riparian habitat conditions for bull trout. The assessment shall include information on quantity and quality of spawning, rearing and overwintering conditions for resident and adfluvial bull trout. It would include a pre-and post-project assessment of riparian conditions including floodplain and channel migration zone areas, and fish passage barriers (natural and man-made).
3. The Rock Creek watershed assessment shall also include the following:
 - a. An assessment of possible sediment mitigation and reduction projects within the Rock Creek watershed as outlined in the proposed action. Recommendations of stream enhancement projects shall be included in that assessment.
 - b. A feasibility assessment (including engineering options, conceptual designs, estimated costs and expected sediment load effects) for sediment abatement measures that would reduce sediment levels in the Rock Creek

- drainage. This assessment would include any designs for the proposed stream diversion around the proposed paste facility and a complete roads analysis and recommendations associated with mine activities and proposed mitigation projects. This assessment will identify all potential sources of sediment (natural and man-caused) such as mass wasting areas and drainage from road surfaces.
- c. The sediment abatement program shall implement sediment mitigation actions designed to reduce sediment levels in Rock Creek by 38% (the projected increase in sediment levels attributable to development of the mine as described in the BA) prior to surface disturbance activity not related to the evaluation adit stage of the project.
 - d. Upon completion of the feasibility assessment, the KNF shall require the applicant to complete design and permitting requirements, in consultation with MDEQ, the KNF, and the Service, and begin construction of such sediment abatement measures as agreed to by the KNF and the Service.
4. Upon the issuance of the letter of approval for the Rock Creek Mine, the KNF shall require the applicant to complete and submit to the KNF and the Service a sediment monitoring plan that would adequately assess the current (i.e., baseline) and long-term status of sediment levels in Rock Creek. The sediment monitoring plan shall be developed in consultation with MDEQ, the KNF, and the Service, and would address the entire KNF permit time period. The sediment monitoring plan shall also include a complete assessment of the effectiveness of the sediment abatement program in the Rock Creek drainage. If the assessment concludes, and the Service agrees, that the sediment abatement program failed to substantially reduce sediment levels in Rock Creek, then the applicant shall prepare an assessment of other measures that could be implemented in the Rock Creek drainage and would be completed in a time frame agreed to by the Service.
 5. The KNF shall ensure that the applicant establishes and documents the natural hydrograph conditions prior to the mine becoming fully operational. This shall include installation of a system of stream gages, as necessary, to record various stream flow conditions throughout the Rock Creek and Bull River drainages before, during, and after mine operations. To determine proper stream gage locations, the KNF shall ensure that a qualified hydrologist is consulted.

To fulfill RPM #2, the following terms and conditions shall be implemented:

6. Prior to surface disturbance activity not related to the evaluation adit stage of the project, the KNF shall require the applicant to complete, and submit to the KNF and the Service, an evaluation of operational options with existing diffuser location and alternative locations for siting the diffuser entering the Clark Fork River below Noxon Dam. The evaluation shall be prepared in consultation with the KNF, MDEQ, and the Service, and shall focus on recommendations that

would minimize potential effects on migrating or resident bull trout utilizing the Clark Fork River habitats adjacent to the mouth of Rock Creek and the spring area immediately upstream. The Service shall have the authority to ultimately approve the evaluation.

7. If the evaluation identifies a more appropriate operation or location for the diffuser, the KNF shall require the applicant to modify the plan of operations, as agreeable to the Service, to incorporate the alternative most likely to minimize impacts to bull trout.

To fulfill RPM #3, the following term and condition shall be implemented:

8. Prior to surface disturbance activity not related to the evaluation adit stage of the project, the KNF shall require the applicant to submit a plan to the KNF and the Service for metals monitoring as it relates to bull trout habitat requirements. The plan shall include monitoring in water samples, sediment samples, and fish samples. This monitoring shall start prior to mine development to establish the baseline, and continue during operations and post operations as determined necessary by the KNF and the Service. The Service shall have the authority to ultimately approve the plan.

To fulfill RPM #4, the following term and condition shall be implemented:

9. Prior to surface disturbance activity not related to the evaluation adit stage of the project, the KNF shall require the applicant to submit a plan to the KNF and the Service for monitoring of groundwater effects as they relate to bull trout habitat requirements. This monitoring shall start prior to mine development to assess the baseline, and continue during operations and post operations as determined necessary by the KNF and the Service. The Service shall have the authority to ultimately approve the plan.

To fulfill RPM #5, the following term and condition shall be implemented:

10. Prior to surface disturbance activity not related to the evaluation adit stage of the project, the KNF shall require the applicant to submit a risk assessment of accidents related to haul routes for mine related vehicle traffic to the KNF and the Service for evaluation. The assessment shall determine areas most at risk for bull trout and make recommendations for additional measures and responses to minimize risk. If any additional measures can be incorporated to minimize the risk of catastrophic failures, the KNF, MDEQ, and the Service would determine the timeline and mechanism for implementation of those identified measures.

To fulfill RPM #6, the following term and condition shall be implemented:

11. Measures to minimize paste pile or facility failures shall include: employing the Bottom-Up construction sequence, installing blanket and finger drains beneath the paste facility; continually modeling and monitoring the moisture content of the paste pile during operations to better understand saturation levels, generating a detailed design of the paste plant operations and disposal system to ensure quality assurance and quality control during operation and post-closure. If any additional measures can be incorporated to minimize the risk of catastrophic paste pile or facility failures, the Forest, MDEQ, and the Service would determine the timeline and mechanism for implementation of those identified measures.

To fulfill RPM #7, the following terms and condition shall be implemented:

12. The KNF shall require the applicant to annually prepare and submit to the Service a report of the mining year activities as well as the next year's proposed activities.
13. During project development and operation the KNF or applicant shall notify the Service within 24 hours of any emergency or unanticipated situations arising that may be detrimental for bull trout relative to the proposed activity.
14. Within 90 days of the end of each calendar year, the KNF or applicant shall provide a written report or letter to the Service indicating the actual number of bull trout taken, if any, as well as any relevant biological/habitat data or other pertinent information on bull trout that was collected.
15. The KNF shall assure consistent implementation of measures and standards specified in the Aquatic Conservation strategies as indicated in the 1998 Biological Opinion for the Effects to Bull Trout from the Continued Implementation of Land and Resource Management Plans and Resource Management Plans as Amended by the Interim Strategies for Managing Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, Western Montana, and portions of Nevada (INFISH).
16. To better monitor mitigation measures identified, the KNF shall provide summaries to the Service of all INFISH compliance, water quality and fish population monitoring conducted in conjunction with these mining operations.
17. Upon locating dead or injured bull trout, or upon observing destruction of bull trout redds, the KNF or applicant shall notify the Service within 24 hours. Notification shall be made to the Service's Montana Ecological Services Office at 406-449-5225. The KNF or applicant shall record information relative to the date, time, and location of dead or injured bull trout when found, and possible cause of injury or death of each fish and provide this information to the Service.



File Code: 2600
Date: December 8, 2017

Jodi Bush
Office Supervisor
Montana Ecological Services Office
585 Shepard Way, Suite 1
Helena, MT 59601-6287

RE: Request for clarification about the revised Biological Opinion on the effects of the Rock Creek Mine Project to bull trout and their critical habitat.

Dear Ms. Bush:

Thank you for the effort you and your staff have put toward preparing and issuing the Revised Biological Opinion (BO) on the effects of the Rock Creek Mine Project to bull trout and their critical habitat, and Supplement No.2 to the 2006 BO on the effects to grizzly bears. We appreciate your attention to the Rock Creek Project, especially considering your full workload and competing responsibilities.

Upon thorough review, the project applicant RC Resources, Inc. (RCR) and the Kootenai National Forest (KNF) noticed some aspects of the Reasonable and Prudent Measures (RPMs) and Terms and Conditions (T&Cs) included in the Revised Biological Opinion (BO) on the effects to bull trout and their critical habitat that we do not fully understand. We are requesting clarification on these items, as outlined below.

1. In the BO, the "Action Area" is defined as including the lower Bull River but not the entire Bull River watershed (see p. 3):

"The action area also includes the East Fork Bull River, lower Bull River (from East Fork Bull River to Cabinet Gorge Reservoir), and Copper Gulch. These areas are included in the action area based on possible reductions to baseflow, along with Rock Creek, based on the 3D groundwater model mentioned above. Possible impacts to Cabinet Gorge Reservoir would be restricted to the mouth of Rock Creek and localized water quality impacts from the diffuser discharge."

However, the RPMs and Terms and Conditions refer to the entire Bull River Watershed (see pp. 81 and 83): *"These Reasonable and Prudent Measures (RPMs) are similar to what was included in our 2007 BO, with the difference being that some RPMs now pertain to the Bull River watershed in addition to the Rock Creek watershed."*; *"...complete watershed assessments of the Rock Creek and the Bull River."*



Please clarify if the RPMs and T&Cs should apply to the lower Bull River (including the East Fork Bull River and Copper Gulch) watershed or the entire Bull River watershed.

2. RPM #1 requires a “*pre-project watershed assessment of the Rock Creek and Bull River watersheds which characterize the bull trout population and habitat conditions in each watershed.*” To implement this measure, T&C #1 requires RCR to complete and submit the assessments “*prior to surface disturbance activity not related to the evaluation adit stage of the project.*” As noted on p. 77 of the 2017 BO “*the Service uses the following as surrogates of incidental take: (1) the amount of sediment loading in the Rock Creek watershed; and (2) the extent of baseflow depletion in the Rock Creek and Bull River watersheds.*” As indicated in Section 4.7.3.1.1 of the Final SEIS, during Phase I “*Groundwater drawdown due to construction of the adit is predicted to be limited to the area adjacent to the constructed adit and is not predicted to affect stream baseflow.*” In addition, all proposed action surface activities potentially contributing to sediment would occur in the Rock Creek watershed only with FS required sediment mitigation measures beginning with Phase I project activities. Therefore, RCR requests that the Service consider modifying RPM #1 and implementing T&Cs as follows:
 - Requiring a pre-project (prior to Phase I) watershed assessment that focuses on bull trout population, habitat, and sediment sources for the Rock Creek watershed only. Sediment reduction activities are required to begin during Phase I with potential sediment contributing activities occurring in the Rock Creek watershed only;
 - Requiring an additional watershed assessment and predictive model that would be used to determine baseflow depletion potential before impacts occur focused on bull trout populations, habitat, and baseflow for both Rock Creek and lower Bull River watersheds during Phase I (prior to Phase II). Phase I activities are not predicted to affect stream baseflow, and the hydrogeologic data collected during Phase I will be needed for development of a comprehensive baseflow focused watershed assessment.
3. RPM #3 requires implementation of a metals monitoring program including monitoring levels of metal concentrations in groundwater, surface water, sediments, macroinvertebrates, and fish tissue. T&C #8 fulfills this RPM by requiring RCR to submit a plan for metals monitoring “*prior to surface disturbance activities not related to the evaluation adit stage of the project....*” Although RCR does not anticipate encountering significant mineralized material during Phase I, some may be encountered. Therefore, RCR requests that the Service require initiation of T&C #8 prior to evaluation adit construction during Phase I.
4. RPM #5 requires completion of a risk assessment of road failure related to haul routes and mine related vehicle traffic. T&C #10 fulfills this RPM by requiring RCR to “*submit a risk assessment of accidents related to haul routes for mine related vehicle traffic to the KNF and the Service for evaluation.*” Given the location of the evaluation adit and need for surface transport of materials to the adit during both its construction and operation, RCR requests that the Service require completion of a vehicular traffic risk assessment

for Phase I adit activities prior to evaluation adit construction during Phase I. We would also suggest that the Service require the completion of an additional traffic risk assessment study specific to potential Phase II activities. This additional study would be completed by RCR during Phase I and submitted to the Service and KNF prior to possible Phase II activity.

5. RPM #1c states that sediment monitoring is required in Rock Creek and the Bull River, but then later in RPM #1e and #1f, T&C #2, and T&C #3a and #3b the sediment monitoring program is required for Rock Creek only. Please clarify where sediment monitoring is required.
6. The BO states (see p. 13): “*The Service will remain responsible for advising Hecla and the KNF on developing the Water Resources and Aquatics and Fisheries Monitoring Plans, and will have final approval authority (see Terms and Conditions in the Incidental Take Statement of this BO).*”

Formal consultation is complete with the issuance of the BO, per 50 CFR 402.14 (1)(1) and the May 4, 2010 opinion accompanying the decision on the *Rock Creek Alliance et al. v. USFS, Revett Silver Company, and USFWS*. As the action agency, the Forest Service has the authority to approve monitoring and mitigation plans. We are unclear about the regulatory mechanism that confers approval authority of monitoring and mitigation plans to the Service once formal consultation is complete. For similar projects, the Service has indicated that it will participate in an advisory role in the development of monitoring plans and memorandums of understanding. Please clarify if the Service intends to retain approval authority of mitigation and monitoring plans or if it prefers to participate solely in an advisory capacity.


7. RPM #1d (p. 81) directs the KNF to “Include an assessment of alternatives and designs for stream diversion to be constructed around the paste facility.” T&C 3b (p. 84) states “This assessment would include any designs for the proposed stream diversion around the proposed paste facility....” The proposed action does not include a stream diversion as the only drainage in the paste tailings facility footprint is an ephemeral, non-jurisdictional, and non-fish-bearing unnamed tributary to Miller Gulch (see attached Figure 2-7 from the Final SEIS). Run-on diversion structures would be constructed around all proposed facilities; however, these features are designed for stormwater management only. Please clarify if the Service wishes to retain this RPM and T&C.
8. The Service did not include the Montanore Project in the environmental baseline for the 2017 Rock Creek BO. We believe this is correct for the reasons outlined on p. viii of the 2006 Rock Creek terrestrial BO; however, the 2017 aquatic BO does not explicitly state the Service’s rational for excluding the Montanore Project. RCR requests that the Service provide their rational for excluding the Montanore Project from the environmental baseline.

Thank you for taking the time to respond to our questions and requests. Please contact Katelyn Miller, Rock Creek Project Coordinator (contact information shown below) to discuss any questions or provide additional information, if needed.

Katelyn Miller
Rock Creek Project Coordinator
Kootenai National Forest
Libby: 406-283-7605
Trout Creek: 406-827-0717

katelynpmiller@fs.fed.us

Sincerely,



CHRISTOPHER S SAVAGE
Forest Supervisor

cc: Hecla Mining Company (D. Stiles)



United States Department of the Interior

Fish and Wildlife Service
Montana Ecological Services Office
585 Shepard Way, Suite 1
Helena, Montana 59601-6287

Phone: (406) 449-5225; Fax: (406) 449-5339



In Reply Refer To:
File: M.19 Kootenai National Forest (F)
06E11000-2017-F-0157 Rock Creek Mine

January 9, 2017

Chris Savage, Forest Supervisor
Kootenai National Forest
31374 US Highway 2
Libby, MT 59923

Dear Mr. Savage,

Thank you for your December 8, 2017 letter requesting U.S. Fish and Wildlife Service (Service) clarification on elements of the revised Biological Opinion for the Rock Creek Mine Project (BO, November 1, 2017). You requested clarification on eight items. For clarity, the Service's response is presented below in the same fashion (i.e., items 1 through 8).

1. Item #1 in your letter stated: *"Please clarify if the Reasonable and Prudent Measures and Terms and Conditions (RPMs and T&Cs) should apply to the lower Bull River (including the East Fork Bull River and Copper Gulch) watershed or the entire Bull River watershed."*

All Reasonable and Prudent Measures (RPMs) and Terms and Conditions (T&Cs) in the revised BO pertaining to the "Bull River watershed" shall apply to the lower Bull River and East Fork Bull River watersheds. For clarity, we consider the lower Bull River and East Fork Bull River watersheds to be the following:

Lower Bull River Watershed: The confluence of the Bull River and East Fork Bull River, downstream to the confluence of the Bull River and the Clark Fork River. This includes the Copper Gulch watershed.

East Fork Bull River Watershed: The headwaters of the East Fork Bull River downstream to the confluence of the East Fork Bull River and Bull River.

The stream segments described above are shown in Appendix 1 (Figure 3) of the revised BO.

2. Item #2 in your letter requested clarification on the timing of watershed assessments and sediment reduction activities required by T&C #2, #3 and #4. To clarify, the watershed

assessment for the Rock Creek watershed (as required by T&C #2 and #3) shall be conducted prior to Phase I of the proposed action. The watershed assessment for the Lower Bull River and East Fork Bull River watersheds shall be conducted prior to Phase II of the proposed action. All sediment reduction activities in the Rock Creek watershed (as required by T&C #3 and #4) shall be conducted during Phase I of the proposed action.

3. Item #3 in your letter requests clarification on the timing of the metals monitoring program discussed in RPM #3 and T&C #8 of the revised BO. This letter supplants the revised BO such that all elements of T&C #8 shall be implemented prior to construction of the evaluation adit during Phase I of the proposed action.
4. Item #4 in your letter requests clarification on the timing of the risk assessment of road failure related to haul routes and mine related traffic. This assessment is discussed in RPM #5 and T&C #10 of the revised BO. This letter supplants T&C #10 of the revised BO to state the following:
 - The risk assessment of road failure for activities associated with Phase I of the proposed action shall be completed prior to construction of the evaluation adit; and,
 - An additional risk assessment of road failure specific to activities associated with Phase II of the proposed action shall be completed during Phase I of the proposed action, and shall be submitted to the Service prior to any Phase II activity.
5. Item #5 in your letter seeks clarity on the location of required sediment monitoring that is prescribed in RPM #1c of the revised BO. The sediment monitoring discussed in RPM #1c shall only occur in the Rock Creek watershed; however, all other elements of the assessments described in RPM #1c shall occur in the Rock Creek, lower Bull River and East Fork Bull River watersheds.
6. Item #6 in your letter asks the Service to *“Please clarify if the Service intends to retain approval authority of mitigation plans or if it prefers to participate solely in an advisory capacity.”*

The Service retains final approval authority of the mitigation and monitoring plans you describe in item #6 of your letter for the purposes of determining Endangered Species Act (Act) compliance. The intention of the verbiage is not to suggest unilateral or supreme authority over other agencies or laws; rather a pragmatic step that such plans cannot be subsequently modified without ultimate Service approval. While we retain final approval authority, we anticipate that these plans will be developed in a collaborative fashion with the other stakeholders (e.g., Kootenai National Forest (KNF); Rock Creek Resources; Montana Fish, Wildlife and Parks; Montana Department of Environmental Quality (MDEQ)). Further, retention of this authority is consistent with Service responsibilities retained in the previous BO (see 2007 BO, page 79).

Your letter also seeks clarification as to what mechanism provides the Service with final

approval authority of the mitigation and monitoring plans presented in item #6 of your letter. First, as disclosed in Appendix K of the Supplemental Environmental Impact Statement (SEIS) (USFS 2017a), and on page 13 of the BO, Service approval is a design aspect of the proposed action (along with approval of KNF and MDEQ). As a result, the analyses, the jeopardy determination, and the adverse modification determination in the BO are all premised on the action as proposed, including the Service retaining final approval authority on the mitigation and monitoring plans. If the Service does not have final approval authority, then the analysis for effects of the action, and the jeopardy and adverse modification determinations would need to be reconsidered.

Second, authority is conferred to the Service through the Act and its implementing regulations. The Service is required to specify “reasonable and prudent measures” and “terms and conditions” necessary or appropriate to minimize the impact of any “incidental take” resulting from the action (50 C.F.R. § 402.14). In the case of the Rock Creek Mine BO, Service approval of the mitigation plan (and monitoring plans described in previous parts of this letter) is part of the Incidental Take Statement (ITS) of the BO. The Service has a responsibility to judge the adequacy of yet-to-be-developed project elements that affect federally listed species.

Under sections 7(b)(4) and 7(o)(2) of the Endangered Species Act (Act), take 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 the ITS. The authority conferred to the Service through the Act to approve mitigation and monitoring plans is not whether actions can, or cannot, take place. The Service’s authority is conferred through Service inclusion in the terms and conditions of the ITS, and as such, becomes a requirement for the exemption of section 7(o)(2) of the Act to apply. Mitigation and monitoring plans developed and implemented without Service approval could result in the proposed action being out of compliance with the ITS (if actions were to occur that hadn’t been evaluated under the proposed action), and for this same reason, could result in prohibited taking under the Act.

7. Item #7 in your letter asks if the Service wishes to retain RPM #1d and T&C #3b. Yes, the Service retains applicable aspects of RPM #1d and T&C #3b. If a stream diversion is no longer proposed, then RPM #1d and T&C #3b are not applicable to a stream diversion. In the ITS of the revised BO, we state that many of the components of the 2017 BO ITS are similar to the 2007 BO ITS. This RPM and T&C are two such components. If questions arise regarding the implementation of these components, the Service would be more than willing to discuss details and develop an approach to move forward.
8. Item #8 in your letter requests that the Service provide rationale for exclusion of the Montanore Mine Project from the Environmental Baseline section of the revised BO. The Environmental Baseline section of any BO considers actions that have been implemented, or have undergone section 7 consultation. On May 30, 2017, the United States District Court determined that the Montanore Mine Project BO contained substantial deficiencies and remanded the BO to the Service for further consideration. As a result, we did not include the Montanore Mine Project as part of the environmental baseline because it has not been implemented, and it is no longer considered to have undergone section 7 consultation.

We appreciate your efforts to ensure the conservation and recovery of federally listed species as part of our joint responsibilities under the Endangered Species Act. If you have questions or comments related to this correspondence, please contact Kevin Aceituno at kevin_aceituno@fws.gov or phone (406)-758-6871.

Sincerely,



Jodi L. Bush
Office Supervisor

cc: Rock Creek Resources (D. Stiles)
Montana FWP (J. Williams)

Attachment 8 - KNF's 2017 Bull Trout Supplemental Biological Assessment



File Code: 2600
Date: January 13, 2017

Jodi L. Bush
Field Supervisor
US Fish and Wildlife Service
585 Shepard Way, Suite 1
Helena, MT 59601-6287

Dear Jodi,

The Kootenai National Forest (KNF) has reviewed all the information compiled to inform our Supplemental Draft Environmental Impact Statement (DSEIS) for the Rock Creek Mine Project. The KNF has determined that the information pertaining to bull trout and their designated critical habitat does not constitute new information or identify effects outside those previously considered in the formal consultation that has occurred over the past 17 years as described at 50 CFR 402.16. The information that has been collected to date does however better inform the decision as well as provide strong support for what was known or previously suspected regarding the status of bull trout and their designated critical habitat in the Lower Clark Fork Core Area.

The Rock Creek Project's current BO dated October 11, 2006 and supplemented September 27, 2007 was the starting point for our review and analysis. Our biologists' opinion is that the information accumulated to date supports the USFWS existing BO as it currently stands with no need to reopen consultation. I would ask that you consider the supplement which I have included for your review and provide your written concurrence should you agree with that determination.

If you have questions or need any assistance please do not hesitate to contact either John Carlson, KNF Consultation Biologist, or Bobbie Lacklen, Rock Creek Project Coordinator, at (406) 293-6211. Thank you for your consideration in this matter and we look forward to working with the USFWS as we continue to move forward with this project.

Sincerely,


CHRISTOPHER S SAVAGE
Forest Supervisor

cc: Doug Stiles, Hecla Mining Inc.



SUPPLEMENTAL BIOLOGICAL ASSESSMENT
for
BULL TROUT AND BULL TROUT CRITICAL HABITAT
on the
ROCK CREEK COPPER/SILVER MINE PROJECT

Prepared by:

/s/ 

John Blum, Consulting Fisheries Biologist

January 12, 2017
Date

/s/ 

Edward Kline, Consulting Fisheries Biologist

January 12, 2017
Date

Approved by:

/s/ 

John Carlson, Kootenai National Forest Fisheries Biologist

1/13/17
Date

TABLE OF CONTENTS

1	Introduction and Background	1
1.1	Regulatory Background and Consultation History.....	2
1.2	Summary of 2006/2007 Biological Opinion.....	4
1.2.1	Relationship of Bull Trout Local Populations, Core Areas, and Jeopardy Analyses...	4
2	Description of the Proposed Action.....	6
2.1	Bull Trout Action Area	6
2.2	Proposed Action	6
3	Status of Bull Trout and Bull Trout Critical Habitat	7
3.1	Species Description	8
3.2	Life History.....	8
3.3	Habitat Requirements.....	8
3.3.1	Water Temperature.....	8
3.3.2	Substrate Composition.....	9
3.3.3	Migratory Corridors.....	9
3.3.4	Channel Stability and Stream Flow.....	9
3.3.5	Cover	9
3.4	Population Dynamics.....	9
3.5	Status and Distribution	10
3.5.1	Historical and Current Distribution.....	10
3.5.2	Status of Bull Trout in the Columbia River Basin and Columbia Headwaters Recovery Unit.....	11
3.6	Status of Designated Critical Habitat	13
4	Environmental Baseline	16
4.1	Rock Creek Watershed.....	16
4.1.1	Rock Creek	16
4.1.2	East Fork Rock Creek.....	18
4.1.3	West Fork Rock Creek.....	19
4.2	Bull River Watershed.....	19
4.2.1	Lower Bull River.....	20
4.2.2	East Fork Bull River.....	20
4.2.3	Copper Gulch	22
4.3	Cabinet Gorge Reservoir	23

4.4	Climate Change and Effects in the Pacific Northwest.....	25
4.4.1	Effects of Climate Change on Bull Trout.....	26
4.4.2	Effects of Climate Change in the Project Area	27
5	Effects of the Action.....	29
5.1	General Effects of Mining Operations.....	29
5.2	Specific Effects of the Rock Creek Mine Project.....	29
5.2.1	Groundwater and Surface Water Quantity.....	29
5.3	Bull Trout Response to the Proposed Action	40
5.3.1	Rock Creek	40
5.3.2	East Fork Rock Creek.....	42
5.3.3	West Fork Rock Creek.....	43
5.3.4	Bull River	43
5.3.5	East Fork Bull River.....	44
5.3.6	Copper Gulch.....	44
5.3.7	Cabinet Gorge Reservoir.....	44
5.4	Effects of the Action to Designated Bull Trout Critical Habitat.....	45
5.4.1	Rock Creek and East Fork Rock Creek.....	45
5.4.2	Bull River	46
5.4.3	East Fork Bull River.....	46
5.4.4	Cabinet Gorge Reservoir.....	46
5.5	Cumulative Effects.....	47
5.5.1	Cumulative Effects to Bull Trout	47
5.5.2	Cumulative Effects to Designated Bull Trout Critical Habitat.....	47
6	Conclusion	48
7	Literature Cited.....	50

TABLES

Table 1	Mainstem Rock Creek Environmental Baseline
Table 2	East Fork Rock Creek Environmental Baseline
Table 3	West Fork Rock Creek Environmental Baseline
Table 4	Lower Mainstem Bull River Environmental Baseline
Table 5	East Fork Bull River Environmental Baseline
Table 6	Copper Gulch Environmental Baseline
Table 7	Possible Changes to Baseflow (Bulk K = 10^{-6} scenario) – Maximum Drawdown (approximately Year 70)

FIGURES

Figure 1	Location Map
Figure 2	Bull Trout Critical Habitat and Fish Monitoring Locations

ABBREVIATIONS

µg/L	micrograms per liter
3D	three-dimensional
BA	Biological Assessment
BMP	best management practice
BO	Biological Opinion
CFR	Code of Federal Regulations
cfs	cubic feet per second
cm/sec	centimeters per second
CMW	Cabinet Mountains Wilderness
DEQ	Montana Department of Environmental Quality
DPS	Distinct Population Segment
EFBR	East Fork Bull River
EFRC	East Fork Rock Creek
EPT	Ephemeroptera, Plecoptera, Trichoptera Index
ESA	Endangered Species Act
FA	functioning appropriately
FAR	functioning at risk
FEIS	Final Environmental Impact Statement
FERC	Federal Energy Regulatory Commission
FMO	foraging, migration, and overwintering (habitat)
FR	Federal Register
ft	foot
FUR	functioning at unacceptable risk
FWP	Montana Fish, Wildlife and Parks
g/m ²	grams per square meter
GDE	Groundwater Dependent Ecosystem
gpm	gallons per minute
km	kilometer
KNF	Kootenai National Forest
LPO	Lake Pend Oreille
LWD	large woody debris
m	meter
MDEQ	Montana Department of Environmental Quality
MFISH	Montana Fisheries Information System
mi	mile
mm	millimeter

MOA	Memorandum of Agreement
MPDES	Montana Pollutant Discharge Elimination System
MPI	matrix of pathways and indicators
NEPA	National Environmental Policy Act
PCE	primary constituent element
QA/QC	quality assurance/quality control
RCR	RC Resources
Reclamation	Bureau of Reclamation
RHCA	Riparian Habitat Conservation Areas
RM	river mile
ROD	Record of Decision
SEIS	Supplemental Environmental Impact Statement
SR	spawning–rearing (habitat)
USDA	U.S. Department of Agriculture
USDI	U.S. Department of the Interior
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGCRP	U.S. Global Change Research Program
WFRC	West Fork Rock Creek

1 Introduction and Background

RC Resources (RCR) proposes to develop the Rock Creek Project, a proposed underground copper/silver mine and mill/concentrator complex in northwestern Montana with a mine life of 33 to 38 years (Figure 1). RCR currently holds mineral rights for the Rock Creek ore deposit beneath and adjacent to the Cabinet Mountains Wilderness (CMW) in the Cabinet Ranger District of the Kaniksu National Forest, which is administered by the Kootenai National Forest (KNF). The mill and other facilities would be located on National Forest System lands. All proposed facilities would be located outside of the CMW except for a fourth adit with an intake portal that might be constructed for ventilation (as described in the Draft Supplemental Environmental Impact Statement (SEIS); USFS 2016).

The proposed action is Alternative V, the U.S. Forest Service's (USFS's) preferred alternative to RCR's proposed mine plan, and is described in pages B-18 through B-21 of the 2007 Final Biological Opinion (BO; USFWS 2007). The complete description of Alternative V is provided in the Final Environmental Impact Statement (FEIS; MDEQ and USFS 2001). Additional information is also found in Section 2.3.1, Table 2-1, and summarized in Table S-1 of the Draft SEIS (USFS 2016). The Rock Creek Project would be conducted in two stages: 1) the construction and development of an evaluation adit (Phase I); and 2) the development, construction, operation, and reclamation of the mine and mill facilities (Phase II). The evaluation adit would be used for exhaust ventilation during mining. The Rock Creek ore deposit would be accessed through two parallel adits driven from outside the CMW. A fourth adit may be constructed in the CMW as described above. The underground mining operation would use a room-and-pillar mining method where pillars of ore would be left in place to support the rock above the room. The milling process would use a conventional froth flotation process, producing a copper/silver concentrate that would be shipped to a smelter by rail. Tailings would be deposited in a tailings facility behind an embankment.

Bull trout (*Salvelinus confluentus*) is currently listed as threatened under the Endangered Species Act (ESA; listed) and occurs within the project area. The U.S. Fish and Wildlife Service (USFWS) has designated bull trout critical habitat in the project area (USFWS 2010). The ESA requires the KNF to ensure that any action it approves is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of critical habitat.

In October 2006, the USFWS issued its Biological Opinion (BO) on the Effects to Bull Trout from the Implementation of Proposed Actions Associated with Plan of Operations for the RCR Rock Creek Copper/Silver Mine (USFWS 2006). In September 2007, the USFWS issued an amended, Final BO (USFWS 2007). In the time since the 2007 Final BO was submitted, additional information has been collected and developed pertaining to bull trout, its critical habitat, and the effects of the proposed

Rock Creek Mine on bull trout and bull trout critical habitat. Only bull trout and bull trout critical habitat are addressed in this Supplemental Biological Assessment (BA).

The purpose of this Supplemental BA is to update information presented in the 2007 Final BO (USFWS 2007); this Supplemental BA analyzes the new information that has been collected or developed to aid in determining if formal consultation should be re-initiated regarding bull trout and bull trout critical habitat.

Issues satisfactorily addressed in the 2007 Final BO (USFWS 2007) are not discussed in this Supplemental BA. To facilitate comparison between the 2007 Final BO and this Supplemental BA, the general format and outline of the 2007 Final BO are followed when possible.

1.1 Regulatory Background and Consultation History

The following regulatory background and consultation history is compiled chronologically, focusing on bull trout and bull trout critical habitat.

In 1999, the USFWS received a BA analyzing the effects of the proposed action on bull trout with a determination of Likely to Adversely Affect the ESA listed bull trout (USFS 1999). Formal consultation with the USFWS regarding the effects of the project to the bull trout was requested at that time. Subsequently, the USFWS completed a BO for the Rock Creek Project on December 15, 2000 (USFWS 2000). The USFWS concluded that the proposed action would not jeopardize the continued existence of bull trout. The USFS and the Montana Department of Environmental Quality (MDEQ) jointly completed the FEIS for the project (MDEQ and USFS 2001) and incorporated additional stipulations in the preferred Alternative V description as a result of the consultation process. A Record of Decision (ROD) followed the FEIS and incorporated the 2000 Rock Creek Mine BO. Critical Habitat had not yet been proposed at that time.

A Complaint for Declaratory and Injunctive Relief was filed on August 27, 2001, challenging the validity of the 2000 BO. The USFWS withdrew the 2000 BO in March 2002, and the USFS subsequently withdrew the ROD. Additional consultation on bull trout occurred during 2002 and 2003.

On May 9, 2003, the USFWS issued a BO (USFWS 2003) that concluded that the proposed Rock Creek Project would not likely jeopardize bull trout and would not likely adversely modify proposed bull trout critical habitat based upon updated information. In June 2003, the KNF issued a new ROD for the Rock Creek Project.

An amended Complaint for Declaratory and Injunctive Relief was filed on July 10, 2003, pertaining to the 2003 BO. On March 28, 2005, the court set aside and remanded the 2003 BO back to the USFWS for reconsideration.

On September 26, 2005, 2.88 river miles (RM) of bull trout critical habitat were designated in Rock Creek—2.65 RM (four segments) in the mainstem of Rock Creek, and 0.23 RM (one segment) in East Fork Rock Creek; these units were evaluated in the 2007 Final BO (USFWS 2007). The USFWS concluded that the proposed action is not likely to destroy or adversely modify designated bull trout critical habitat of the Columbia River Basin.

The USFWS replaced the remanded 2003 BO with its 2006 BO. After the USFS requested re-initiation of consultation, and in response to new information, the USFWS issued a Supplement to the 2006 BO in 2007, in which it concluded that the re-initiation of formal ESA consultation was not required. This 2007 Final BO (USFWS 2007) was based on further consideration in accordance with the 2005 Court Order and on new information related to bull trout that became available from 2003 to 2007. The amended, 2007 Final BO was issued in September 2007. Rock Creek Alliance et al. filed for summary judgement on April 28, 2008. In its March 26, 2010, decision, the U.S. District Court upheld the amended, 2007 Final BO. The 2007 Final BO provides a response to the Court's concern regarding the consideration of relevant information in the 6 years between 2000 and 2006, updating the current status of the species at that time. The 2007 Final BO provided updated information on the status of bull trout range-wide and within the Clark Fork River Management Unit, Lower Clark Fork Core Area, and the Rock Creek local population. The 2007 Final BO also addressed the Court's determination that the USFWS "failed to adequately explain" the aggregate effect to the status of the species of issuing over 100 biological opinions range-wide (revised from USFWS 2007, p. B-21).

U.S. District Court for the District of Montana decided on March 29, 2010, that there were deficiencies in the 2001 FEIS and ROD due to the following:

1. KNF failed to clearly require Revett to implement the sediment source reduction measures during Phase I of the Rock Creek Project.
2. KNF did not consider supplemental information about bull trout populations and habitat in a National Environmental Policy Act (NEPA) document.
3. The 2001 FEIS did not show Riparian Habitat Conservation Areas (RHCAs) clearly enough to determine effects (pages 70–71 of Molloy's opinion, May 4, 2010).

In a November 16, 2011, decision, the Ninth Circuit Court of Appeals unanimously upheld the bull trout critical habitat analysis of the amended, 2007 Final BO. No appeal was made of the no-jeopardy determination for bull trout in the amended, 2007 Final BO; hence, no review of that determination was made by the Ninth Circuit Court of Appeals.

On October 17, 2010, the USFWS published a final rule regarding bull trout critical habitat, which further expanded bull trout critical habitat in Rock Creek and other watersheds associated with the Project (see Section 3.7).

A Draft SEIS was issued on February 12, 2016, by KNF to respond to court-noted deficiencies in the 2001 FEIS and 2003 ROD. The Draft SEIS updated other resource analyses if there were significant new circumstances or information relevant to environmental concerns and directly related to the proposed action or its impacts. KNF will use the analysis in the Final SEIS to determine whether to issue approvals necessary for construction and operation of the Rock Creek Project.

1.2 Summary of 2006/2007 Biological Opinion

Key findings in the 2007 Final BO (USFWS 2007) are provided below. Updated technical information (up to June 2006) was included in the 2007 Final BO. The 2007 Final BO contained updates to the 2003 BO, which included, but were not limited to, the following:

- Designation of critical habitat for bull trout on September 26, 2005
- Updated information on the 2004 and 2005 radio-tracking of several adult adfluvial bull trout into Rock Creek
- USFWS adoption of new terminology (May 2005) different from the original listing (USFWS 1998)
- USFWS guidance on adverse modification determination of critical habitat, December 9, 2004
- USFWS guidance on jeopardy determinations under Section 7 of the ESA for bull trout, September 26, 2005 (70 FR 56212) (April 20, 2006, guidance memorandum)
- Improved upstream passage of adult bull trout around Cabinet Gorge Dam since 2001
- Consolidation of four core areas in the lower Clark Fork River into one (July 2006)
- Five-year Status Review, Bull Trout Core Area Conservation Status Assessment (USFWS 2005)

It was the USFWS's biological opinion, as documented in the 2007 Final BO (USFWS 2007), that the Rock Creek mine as proposed, is not likely to jeopardize the continued existence of the listed entity of bull trout nor adversely modify critical habitat for this species (USFWS 2006, Summary page v).

1.2.1 Relationship of Bull Trout Local Populations, Core Areas, and Jeopardy Analyses

The 2007 Final BO (USFWS 2007, p. B-7) addressed the U.S. District Court's concern regarding the USFWS's seeming contradiction of earlier findings related to language in previous biological opinions that suggested all bull trout subpopulations were critical to the Columbia River Distinct Population Segment (DPS). The 2007 Final BO clarified the following:

The hierarchal relationship between units of analysis is used to determine whether the proposed action is likely to jeopardize the survival and recovery of bull trout. Should the adverse effects of the proposed action not rise to the level where it appreciably reduces both survival and recovery of the species at a lower scale, such as the local or the core population, by deduction the proposed action could not jeopardize bull trout at the

higher scale of the coterminous United States (i.e., rangewide). Therefore, the determination would result in a no-jeopardy finding. However, should a proposed action produce adverse effects that are determined to appreciably reduce both survival and recovery of the species at a lower scale of analysis, then further analysis is warranted at the next higher scale.

Based on the direction from the USFWS, the 2007 Final BO (USFWS 2007) addressed impacts to the Rock Creek population and bases these findings on how the project would affect that population. At the time that the 2007 Final BO was submitted, the following was the hierarchy of units for bull trout jeopardy analysis for the Rock Creek Project (Table B1, USFWS 2007, p. B-7):

- Columbia River Interim Recovery Unit: One of five interim recovery units in the range of the species within the coterminous United States
- Clark Fork River Management Unit: One of 23 management units in the Columbia River Interim Recovery Unit
- Lower Clark Fork Core Area: One of 35 core areas in the Clark Fork River Management Unit (adjusted for four original core areas consolidated into one—Lower Clark Fork Core Area)
- Rock Creek Local population (one of 14 local populations in the affected Core Area)
- East and West Fork Rock Creek: tributaries to Rock Creek

2 Description of the Proposed Action

2.1 Bull Trout Action Area

The Action Area for this Supplemental BA includes the Rock Creek watershed, some streams in the Bull River watershed, and Cabinet Gorge Reservoir. Compared to the 2007 Final BO (USFWS 2007), the Action Area includes the addition of Bull River between East Fork Bull River and Cabinet Gorge Reservoir (i.e., lower Bull River), East Fork Bull River, and Copper Gulch (Figure 2). The Rock Creek watershed would contain all of the proposed mine facilities and activities. East Fork Bull River, lower Bull River, and Copper Gulch are included in the Action Area based on possible reductions to baseflow, along with Rock Creek, based on a three-dimensional (3D) groundwater model (USFS 2016, Section 4.7.3). Possible impacts to Cabinet Gorge Reservoir would be restricted to the mouth of Rock Creek and localized water quality impacts from the diffuser discharge.

2.2 Proposed Action

Minor changes to the proposed action (Alternative V) have been made since the preparation of the 2007 Final BO (USFWS 2007), including revised tailings facility and mill site footprints, not converting monitoring wells to pumpback wells, and new stipulations for underground mine and subsidence monitoring. The changes are minor and are not likely to affect the analysis of effects to bull trout or bull trout critical habitat. These changes are found in the Draft SEIS (USFS 2016; pp. 2-2 and 2-10). The differences between Alternative V in the 2003 ROD and the KNF's modifications to Alternative V in the Draft SEIS (USFS 2016) include modifications resulting from more detailed and/or final design of Phase I facilities.

The most significant of these changes include providing power to the evaluation adit site through a powerline rather than using generators, burying the evaluation adit water pipeline in the access road rather than placing the pipeline aboveground, and discharging treated mine water from the evaluation adit to infiltration ponds (groundwater) rather than discharging to the Clark Fork River. A number of other minor modifications resulted from more detailed design of facilities and mitigation measures, including modifying the paste tailings facility footprint to avoid impacts on wetlands on National Forest Service lands, modifying the layout of the mill site to avoid RHCAs, modifying the layout and location of Phase I support facilities and associated groundwater disposal system, revising the water treatment system design, and developing details of mitigation associated with the access road to implement sediment reduction requirements.

The proposed action is Alternative V, the USFS's preferred alternative to RCR's proposed mine plan, and is described in pages B-18 through B-21 of the 2007 Final BO (USFWS 2007). The complete description of Alternative V is provided in the FEIS (MDEQ and USFS 2001). Additional information is also found in Chapter 2, Table 2-1 and summarized in Table S-1 of the Draft SEIS (USFS 2016).

3 Status of Bull Trout and Bull Trout Critical Habitat

This section identifies new information germane to the status of bull trout and bull trout critical habitat generated and obtained since the 2007 Final BO (USFWS 2007) (i.e., data since 2006) that is evaluated in this BA. The application of this new information to the existing environmental baseline and effects of the action are described in Sections 4 and 5, respectively. The new information applied in this BA includes the following:

- 2010 bull trout critical habitat designations
- 2015 Bull Trout Recovery Plan
- Action Area expansion to include lower Bull River, East Fork Bull River, and Copper Gulch based on modeled possible reductions to baseflow
- Other new fisheries and aquatic information considered while researching and preparing this Supplemental BA, including the following:
 - Avista Corporation's and Montana Fish, Wildlife and Parks' (FWP's) genetic and population monitoring data for Rock Creek and other study area streams (Young and McKelvey 2009; Avista 2011; DeHaan et al. 2011)
 - USFS data for Rock Creek (Kline Environmental Research 2012)
 - Rock Creek Fisheries and Aquatic Habitat Assessment Supplement (Salmon Environmental Services 2012)
 - USFWS modeled bull trout populations for the Lower Clark Fork River (Peterson et al. 2015)
 - Avista Corporation's annual monitoring reports for the Clark Fork Hydroelectric Project (Avista 2014, 2015)
 - Avista Corporation's 2014 surveys of the Bull River watershed (Moran and Storaasli 2015)
 - Avista Corporation's 2015 surveys of the Rock Creek watershed (Moran and Storaasli 2016)
 - RCR's 2015 Water Monitoring Report (Hydrometrics 2015; see Section 5.2.1.3)
 - Rock Creek Aquatic Habitat Survey (Salmon Environmental Services 2015; Appendix C of Hydrometrics 2015)
 - Baseline indicator revisions based upon new information (see Section 4)
 - Confirmation of bull trout occurrence in Copper Gulch (Kline Environmental Research 2016)
- Climate change models and research
 - Mantua et al. 2009; Warren et al. 2009; USGCRP 2009; Herbst and Cooper 2010; USFS 2010; Reclamation 2011a, 2011b, 2011c; Isaak et al. 2012; Isaak et al. 2015, Isaak et al. 2016; Wenger et al. 2011

- NorWest database for the Cabinet Mountains Wilderness (USFS’s NorWeST project climate scenarios (www.fs.fed.us/rm/boise/AWAE/projects/NorWeST.html); see Section 4.5)
- RCR’s Rock Creek Mine Field Investigation (Morrison Maierle 2016; see Section 5.2.1.3)

As part of the proposed actions, the following information was also examined:

- Clarification of Phase I and Phase II sediment mitigation (see Section 2.3.1.16 and Appendix N of the Draft SEIS)
- Updates to water resources monitoring plan, including the Rock Creek Mine Field Investigation (Morrison Maierle 2016), clarification of contingency action plan, and the timing of monitoring (Appendix K of Draft SEIS)

The following summarizes the status of bull trout and bull trout critical habitat as reported in the 2007 Final BO (USFWS 2007) and Draft SEIS (USFS 2016).

3.1 Species Description

There has been no change in the species description of bull trout since the 2007 Final BO was prepared. See the 2007 Final BO (USFWS 2007, p. B-22) and Lee et al. (1997) for this information.

3.2 Life History

There has been no new information to change the description of the life history of bull trout since the 2007 Final BO. A summary of bull trout life history is provided in the 2007 Final BO (USFWS 2007, p. B-23) and Lee et al. (1997).

3.3 Habitat Requirements

There has been no new information regarding habitat requirements for bull trout since the 2007 Final BO. Bull trout habitat requirements are described in detail in the 2007 Final BO, in addition to a discussion of predation, competition, disease, and hybridization with brook trout (*Salvelinus fontinalis*). (USFWS 2007, p. B-23 and B-24). Updated habitat information for the Action Area is included in Section 4.

3.3.1 Water Temperature

There is more recent information on water temperature preferences for bull trout since the 2007 Final BO (USFWS 2007, p. B-24 to B-25) in Rock Creek and Bull River; however, these data are consistent with the previously collected temperature data describing bull trout tolerance ranges for different life stages. Temperature monitoring in affected streams and mitigating possible groundwater depletion impacts on stream temperature are included in the terms and conditions of the 2007 Final BO and the Agency Conceptual Monitoring Plan (USFS 2016, Appendix K).

3.3.2 Substrate Composition

There is no known new information that would change the conclusions regarding the influences of substrate composition on bull trout since the 2007 Final BO (USFWS 2007, p. B-25). Monitoring sedimentation in affected streams and mitigating fine sediment sources are included in the terms and conditions of the 2007 Final BO and the Agency Conceptual Monitoring Plan (USFS 2016, Appendix K). Updated substrate information for the Action Area is included in Section 4.

3.3.3 Migratory Corridors

There is no new information that would change the conclusions regarding the role of migratory corridors in influencing bull trout populations since the 2007 Final BO (USFWS 2007, p. B-25 and B-26). Section 3.6 discusses the role of bull trout trap and transport on the status and distribution in the Lower Clark Fork Geographic Area, Lake Pend Oreille Core Area, and Lake Pend Oreille – A Core Area.

3.3.4 Channel Stability and Stream Flow

There is no new information that would change the conclusions regarding the influences of stream channel stability and stream flow on bull trout since the 2007 Final BO (USFWS 2007, p. B-26). Stream channel stability and flow monitoring are included in the terms and conditions of the 2007 Final BO and the Agency Conceptual Monitoring Plan (USFS 2016, Appendix K). Modeled reductions in baseflow to streams in the Action Area are addressed in Section 5.2.

3.3.5 Cover

There is no new information that would change the conclusions regarding the influences of complex forms of cover, including large woody debris, undercut banks, boulders, and pool composition on bull trout since the 2007 Final BO (USFWS 2007, p. B-26). Monitoring of stream cover as a habitat feature is included in the terms and conditions of the 2007 Final BO and the Agency Conceptual Monitoring Plan (USFS 2016, Appendix K).

3.4 Population Dynamics

There has been no new information that changes the understanding of overall population dynamics of bull trout population or the conclusions since the 2007 Final BO (USFWS 2007) was prepared. Population size, variability, stability, and structure were detailed in the 2007 Final BO. USFWS (2015b) reviewed the status of bull trout and concluded that little had changed regarding individual core area status since the 5-year review (USFWS 2008). Information that has been collected in the Action Area, as well as the lower Clark Fork River and the Lake Pend Oreille Core area, supports previously collected information. The monitoring program for bull trout that will allow population dynamics to

be described in the project area are included in the terms and conditions of the 2007 Final BO and the Agency Conceptual Monitoring Plan (USFS 2016, Appendix K).

3.5 Status and Distribution

3.5.1 Historical and Current Distribution

The historical and current distribution of bull trout are described in detail with associated references in the 2007 Final BO (USFWS 2007, p. B-31 and B-32) and Draft SEIS (USFS 2016, Section 3.13.2). The historical range of bull trout was restricted to western North America. In the United States, bull trout were historically recorded from northern California, Oregon, and throughout the Columbia River Basin in much of interior Oregon, Washington, Idaho, northern Nevada, and western Montana (Pratt and Huston 1993). The actual decline in the distribution of bull trout cannot be estimated because it is not known how much of the potential range was occupied.

As stated in the 2015 Recovery Plan for the Coterminous United States Population of Bull Trout (*Salvelinus confluentus*) prepared by the USFWS (2015a), bull trout were still widely distributed at the time of their coterminous United States listing in 1999 (USFWS 1999), although they were suspected to have been extirpated from some of their historical range. These suspected declines have largely been attributed to habitat degradation and fragmentation, blockage of migratory corridors, poor water quality, past fisheries management practices, and the introduction and subsequent proliferation of non-native fish species (USFWS 2015a). USFWS modeling (Peterson et al. 2015) predicted that management actions which reduced the influence of non-native trout were expected to result in the largest comparative improvement in bull trout population status for individual patches and at the aggregate level including all patches upstream of Cabinet Gorge Dam.

Since 1999, there has been very little change in the general distribution of bull trout in the coterminous United States (USFWS 2015a); therefore, the distribution has not changed since the 2007 Final BO was submitted. Further details on distribution and status can be found in the 2007 Final BO (USFWS 2007). In the Final Bull Trout Recovery Plan (USFWS 2015a), the bull trout recovery strategy was founded on a hierarchical approach to geographic classification. Bull trout are listed as a single DPS within the five-state area of the coterminous United States. This single DPS is subdivided into six biologically based recovery units; there had previously been five interim recovery units. A DPS differs from a recovery unit in that it is an "individual listed entity, designated through a rule-making process pursuant to Section 4 of the Act [Endangered Species Act], and can be listed or delisted independently of other populations of the same species" (USFWS 2015b). Recovery units are population units that have been "documented as necessary to both the survival and recovery of the species in a final recovery plan" (NMFS and USFWS 2010).

To effectively manage the structure in the Columbia Headwaters Recovery Unit, the USFWS separated the core areas into five natural geographic assemblages, largely reminiscent of the 2002 recovery planning structure (USFWS 2002). Core areas, which contain local populations, are assigned to geographic units.

Based on the most current available information, several core areas were split or combined, additional core areas that were historically occupied were identified, and those that did not fit the core area definition were removed. There are now 35 core areas in the Columbia Headwater Recovery Unit, compared to 47 in 2002. Fifteen of the core areas are referred to as “complex” core areas because they represent spawning streams considered to host separate and largely unique genetically identifiable local populations. There are also 20 smaller core areas represented by a single local population.

The following is the current hierarchy of units for bull trout jeopardy analysis for the Rock Creek Project (USFWS 2015b). The hierarchy of units and number of local populations has changed since the 2007 Final BO (USFWS 2007):

- Columbia Headwaters Recovery Unit: One of six recovery units in the range of the species within the coterminous United States
- Lower Clark Fork Geographic Unit: One of five geographic units within the Columbia Headwaters Recovery Unit
- Lake Pend Oreille (LPO) Core Area: One of two complex core areas within the Lower Clark Fork Geographic Unit
- LPO-A Core Area: Upstream of Cabinet Gorge Dam
- Rock Creek: One of 15 local populations in LPO-A
 - East and West Fork Rock Creek: Tributaries to Rock Creek
- Bull River: One of 15 local populations in LPO-A
 - East Fork Bull River and Copper Gulch: Tributaries to Bull River

In the 2002 and 2004 Draft Recovery Plans and the 5-year review (USFWS 2008), the project area had been in the former Clark Fork River Basin Recovery Unit, in the former Cabinet Gorge Reservoir Core Area.

3.5.2 Status of Bull Trout in the Columbia River Basin and Columbia Headwaters Recovery Unit

The USFWS (2015a) Recovery Plan for the Coterminous United States Population of Bull Trout (*Salvelinus confluentus*) lists six recovery units that are further organized into multiple bull trout core areas that include one or more local populations. Within the coterminous United States, USFWS currently recognizes 109 occupied bull trout core areas, which comprise 600 or more local

populations. In addition, there are six core areas where bull trout historically occurred but are now extirpated and two “research needs areas” where bull trout were known to occur historically, but their current presence and historical use of the area are uncertain. The core areas are designated based on the best available information, and since the publication of the 2002 and 2004 draft recovery plans some core areas have been modified, split, or combined as more specific distribution, migratory patterns, and genetic information have been gathered. Core areas are functionally similar to bull trout metapopulations, in that bull trout within a core area are much more likely to interact, both spatially and temporally, than are bull trout from separate core areas.

3.5.2.1 Lower Clark Fork Geographic Region

The Lower Clark Fork Geographic Region is part of the Columbia Headwaters Recovery Unit, which extends across western Montana, northern Idaho, and a portion of northeastern Washington (USFWS 2015a). This recovery unit also contains the Upper Clark Fork, Flathead Lake, Coeur d’Alene Lake, and Kootenai River geographic units. Within this recovery unit, the 2015 Recovery Plan describes 35 core bull trout areas. Fifteen of these core areas are referred to as “complex” core areas because they represent larger interconnected habitats that each contain spawning streams that host multiple separate and largely genetically identifiable local populations of bull trout. The remaining 20 core areas are described as “simple” core areas that primarily consist of isolated headwater lakes with single local populations.

The September 2015 USFWS Columbia Headwaters Recovery Unit Implementation Plan for Bull Trout (*Salvelinus confluentus*) (USFWS 2015b) describes the Lower Clark Fork Geographic Region as being composed of two complex core areas: Lake Pend Oreille and Priest Lake.

USFWS (Peterson et al. 2015) modeled bull trout populations for the Lower Clark Fork River to assist conservation and management. Ten local patches were evaluated, divided into management units. Bull River and Rock Creek were addressed as a single management unit because of their location between Cabinet Gorge Dam and Noxon Rapids Dam. Under the current environmental conditions and management intensity, the model predicted a moderate likelihood of stable or increasing bull trout populations in Rock Creek (59%). For Bull River, the model weakly indicated population stability (54%). An aggregate model for the eight bull trout patches upstream from Cabinet Gorge Dam predicted a moderate (59%) likelihood that, collectively, this “metapopulation” was stable or increasing.

3.5.2.2 Lake Pend Oreille Core Area

Lake Pend Oreille is the largest and deepest natural lake in Idaho. The surface elevation is regulated by the Albeni Falls Dam, located on the Pend Oreille River 23 miles downstream. Most of the lake’s volume is contained in the southern basin, which has a mean depth of 715 feet. The northern arm of the lake has a mean depth of 98 feet (Hoelscher 1993). The Clark Fork River is the lake’s principal

inlet, contributing as much as 90% of the lake's annual inflow. The only surface outlet is the Pend Oreille River (USFS 2016).

Due to its systematic and jurisdictional complexity, the LPO core area is further broken out into three parts: LPO-A, LPO-B, and LPO-C. LPO-A is upstream of Cabinet Gorge Dam, almost entirely in Montana, and includes the mainstem Clark Fork River upstream to the confluence of the Flathead River as well as the portions of the lower Flathead River (e.g., Jocko River) on the Flathead Indian Reservation. The Action Area for the project is entirely within LPO-A. LPO-B is the Pend Oreille lake basin proper and its tributaries, extending between Albeni Falls Dam downstream from the outlet of Lake Pend Oreille and Cabinet Gorge Dam just upstream of the lake, almost entirely in Idaho. LPO-C is the lower basin (i.e., lower Pend Oreille River), downstream of Albeni Falls Dam to Boundary Dam (1 mile upstream from the Canadian border) and bisected by Box Canyon Dam, including portions of Idaho, eastern Washington, and the Kalispel Reservation. In the Lake Pend Oreille Core Area, there are 35 local bull trout populations; of these, 15 are located above Cabinet Gorge Dam (USFWS 2010). In addition to these 35 local populations (all located above Albeni Falls Dam), there are nine streams below Albeni Falls and Box Canyon dams that are listed as currently unoccupied, potential local populations (USFWS 2010).

3.5.2.3 Lake Pend Oreille – A Core Area

LPO-A includes Rock Creek, the Bull River, and Cabinet Gorge Reservoir. Cabinet Gorge Reservoir provides foraging, migration, and overwintering (FMO) habitat for bull trout. There are 15 local populations in the LPO-A Core area, including Bull River and Rock Creek (USFWS 2015a, p. D-166). Rock Creek and Bull River are the two watersheds in the Cabinet Gorge Reservoir reach of the Lower Clark Fork River that were previously known to support bull trout populations (Moran and Storaasli, 2016). In addition to these watersheds, relatively low numbers of bull trout are known to use Cabinet Gorge Reservoir for foraging and during out-migration from Rock Creek and other tributaries (USFS 2016).

3.6 Status of Designated Critical Habitat

The 2007 Final BO was based on bull trout critical habitat designations made in 2005 (USFWS 2005); details and a summary of the history of critical habitat designations in 2005 can be found in the 2007 Final BO (USFWS 2007). This Supplemental BA incorporates year-2010 changes to bull trout critical habitat designations (USFWS 2010).

Guidance for analysis of designated critical habitat for bull trout was provided in the final rule and previously in the Director of the USFWS' December 9, 2004, memorandum, which was in response to litigation on the regulatory standard for determining whether proposed federal agency actions are likely to result in the "destruction or adverse modification" of designated critical habitat under Section 7(a)(2) of the ESA. This memorandum outlined interim measures for conducting Section 7

consultations pending the adoption of any new regulatory definition of “destruction or adverse modification.” As a result, the 2007 Final BO (USFWS 2007) did not rely on the regulatory definition of “destruction or adverse modification” of critical habitat at 50 CFR 402.02, but rather upon the statutory provisions of the ESA to complete analysis with respect to critical habitat.

Changes in critical habitat in the Action Area are summarized below and can be found in Figure 2:

- Rock Creek
 - 2005: 2.88 river miles (spawning–rearing [SR] habitat)
 - Section 1: RM 0.0–0.46
 - Section 2: RM 0.8–1.45
 - Section 3: RM 2.53–3.64
 - Section 4: RM 4.81–5.25
 - Section 5: (East Fork Rock Creek) RM 6.05–6.28
 - Total of 2.88 river miles of critical habitat
 - 2010: 8.4 river miles
 - Increased 5.5 river miles, extending from RM 0.0–8.4 (natural barrier on East Fork Rock Creek) (SR habitat)
- Bull River
 - 2005: 21.4 river miles from confluence with Cabinet Gorge Reservoir to its headwaters
 - From confluence with Cabinet Gorge Reservoir to RM 25 (in segments; not continuous) (FMO habitat)
 - 2010: 24.7 river miles
 - Increased 3.3 miles, extending from confluence with Cabinet Gorge Reservoir to RM 24.7 (FMO habitat). This Supplemental BA, however, only addresses lower Bull River from its confluence with East Fork Bull River downstream to its confluence with Cabinet Gorge Reservoir.
- East Fork Bull River
 - 2005:
 - No critical habitat
 - 2010
 - 8.0 river miles of critical habitat from confluence with Bull River upstream (SR habitat)

- Cabinet Gorge Reservoir
 - 2005:
 - No critical habitat
 - 2010:
 - 3,200 acres designated critical habitat (FMO)

Critical habitat designations identify, to the extent known using the best scientific and commercial data available, habitat areas that provide essential life cycle needs of the species. The condition of critical habitat is assessed based on primary constituent elements (PCEs) as defined at 50 CFR 424.12 (b).

PCEs for bull trout include the following:

1. Stream temperatures from 36 to 59 °F (2 to 15 °C)
2. Complex stream channels influenced by large woody debris, pools, and undercut banks that result in various depths, velocities, and instream habitat structures
3. Substrates of sufficient size, amount, and composition for juvenile and egg survival
4. Natural stream flows or artificial flows that are regulated in order to support bull trout
5. Springs, seeps, and groundwater sources, and subsurface flow that contributes to the water quantity and quality as a cold water source
6. Migratory corridors that support unimpeded movement between spawning, rearing, foraging, and overwintering areas
7. Adequate food base of terrestrial and aquatic insects and forage fish
8. Permanent water sufficient to provide the quality and quantity for normal reproduction, growth, and survival

4 Environmental Baseline

Regulations implementing the ESA (50 CFR 402.02) define the environmental baseline as the past and present impacts of all federal, state, or private actions and other human activities leading to the current status of the species, its habitat (including designated critical habitat), and ecosystem in the Action Area. Also included in the environmental baseline are the anticipated impacts of all proposed federal projects in the Action Area which have already undergone Section 7 consultations and the impacts of state and private actions which are contemporaneous with the consultations in progress.

The baseline conditions for the Action Area local bull trout population parameters and associated important habitat indicators are summarized in Tables 1 through 6. Baseline conditions for bull trout and other salmonid populations within these waterbodies are discussed in the following sections.

4.1 Rock Creek Watershed

The Draft SEIS (USFS 2016, Section 3.11.2) describes the Rock Creek watershed in detail including descriptions of habitat features and fish occurrence and distribution. Major tributaries to Rock Creek include West Fork Rock Creek, East Fork Rock Creek, Engle Creek, and Orr Creek. Bull trout are found in Rock Creek, West Fork Rock Creek, and East Fork Rock Creek. These reaches are described separately below.

4.1.1 Rock Creek

The baseline conditions for Rock Creek local bull trout population parameters and associated important habitat indicators are summarized in Table 1.

Surveys of Rock Creek fish populations have continued since the 2007 Final BO (USFWS 2007), including electrofishing, bull trout redd surveys, downstream-migrating fish trapping and transport, and radiotracking. The majority of this newer work has been performed as part of Avista's Clark Fork Settlement Agreement. The majority of fish sampled by Avista in the Rock Creek watershed were observed in East Fork Rock Creek, followed by mainstem Rock Creek, and West Fork Rock Creek.

Previous studies of the Rock Creek watershed have illustrated that the salmonid community is composed of four species: westslope cutthroat trout (*Oncorhynchus clarki lewisi*), bull trout, and (in lower Rock Creek and Engle Creek) brook trout and rainbow trout (*O. mykiss*). Bull trout is the second most abundant species within the Rock Creek watershed, after westslope cutthroat trout. Genetic testing was conducted in 2009 on bull trout captured in the mainstem of Rock Creek (Young and McKelvey 2009). During a more recent Fish Abundance Studies Program electrofishing survey of the Rock Creek watershed in 2015, Avista recorded multiple bull trout in both upper and lower Rock Creek (Moran and Storaasli 2016). Westslope cutthroat were found in Rock Creek and Orr Creek, and non-native brook trout were found in lower Rock Creek and Engle Creek.

The Tributary Trapping and Downstream Juvenile Bull Trout Transport Studies Program was initiated in 2000 in the Bull River and Rock Creek watersheds. In 2014, Rock Creek was trapped to capture downstream-migrating bull trout. Thirty-five juvenile bull trout were captured in Rock Creek in 2014: 32 in a weir and 3 in a screw trap (Avista 2015). These fish were transported downstream, either to the mouth of Johnson Creek in Lake Pend Oreille during times of high flow, or in the lower Clark Fork River near the Cabinet Gorge Fish Hatchery (Avista 2015).

Moran and Storaasli (2016) conducted fish population assessments in Rock Creek in 2015, and provided updated and trend data for the years prior to their survey in Rock Creek through abundance estimates and associated indices. Moran and Storaasli (2016) summarized relevant information, including the following:

- Bull trout spawning, Lower Rock Creek (p. 26):
 - Bull trout spawning by migratory adults in lower Rock Creek has been limited, and in a few instances appeared to be associated with the straying of upstream-transported adult bull trout.
 - Five bull trout redds were found during nine surveys conducted from 2004 through 2015 in lower Rock Creek.
 - Due to the limited sampling of lower Rock Creek and the difficulty in attributing juveniles captured to spawning location, it is unknown to what extent this limited spawning contributed to juvenile bull trout abundance.
 - The impact of hybridization with brook trout in lower Rock Creek was evident in the capture of three confirmed brook trout x bull trout hybrids in 2014 and one in 2015.
- Migratory bull trout in Lower Rock Creek (p. 27):
 - The capture of 36 adult bull trout from 2001 through 2015 below Cabinet Gorge Dam that were genetically assigned to Rock Creek demonstrates the existence of an endemic migratory life history component.
- Summary (p. 33):
 - The principal area of the watershed important to bull trout and westslope cutthroat trout is the approximately 4.8 kilometers (3 RM) of upper Rock Creek (i.e., East Fork Rock Creek and upper mainstem Rock Creek) with perennial streamflow located between the mouth of the West Fork and the cascade at approximately river kilometer 13.4 (RM 8.4).
 - The resident life history form predominates for bull trout and westslope cutthroat trout of the Rock Creek watershed; however, the migratory form of both species also occurs and has been assisted by Avista's fish passage mitigation programs.
 - Naturally occurring seasonal intermittency during base streamflow limits the amount of available habitat, strands fish, and can restrict access to and from headwater areas by migratory bull trout.

- In the 15 years of conducting redd surveys, and noted intermittency in 1985, 1986, and 1993, only the abnormally higher base streamflow of 2004 was known to enable connectivity throughout the mainstem during the bull trout migration and spawning period.
- Non-native brook trout dominate the trout assemblage of Engle Creek and, to a lesser degree, lower Rock Creek. Recent confirmation of brook trout x bull trout hybridization in lower Rock Creek illustrates the loss of reproductive success for bull trout that spawn in this area.

4.1.2 East Fork Rock Creek

The baseline conditions for the East Fork Rock Creek local bull trout population parameters and associated important habitat indicators are summarized in Table 2.

Previous studies of East Fork Rock Creek have illustrated that the salmonid community is composed of bull trout and westslope cutthroat trout. There is the threat of brook trout hybridization; however, poor connectivity to Rock Creek has nearly isolated this population. As noted above, brook trout x bull trout hybrids were observed in lower Rock Creek.

Horn and Tholl (2008) compared biomass and density estimates from 1999 to 2007 for fish monitoring sites on East Fork Rock Creek (Avista Sections 2 and 4) to estimate the stability of bull trout and westslope cutthroat trout populations. Biomass was found to be fairly stable at the sampling reach near the confluence of East and West Fork Rock Creek (Avista Section 2, 400 to 500 grams per 100 square meters [$g/100 m^2$]) and somewhat less stable higher in the watershed (Avista Section 4, 400 to 600 $g/100 m^2$), although biomass was similar in magnitude between the sites. Horn and Tholl (2008) suggested that the stability in biomass for both species (accounting for 100% of East Fork Rock Creek fish community composition) may indicate that total fish populations in East Fork Rock Creek are at or near carrying capacity, while the observed difference in biomass range between the two sites may suggest that resource competition is more intense at Avista Section 4. A waterfall in the upper reaches of East Fork Rock Creek functions as a natural barrier to upstream fish migration.

Avista's genetic testing of westslope cutthroat trout and bull trout has confirmed that populations of both species in East Fork Rock Creek below the natural barriers (waterfalls) are largely genetically pure, meaning they have not hybridized with non-native fish species (Avista 2011).

Moran and Storaasli (2016) summarized that naturally occurring seasonal intermittency during base streamflow limits the amount of available habitat, strands fish, and can restrict access to and from headwater areas by migratory bull trout. This intermittency, however, also aids the species by limiting the establishment of non-native salmonids. Fifteen years of monitoring data have shown variable but

stable numbers of westslope cutthroat trout and bull trout in East Fork Rock Creek, with no established population of non-native species.

4.1.3 West Fork Rock Creek

The baseline conditions for the West Fork Rock Creek local bull trout population parameters and associated important habitat indicators are summarized in Table 3.

Previous studies of West Fork Rock Creek have illustrated that the salmonid community is composed of westslope cutthroat trout and bull trout. This was confirmed during year 2012 and 2015 electrofishing surveys of West Fork Rock Creek (Kline Environmental Research 2012; Moran and Storaasli 2016). Westslope cutthroat were more abundant than bull trout and were found in an unnamed tributary to West Fork Rock Creek during 2015. Bull trout were not observed in West Fork Rock Creek during 2007 electrofishing spot surveys aimed at capturing westslope cutthroat trout for genetic testing (Avista 2011). A waterfall in the upper reaches of West Fork Rock Creek functions as a natural barrier to fish moving further upstream. Avista's genetic testing of westslope cutthroat trout and bull trout has confirmed that populations of both species in West Fork Rock Creek below the natural barriers (waterfalls) are largely genetically pure (Avista 2011).

Moran and Storaasli (2016) conducted fish population assessments in Rock Creek in 2015, and provided updated and trend data for the years prior to their survey in Rock Creek through abundance estimates and associated indices. Key findings for migratory bull trout in West Fork Rock Creek included the following:

- The approximately 2.5 kilometers (1.6 miles) of the West Fork with perennial streamflow provides additional small-stream habitat for genetically pure westslope cutthroat trout as well as a variable number of bull trout.
- It is currently not known if the West Fork supports bull trout spawning or supports more than a few bull trout; past sampling has quantified higher abundance, but the small size and intermittency of this stream may limit its potential for bull trout rearing.

Naturally occurring seasonal intermittency during base streamflow limits the amount of available habitat, strands fish, and can restrict access to and from headwater areas by migratory bull trout. This intermittency, however, also aids the species by limiting the establishment of non-native salmonids.

4.2 Bull River Watershed

The Draft SEIS (USFS 2016, Section 3.11.3) describes the Bull River watershed, including descriptions of habitat features and fish occurrence and distribution.

4.2.1 Lower Bull River

The baseline conditions for the Bull River local bull trout population parameters and associated important habitat indicators are summarized in Table 4. Baseline information is limited to lower Bull River, from its confluence with East Fork Bull River downstream to its confluence with Cabinet Gorge Reservoir.

Brown trout (*Salmo trutta*), brook trout, bull trout, largescale sucker (*Catostomus macrocheilus*), mountain whitefish (*Prosopium williamsoni*), and slimy sculpin (*Cottus cognatus*) are common to abundant throughout the mainstem of the Bull River. Longnose dace (*Rhinichthys cataractae*), northern pikeminnow (*Ptychocheilus oregonensis*), rainbow trout, and westslope cutthroat trout have also been identified throughout the Bull River mainstem, although they are characterized as rare (FWP 2014a). All of the species listed above are native to the region with the exception of brown trout, brook trout, and rainbow trout. Brown trout and brook trout together accounted for as much as 80% of the trout population in 1999 (Chadwick Ecological Consultants 2000) and were also the most abundant salmonid species found in middle and lower sections of the mainstem Bull River in 2005 (Moran 2006). Non-native trout, particularly brown trout and brook trout, in the mainstem Bull River threaten native bull trout and westslope cutthroat trout through predation, competition, and hybridization (Chadwick Ecological Consultants 2000; GEI 2005).

The mainstem Bull River provides habitat for westslope cutthroat trout and bull trout of all life stages, including spawning (Moran 2004; Storaasli and Moran 2012), although bull trout and westslope cutthroat trout are rare in lower reaches (Moran 2006). Westslope cutthroat trout were sampled at densities of less than 50 fish/mile in 2009 (May 2009; StreamNet 2009). The mainstem of the Bull River is also an important migratory corridor for native trout that spawn in headwater streams of the Bull River watershed (Katzman and Hintz 2003; Lockard et al. 2003; Lockard et al. 2008).

The following was taken from USFS (2013):

The lower Bull River has one known spawning reach and some dispersed areas. Historically there was a large concentration of redds roughly 0.5 miles downstream from the confluence with the East Fork. Spawners number around 20-40 annually. Rearing habitat is available in the mainstem Bull River but the number of fish utilizing that habitat is unknown. It is well documented that fish from the Bull River move downstream to the lower Clark Fork River. There is limited rearing habitat in Cabinet Gorge Reservoir which limits productivity.

4.2.2 East Fork Bull River

Baseline conditions for the East Fork Bull River local bull trout population parameters and associated important habitat indicators are summarized in Table 5. Bull River headwaters streams have two

known spawning reaches, with the bulk of spawning occurring in East Fork Bull River from the CMW boundary upstream to the confluence of Isabella Creek. Spawners number around 20 to 40 annually (USFS 2013).

As detailed in the Draft SEIS (USFS 2016, p. 3-136), East Fork Bull River fish populations have been sampled extensively, including electrofishing, bull trout redd surveys, downstream-migrating fish trapping and transport, and radiotracking. The majority of this work has been performed as part of Avista's Clark Fork Settlement Agreement (Moran and Storaasli 2015) or by Montana FWP (FWP 2014b).

East Fork Bull River supports the highest densities of native trout within the Bull River watershed (WWP 1996). Fish population surveys in East Fork Bull River confirm that brook trout, brown trout, bull trout, westslope cutthroat trout, mountain whitefish, sculpin (*Cottus* spp.), and northern pikeminnow are present in East Fork Bull River (WWP 1996; Chadwick Ecological Consultants 2000; FWP 2008; Young and McKelvey 2009; Horn and Tholl 2011). By species, fish densities were highest for westslope cutthroat trout during the 1992 to 1994 surveys, followed by brown trout, bull trout, and brook trout (WWP 1996).

Annual fish population estimates completed by Avista show changing population dynamics in downstream reaches of East Fork Bull River (between its confluence with the Bull River and Snake Creek) since 2000 (Horn and Tholl 2011). Overall fish population densities decreased between 2000 and 2002 as a result of short-term degradation caused by stream restoration completed in 2000, but increased between 2003 and 2008 following stabilization of restored areas. Non-native brown trout remained the dominant fish species in lower East Fork Bull River following stream restoration. However, non-native fish were actively removed starting in 2007 to encourage local population growth of bull trout and westslope cutthroat trout. The proportion of native fish in lower East Fork Bull River has increased annually since 2008, and westslope cutthroat trout was the dominant fish species in 2009 and 2010. Westslope cutthroat trout were found at densities of 50 to 150 fish/mile in East Fork Bull River in 2009 (May 2009; StreamNet 2009). Bull trout and westslope cutthroat trout have been historically dominant in East Fork Bull River reaches sampled upstream of Snake Creek (WWP 1996; Chadwick Ecological Consultants 2000; Horn and Tholl 2011).

Avista's downstream juvenile trapping program, initiated in 2000, continued through 2014 (Avista 2015). In East Fork Bull River, 11 juvenile bull trout were captured at weirs (one in the north channel and one in the south channel), while 5 were captured in a screw trap (Avista 2015).

A non-native fish suppression project took place in East Fork Bull River from 2006 to 2014. Removal of non-native salmonids was anticipated to increase rearing potential for native salmonids. During operation of all fish traps in 2014, a total of 69 brown, 135 brook, and one rainbow trout were captured in East Fork Bull River. Per previously established protocols, of these captures, 26 brown

and 26 brook trout of larger size (greater than 150 mm in length) were transported to the lower mainstem Bull River, while the remaining non-native salmonids were euthanized. In addition, 25 adult bull trout were captured downstream of Cabinet Gorge Dam and released into Cabinet Gorge Reservoir or associated tributaries; 21 of these fish originated from and were transported to East Fork Bull River (Avista 2015).

4.2.3 Copper Gulch

The baseline conditions for the Copper Gulch local bull trout population parameters and its associated important habitat indicators are summarized in Table 6.

Copper Gulch is a tributary to Bull River extending 4.7 river miles east from the Bull River mainstem to its headwaters in the CMW. As reported in the Draft SEIS (USFS 2016), fish habitat (including spawning, rearing, and overwintering habitat) in Copper Gulch was determined to be limited near the Bull River confluence due to channel stability during previous aquatic habitat assessments. Rearing and overwintering habitat was found to improve between RM 0.9 and 1.7 based on higher large woody debris, channel complexity, and stability, but spawning habitat was limited. Above RM 1.7, fish habitat continues to be limited by steep gradient and regular dewatering (Land and Water Consulting 2001).

Previous surveys identified bull trout, brown trout, brook trout, mountain whitefish, and hybridized westslope cutthroat trout in the watershed. May (2009) found westslope cutthroat trout in Copper Gulch to be mostly genetically pure, while FWP (FWP 2014c) surveys of Copper Gulch completed during 2012 identified brook trout, brown trout, and westslope cutthroat trout-rainbow trout hybrids in the lower reach near the mouth and non-hybridized westslope cutthroat trout near RM 1.7 (Kline Environmental Research 2012). Cutthroat trout were abundant near the upper end of the perennial reach and were the only salmonid captured (Montana FWP, reported in Kline and Savor 2012). Bull trout were considered to have been historically present (Pratt and Huston 1993) but were thought to be absent (KNF 2013). During a September 25, 2016, snorkeling survey of four reaches of Copper Gulch, however, Kline Environmental Research (2016) positively identified five trout species: rainbow trout, brook trout, brown trout, westslope cutthroat trout, and bull trout. Bull trout sightings were restricted to the two upper survey reaches that coincided with improved habitat conditions relative to the two downstream reaches and occurred in low gradient riffle, run, and scour pool habitats.

The remainder of this section on Copper Gulch was taken from Land and Water Consulting (2001), as reported in KNF (2013):

Channel stability in the lower reach has been negatively impacted by extensive stream channelization and subsequent channel maintenance. For flood control purposes, the reach was bermed and confined to the crest of the alluvial fan in 1972, causing the

channel to dewater during low flow periods and aggrade approximately 2 to 4 feet above the historic floodplain. The lower private bridge crossing was negatively impacting flow conveyance and sediment transport by restricting flow during spring runoff. The existing bridge encroached on the channel and prevented the unimpeded transport of water, sediment, debris and ice during peak flows.

Suitable spawning, rearing, and overwintering habitat was limited and in poor condition. Factors affecting fish habitat included stream channelization, riparian alteration, channel clearing, and the high gradient nature of the drainage. In general, stream habitat consisted of shallow, riffle dominated habitat types due to a lack of pool-forming structures such as large woody debris. Unstable bedload accumulations prevented distribution of suitable spawning gravel. Suitable spawning substrates may occur in the lower reach upstream of the confluence with Bull River; however, this area is subject to seasonally intermittent flows that make upper reaches unavailable to fall spawners.

The next surveyed reach extended upstream approximately 0.8 miles to where the stream channel dewatered. There were moderate amounts of large woody debris and relatively functional riparian areas. The reach was classified as Rosgen type B3, characterized by moderate slopes, step-pool bedform features, and moderate entrenchment ratios. Bank erosion potential was rated low to moderate in areas of past riparian logging. Riffles were dominant and pools were deeper than in the downstream reach. Substrate was dominated by cobble and large gravel and had low amounts of suitable size spawning gravels. Fish were observed throughout the reach.

The upper reach was characterized as a high-energy system with moderate amounts of large woody debris, and considerable amounts of bedload accumulations. The reach was more stable and complex than the lower reach. Spawning habitat was limited to gravel accumulations behind obstructions. Adequate rearing and overwintering habitat was available in the form of deep, low velocity areas of the channel and substrate interstices. A mid-summer water temperature of 5.5°C was recorded.

4.3 Cabinet Gorge Reservoir

Detailed information on the status and distribution of bull trout in the Cabinet Gorge Reservoir, including the operations of Avista hydroelectric projects and the Avista Clark Fork Settlement Agreement, is provided in the Draft SEIS (USFS 2016, Section 3.11.6). A baseline table was not prepared for Cabinet Gorge Reservoir because most of the baseline indicators are not applicable to reservoirs.

Monitoring of fish abundance in Cabinet Gorge Reservoir using a variety of sampling methods has occurred sporadically since its creation in 1952. An extensive fish sampling program was completed by Avista in 1994 to 1995 as part of their FERC relicensing. Additional studies using standardized gill nets have been completed since 2000 within Cabinet Gorge Reservoir for interannual comparisons. The results of gill net studies from 2000 through 2006 within Cabinet Gorge Reservoir were summarized by Hanson and Tholl (2007). Throughout the 5-year gill net study (no gill netting occurred in 2001 or 2004), a total of 1,482 individual fish representing 18 species were documented. The most abundant species captured was the northern pikeminnow followed by yellow perch (*Perca flavescens*) and peamouth chub (*Mylocheilus caurinus*). By comparison, during the sampling completed in 1994 to 1995, redbreast shiner (*Richardsonius balteatus*) was the most abundant species followed by northern pikeminnow and yellow perch (WWP 1996).

As described in the Draft SEIS (USFS 2016), far fewer fish were caught collectively during Avista's gill netting study conducted between 2000 and 2006 than in 1994 and 1995. Five bull trout were collected during 1994 and 1995 and no bull trout were collected between 2000 and 2006; however, bull trout captures were intentionally avoided during the 2000 to 2006 surveys due to their threatened species status.

Fish survey work completed in Cabinet Gorge Reservoir by FWP in May 2002 collected a total of eight bull trout using a variety of methods including angling (one), boat shocking (four), and electrofishing (three). Electrofishing surveys conducted later that year collected an additional single bull trout in June and another four bull trout in July. Two bull trout were also collected in a trap net in October 2002 and another two were collected during an April 2007 electrofishing survey. Based on these surveys, FWP's (2014d) overall assessment of bull trout distribution in Cabinet Gorge Reservoir is that they are relatively rare. Bull trout that do occur in the reservoir are considered native in origin. Genetic analysis indicates that both pure and hybridized individuals occur in the system.

Avista gill netting surveys in Cabinet Gorge Reservoir have revealed changes in non-native species abundance and composition since monitoring began in 2000 (Hanson and Tholl 2007; Tholl and Horn 2008, 2009; FWP 2014d). Walleye were initially observed in Cabinet Gorge Reservoir during 2005 and have been collected consistently in subsequent years (see Draft SEIS, Table 3-43; USFS 2016). The number of northern pike captured during gill net sampling increased between 2000 and 2005, although the number of northern pike collected has decreased slightly since the 2005 peak. In addition to walleye and northern pike, non-native smallmouth bass, largemouth bass, and brown trout are known to feed on native salmonids, representing a threat to bull trout and westslope cutthroat trout foraging in Cabinet Gorge Reservoir or out-migrating from tributaries.

4.4 Climate Change and Effects in the Pacific Northwest

The 2007 Final BO (USFWS 2007) did not address ongoing or future climate change. The USFS issued the Kootenai and Idaho Panhandle Plan Revision Zone Climate Change Report in 2010 (USFS 2010) and the U.S. Department of the Interior, Bureau of Reclamation (Reclamation) issued three reports on climate change in 2011 (Reclamation 2011a, 2011b, 2011c). Information is summarized in the following sections.

For the Columbia River Basin in general, overall warming is expected to diminish the accumulation of snow during the cool season (i.e., late autumn through spring) and the availability of snowmelt to sustain runoff during the warm season (i.e., late spring through early autumn). Increased rainfall in December through March is expected to increase runoff during those months and potentially increase rain-on-snow events. Decreased snowpack volume could result in decreased groundwater infiltration, decreased spring/summer runoff, and ultimately decreased contribution to baseflow in streams (USFS 2010; Reclamation 2011c). Variation in annual air temperatures also is projected to increase slightly through time, which may increase water temperatures (Reclamation 2011c). Modeling conducted using the USFS's NorWeST project climate scenarios (www.fs.fed.us/rm/boise/AWAE/projects/NorWeST.html) indicated that stream temperatures in August could increase by approximately 3.6 °F over baseline conditions in the Pacific Northwest within about 60 years (NorWeST). Stream temperatures in some headwater and tributary reaches would remain less than the 52 °F temperature established as the cold water criterion for native trout occupancy.

Changes in temperature and precipitation have occurred in the Pacific Northwest and are likely to continue to occur in the future (Reclamation 2011a). Weather data from the western United States have generally demonstrated a warming pattern, with the most consistent trends in streamflows observed being lower summer flows and shifts in the timing of spring runoff (Reclamation 2011c; Isaak et al. 2012). Precipitation is projected to remain relatively static during the early 21st century and then slightly increase during the last half of the 21st century (Reclamation 2011a).

Climate change in the Pacific Northwest has the potential to impact aquatic resources through rising stream temperatures, altered streamflows, decreased snowpack, shifts in the timing of the runoff period, increased wildfire disturbance, and increased frequency of heavy precipitation events, including rain-on-snow events (USGCRP 2009; Herbst and Cooper 2010; USFS 2010; Wenger et al. 2011; Reclamation 2011c; Isaak et al. 2012). Much of the predicted effect on aquatic life is attributed to increased air temperatures that may result in increased stream and lake temperatures (Reclamation 2011c; Wenger et al. 2011).

Warmer stream temperatures and changes in flow regimes could directly affect some cold water fish species in the Columbia River Basin, including bull trout, cutthroat trout, and other salmonids, by

contracting and shifting the range of habitat suitable for such fish and increasing the risk of egg scour (Mantua et al. 2009; Warren et al. 2009; Reclamation 2011c). Isaak et al. (2015) used the NorWeST database to delineate the expected occurrence of cold water stream habitats that could serve as climate refugia for bull trout and cutthroat trout in the Northern Rocky Mountains in the future under both moderate and extreme climate change scenarios. Analysis results suggested some climate refugia would persist for both species, but the stream length of suitable cold water habitat for cutthroat trout and bull trout in summer could decrease from 33% to 61% in these two scenarios relative to baseline conditions.

Effects on macroinvertebrate assemblages from climate change have been documented but are not always consistent. Observed responses of these communities are often specific to species, taxa with certain traits, or those that inhabit certain areas within the stream (Burgmer et al. 2007; Chessman 2009; Lawrence et al. 2010; Poff et al. 2010; Domisch et al. 2011; Sheldon 2012). Domisch et al. (2011) modeled impacts of climate change on almost 40 macroinvertebrate species, and predicted that significant declines in the abundance and distributions could be particularly noticeable for species that inhabit headwater reaches, which are often dominated by taxa that favor colder stream temperatures and faster flowing water.

The Intergovernmental Panel on Climate Change (2007) determined that changes in temperature and precipitation have occurred in northwest Montana and are likely to continue to occur in the future. Weather data from the western United States have generally demonstrated a warming pattern, with the most consistent trends in streamflows observed being lower summer flows and shifts in the timing of spring runoff (Isaak et al. 2012). Within regions and across species, the effects of these trends are anticipated to differ among streams and populations (USFS 2010). Additionally, many studies have not been conducted over sufficient periods or diverse locations to determine the outcome of small incremental changes on fish and invertebrate populations, and the complex responses of aquatic organisms to such changes is further confounded by changes in land use (Barbour et al. 2010; USFS 2010; Isaak et al. 2012). Predictions of the loss of trout habitat associated with climate change in the studies discussed ranged from 18% to 92% over a range of locations, and the hydrological models used for such predictions were noted to be limited in terms of fine-scale resolution and the ability to account for all possible factors (Rieman et al. 2007; Wenger et al. 2011; Isaak et al. 2015). Based on these limitations, the magnitude and extent of the effects of climatic and hydrologic trends on fish and other aquatic organisms and their habitat are unclear (USFS 2010).

4.4.1 Effects of Climate Change on Bull Trout

Much of the predicted effect from climate change on aquatic life is attributed to increased air temperatures that may result in increased stream and lake temperatures (Reclamation 2011c). This, coupled with decreased summer flows due to a decrease in snowpack, has the potential to cause a substantial increase in stream water temperatures. Modeling conducted using the USFS's NorWeST

project climate scenarios (www.fs.fed.us/rm/boise/AWAE/projects/NorWeST.html) indicated that stream temperatures could increase by approximately 3.6 °F over baseline conditions in the Pacific Northwest within about 60 years (NorWeST 2016). Further analysis and modeling conducted by Isaak et al. (2016) using the NorWeST database projects stream temperatures to warm by approximately 0.72 to 1.13 °F over baseline conditions in the Pacific Northwest within about 60 years.

Bull trout may be particularly susceptible to changes in stream temperatures resulting from climate change because they have lower optimal temperatures than other salmonids in the study area, and their spawning and early rearing areas appear to be limited by temperature constraints (Rieman et al. 2007). Climate change may increase winter flows and result in earlier runoff. Because bull trout spawn in the fall, increased winter flows could increase the risk of eggs being scoured from their nests or newly emerged fry washing downstream (USGCRP 2009; Shellberg et al. 2010; Reclamation 2011c; Wenger et al. 2011; Isaak et al. 2012). Climate change could also increase fragmentation of the available habitat that is thermally suitable for bull trout (Rieman et al. 2007).

Rieman et al. (2007) developed a model based on current bull trout distribution, mean annual air temperatures, latitude, longitude, and elevation to predict the effects of climate change on bull trout in the interior Columbia River Basin in the United States. Based on their model, Rieman et al. (2007) predicted that climate warming could result in an 18% to 92% loss of thermally suitable habitat for small (less than 150 mm long) bull trout. Rieman et al. (2007) acknowledged the uncertainty and limited resolution of their analysis and that local effects could confound their results. They cautioned against directly extrapolating their results for management of bull trout populations or habitats within individual sub-basins without consideration of the local effects. In examining broad patterns and comparing relative effects of habitat loss and fragmentation, Rieman et al. (2007) concluded that climate change is and will be a “first-order determinant” in bull trout distribution. Isaak et al. (2015) used the NorWeST database to delineate the expected occurrence of cold water stream habitats that could serve as climate refugia for bull trout in the Northern Rocky Mountains in the future under both moderate and extreme climate change scenarios. Analysis results suggested some climate refugia would persist, but the stream length of suitable cold water habitat for bull trout in summer could decrease from 33% to 61% in these two scenarios relative to baseline conditions.

4.4.2 Effects of Climate Change in the Project Area

Summer stream temperatures within the study area were modeled using data from the NorWeST database (www.fs.fed.us/rm/boise/AWAE/projects/NorWeST.html) to determine the expected extent and location of cold water habitat for bull trout in the year 2080 under an extreme climate change scenario similar to the analysis included in Isaak et al. (2015). Comparison of baseline conditions from 1993 through 2011 to the conditions projected to occur by 2080 suggested that the length of stream providing appropriate cold water habitat for bull trout could decrease in the Action Area. Based on the modeled predictions, stream temperatures in some headwater and tributary reaches in 2080

would remain less than the 52 °F temperature established as the cold water criterion for native trout occupancy in Isaak et al. (2015). Of note, this analysis accounted only for changes in stream temperature expected to occur in summer, specifically in August, due to the limited data available for other seasons, and the analysis did not evaluate other aspects of the habitat other than temperature that are necessary to support bull trout populations. Additionally, as noted in Isaak et al. (2015), significant uncertainty exists in the timing and magnitude of possible future changes.

In fact, streams in the Action Area might be highly resistant to temperature increases based on Isaak et al. (2016):

The imminent demise of montane species is a recurrent theme in the climate change literature, particularly for aquatic species that are constrained to networks and elevational rather than latitudinal retreat as temperatures increase. Predictions of widespread species losses, however, have yet to be fulfilled despite decades of climate change, suggesting that trends are much weaker than anticipated and may be too subtle for detection given the widespread use of sparse water temperature datasets or imprecise surrogates like elevation and air temperature. Through application of large water-temperature databases evaluated for sensitivity to historical air-temperature variability and computationally interpolated to provide high-resolution thermal habitat information for a 222,000-km network, we estimate a less dire thermal plight for cold-water species within mountains of the northwestern United States. Stream warming rates and climate velocities were both relatively low for 1968–2011 (average warming rate = 0.101 °C/decade; median velocity = 1.07 km/decade) when air temperatures warmed at 0.21 °C/decade. Many cold-water vertebrate species occurred in a subset of the network characterized by low climate velocities, and three native species of conservation concern occurred in extremely cold, slow velocity environments (0.33–0.48 km/decade). Examination of aggressive warming scenarios indicated that although network climate velocities could increase, they remain low in headwaters because of strong local temperature gradients associated with topographic controls. Better information about changing hydrology and disturbance regimes is needed to complement these results, but rather than being climatic cul-de-sacs, many mountain streams appear poised to be redoubts for cold-water biodiversity this century.

5 Effects of the Action

“Effects of the action” refers to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action that will be added to the environmental baseline. Direct effects are considered immediate effects of the project actions on the species or its habitat, at any point during the project. Indirect effects are those caused by the project actions that may occur later in time than the immediate action, but are still reasonably certain to occur. Interrelated actions are those that are part of a larger action but depend upon the project actions for their justification. Interdependent actions are those that have no independent utility apart from the action under consultation (2007 Final BO; B-65).

5.1 General Effects of Mining Operations

The 2007 Final BO (USFWS 2007, p. B-67) addresses the general effects of mining; nothing has changed since its publication.

5.2 Specific Effects of the Rock Creek Mine Project

The specific effects that could potentially impact bull trout and bull trout critical habitat are addressed by extensive monitoring and mitigation (USFS 2016, Appendix K). The 2007 Final BO (USFWS 2007) addresses stream temperature and groundwater influence, sedimentation, large woody debris, water quality/chemical contamination, and catastrophic failure. Nothing has changed since its publication on these topics with the exception of additional groundwater modeling (Hydrometrics 2014) and associated reviews. The range of groundwater inflows to the mine predicted in Hydrometrics (2014) was 4 to 9 times less than the amount consulted on in the 2007 Final BO. A summary of analyses and monitoring relating to groundwater and surface water quantity addressed in the 2007 Final BO and subsequently is provided below.

5.2.1 Groundwater and Surface Water Quantity

As described in the 2007 Final BO (USFWS 2007), the proposed mining activities may intercept sources of groundwater that enter into Rock Creek through springs and seeps located in or adjacent to streambanks or in-channel areas. Because bedrock groundwater contributes to streamflow, baseflow may be impacted by groundwater drawdown. Changes in baseflow may directly affect the amount of aquatic habitat available to bull trout at different life stages (Al-Chokhachy et al. 2010). These inputs of cold water are important in maintaining stream temperatures and instream flows for bull trout in Rock Creek, especially baseflows during seasonal low-flow periods such as late summer and early fall. In the 2007 Final BO, the USFWS noted that changes to the downgradient groundwater system for Rock Creek may occur as a result of the mine’s dewatering and drainage operations.

The proposed mitigation that would minimize these possible effects (i.e., 1,000-foot buffer zones around Cliff Lake and Moran Basin, and grouting) is based on extensive input from KNF, USFWS, the Environmental Protection Agency (EPA), Montana FWP, and MDEQ. Monitoring to identify possible effects to stream temperature and flow is documented in the conceptual monitoring plan in the Draft SEIS, as described in Section 5.2.1.1. The 2007 Final BO (USFWS 2007) noted that incidental take of bull trout is not anticipated at this time; however, due to the uncertainty of the mitigation effectiveness, it is reasonable to assert that, over the long term, new information from monitoring water quality and quantity may reveal an increase in the risk of incidental take to bull trout due to changes in stream temperature and instream flows that result from influence of the mine's activities on the groundwater system that sustains Rock Creek. To address this data need, intensive long-term monitoring of stream temperatures and seasonal instream flows is being conducted to detect mining-induced changes in the groundwater system that may elevate the risk of incidental take to Rock Creek bull trout. The draft Water Resources Monitoring Plan Appendix K of the Draft SEIS (USFS 2016) is designed to provide long-term monitoring data sufficient to characterize pre-mining hydrologic and water quality conditions; quantify any measurable impacts during the construction, operation, or reclamation of the project; and provide information to determine required mitigation measures, if needed.

As stated in the Draft SEIS (USFS 2016):

The Agencies developed mitigation to protect surface water and groundwater and related resources (aquatic resources) and address the uncertainty in the 3D groundwater model predictions because of incomplete or unavailable information. More information would not change the mitigation measures that would be implemented to minimize impacts. The mitigation includes maintaining a mining buffer (no mining zone) 1,000 feet around Cliff Lake and the north and south ore outcrop zones; a 100-foot buffer on either side of the Copper Lake Fault, the Moran Fault, and other faults intersecting the ore zone; and a 450-foot vertical buffer between the mine workings and the surface. Additional groundwater information is not needed to know that such mitigations would reduce effects on groundwater and effects on stream flows overlying the mine void nor would additional information change the type of mitigation. The analysis provided by the 3D groundwater model, along with the required mitigation measures, provided the basis for a reasoned choice among alternatives and for evaluating the reasonably foreseeable significant adverse effects on surface water and groundwater.

Data are not yet available to fully characterize how effective the mitigation would be regarding groundwater drawdown, groundwater levels, seep discharge, and stream flow. The proposed monitoring program includes baseline characterization and ongoing data collection through the life

of the project. Phase I exploration adit monitoring data will be used to calibrate the 3D groundwater model to improve the ability to make predictions of changes to instream flow and temperature. The additional data collected during Phase I will also allow mitigation measures to be evaluated with greater certainty.

The remainder of this section summarizes specific effects on groundwater and surface water quantity, as reported in the Draft SEIS (USFS 2016). Section 5.2.1.1 describes the analysis approach used by the USFWS (2007) to ensure that the effects on groundwater and surface water quantity are accurately modeled and monitored. Section 5.2.1.2 describes the Hydrometrics' 3D groundwater model and summarizes the third-party review of the model. Section 5.2.1.3 describes updates to water resources monitoring plans, including the Rock Creek Mine Field Investigation (Morrison Maierle 2016), timing of monitoring, and clarification of contingency action plans.

5.2.1.1 USFWS (2007) BO Groundwater Evaluation

The effects of the action analyzed in the BO included "the loss of groundwater recharge and upwellings resulting from the removal and discharge of between 1,700 and 2,046 gallons per minute (gpm) during mining operations for the life of the mining operations and possibly after mine closure." Because of the uncertainty in predicting the effects of mine inflows, however, the BO indicated:

The loss of groundwater and resulting effect on stream temperature, if any, is difficult to predict. Therefore, close stream temperature monitoring will be needed and has been proposed as a project component in order to detect any mining induced changes in the groundwater system in terms of water quantity, water temperature, and water chemistry budgets in Rock Creek.

The BO also assesses the effect of lower groundwater levels, described in the BO as "groundwater drainage stress." The BO stated "monitoring subsurface hydraulic conditions would allow early detection of possible mining impacts and grouting of groundwater inflows to the mine. The Corrective Action Plan would identify measures to be taken should monitoring identify possible water resources issues. Hydrogeologic information collected during evaluation adit construction would be used to develop these measures and evaluate their effectiveness."

RCR will develop final monitoring and mitigation plans prior to project startup. The plans would be reviewed and refined by KNF and the USFWS. The USFWS will participate as an advisor as needed on issues related to water use, fishery monitoring plans, sediment abatement plans and monitoring, and groundwater monitoring. Re-initiation of consultation with the USFWS may be necessary if monitoring data indicated changes in risks to bull trout described in the 2007 BO Supplement. All plans are to identify action levels, which would require RCR to implement a corrective action plan.

Corrective action plans for the most likely scenarios would need to be developed and approved prior to project startup (Section 1.9.1, Appendix K, USFS 2016).

Because of the uncertainty in predicting the effects of mine inflows, the 2007 Final BO (USFWS 2007) indicated:

Buffer zones are assumed effective in reducing the impact to overlying lakes and down gradient streams, but mine related effects to groundwater flow and chemistry are very difficult to predict reliably. The case studies of other mines presented by Gurrieri (2001) provide evidence of the unpredictable nature of groundwater flow in fractured rocks. In this instance, the Troy mine serves as a close analog to predict impacts from mining because of its similar location, climate, geology, and structure (Gurrieri 2001). Disruptions of surrounding surface water bodies has not been documented, but lakes or perennial streams do not directly overlie the Troy mine and intensive monitoring has not been conducted. Gurrieri (2001) concludes the likelihood of impact would be reduced to low for both lakes given the proposed mitigation.

As noted in KNF (2014), the range of groundwater inflows reported in the current assessment were 4 to 9 times less than those evaluated in the 2007 Final BO (USFWS 2007). As a result, the possible adverse effects, based on these preliminary models, would be less than reported in the 2007 Final BO.

KNF (2014) states:

The groundwater modeling completed for Rock Creek SEIS does not constitute new information but rather corroborates the previous effects analyses which were based on the assumption there would be groundwater interception associated with the mine. The modeling assessment provided a range that reflects the sensitivity of the input parameters and the uncertainty of the analysis. The range of groundwater inflows of 230 to 480 gpm predicted in the current assessment was 4 to 9 times less than the 1,700 and 2,046 gpm consulted on in the Final BO [Note: Table 2-5 in the Draft SEIS (USFS 2016) states total mine and adit water inflow during production and operations ranges from 299 to 531 gpm]. The modeling also simulated various mitigations included in the 2001 FEIS and Final BO, such as mining buffer zones, grouting and adit plugging. The modeling reinforces the Rock Creek Final BO, which considered the higher inflow rates in the consultation.

Although the groundwater model may be used to estimate total mine inflows, it is not suitable for assessing changes in stream flow at the sub-basin scale. The 3D groundwater model would be

refined and rerun after data from the Phase I evaluation were incorporated into the model (see the Water Resources Monitoring Plan in Appendix K (USFS 2016).

5.2.1.2 New 3D Groundwater Model and Assumptions

The Draft SEIS (USFS 2016; Section 4.7.3.1) describes the hydrogeological conditions and analysis of groundwater quantity. The model applied bulk hydraulic conductivity assumptions consistent with the range of the conceptual site model (Hydrometrics 2014).

Sub-basin Level Analysis. For the sub-basin level analysis, KNF used a qualitative approach to assess the possible impacts to surface flows from changes that could result from groundwater interception by the proposed mine. The rationale for a qualitative approach at the sub-basin level and not a quantitative assessment is based on model limitations and uncertainty at the sub-basin level that were identified in Hydrometrics' Groundwater Modeling Assessment for the Rock Creek Project (Hydrometrics 2014) and acknowledged by the model's reviewers, an independent third-party (Martin 2014).

At the sub-basin level, possible changes to headwater stream flow are not currently quantifiable given the significant uncertainty associated with the model assumptions. There is a need for more data to help calibrate the model but those data will only be available after Phase I of the project is completed and an evaluation adit is driven to access the ore deposit.

Since an evaluation adit (Phase I) has not yet been completed for the Rock Creek Project, the available information is not sufficient to develop a more quantitative modeling assessment. The data needed to advance the model to allow reliable quantitative estimates at the sub-basin level of analysis are described by Hydrometrics (2014) as follows:

Collection of additional data requires site specific testing that is planned to be completed during the Phase I Evaluation Adit development, which would allow RCR to significantly refine the analysis and further evaluate where mitigation measures may be warranted. RCR has indicated its commitment to do detailed hydrogeological characterization and testing during development of the Phase I Evaluation Adit.

The following are specific recommendations for data collection and testing based on data needs identified in the modeling analysis.

Bedrock Permeability – The assumptions used in the model for the bulk permeability of the bedrock greatly influence the predicted mine inflow rates and the potential effects on outlying streams. Since there is effectively no site specific hydraulic test data from the mine area, testing of hydraulic conductivity of the bedrock should be conducted at regular intervals as the adit is advanced. Hydraulic conductivity of the bedrock should be evaluated by conducting injection or discharge tests at drill holes completed into the

bedrock from the Evaluation Adit. Ideally, testing would be conducted along the full length of the adit and would include injection tests on shallower unsaturated sections of the adit to document the bedrock permeability at these shallower depths.

Pressure Head – The hydraulic heads over the adit and ore body are currently unknown and will directly influence mine water inflow rates. The hydraulic head also provides information on the relationship between groundwater at the workings and adjacent surface water bodies. For example, head data from fracture systems in the Copper Lake Fault near Cliff Lake will help establish whether there is potential for a direct hydrologic connection between these two systems. Together with hydraulic conductivity data, changes in head over the workings can be used to infer seasonal and average annual recharge rates. The rate of change in hydraulic head in the groundwater system over time in response to adit development can also provide a more definitive basis for calibration of the transient response of the groundwater model.

Pressure head data should be collected by installing packers in the drill holes completed along the length of the adit that exhibit saturated conditions, and then instrumenting the holes with pressure transducer/recorders. The transducer/recorders should be installed as the adit is advanced to document the response of the groundwater system to adit dewatering over time.

Mine Water Inflows – Detailed records should be kept of mine water inflows since these data can be used in conjunction with hydraulic head data to cross calculate bulk permeability of the bedrock, estimate recharge rates and document seasonal variations in mine water inflows. As observed at the Troy Mine, this aspect of the hydrologic system will likely be informative in determining the magnitude and rate of recovery.

Storativity – Extended discharge tests should be conducted on two to three of the instrumented drill hole sites with monitoring at adjacent locations to evaluate aquifer storativity. The length of the test should be determined based on initial hydraulic conductivity estimates and the distance to adjacent monitoring sites. Porosity/storativity values will help refine the model's predicted transient response to pumping.

Mine Water Chemistry – Samples of mine water should be collected as the evaluation adit is advanced to document water chemistry. Samples of “undisturbed” water should be collected from extended discharge tests at instrumented drill holes off the evaluation adit. Analytical parameters should include major ions, metals and isotopes for comparison to water chemistry in surrounding surface waters. These data may help

infer relative contributions of groundwater from the deeper bedrock system to adjacent surface waters.

Fault Zone Characterization – Test holes should be drilled through the Copper Lake Fault Zone and instrumented and tested as described for the evaluation adit test holes to document extent of fracturing, and establish permeability, head and storativity characteristics. Water quality samples should be collected for major ions, metals and isotopes.

Supplemental Stream Monitoring – More detailed investigations should be conducted in Copper Gulch and South Basin in conjunction with groundwater monitoring during Phase I Evaluation Adit investigations to assess the extent to which base flow conditions in these drainages are hydrologically related to conditions in the deeper groundwater system; or, whether they are dependent upon discrete saturated fault and fracture networks not related to a regional water table. Investigations should include late season (September-October) synoptic stream gaging and water quality sampling, in conjunction with groundwater monitoring and sampling in the deeper bedrock system during Phase I Evaluation Adit investigations to assess the relative contribution of flow from deeper bedrock aquifers versus shallower flow systems.

These data would greatly improve the technical foundation for conducting future modeling analysis and would provide a more meaningful basis for validating the potential for effects from the proposed mine.

The Phase I monitoring activities to help generate these data are described in Section 5.2.1.3.

Basin-level Analysis. KNF (USFS 2016) used the Rock Creek groundwater model to quantify and describe possible changes in baseflow at the basin or watershed level. As described previously, the model is not yet calibrated with site-specific hydrologic data for the Rock Creek Project pending development of the Phase I exploration adit. However, the model outputs were calibrated at the basin scale with measured water flow data for streams in the lower basin and the model can be adjusted accordingly. Overall, the peer-review corroboration of the 3D groundwater model and the correspondence with existing project area stream flow data provides a reasonable level of confidence in using the modeled results as part of a quantitative analysis at the basin or watershed level.

The possible reductions in stream baseflow from the project are shown in Table 7 and were estimated using the Rock Creek 3D groundwater model (Hydrometrics 2014). The model showed that the maximum possible drawdown, and therefore maximum effects, could occur in Year 70. During the period of maximum drawdown, the project could possibly reduce baseflow in Rock Creek above the confluence with Clark Fork River by 5.7%. The possible baseflow reduction at the mouth of

East Fork Bull River above the confluence with Bull River is 4.0%. The possible baseflow reduction at the mouth of Bull River above the confluence with Clark Fork River is 0.7%.

5.2.1.2.1 Independent Review of Rock Creek 3D Groundwater Model

Independent reviews of the Rock Creek 3D groundwater model (Hydrometrics 2014) were completed by AquaResource (Martin 2014) and the U.S. Environmental Protection Agency (Pierce 2014).

Review of Hydrometrics' Groundwater Modeling Assessment (AquaResource 2014)

AquaResource (2014) indicated the numerical modeling tools developed and used by Hydrometrics were state-of-the-practice and appropriately represented the conceptual understanding of the mine area hydrology. AquaResource found the evaluation to be thorough and that it appropriately evaluated impacts throughout the groundwater flow system, the effect on surface water features, and the effectiveness of possible mitigation measures. The AquaResource review also included discussion of various model uncertainties. Two in particular are relevant to the effects analysis on bull trout: baseflow changes along streams and the uncertainty analysis for mitigation scenarios. The following is a quote from the AquaResource review memorandum:

Baseflow Changes along Streams. The report states that the model should be viewed as qualitative and that 'quantifying stream depletion is beyond the capabilities of this model (p 4-16).' The tables in Appendix B [of the 3D model report (Hydrometrics 2014)] provide data for headwater stream segments within the Cabinet Mountain Wilderness boundary, and this [sic] data, if taken out of context, could be misleading. It is expected that the difference between [3D model] simulations is appropriate (this is where models are most reliable), but that the absolute value of discharge is uncertain, because of the scale of those features and the absence of field data for use in model calibration.

It is expected that future field work will include collection of appropriate data to refine the understanding of existing field conditions and lead to more reliable predictions in the future.

Uncertainty Analysis for Mitigation Scenarios. The report does not provide an uncertainty analysis for mitigation scenarios, including those representing set-backs/grouting to mitigate interaction with faults or plugging designed to return the [hydrologic] system to pre-development distributions of flows through the area.

An uncertainty analysis is not required at this point; however, it is expected that by the time such measures would be required, additional data would be in place to refine and better constrain the analysis, such that appropriate mitigation measures can be designed.

EPA review of Hydrometrics' Groundwater Modeling Assessment (Pierce 2014)

In its capacity as a cooperating agency on the Draft SEIS, the EPA reviewed the draft and final model reports and participated in several meetings and conference calls with KNF and Hydrometrics during model development. EPA provided comments on the final model report (Pierce 2014). The following is a quote from EPA's review email:

Need for additional data. The current data and modeling limitations emphasize the importance of the data collection planned during Phase 1 and subsequent re-run of the model. As the report notes, the model is significantly constrained by a lack of sufficient input data, hindering its predictive ability. This limitation is particularly true for assessments at a local (i.e., sub-watershed) scale, which is of interest due to potential impacts to baseflows in the upper portions of Rock Creek and Bull River watersheds. For example, the report contains no predictions for effects to headwaters due to a lack of data and information regarding their water source. The current model results only provide a qualitative assessment of how the hydrologic system may respond to mining activities. This constraint is readily acknowledged by the report authors. Data obtained during Phase I will be critical to refine the current model and its inputs, improve the model's ability to assess long-term hydrologic conditions and better quantify impacts.

Need for re-evaluation of mitigation and management measures. Once sufficient input data enables the model to derive a more quantitative assessment of potential changes to the hydrologic system and associated impacts, it will be important to evaluate mitigation or management options to offset any impacts. Accordingly and as we have previously mentioned, we recommend re-evaluation of the project mitigation and management measures once improved data and information are available. Some of those measures, such as plugging the mine after closure, could be evaluated with the model itself. Other measures, such as those of a compensatory nature, may not be evaluated directly with the model.

The EPA also included recommendations for data collection and project mitigation and management measures that were incorporated into Appendix K of the Draft SEIS (USFS 2016).

5.2.1.3 Updates to Water Resources Monitoring Plans

This section describes the current monitoring program, timing of monitoring, and clarification of contingency action plans that have been modified since the 2007 Final BO (USFWS 2007). The majority of this information was provided in the Draft SEIS Water Resources Monitoring Plan (USFS 2016, Appendix K), which contains KNF and Montana DEQ conceptual monitoring plans for Alternative V.

As described in detail in the Draft SEIS (USFS 2016, Appendix K) baseline streamflow monitoring is required prior to the initiation of evaluation adit construction in the area where surface water or groundwater may be affected by Phase I construction and operations. Monitoring is ongoing and includes previously monitored sites; sites that might be impacted by construction and mining activities; streams, springs, and seeps near the ore body that were added based on the 3D groundwater model results and area surveys; and a benchmark stream site. At these surface water sites, monitoring for flow and water quality, including storm flows, is ongoing. Streamflow monitoring will continue during all mining periods and after mine closure. Ongoing monitoring data will also allow for evaluation of seasonal trends. As described in Appendix K (USFS 2016), investigations are being performed to determine if and where streams are connected to the regional groundwater system. The 3D groundwater model will be refined and rerun after data from Phase I Evaluation are incorporated into the model. Following additional data collection and modeling, the possible impacts on surface water resources in the study area may change and the model uncertainty would decrease.

The Rock Creek Mine Field Investigation within the Phase 1 GDE inventory boundary identified in the Draft SEIS was completed in August 2016 (Morrison Maierle 2016) and is summarized in Section 4.5.

As stated in Section 1.6 of Appendix K of the Draft SEIS (USFS 2016):

The water resources monitoring program would begin during Phase I implementation at least 1 year prior to evaluation adit dewatering in the area near the evaluation portal pad and in the area near the infiltration ponds where surface water or groundwater may be affected by Phase I construction and operations (Figure K-3); this does not include monitoring for the upgrade work completed by RCR on NFS Roads 150 and 2741, which is covered in MPDES permit MT0031763. Phase II water resources monitoring would begin during the first year of Phase I construction and would occur for several years prior to the initiation of Phase II construction in the Rock Creek, East Fork Bull River, Bull River, Miller Gulch, and Clark Fork River watersheds where surface water or groundwater may be affected by Phase II construction and operations.

Monitoring would continue through the life of the project as well as after reclamation for a period to be specified by the Agencies. RCR and its predecessors have collected and reported ambient surface and groundwater quantity and quality data within the study area (Hydrometrics 2015; Morrison Maierle 2016), as described in the following sections. These data sources are the only two described because they represent information collected after the 2007 Final BO (USFWS 2007). Substantial baseline data had been collected on surface and groundwater prior to 2007 and were used to support agency decisions.

5.2.1.3.1 RCR's 2015 Monitoring Report and 2016 Rock Creek Mine Field Investigation
As part of the Aquatics and Fisheries Mitigation Plan implemented to address terms and conditions of the 2007 Final BO (USFWS 2007, Appendix E), RCR was required to conduct a watershed assessment to better define bull trout populations and better define habitat conditions. In 2012, Salmon Environmental (2012) prepared the Rock Creek Fisheries and Aquatic Habitat Assessment Supplement that incorporated data collected in the Rock Creek watershed since 1997. The Draft SEIS (USFS 2016) states that the Salmon Environmental Services (2012) reports meet the intent of the terms and conditions of the Final 2007 BO for the watershed analysis.

New data are available from the ongoing monitoring program that update the information on surface water hydrology and habitat from the Draft SEIS (USFS 2016). Hydrometrics (2015) presents the baseline water quality data conducted in 2015 for areas adjacent to the Rock Creek Project. The 2015 data support the continuing collection of hydrologic data to document baseline conditions, and for this year, provide a valuable record during a year of low precipitation. Hydrometrics (2015) also documents the baseline stormwater data collected to meet the conditions of the Montana DEQ stormwater permit.

The work performed by Hydrometrics (2015) occurred in September 2015 and includes spring and seep inventory work, groundwater monitoring, and stream flow estimates. Work reported by Hydrometrics (2015) that is relevant to bull trout habitat includes the streamflow observations and the supporting aquatic habitat survey conducted by Salmon Environmental Services (2015) in October 2015, which documented channel habitat conditions at nine stations in Rock Creek and one station each in the lower reaches of the East Fork and West Fork of Rock Creek for a total of 11 sites.

2015 was a drought year and the sections of naturally dry channel were more extensive than observed in early aquatic habitat surveys conducted during the last week of October 2011 and the third week of August 2012 (Salmon Environmental Services 2015). The lower three sites on Rock Creek were dry or had flow that was too low to provide passage or habitat. Site 4 on the mainstem of Rock Creek was dry above the confluence with Engle Creek. Below the confluence, all flow was from Engle Creek and beaver pond storage. At Site 4, three small beaver dams in Rock Creek created low-flow pool habitat that was not present in October 2011 or August 2012. Numerous young-of-the-year fish were observed at the outlet of Engle Creek/head of the pond and in Rock Creek pools below the pond (Salmon Environmental Services 2015).

Sites 5, 6, and 7 were dry. Sites 5 and 6 had surface flow in October 2011 and August 2012, and Site 7 had surface flow in October 2011 but was dry in August 2012. At Site 8, Orr Creek provided enough flow to maintain a small, isolated pool that contained a single fish, but the flow went subsurface below the pool and there was no flow to Rock Creek. Also at Site 8, a new sediment and small woody

debris dam was present on Orr Creek at the confluence of Rock Creek that was not present in 2011 or 2012.

Site 9, on Rock Creek, was dry upstream and downstream of the bridge; this site had flow in October 2011 and August 2012. Site 10 (East Fork Rock Creek) was dry above the confluence with West Fork; this site had surface flow in October 2011 and August 2012. A small amount of surface flow upstream of the bridge was insufficient to provide habitat connectivity or pool habitat. The combined flow from the East Fork and the first perennial tributary includes flow sufficiently to provide habitat connectivity and pools for young-of-the-year fish. Site 11 (West Fork Rock Creek) was dry; this site had surface flow in October 2011 and August 2012.

Groundwater and seep data will be used to help calibrate the 3D groundwater model to estimate possible groundwater depletion effects on bull trout habitat following the development of the Phase I exploration adit. Therefore, at this time, the Rock Creek Mine Field Investigation (Morrison Maierle 2016) does not provide new information related to bull trout habitat. The following briefly describes the field investigation within the Phase I Boundary for context. Building on the seep monitoring information provided by Hydrometrics (2015), Morrison Maierle (2016) performed the Rock Creek Mine Field Investigation, which included assessing 20 site locations provided by the USFS. The sample locations and water sample analyte list were consistent with Appendix K of the Draft SEIS (USFS 2016), although there were some differences between sites identified in the Draft SEIS and Hydrometrics (2015). Overall, 17 sites were investigated: 10 as potential GDEs and 7 as stream sites. Stream sites included Chicago Creek, Copper Gulch, South Basin Creek, and West Fork Rock Creek-North, all of which were dry at the time of the investigation. West Fork Rock Creek-South had a flow of 300 gpm. Five of the 10 GDE seep samples areas had flow, ranging from 0.1 to 2 gpm.

5.3 Bull Trout Response to the Proposed Action

5.3.1 Rock Creek

Possible effects to Rock Creek bull trout and habitat are the same as considered in the 2007 Final BO (USFWS 2007). Possible baseflow reductions could magnify or create new seasonal migration barriers in stream reaches in mainstem Rock Creek but could also enhance the exclusion of non-native fish from upper Rock Creek. These migration barriers may be inconsequential to resident bull trout populations (which are generally smaller and able to pass through narrower and shallower restrictions) such as those currently found in the Rock Creek watershed, but detrimental to the larger migratory bull trout (USFS 2016). Shallow and wide riffle-stream segments can be impassable by bull trout at low flow, particularly larger migratory life stages of bull trout, because movement is restricted in shallow water (Maret et al. 2005, 2006). The baseline condition for mainstem Rock Creek baseflow is functioning appropriately (FA; see Table 1) because intermittency is a natural condition (Sando and Blasch 2015). This condition would not be degraded below FA because, if reductions to

baseflow occurred, they would amount to incremental changes to the length and duration of seasonally dry reaches and would further reduce the risk of non-native fish population expansion. Baseflow reduction could also indirectly affect bull trout habitat and migration by influencing flows through alluvium and stream substrates, affecting spawning habitats and egg incubation. Groundwater drawdown could also decrease the capacity of groundwater to moderate stream temperatures, although reduced flow of water that has had an opportunity to warm due to surface exposure from reaches or tributaries that are not occupied by bull trout could have the effect of reducing summer stream temperatures downstream in Rock Creek where bull trout occur. Possible impacts to bull trout and bull trout habitat from modeled baseflow reductions are uncertain and will be assessed after Phase I data collection and a rerun of the 3D groundwater model. The range of groundwater inflows to the mine reported in the 3D model report (Hydrometrics 2014) were 4 to 9 times less than those evaluated in the 2007 Final BO (USFWS 2007). As a result, possible reductions in baseflow would be less than was considered in the 2007 Final BO (KNF 2014).

As stated in Section 1.6 of Appendix K of the Draft SEIS (USFS 2016):

The water resources monitoring program would begin during Phase I implementation at least 1 year prior to evaluation adit dewatering in the area near the evaluation portal pad and in the area near the infiltration ponds where surface water or groundwater may be affected by Phase I construction and operations (Figure K-3); this does not include monitoring for the upgrade work completed by RCR on NFS Roads 150 and 2741, which is covered in MPDES permit MT0031763. Phase II water resources monitoring would begin during the first year of Phase I construction and would occur for several years prior to the initiation of Phase II construction in the Rock Creek, East Fork Bull River, Bull River, Miller Gulch, and Clark Fork River watersheds where surface water or groundwater may be affected by Phase II construction and operations.

Rock Creek is on DEQ's list for impaired waters as a result of substrate alterations due to silviculture practices that have impaired aquatic life. The baseline condition for sediment in Rock Creek is functioning at risk (FAR; see Table 1) and despite improvements due to use of best management practices (BMPs) and sediment mitigation would be expected to remain FAR. During construction of new or improved stream crossings, BMPs would be used to minimize effects in the stream channel. In addition, the Montana Pollutant Discharge Elimination System (MPDES)/Stormwater permit includes numerous conditions to minimize sediment from road construction.

A number of minor modifications to Alternative V resulted from more detailed design of facilities and mitigation measures (see Table 1). These included modifying the paste tailings facility footprint to avoid impacts to wetlands on National Forest System lands, modifying the layout of the mill site to avoid RHCAs, modifying the layout and location of Phase I support facilities and associated

groundwater disposal system, revising the water treatment system design, and developing details of mitigation associated with the access road to implement sediment reduction requirements.

RHCAs are portions of watersheds where riparian-dependent resources receive primary emphasis, and management activities are subject to specific standards and guidelines. RHCAs include traditional riparian corridors, wetlands, intermittent streams, and other areas that help maintain the integrity of aquatic ecosystems by: 1) influencing the delivery of coarse sediment, organic matter, and woody debris to streams; 2) providing root strength for channel stability; 3) shading the stream; and 4) protecting water quality (Naiman et al. 1992). An unaltered vegetation buffer would be left between Rock Creek and the road and utility corridors, where possible, and impacts on RHCAs between the mill site and the East and West Forks of Rock Creek would be avoided. Some vegetation along streams would be cleared for the powerline at utility corridor crossings on Rock Creek and West Fork Rock Creek and for construction of the new bridge over Engle Creek. Streamside vegetation clearing can increase stream temperature in localized areas by exposing the stream to increased warming by sunlight, but it is less than a fraction of 1% of the affected streamside habitat along Engle Creek so impacts would be negligible.

Mine dewatering and the resulting drawdown of bedrock groundwater may subtly change the ionic composition of stream water. Reducing the source of deeper groundwater may reduce the concentration of some anions and cations in surface water such as sodium, calcium, potassium, bicarbonate, magnesium, chloride, and sulfate. If such a water quality change occurred and if it was detectable, it would be detectable only during low-flow periods when bedrock groundwater is the major source of supply to surface water. Even at low flows, the changes in water quality may be difficult to measure due to the naturally low dissolved solids concentrations in both surface water and groundwater. Benchmark surface water sites would be used to develop trend analyses to determine if flow or water quality changes were due to mine dewatering and other activities or to natural variability and climate change. There is a possibility that baseflow reductions resulting from the Rock Creek Project could result in subtle changes to surface water quality, but such changes and the effects such changes may have on aquatic life and fisheries would likely be undetectable.

5.3.2 East Fork Rock Creek

Possible effects to East Fork Rock Creek bull trout and critical habitat are the same as in the 2007 Final BO (USFWS 2007). If baseflow reductions were to occur, impacts to East Fork Rock Creek could be similar to those described for Rock Creek in Section 5.3.1. Possible reduced baseflows in East Fork Rock Creek could magnify or create new seasonal barriers in East Fork Rock Creek in a short intermittent reach that occurs in lower East Fork Rock Creek. The baseline condition for baseflow in East Fork Rock Creek is FA (Table 2). Possible impacts to bull trout and bull trout habitat from modeled baseflow reductions are uncertain and will be assessed after Phase I data collection and a rerun of the 3D groundwater model. The range of groundwater inflows to the mine reported in the

3D model report (Hydrometrics 2014) were 4 to 9 times less than those evaluated in the 2007 Final BO (USFWS 2007). As a result, possible reductions in baseflow would be less than was considered in the 2007 Final BO (KNF 2014).

5.3.3 West Fork Rock Creek

Possible effects to West Fork Rock Creek bull trout and habitat are the same as in the 2007 Final BO (USFWS 2007). The 3D groundwater model (USFS 2016, Section 4.7.3) indicated that mine dewatering could reduce baseflow in an unidentified reach of either West Fork Rock Creek or East Fork Rock Creek. If impacts due to baseflow reductions and sediment in West Fork Rock Creek were to occur, they would be similar to those described for Rock Creek in Section 5.3.1. and in the 2007 Final BO (USFWS 2007). There is no designated bull trout critical habitat in West Fork Rock Creek, with the majority of the bull trout being resident; the migratory bull trout component is absent or rare in West Fork Rock Creek.

The baseline condition for sediment in West Fork Rock Creek is FAR (Table 3) and would be expected to remain FAR despite improvements due to use of BMPs and sediment mitigation. The baseline condition for baseflow in West Fork Rock Creek is FA, with natural intermittency in the lower and upper reaches (Table 3). Possible impacts to bull trout and bull trout habitat from modeled baseflow reductions are uncertain and will be assessed after Phase I data collection and a rerun of the 3D groundwater model. The range of groundwater inflows to the mine reported in the 3D model report (Hydrometrics 2014) were 4 to 9 times less than those evaluated in the 2007 Final BO (USFWS 2007). As a result, possible reductions in baseflow would be less than was considered in the 2007 Final BO (KNF 2014).

5.3.4 Bull River

Baseflow reductions to lower Bull River could occur due to baseflow reductions in upper East Fork Bull River (and its tributaries) and Copper Gulch (and its tributary Chicago Creek). The possible decreases in baseflow at the mouth of the Bull River would represent a change of less than 1% of the measured baseflow in Bull River. If baseflow was reduced, impacts to Bull River bull trout and bull trout critical habitat would be similar to those described in detail for Rock Creek (Section 5.3.1), but at a significantly lower level. Although baseflows could be reduced by approximately 1% at the mouth of Bull River, flows in Bull River are not intermittent and there are no known migration barriers to bull trout in the mainstem. Although some spawning does occur in the mainstem Bull River, it is used primarily for rearing and providing passage to East Fork Bull River.

The baseline condition for baseflow in lower Bull River is FA (Table 4). Possible impacts to bull trout and bull trout habitat from possible baseflow reductions are uncertain and will be assessed after Phase I data collection and a rerun of the 3D groundwater model. The range of groundwater inflows to the mine reported in the 3D model report (Hydrometrics 2014) were 4 to 9 times less than those

evaluated in the 2007 Final BO (USFWS 2007). As a result, possible reductions in baseflow would be less than was considered in the 2007 Final BO (KNF 2014), although Bull River was not specifically addressed in the 2007 Final BO.

5.3.5 East Fork Bull River

During operations, baseflow reductions are possible in designated bull trout critical habitat in East Fork Bull River (USFS 2016). The baseline condition for baseflow in East Fork Bull River is FAR (Table 5), but only because the indicator is coupled with peak flows which might be increased above natural peak flows due to high road densities. This FAR determination by the USFS (2013) is presumably dictated by conditions in the lower reaches of East Fork Bull River because the majority of the drainage is in the CMW where there are no roads. Possible impacts to bull trout and bull trout habitat from possible baseflow reductions are uncertain and will be assessed after Phase I data collection and a rerun of the 3D groundwater model. The range of groundwater inflows to the mine reported in the 3D model report (Hydrometrics 2014) were 4 to 9 times less than those evaluated in the 2007 Final BO (USFWS 2007). As a result, possible reductions in baseflow would be less than was considered in the 2007 Final BO (KNF 2014), although East Fork Bull River was not specifically addressed in the 2007 Final BO.

5.3.6 Copper Gulch

The baseline condition for baseflow in Copper Gulch is FAR (Table 7) because artificial straightening in the lower reach of Copper Gulch and the construction of flood control berms on private lands have altered the sediment transport competency of the stream, leading to aggradation and dewatering. Possible impacts to bull trout and bull trout habitat from possible baseflow reductions are uncertain and will be assessed after Phase I data collection and a rerun of the 3D groundwater model. The range of groundwater inflows to the mine reported in the 3D model report (Hydrometrics 2014) were 4 to 9 times less than those evaluated in the 2007 Final BO (USFWS 2007). As a result, possible reductions in baseflow would be less than was considered in the 2007 Final BO (KNF 2014), although Copper Gulch was not specifically addressed in the 2007 Final BO.

5.3.7 Cabinet Gorge Reservoir

Sediment impacts from the proposed action would be restricted to the confluence of Cabinet Gorge Reservoir and the mouth of Rock Creek. Water quality impacts from the diffuser discharge would be a localized point source. Impacts to Cabinet Gorge Reservoir bull trout would be negligible. A baseline table was not prepared for Cabinet Gorge Reservoir because most of the baseline indicators are not applicable to reservoirs.

5.4 Effects of the Action to Designated Bull Trout Critical Habitat

The USFWS examined the effects to individual PCEs in Appendix I of the 2007 Final BO (USFWS 2007). Updated analyses of PCEs for bull trout critical habitat for each stream are provided below. The 2007 Final BO analysis remains valid. Additional bull trout critical habitat in Rock Creek, East Fork Rock Creek, Bull River, East Fork Bull River, and Cabinet Gorge Reservoir was designated in 2010 (USFWS 2010). Within the project area, critical habitat designation on Federal lands was added to already designated critical habitat on State and private lands. Although some of the current critical habitat was not designated as such for the 2007 Final BO (USFWS 2007), the effect on habitat in general and the previously designated critical habitat in Rock Creek was analyzed and the impacts of the project on bull trout habitat in East Fork and mainstem Rock Creek were discussed.

5.4.1 Rock Creek and East Fork Rock Creek

Rock Creek and East Fork Rock Creek contain 8.4 miles of designated bull trout critical habitat, extending from the confluence of Rock Creek with Cabinet Gorge Reservoir to a permanent barrier to upstream fish passage on East Fork Rock Creek.

The following conclusion from the 2007 Final BO (USFWS 2007) is valid despite the year-2010 changes to critical habitat designations in Rock Creek and is overstated given sediment BMPs and mitigation.

As proposed, implementation of the Rock Creek mine is anticipated to negatively impact designated critical habitat in Rock Creek by diminishing the function of some of the PCEs due to increases in sedimentation in the West Fork and mainstem of Rock Creek and to a lesser extent critical habitat in the East Fork Rock Creek. Activities in the action area associated with the proposed mining operation would likely degrade aquatic habitat including spawning habitat, rearing habitat, and food supply and impact all bull trout life history stages during the 5-year construction period and likely for two years after construction is completed. Thereafter, the effects from sedimentation should subside and levels of sedimentation are expected to return to those observed before construction. Increases in sedimentation, water quality degradation, and changes in channel and habitat complexity related to mining activities are anticipated to reduce the functional ability of critical habitat to a small degree below baseline conditions temporarily, for about five to seven years associated with the construction period. The areas of critical habitat mostly affected in Rock Creek would be small localized stream segments in close proximity to the project area. All the primary constituent elements in Rock Creek are expected to remain functional, albeit at a lower level.

Loss of riparian habitat in bull trout critical habitat would be limited to 2 acres in Rock Creek (USFS 2016, Table 4-18 in Section 4.11, Aquatic Life and Fisheries). Impacts on RHCAs are described in detail in Section 4.11, Aquatic Life and Fisheries of the Draft SEIS (USFS 2016).

The PCEs relating to a natural hydrograph and water quantity for Rock Creek and East Fork Rock Creek are FA or FAR (Tables 1 and 2). Possible impacts to bull trout and bull trout critical habitat from possible baseflow reductions are uncertain and will be assessed after Phase I data collection and a rerun of the 3D groundwater model. The range of groundwater inflows to the mine reported in the 3D model report (Hydrometrics 2014) were 4 to 9 times less than those evaluated in the 2007 Final BO (USFWS 2007). As a result, possible reductions in baseflow would be less than was considered in the 2007 Final BO (KNF 2014).

5.4.2 Bull River

The mainstem of the Bull River contains 24.7 miles of bull trout critical habitat, extending from its confluence with Cabinet Gorge Dam upstream. The PCEs relating to a natural hydrograph and water quantity for lower Bull River are FA or FAR (Table 4). Possible impacts to bull trout and bull trout habitat from possible baseflow reductions are uncertain and will be assessed after Phase I data collection and a rerun of the 3D groundwater model. The range of groundwater inflows to the mine reported in the 3D model report (Hydrometrics 2014) were 4 to 9 times less than those evaluated in the 2007 Final BO (USFWS 2007). As a result, possible reductions in baseflow would be less than was considered in the 2007 Final BO (KNF 2014), although Bull River was not specifically addressed in the 2007 Final BO.

5.4.3 East Fork Bull River

The total amount of designated critical habitat is 7.4 miles in East Fork Bull River watershed. The PCEs relating to a natural hydrograph and water quantity for East Fork Bull River are FAR (Table 5). Possible impacts to bull trout and bull trout habitat from possible baseflow reductions are uncertain and will be assessed after Phase I data collection and a rerun of the 3D groundwater model. The range of groundwater inflows to the mine reported in the 3D model report (Hydrometrics 2014) were 4 to 9 times less than those evaluated in the 2007 Final BO (USFWS 2007). As a result, possible reductions in baseflow would be less than was considered in the 2007 Final BO (KNF 2014), although East Fork Bull River was not specifically addressed in the 2007 Final BO.

5.4.4 Cabinet Gorge Reservoir

PCEs were not assessed for Cabinet Gorge Reservoir because they are intended for assessing streams. Sediment impacts from the proposed action would be restricted to the confluence of Cabinet Gorge Reservoir and the mouth of Rock Creek. Water quality impacts from the diffuser

discharge would be a localized point source. Impacts to Cabinet Gorge Reservoir bull trout critical habitat would be negligible.

5.5 Cumulative Effects

Cumulative effects include the effects of future state, tribal, local, or private actions reasonably certain to occur in the Action Area considered in this BA. Future federal actions unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the ESA.

5.5.1 Cumulative Effects to Bull Trout

The 2007 Final BO (USFWS 2007) (Appendix E) updated the analysis of cumulative effects in the 2001 FEIS. The analysis of groundwater and surface water effects on bull trout habitat and clarification of sediment mitigation planning described in the Draft SEIS (USFS 2016) provides additional information relevant to the status of, and possible cumulative impacts on, bull trout in the study area. Analysis of cumulative impacts relating to habitat conditions (critical habitat), illegal harvest, introduced species, temperature, residential and commercial development, road construction, angling and poaching pressure, timber harvest, and mining activities described in the 2001 FEIS and 2007 Final BO remain applicable to the proposed Rock Creek Project.

5.5.2 Cumulative Effects to Designated Bull Trout Critical Habitat

The 2007 Final BO (USFWS 2007) updated the analysis of cumulative effects in the 2001 FEIS. Analysis of cumulative impacts relating to habitat conditions (critical habitat), as described in the 2001 FEIS and 2007 Final BO remain applicable to the proposed Rock Creek Project.

6 Conclusion

The purpose of this Supplemental BA is to update information presented in the amended, 2007 Final BO (USFWS 2007). This Supplemental BA incorporates the new information that has been collected or developed and analyzes the possible effects on bull trout and bull trout critical habitat focusing on the following:

- Whether new information reveals effects of the proposed action that may affect bull trout or bull trout critical habitat in a manner or to an extent not previously considered
- Whether the identified action has been subsequently modified in a manner that causes an effect to bull trout or bull trout critical habitat that was not considered in the 2007 Final BO
- Whether newly designated bull trout critical habitat may be affected by the proposed action (50 CFR § 402.16)

Each of these questions is addressed below.

Does new information reveal effects of the action that may affect bull trout or bull trout critical habitat in a manner or to an extent not previously considered?

Information collected since the 2007 Final BO (USFWS 2007) does not reveal any new effects of the action that might affect bull trout or critical habitat in a manner not previously considered in the 2007 Final BO. The only change to critical habitat in the 2010 designation was that critical habitat was included on federal lands, compared to habitat on privately owned lands in the 2005 designation. It did not change the habitat; similar habitat exists on both private and federal lands in the Action Area. Possible impacts to bull trout and bull trout critical habitat from possible baseflow reductions, including streams in the Bull River drainage that were not assessed in the 2007 Final BO, will be assessed after Phase I data collection and a rerun of the 3D groundwater model. Possible reductions in baseflow would be less than was considered in the 2007 Final BO (KNF 2014).

As stated in the 2007 Final BO (USFWS 2007):

Risks to bull trout could increase if the mining operations cause water quality and water quantity changes that affect stream flows in Rock Creek. However, at this juncture, it is difficult to determine with any certainty whether a risk to bull trout would exist under project implementation because of the lack of data or pertinent information on the relationship of underground mining effects on aquatic species. The potential changes of water quality and quantity are unpredictable and the only way to determine this risk is to monitor the appropriate streamflow parameters, and if new information reveals that the risk to Rock Creek bull trout is anticipated, re-initiation of consultation would be warranted, and the USFWS would request it (USFWS 2007, p. B-82).

Has the identified action been subsequently modified in a manner that causes an effect to bull trout or bull trout critical habitat that was not considered in the 2007 Final Biological Opinion?

The proposed action (Alternative V) has not changed since the 2007 Final BO (USFWS 2007) was produced in a manner that would cause effects to bull trout or bull trout critical habitat that were not considered in the 2007 Final BO (USFWS 2007).

Would newly designated bull trout critical habitat be affected by the proposed action?

Additional bull trout critical habitat in Rock Creek, East Fork Rock Creek, Bull River, East Fork Bull River, and Cabinet Gorge Reservoir was designated in 2010 (USFWS 2010). Within the project area, critical habitat designation on Federal lands was added to already designated critical habitat on State and private lands. Although some of the current critical habitat was not designated as such for the 2007 Final BO (USFWS 2007), the effect on habitat in general and the previously designated critical habitat in Rock Creek was analyzed and the impacts of the project on bull trout habitat in East Fork and mainstem Rock Creek were discussed: "As proposed, implementation of the Rock Creek mine is anticipated to adversely impact the majority of occupied habitat in the West Fork and mainstem of Rock Creek and to a lesser extent habitat in the lower section of East Fork Rock Creek (only a few hundred yards of the East Fork are partially downgradient from the mill site)" (USFWS 2007, p. B-87). The 2007 Final BO (USFWS 2007) also states that, "The potential changes of water quality and quantity are unpredictable and the only way to determine this risk is to monitor the appropriate streamflow parameters, and if new information reveals that the risk to Rock Creek bull trout is anticipated, re-initiation of consultation would be warranted, and the USFWS would request it" (USFWS 2007, p. B-82). This statement still applies and also pertains to East Fork Bull River and Bull River. Impacts to Cabinet Gorge Reservoir bull trout critical habitat from the project would be negligible.

Need for re-initiation of formal consultation:

The information that has been produced since the 2007 Final BO (USFWS 2007) better informs the previous environmental documents and decisions. The recent information does not meet the tests from 50 CFR § 402.16 that require re-initiation of consultation for the reasons described above; therefore, re-initiation of formal consultation is not required.

7 Literature Cited

- Al-Chokhachy, R., B. Roper, T. Bowerman, and P. Budy, 2010. A review of bull trout habitat associations and exploratory analysis of patterns across the Interior Columbia River Basin. DOI:10.1577/M09-034.1., 17 pp.
- AquaResource, 2014. Comments on Hydrometrics Rock Creek Modeling Report. March 6. 5 pp.
- Avista (Avista Corporation), 2011. Rock Creek fisheries studies data summary 2001–2010. Spokane, Washington.
- Avista, 2014. 2013 Annual Report. The Clark Fork Project, FERC Project No. 2058.
- Avista, 2015. 2014 Annual Report. The Clark Fork Project, FERC Project No. 2058.
- Barbour, M.T. B.G. Bierwagen, A.T. Hamilton, and N.G. Aumen, 2010. Climate change and biological indicators: detection, attribution, and management implications for aquatic ecosystems. *Journal of the North American Benthological Society* 29(4):1359-1363.
- Burgmer, T., H. Hillebrand, and M. Pfenninger, 2007. Effects of climate-driven temperature changes on the diversity of freshwater macroinvertebrates. *Oecologia* 151:93-103.
- Chadwick Ecological Consultants, 2000. Fisheries survey of the Bull River Drainage, Montana. Prepared for Avista Corporation, Spokane, Washington.
- Chessman, B.C., 2009. Climatic changes and 13-year trends in stream macroinvertebrate assemblages in New South Wales, Australia. *Global Change Biology* 15:2781-2802.
- DeHaan, P., B. Adams, J. VonBargen, and D. Hawkins, 2011. Genetic analysis of Native Salmonids from the Lake Pend Oreille and Clark Fork River System, Idaho and Montana. Annual Report for Calendar Year 2010. U.S. Fish and Wildlife Service. Abernathy Fish Technology Center. Longview, Washington.
- Domisch, S., S.C. Jahnig, and P. Haase, 2011. Climate-change winners and losers: stream macroinvertebrates of a submontane region in central Europe. *Freshwater Biology* 56:2009-2020.
- FWP (Montana Fish, Wildlife and Parks), 2008. The Road Ahead: Strategic Plans. Available at: <http://fwp.mt.gov/fwpDoc.html?id=11812>. Last Accessed: May 16, 2012.
- FWP, 2014a. MFish – Waterbody Report for Bull River. Available at: <http://fwpiis.mt.gov/dotNetApps/MFISH/Reports.aspx?LLID=1155046>. Last accessed: September 29.

- FWP, 2014b. MFish – Waterbody Report for East Fork Bull River. Available at:
<http://fwpiis.mt.gov/dotNetApps/MFISH/Reports.aspx?LLID=1154653480630&begmeas=0&endmeas=7.982>. Last accessed: September 29.
- FWP, 2014c. MFish – Waterbody Report for Copper Gulch. Available at:
<http://fwpiis.mt.gov/dotNetApps/MFISH/Reports.aspx?LLID=1155136>. Last Accessed:
September 29, 2014.
- FWP, 2014d. MFish – Waterbody Report for Cabinet Gorge Reservoir. Available at:
<http://fwpiis.mt.gov/dotNetApps/MFISH/Reports.aspx?LLID=1158485480239>. Last Accessed
September 29, 2014.
- GEI (GEI Consultants, Inc.), 2005. Lower Clark Fork River Drainage habitat problem assessment: Lower Clark Fork River, Noxon, Montana. G. Gillin, Project Manager. Submitted to: Avista Corporation, Noxon, Montana.
- Hanson, J.R., and T.D. Tholl, 2007. Noxon and Cabinet Gorge Reservoir Fisheries Monitoring, Comprehensive Report 1997–2006. Montana Tributary Habitat Acquisition and Recreational Fishery Enhancement Program, Appendix B. Report to Avista Corporation, Spokane, WA.
- Herbst, D.B. and S.C. Cooper. 2010. Before and after the deluge: rain-on-snow flooding effects on aquatic invertebrate communities of small streams in the Sierra Nevada, California. *Journal of the North American Benthological Society* 29(4):1354-1366.
- Hoelscher, B., 1993. Pend Oreille Lake fishery assessment. Water Quality Status Report No. 102. Idaho Department of Health and Welfare, Division of Environmental Quality, Boise, Idaho.
- Horn, C., and T. Tholl, 2008. Native Salmonid Abundance and Tributary Habitat Restoration Monitoring: Comprehensive Report, 2005–2007; Including Summarized Data, 1999–2007. Prepared for Avista Corporation, Noxon, Montana. 127 pp.
- Horn, C., and T. Tholl, 2011. Native Salmonid Abundance and Tributary Habitat Restoration Monitoring: Comprehensive Report, 2008–2010; Including Summarized Data, 1999–2010. Prepared for Avista Corporation, Noxon, MT. 137 pps.
- Hydrometrics, Inc. (Hydrometrics), 2014. Groundwater Modeling Assessment for the Rock Creek Project Sanders County, Montana. January 2014, revised October 2014. 148 pp., including tables, figures, and appendices.
- Hydrometrics, 2015. 2015 Water Resources Monitoring Report for the Rock Creek Project. Prepared for RC Resources, Inc. December 2015.

- Intergovernmental Panel on Climate Change, 2007. Climate change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K. and A. Reisinger (eds.)] IPCC, Geneva, Switzerland, 104 pp.
- Isaak, D.J., C.C. Muhlfeld, A.S. Todd, R. Al-Chokhachy, J. Roberts, J.L. Kershner, K.D. Fausch, and S.W. Hostetler, 2012. The past as prelude to the future for understanding 21st-century climate effects on Rocky Mountain trout. *Fisheries* 37(12):542-556.
- Isaak, D.J., M.K. Young, D.E. Nagel, D.L. Horan, and M.C. Groce, 2015. The cold-water climate shield: delineating refugia for preserving salmonid fishes through the 21st century. *Global Change Biology*. Accessed at: http://www.fs.fed.us/rm/pubs_journals/2015/rmrs_2015_isaak_d001.pdf.
- Isaak, D.J., M.K. Young, C.H. Luce, S.W. Hostetler, S.J. Wenger, E.E. Peterson, J.M. Ver Hoef, M.C. Groce, D.L. Horan, and D.E. Nagel, 2016. Slow climate velocities of mountain streams portend their role as refugia for cold-water biodiversity. www.pnas.org/cgi/doi/10.1073/pnas.1522429113.
- Katzman, L., and L. Hintz, 2003. Bull River westslope cutthroat trout and bull trout life history study Final Report – 2000. Fish Passage/Native Salmonid Restoration Plan, Appendix B, and Montana Tributary Habitat Acquisition and Recreational Fishery Enhancement Program, Appendix B. Avista Corporation. Noxon, Montana.
- Kline Environmental Research, 2012. Technical Memorandum: Summary of data collected during 2012 for inclusion in the Aquatic Biological Assessment for the Montanore Project. December 13.
- Kline Environmental Research, 2016. Copper Gulch fish survey conducted on September 26, 2016. Technical memorandum to Eric Klepfer, cc Doug Stiles. October 4, 2016.
- Kline and Savor (Kline Environmental Research and Savor Environmental Services), 2012. Technical Memorandum, Summary of data collected during 2012 for inclusion in the Aquatic Biological Assessment for the Montanore Project. December 13, 2012 (revision of November 28, 2012, memorandum).
- KNF, 2013. Kootenai National Forest. Biological Assessment for threatened, endangered, and proposed aquatic species and designated aquatic critical habitat on the Montanore Minerals Corp. Montanore Project. February 25, 2013.
- KNF, 2014. Kootenai National Forest. Rock Creek Project Analysis Process for Effects to Bull Trout from Changes in Water Quantity and ESA Compliance. File code 2810. To Kootenai Forest Supervisor. November 21, 2014.

- Land and Water Consulting, 2001. Bull River Watershed Assessment; Lower Clark Fork River Drainage. Noxon, Montana. Prepared for Bull River Watershed Council, Heron, Montana.
- Lawrence, J.E., K.B. Lunde, R.D. Mazor, L.A. Beche, E.P. McElravy, and V.H. Resh, 2010. Long-term macroinvertebrate responses to climate change: implications for biological assessment in Mediterranean-climate streams. *Journal of the North American Benthological Society* 29(4):1424-1440.
- Lee, D.C., J.R. Sedell, B.E. Rieman, R.F. Thurow J.E. Williams and others. 1997. Chapter 4: Broadscale Assessment of Aquatic Species and Habitats. In T.M. Quigley and S.J. Arbelbide eds. "An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins Volume III". U.S. Department of Agriculture, Forest Service, and U.S. Department of Interior, Bureau of Land Management, General Technical Report PNW- GTR-405.
- Lockard, L. R. Weltz, E. Stender, J. Storaasli, and J. Stover, 2003. Tributary Trapping and Downstream Juvenile Bull Trout Transport Program. Annual Progress Report – 2002. Fish Passage Native Salmonid Program, Appendix C. Prepared for Avista Corporation, Noxon, Montana.
- Lockard, L. R. Weltz, J. Stover, and S. Skaggs, 2008. Tributary Trapping and Downstream Juvenile Bull Trout Transport Program. Annual Progress Report – 2007. Fish Passage Native Salmonid Program, Appendix C. Prepared for Avista Corporation, Noxon, Montana.
- Mantua, N.J., I. Tohver, and A.F. Hamlet, 2009. Impacts of climate change on key aspects of freshwater salmon habitat in Washington State, Chapter 6. In: *The Washington Climate Change Impacts Assessment: Evaluating Washington's Future in a Changing Climate*. Climate Impacts Group, University of Washington, Seattle, Washington.
- Maret, T.R., J.E. Hortness, and D.S. Ott, 2005. Instream flow characterization of upper Salmon River Basin streams, Central Idaho, 2004. U.S. Geological Survey Scientific Investigations Report 2005-5212, 124 p.
- Maret, T.R., J.E. Hortness, and D.S. Ott, 2006. Instream flow characterization of Upper Salmon River Basin streams, Central Idaho, 2005. U.S. Geological Survey Scientific Investigations Report 2006-5230, 120 p.
- Martin, P.J., 2014. Comments on Hydrometrics Rock Creek Modeling Report. Updated Version – January 2014. Letter report submitted to Karen Baud, ERO Resources Corp. 5 pp.
- May, B.E., 2009. Westslope cutthroat trout status update summary 2009. Wild Trout Enterprises LLD, Bozeman, Montana.

- MDEQ and USFS (Montana Department of Environmental Quality and U.S. Forest Service), 2001. Final Environmental Impact Statement, Rock Creek Project, Volume I and Volume II (Appendices). Helena, Montana.
- Moran, S., 2004. Lower Clark Fork River, Montana – Avista Project Area – 2003 Annual Bull and Brown Trout Redd Survey Report. Avista Corporation. Noxon, Montana.
- Moran, S., 2006. Lower Clark Fork River, Montana – Avista Project Area – 2005 Annual Bull and Brown Trout Redd Survey Report. Avista Corporation. Noxon, Montana.
- Moran, S., and J. Storaasli, 2015. Fish abundance studies, fisheries survey of the Bull River drainage, Montana – 2014. Fish Passage/Native Salmonid Restoration Program. Prepared for Avista Corporation. December 2015.
- Moran, S., and J. Storaasli, 2016. Fish abundance studies, fisheries survey of the Rock Creek drainage, Montana – 2015. Fish Passage/Native Salmonid Restoration Program. Prepared for Avista Corporation. October 2016.
- Morrison Maierle, 2016. Rock Creek Mine Field Investigation 2016. Prepared for Hecla Mining-Revett Silver Company. October 2016.
- Naiman, R.J., T.J. Beechie, [and others], 1992. Fundamental elements of ecologically healthy watersheds in the Pacific Northwest coastal ecoregion. In: Naiman, R.J., ed. Watershed management: Balancing sustainability and environmental change. New York: 127-169.
- NMFS and USFWS (National Marine Fisheries Service and U.S. Fish and Wildlife Service), 2010. Interim Endangered and Threatened Species Recovery Planning Guidance. Version 1.3. 122 pages.
- Peterson, D.P., S. Bernall, K. Bouwens, K. Breidinger, J. DosSantos, D. Grupenhoff, W. Fredenberg, R. Kreiner, S. Moran, B. Naples, L. Nelson, R. Ryan, and D. Schmetterling, 2015. Strategic Modeling to Assist Conservation of Bull Trout in the Lower Clark Fork River – Final Report. U.S. Fish and Wildlife Service, Abernathy Fish Technology Center, Longview, Washington. February.
- Pierce, M., 2014. Personal communication from M. Pierce, USEPA Region 8 NEPA Compliance and Review Program to M. Huffine, Kootenai National Forest Rock Creek Project Coordinator about comments on Hydrometrics' revised 3D groundwater model, March 6.
- Poff, N.L., M.I. Pyne, B.P. Bledsoe, C.C. Cuhacyan, and D.M. Carlisle, 2010. Developing linkages between species traits and multiscaled environmental variation to explore vulnerability of stream benthic communities to climate change. *Journal of the North American Benthological Society* 29(4):1441-1458.

- Pratt, K.L., and J.E. Huston, 1993. Status of bull trout (*Salvelinus confluentus*) in Lake Pend Oreille and the lower Clark Fork River: draft. The Washington Power Company, Spokane.
- Reclamation (USDI Bureau of Reclamation), 2011a. Literature Synthesis on Climate Change Implications for Water and Environmental Resources. 2nd Ed. Technical Memorandum 86-68210-2010-03. Prepared by Technical Service Center, Water Resources Planning and Operations Support Group, Water and Environmental Resources Division. January. pp. 125. Available at: <http://www.usbr.gov/research/docs/climatechangelitsynthesis.pdf>.
- Reclamation, 2011b. West-Wide Climate Risk Assessments: Bias- Corrected and Spatially Downscaled Surface Water Projections. Technical Memorandum No. 86-68210-2011-01. Prepared by Water Resources Planning and Operations Support Group, Water and Environmental Resources Division. March. pp. 122. Available at: <http://www.usbr.gov/WaterSMART/docs/west-wide-climate-risk-assessments.pdf>.
- Reclamation, 2011c. SECURE Water Act Section 9503(c) – Reclamation Climate Change and Water. April. pp 206. Available at: <http://www.usbr.gov/climate/SECURE/docs/SECUREWaterReport.pdf>.
- Rieman, B.E., D. Isaak, S. Adams, D. Horan, D. Nagel, C. Luce, and D. Myers, 2007. Anticipated Climate Warming Effects on Bull Trout Habitats and Populations Across the Interior Columbia River Basin. *Transactions of the American Fisheries Society* 136:1552-1565.
- Salmon Environmental Services, 2012. Rock Creek Fisheries and Habitat Assessment Supplement. Prepared for RC Resources, Inc., Troy, Montana. 72 pp. November 14, 2012.
- Salmon Environmental Services, 2015. Rock Creek Aquatic Habitat Survey. Appendix C of Hydrometrics 2015. Prepared for RC Resources, Inc., Noxon, Montana. 22 pp. October 10, 2015.
- Sando, R., and K.W. Blasch, 2015. Predicting alpine headwater stream intermittency: a case study in the northern Rock Mountains. *Ecohydrol. Hydrobiol.* 15(2):68-80.
- Sheldon, A.L., 2012. Possible climate-induced shift of stoneflies in a southern Appalachian catchment. *Freshwater Science* 31(3):765-774.
- Shellberg, J.G., S.M. Bolton, and D.R. Montgomery, 2010. Hydrogeomorphic effects on bedload scour in bull char (*Salvelinus confluentus*) spawning habitat, Western Washington, USA. *Canadian Journal of Fisheries and Aquatic Science*, Volume 67, p. 626-640. March 10.
- Storaasli, J., and S. Moran, 2012. Lower Clark Fork River, Montana – Avista Project Area – 2011 Annual bull and brown trout redd survey report. Fish Passage/Native Salmonid Program. Appendix C. Prepared for Avista Corporation, Noxon, Montana. January.

StreamNet database, 2009. Westslope Cutthroat Trout 2009 Status Assessment, including May et al. (2009) report, supporting data, and GIS files. Portland, Oregon. Available at: http://old.streamnet.org/datastore_search_classic.cfm?id=459&keywords=westslope%20assessment.

Tholl, T.D., and C. Horn, 2008. Noxon and Cabinet Gorge Reservoir fisheries monitoring progress update – 2007. Montana Tributary Habitat Acquisition and Recreation Fishery Enhancement Program, Appendix B. Avista Corporation, Noxon, Montana.

Tholl, T.D., and C. Horn, 2009. Native Salmonid Abundance and Tributary Habitat Restoration Monitoring. Montana Tributary Habitat Acquisition and Recreation Fishery Enhancement Program, Appendix B. Avista Corporation, Noxon, Montana.

USFS (U.S. Forest Service), 1999. Bull trout biological assessment for Rock Creek Mine. Kootenai National Forest, Libby, Montana.

USFS, 2000. Watershed Baseline for the Lower Clark Fork River. USDA, Forest Service. Libby Ranger District.

USFS, 2010. Kootenai and Idaho Panhandle Plan Revision Zone (KIPZ) Climate Change Report. Idaho Panhandle National Forest, Kootenai National Forest, 217 pp.

USFS, 2013. Conservation strategy for bull trout on USFS lands in Western Montana. USDA Forest Service, Northern Region, and USFWS Montana Field Office.

USFS, 2016. Draft Supplemental Environmental Impact Statement for the Rock Creek Project. Volume I and Volume II. United States Department of Agriculture Forest Service, Northern Region. Kootenai National Forest. February 2016.

USFS, USFWS, and BLM (U.S. Forest Service, U.S. Fish and Wildlife Service, and Bureau of Land Management), 1998a. Guidance to USDA Forest Service, USDI Fish and Wildlife Service, and Bureau of Land Management on Section 7 consultation – conference for bull trout.

USFS, USFWS, and BLM, 1998b. Guidance to USDA Forest Service, USDI Fish and Wildlife Service, and Bureau of Land Management on approach for completing Forest Service/BLM Section 7 consultation on the effects of actions to bull trout.

USFWS (U.S. Fish and Wildlife Service), undated. Crosswalk between the Bull Trout Matrix of Pathways and Indicators and Primary Constituent Elements of Proposed Critical Habitat.

- USFWS (U.S. Fish and Wildlife Service), 1998. A framework to assist in making Endangered Species Act determinations of effect for individual or grouped action at the bull trout core area watershed scale. Region 1, USFWS. Revised June 11, 1999.
- USFWS, 1999. Determination of threatened status for the bull trout in the coterminous United States; Final Rule. Federal Register 64(210):58909-58933.
- USFWS, 2000. Endangered and Threatened Wildlife and Plants: Determination of Threatened Status for the Contiguous U.S. Distinct Population Segment of the Canada Lynx and Related Rule: Final Rule. USDI Fish and Wildlife Service. Federal Register, March 24, 2000, Vol. 65, No. 58. pp. 16051-16086.
- USFWS, 2002. Bull Trout (*Salvelinus confluentus*) Draft Recovery Plan. U.S. Fish and Wildlife Service, Portland, Oregon. 147 pp.
- USFWS, 2003. Endangered and Threatened Wildlife and Plants: Notice of remanded determination of status for the contiguous United States distinct population segment of the Canada lynx; clarifications of findings; Final Rule. 50 CFR Part 17. Federal Register, July 3, 2003. Vol. 68, No. 128. pp. 40076-40101.
- USFWS, 2005. Bull Trout Core Area Conservation Status Assessment. W. Fredenberg, J. Chan, J. Young, and G. Mayfield, editors. U.S. Fish and Wildlife Service. Portland, Oregon. 95 pp. plus attachments.
- USFWS, 2006. Biological Opinion on the Effects to Grizzly Bears, Bull Trout, and Bull Trout Critical Habitat from the Implementation of Proposed Actions Associated with Plan of Operation for the Revett RC Resources Incorporated 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. October 11, 2006. p. 130.
- USFWS, 2007. Supplement to the Biological Opinion on the Effects to Bull Trout from the Implementation of Proposed Actions Associated with Plan of Operations for the Revett RC Resources Incorporated Rock Creek Copper/Silver Mine, as proposed by the U.S. Forest Service, Kootenai National Forest. Montana Ecological Services Field Office. pp. 169. September 2007.
- USFWS, 2008. Bull trout (*Salvelinus confluentus*) 5-year review: Summary and evaluation. U.S. Fish and Wildlife Service, Portland, Oregon.
- USFWS, 2010. Bull Trout Final Critical Habitat Justification: Rationale for why habitat is Essential, and Documentation of Occupancy. U.S. Fish and Wildlife Service, Portland, Oregon. 1,035 pp.

- USFWS, 2015a. Recovery plan for the coterminous United States population of bull trout (*Salvelinus confluentus*). Portland, Oregon. xii + 179 pages.
- USFWS, 2015b. Columbia Headwaters Recovery Unit Implementation Plan for Bull Trout (*Salvelinus confluentus*). Kalispel, Montana and Spokane, Washington. 179 pages.
- USGCRP (U.S. Global Change Research Program), 2009. Global Climate Change Impacts in the United States. T.R. Karl, J.M. Melillo, and T.C. Peterson (eds.). Cambridge University Press, New York, New York. Accessed at: <http://minerals.usgs.gov/minerals/pubs/mcs/2013/mcs2013.pdf>.
- Water Consulting, Inc., 2001. Final report for the stabilization and restoration of Rock Creek near Noxon, Montana. Prepared for: the Rock Creek Watershed Council, Heron, Montana.
- Warren, D.R., A.G. Ernst, and B.P. Baldigo, 2009. Influence of spring floods on year-class strength of fall- and spring-spawning salmonids in Catskill mountain streams. *Transaction of the American Fisheries Society* 138:200-210.
- Wenger, S.J., D.J. Isaak, C.H. Luce, H.M. Neville, K.D. Fausch, J.B. Dunham, D.C. Dauwalter, M.K. Young, M.M. Elsner, B.E. Rieman, A.F. Hamlet, and J.E. Williams, 2011. Flow regime, temperature, and biotic interactions drive differential declines of trout species under climate change. *Proceedings of the National Academy of Science* 108(34):14175-14180.
- WWP (Washington Water Power), 1996. Lower Clark Fork River Tributary Survey. Final Report, Volumes I and II. Washington Water Power Company, Spokane, Washington. November 1996.
- Young, M.K., and K.S. McKelvey, 2009. Unpublished data. Rocky Mountain Research Station, Missoula, Montana.

Table 1

Mainstem Rock Creek Environmental Baseline

2017 Baseline Condition		2017 baseline condition justification based on the Matrix of Pathways and Indicators (MPI) (USFWS 1998) and critical habitat Primary Constituent Elements (PCE) (USFWS MPI-PCE crosswalk, undated)
MPI Subpop	Subpopulation size	See EFRC for condition of subpopulation that mainly occurs in EFRC but shares mainstem and WFRC. USFWS 2007: (FAR) Referenced 2000 individuals for core area and largely isolated system. Kline and Savor 2012: None captured during 2012 survey of one reach. Moran and Storaasli 2016: Bull trout per 100 m = 5.9 and 2.2 in two surveyed mainstem reaches = 4.1 average. Perennial flow ~2300 m so population was ~94. Fish lengths indicate only sub-adults. Updated to FUR for mainstem because <50 adults.
	Growth and survival	See EFRC for condition of subpopulation that mainly occurs in EFRC but shares mainstem and WFRC. USFWS 2007: (FUR) Growth rates are low and not expected to improve within the next lifecycle of bull trout. Instantaneous survival rate for bull trout was lower than for other salmonids in Rock Creek. Moran and Storaasli 2016: Section 2 electrofishing reach density estimates since 1985 are variable but do not show a downward trend so updated to FAR.
	Life history diversity and isolation	See EFRC for condition of subpopulation that mainly occurs in EFRC but shares mainstem and WFRC. USFWS 2007: (FUR) Absence or rarity of the adfluvial component. Moran and Storaasli 2016: Some use by straying migrants, evidence of functioning as up/downstream travel corridor to/from EFRC, decreased isolation due to Cabinet Gorge dam trap and transport. Updated to FAR for these reasons and because it is functioning within the natural constraints imposed by seasonal dewatering.
	Persistence and genetic integrity	See EFRC for condition of subpopulation that mainly occurs in EFRC but shares mainstem and WFRC. USFWS 2007: (FUR) Presence and threat of brook trout hybridization in the drainage. Moran and Storaasli 2016: Confirmed high brook trout abundance in mainstem and Engle Creek, although straying migrants could provide persistence.
MPI Habitat	Temperature	USFWS 2007: (FA) 12C summer, 9C spring/fall, 5C winter listed for the drainage. Salmon Env. 2012: 17.8C maximum daily average recorded above during May-Sep 2011 above SH 200 but not clarified if this occurred when seasonal flow ceased. USFS 2013: (FA) Refers to WWP 1996 and Salmon Env. 2012.
	Sediment	USFWS 2007: (FAR) Range from 10% to 24%. Kline and Savor 2012: 27% average pool crest surface fines. USFS 2013: (FA) Percent fines in mainstem Rock Creek are less than 20% and closer to 15% based on core samples collected in 1995, 2001, and 2012. Updated back to FAR because 15% is FAR and because of the 2012 pool crest average.
	Chemical contaminants/nutrients	USFWS 2007: (FA) Nutrient levels are low in the Rock Creek drainage. Productivity in the streams is phosphorus limited. Background contaminants include As, Cd, Cu, Pb, and Zn, which are all naturally present below current detection limits with the exception of Zn at 0.5 µg/L. Not 303(d) listed.
	Man-made physical barriers	USFWS 2007: (FAR) Intermittent flow, culvert barrier during some low flows. USFS 2013: (FAR) SH 200 culvert blocks upstream migration at low flows.
	Substrate embeddedness	USFWS 2007: (FA) No data, refer to fines data. Salmon Env. 2012: Cobble and large gravel predominated in Wolman counts.
	Large woody debris	USFWS 2007 (FAR): Low numbers in mainstem Rock Creek. Kline and Savor 2012: Maximum of 3 reaches for 6 " diameter was 29/mile.
	Pool frequency and quality	USFWS 2007: (FAR) Reduction in pool volume due to sediment loading. Kline and Savor 2012: 18.5 pools/mile, mostly large and deep, 20-foot wetted width. USFS 2013: (FA) Refers to Salmon Env. 2012 for pool condition overall. Updated back to FAR because frequency does not meet FA for mainstem wetted width.
	Large pool frequency	USFWS 2007: (FAR) Existing pools are shallow and wide. Kline and Savor 2012: 14.7 large pools/mile. Updated to USFS 2013: (FA) Refers to Salmon Env. 2012 for pool condition overall. Update also justified because most pools are large (see pool frequency/quality).
	Off-channel habitat	USFWS 2007: (FAR) Naturally limited.
	Refugia	USFWS 2007: (FUR) Currently not adequate. Updated to FAR due to FA for large pools and FAR for large woody debris.
	Scour pool avg width/max depth	USFWS 2007: (FAR) Ratio <10. Update to FA because Kline and Savor 2012: Scour pool w/d = 5.8.
	Streambank stability	USFWS 2007: (FAR) Alluvial terraces are being undermined. Salmon Env. 2012: Areas of rapid bank erosion in a 2001 report.
Floodplain connectivity	USFWS 2007: (FAR) Has not been altered. This explanation appears to be an error. Updated to FA because it has not been altered.	

Table 1

Mainstem Rock Creek Environmental Baseline

2017 Baseline Condition		2017 baseline condition justification based on the Matrix of Pathways and Indicators (MPI) (USFWS 1998) and critical habitat Primary Constituent Elements (PCE) (USFWS MPI-PCE crosswalk, undated)
MPI Habitat	Peak and base flows	USFWS 2007: (FUR) Intermittent flow during some times of the year. Sando and Blasch 2015: Intermittency is natural. Updated to FA because intermittency is natural and beneficial for restricting upstream movement of brook trout. Also, high flows have minimal impact (see disturbance regime).
	Drainage network length	USFWS 2007: (FAR) Roads lack BMP standards. Comment: This does not address increased active channel length as described in MPI. Updated to FA because there is no evidence that human disturbance has increased the active channel length.
	Road density/location	USFWS 2007: (FAR) Densities 1.5 to 3.0 miles per square mile, riparian roads. Salmon Env. 2012: 1.2 miles/sq mile in mainstem drainage.
	Disturbance history	USFWS 2007: (FAR) Equivalent Clearcut Area = 15%. Salmon Env. 2012: 5% burned post-2010. 5.5% timber harvest since 1969. USFS 2016: 6.5% of the entire watershed in a clearcut condition during 1997, but FAR because clearcuts in WFRC watershed result in transport of material to lower Rock Creek.
	Riparian conservation areas	USFWS 2007: (FAR) Roads and sediment are issues within the RHCA. USFS 2016: 39% of stream with roads in RHCA.
	Disturbance regime	USFS 2000: Two high-water events had minimal effects to stream channel, which would indicate the drainage is able to accommodate moderate to high disturbance and maintain its current level of function. USFWS 2007: (FAR) Says data are inadequate. USFS 2000 suggests FA, but left as FAR due to other missing FA attributes.
	Integrated	USFWS 2007: (FUR) Minimal migratory component, low habitat complexity, and low pool frequency. USFS 2013: Comprehensive habitat and fish population surveys conducted in Rock Creek drainage show that temperature, pools, and sediment are functioning appropriately. Moran and Storaasli 2016: Naturally occurring seasonal intermittency during base streamflow limits the amount of available habitat, strands fish, and can restrict access to and from headwater areas by migrants. Only abnormally high annual low flow is known to enable connectivity throughout the mainstem during the migration and spawning period. Updated to FAR because habitat indicators are FA or FAR.
PCE	Influences of subsurface water	Of the relevant MPIs, 5 = FA, 4 = FAR, 0 = FUR.
	Migratory habitats	Of the relevant MPIs, 4 = FA, 3 = FAR, 0 = FUR.
	Food base	Of the relevant MPIs, 3 = FA, 5 = FAR, 0 = FUR.
	Aquatic environment complexity	Of the relevant MPIs, 3 = FA, 7 = FAR, 0 = FUR.
	Temperature	Of the relevant MPIs, 5 = FA, 4 = FAR, 0 = FUR.
	Substrate	Of the relevant MPIs, 1 = FA, 4 = FAR, 0 = FUR.
	Natural hydrograph	Of the relevant MPIs, 3 = FA, 4 = FAR, 0 = FUR.
	Water quantity and quality	Of the relevant MPIs, 5 = FA, 3 = FAR, 0 = FUR.
	Detrimental non-native fish species	Of the relevant MPIs, 0 = FA, 3 = FAR, 0 = FUR.
	Integrated	5 of 9 PCEs are FAR.
Functioning Appropriately		
Functioning at Risk		
Functioning at Unacceptable Risk		
Insufficient Information		

Table 2
East Fork Rock Creek Environmental Baseline

2017 Baseline Condition		2017 baseline condition justification based on the Matrix of Pathways and Indicators (MPI) (USFWS 1998) and critical habitat Primary Constituent Elements (PCE) (USFWS MPI-PCE crosswalk, undated)
MPI Subpop	Subpopulation size	USFWS 2007: (FAR) Referenced 2000 individuals for core area and largely isolated system. Kline and Savor 2012: Number per 100 m = 12 to 14. Moran and Storaasli 2106: Number per 100 m = 17.5, 19.8, 1.3, and 15.6 in four surveyed reaches = 13.6 average. Perennial flow below barrier ~4800 m so population was ~650. Fish lengths indicate only sub-adults but known to be residents. Updated to FA for EFRC because population is stable and possibly at carrying capacity.
	Growth and survival	USFWS 2007: (FUR) Growth rates are low and not expected to improve within the next lifecycle of bull trout. Instantaneous survival rate for bull trout was lower than for other salmonids in Rock Creek. Moran and Storaasli 2016: Section 3 and 4 electrofishing reach density estimates since 2001 are increasing or similar and similar to 1996 estimates so updated to FA.
	Life history diversity and isolation	USFWS 2007: (FUR) Absence or rarity of the adfluvial component. Moran and Storaasli 2016: Predominantly residents but periodic use by migrants and decreased isolation due to Cabinet Gorge dam trap and transport. A large adult was seen on a redd during 2015, assumed to be a known released female. Updated to FAR for these reasons and because it is functioning within the natural constraints imposed by seasonal dewatering in mainstem Rock Creek.
	Persistence and genetic integrity	USFWS 2007: (FUR) Presence and threat of brook trout hybridization in the drainage. Moran and Storaasli 2016: Stable population and nearly isolated from brook trout but poor connectivity. Updated to FAR due to population stability and the positive aspect of isolation.
MPI Habitat	Temperature	USFWS 2007: (FA) 12C summer, 9C spring/fall, 5C winter listed for the drainage. Salmon Env. 2012: ~0 to 12 during Jun-Dec 2010. USFS 2013: (FA) Refers to WWP 1996 and Salmon Env. 2012.
	Sediment	USFWS 2007: (FAR) Range from 10% to 24%. Kline and Savor 2012: 14.7% average pool crest surface fines. USFS 2013: (FA) Fines are virtually non-existent in EFRC. Both support update to FA.
	Chemical contaminants/nutrients	USFWS 2007: (FA) Nutrient levels are low in the Rock Creek drainage. Productivity in the streams is phosphorus limited. Background contaminants include As, Cd, Cu, Pb, and Zn, which are all naturally present below current detection limits with the exception of Zn at 0.5 µg/L. Not 303(d) listed.
	Man-made physical barriers	USFWS 2007: (FAR) Intermittent flow, culvert barrier during some low flows. Updated to FA because there are no man-made barriers. USFWS 2007 was not in reference to EFRC.
	Substrate embeddedness	USFWS 2007: (FA) No data, refer to fines data. Salmon Env. 2012: Cobble and boulder predominated in Wolman counts. USFS 2013: Virtually no fine sediment.
	Large woody debris	USFWS 2007 (FAR): Low numbers in mainstem Rock Creek. Kline and Savor 2012: Count range for 6-inch diameter was below FA and FA is based on 12 inches. USFS 2016: Minimal clearcutting in EFRC drainage so there is LWD recruitment potential.
	Pool frequency and quality.	USFWS 2007: (FAR) Reduction in pool volume due to sediment loading. Kline and Savor 2012: 11 pools/mile, half are deep, 20-foot wetted width. USFS 2013: (FA) Refers to Salmon Env. 2012 for pool condition overall. Updated back to FAR because frequency does not meet FA based on wetted width.
	Large pool frequency	USFWS 2007: (FAR) Existing pools are shallow and wide. Kline and Savor 2012: 3.6 large pools/mile. USFS 2013: (FA) Refers to Salmon Env. 2012 for pool condition overall. Updated back to FAR due to low frequency.
	Off-channel habitat	USFWS 2007: (FAR) Naturally limited.
	Refugia	USFWS 2007: (FUR) Currently not adequate. Updated to FAR due to FAR for large pools and FAR for large woody debris.
	Scour pool avg width/max depth	USFWS 2007: (FAR) Ratio <10. Updated to FA because Kline and Savor 2012: Scour pool w/d = 6.0.
	Streambank stability	USFWS 2007: (FAR) Alluvial terraces are being undermined. Salmon Env. 2012: This was in reference to a past condition on mainstem Rock Creek. No additional information was located.
	Floodplain connectivity	USFWS 2007: (FAR) Has not been altered. This explanation appears to be an error. Updated to FA because it has not been altered.
Peak and base flows	USFWS 2007: (FUR) Intermittent flow during some times of the year. Sando and Blasch 2015: Intermittency is natural. Updated to FA because intermittency is only in the extreme lower end of EFRC and is natural.	

Table 2
East Fork Rock Creek Environmental Baseline

2017 Baseline Condition		2017 baseline condition justification based on the Matrix of Pathways and Indicators (MPI) (USFWS 1998) and critical habitat Primary Constituent Elements (PCE) (USFWS MPI-PCE crosswalk, undated)
	Drainage network length	USFWS 2007: (FAR) Roads lack BMP standards. Comment: This does not address increased active channel length as described in MPI. Updated to FA because there is no evidence that human disturbance has increased the active channel length.
MPI Habitat	Road density/location	USFWS 2007: (FAR) Densities 1.5 to 3.0 miles per square mile, riparian roads. Salmon Env. 2012: 0.2 mile/sq mile in EFRC drainage. Updated to FA because <1 mile/ sq mile and not in valley bottom.
	Disturbance history	USFWS 2007: (FAR) Equivalent Clearcut Area = 15%. Salmon Env. 2012: 6% burned post-2010. <2% timber harvest since 1969. USFS 2016: <1% of the EFRC watershed in a clearcut condition during 1997. Updated to FA due to minimal disturbance.
	Riparian conservation areas	USFWS 2007: (FAR) Roads and sediment are issues within the RHCA. USFS 2016: 29% of stream with roads in RHCA.
	Disturbance regime	USFS 2000: Two high-water events had minimal effects to stream channel, which would indicate the drainage is able to accommodate moderate to high disturbance and maintain its current level of function. USFWS 2007: (FAR) Says data are inadequate. USFS 2000 suggests FA, but left as FAR due to other missing FA attributes.
	Integrated	USFWS 2007: (FUR) Minimal migratory component, low habitat complexity, and low pool frequency. USFS 2013: Comprehensive habitat and fish population surveys conducted in the Rock Creek drainage show that temperature, pools, and sediment are functioning appropriately. Moran and Storaasli 2016: Naturally occurring seasonal intermittency during base streamflow can restrict access to and from headwater areas by migratory bull trout. Only abnormally high annual low flow is known to enable connectivity throughout the mainstem during the migration and spawning period. Fifteen years of monitoring data have shown variable but stable numbers of genetically pure bull trout in upper Rock Creek, with no established population of non-native species. Would update to FA but updated to FAR due to lack of migrants and isolation.
PCE	Influences of subsurface water	Of the relevant MPIs, 7 = FA, 2 = FAR, 0 = FUR.
	Migratory habitats	Of the relevant MPIs, 6 = FA, 1 = FAR, 0 = FUR.
	Food base	Of the relevant MPIs, 5 = FA, 3 = FAR, 0 = FUR.
	Aquatic environment complexity	Of the relevant MPIs, 3 = FA, 7 = FAR, 0 = FUR.
	Temperature	Of the relevant MPIs, 5 = FA, 4 = FAR, 0 = FUR.
	Substrate	Of the relevant MPIs, 2 = FA, 3 = FAR, 0 = FUR.
	Natural hydrograph	Of the relevant MPIs, 5 = FA, 2 = FAR, 0 = FUR.
	Water quantity and quality	Of the relevant MPIs, 7 = FA, 1 = FAR, 0 = FUR.
	Detrimental non-native fish species	Of the relevant MPIs, 2 = FA, 1 = FAR, 0 = FUR.
	Integrated	7 of 9 PCEs are FA.
Functioning Appropriately		
Functioning at Risk		
Functioning at Unacceptable Risk		
Insufficient Information		

Table 3
West Fork Rock Creek Environmental Baseline

2017 Baseline Condition		2017 baseline condition justification based on the Matrix of Pathways and Indicators (MPI) (USFWS 1998)
MPI Subpop	Subpopulation size	See EFRC for condition of subpopulation that mainly occurs in EFRC but shares mainstem and WFRC. USFWS 2007: (FAR) Referenced 2000 individuals for core area and largely isolated system. Kline and Savor 2012: Number per 100 m = 0.8 during 2012. Moran and Storaasli 2106: Number per 100 m = 1.0 and 0.0 in two surveyed reaches = 0.5 average. Perennial flow below barrier ~2500 m so population was ~13. The single fish captured was likely a >5-year old adult. Updated to FUR due to very low abundance.
	Growth and survival	See EFRC for condition of subpopulation that mainly occurs in EFRC but shares mainstem and WFRC. USFWS 2007: (FUR) Growth rates are low and not expected to improve within the next lifecycle of bull trout. Instantaneous survival rate for bull trout was lower than for other salmonids in Rock Creek. Based on WWP 1996, Kline and Savor 2012, and Moran and Storaasli 2016: 2012 and 2015 abundance were much lower than during 1996.
	Life history diversity and isolation	See EFRC for condition of subpopulation that mainly occurs in EFRC but shares mainstem and WFRC. USFWS 2007: (FUR) Absence or rarity of the adfluvial component. Moran and Storaasli 2016: Residents with no confirmed spawning that become isolated from mainstem Rock Creek and EFRC.
	Persistence and genetic integrity	See EFRC for condition of subpopulation that mainly occurs in EFRC but shares mainstem and WFRC. USFWS 2007: (FUR) Presence and threat of brook trout hybridization in the drainage. Moran and Storaasli 2016: Nearly isolated from brook trout. Poor connectivity for migrants but fish exchange with EFRC. Updated to FAR due to the positive aspect of isolation and exchange of fish with EFRC.
MPI Habitat	Temperature	USFWS 2007: (FA) 12C summer, 9C spring/fall, 5C winter listed for the drainage. USFS 2013: (FA) Refers to WWP 1996 and Salmon Env. 2012. Left as FA despite lack of WFRC data because watershed characteristics would not promote excessive warming.
	Sediment	USFWS 2007: (FAR) Range from 10% to 24%. Kline and Savor 2012: 41.1% average pool crest surface fines. USFS 2013: (FA) Fines are highest in WFRC compared to mainstem and EFRC. Changed back to FAR due to 2012 data and because 2013 condition was for entire watershed.
	Chemical contaminants/nutrients	USFWS 2007: (FA) Nutrient levels are low in the Rock Creek drainage. Productivity in the streams is phosphorus limited. Background contaminants include As, Cd, Cu, Pb, and Zn, which are all naturally present below current detection limits with the exception of Zn at 0.5 µg/L. Not 303(d) listed.
	Man-made physical barriers	USFWS 2007: (FAR) Intermittent flow, culvert barrier during some low flows. USFS 2013: (FAR) FR 150 culvert blocks upstream migration at low flows.
	Substrate embeddedness	USFWS 2007: (FA) No data, refer to fines data. Updated to FAR due to fines data.
	Large woody debris	USFWS 2007 (FAR): Low numbers in mainstem Rock Creek. Kline and Savor 2012: Count range for 6-inch diameter was above FA and FA is based on 12 inches, but LWD is functional given the narrow stream channel so updated to FA.
	Pool frequency and quality.	USFWS 2007: (FAR) Reduction in pool volume due to sediment loading. Kline and Savor 2012: 29 pools/mile, 1 deep pool/mile, 11-inch wetted width. USFS 2013: (FA) Refers to Salmon Env. 2012 for pool condition overall. Updated back to FAR because frequency does not meet FA based on wetted width.
	Large pool frequency	USFWS 2007: (FAR) Existing pools are shallow and wide. Kline and Savor 2012: 0.0 large pools/mile. USFS 2013: (FA) Refers to Salmon Env. 2012 for pool condition overall. Updated to FUR due to absence of large pools, although this reflects the stream size.
	Off-channel habitat	USFWS 2007: (FAR) Naturally limited.
	Refugia	USFWS 2007: (FUR) Currently not adequate. Did not update due to a lack of large and deep pools.
	Scour pool avg width/max depth	USFWS 2007: (FAR) Ratio <10. Updated to FA because Kline and Savor 2012: Scour pool w/d = 6.1.
	Streambank stability	USFWS 2007: (FAR) Alluvial terraces are being undermined. Salmon Env. 2012: This was in reference to a past condition on mainstem Rock Creek. No additional information was located.
	Floodplain connectivity	USFWS 2007: (FAR) Has not been altered. This explanation appears to be an error. Updated to FA because it has not been altered.
Peak and base flows	USFWS 2007: (FUR) Intermittent flow during some times of the year. Sando and Blasch 2015: Intermittency is natural. Updated to FA because intermittency is natural.	

Table 3

West Fork Rock Creek Environmental Baseline

2017 Baseline Condition		2017 baseline condition justification based on the Matrix of Pathways and Indicators (MPI) (USFWS 1998)
	Drainage network length	USFWS 2007: (FAR) Roads lack BMP standards. Comment: This does not address increased active channel length as described in MPI. Updated to FA because there is no evidence that human disturbance has increased the active channel length.
MPI Habitat	Road density/location	USFWS 2007: (FAR) Densities 1.5 to 3.0 miles per square mile, riparian roads. Salmon Env. 2012: 2.3 miles/sq mile in WFRC drainage.
	Disturbance history	USFWS 2007: (FAR) Equivalent Clearcut Area = 15%. Salmon Env. 2012: 8% burned post-2010. 9.6% timber harvest since 1969. USFS 2016: 13% of the WFRC watershed in a clearcut condition during 1997.
	Riparian conservation areas	USFWS 2007: (FAR) Roads and sediment are issues within the RHCA. USFS 2016: 74% of stream with roads in RHCA.
	Disturbance regime	USFS 2000: Two high-water events had minimal effects to stream channel, which would indicate the drainage is able to accommodate moderate to high disturbance and maintain its current level of function. USFWS 2007: (FAR) Says data are inadequate. USFS 2000 suggests FA, but left as FAR due to other missing FA attributes.
	Integrated	USFWS 2007: (FUR) Minimal migratory component, low habitat complexity, and low pool frequency. USFS 2013: Comprehensive habitat and fish population surveys conducted in the Rock Creek drainage show that temperature, pools, and sediment are functioning appropriately. Moran and Storaasli 2016: Naturally occurring seasonal intermittency during base streamflow can restrict access to and from headwater areas by migratory bull trout. Only abnormally high annual low flow is known to enable connectivity throughout the mainstem during the migration and spawning period. Maintained FUR due to lack of refugia, high amounts of fine sediment, and low bull trout abundance.
Functioning Appropriately		
Functioning at Risk		
Functioning at Unacceptable Risk		
Insufficient Information		

Table 4
Lower Mainstem Bull River Environmental Baseline

2017 Baseline Condition		2017 baseline condition justification based on the Matrix of Pathways and Indicators (MPI) (USFWS 1998) and critical habitat Primary Constituent Elements (PCE) (USFWS MPI-PCE crosswalk, undated)
MPI Subpop	Subpopulation size	USFS 2000: (FAR) 19 in mainstem. USFS 2013: 20-40 spawners mainly ~0.5 mile downstream of EFBR confluence. Maintained FAR despite <50 because channel is functioning appropriately and much of its value is providing passage to EFBR.
	Growth and survival	USFS 2000: (FAR) Growth rates greater or similar to other Montana streams. Maintained FAR due to likely impacts from non-natives.
	Life history diversity and isolation	USFS 2000: (FAR) Uncertain if residents occur. Rearing in mainstem or Cabinet Gorge Reservoir.
	Persistence and genetic integrity	USFS 2000: (FAR) Brown and brook trout are abundant.
MPI Habitat	Temperature	USFS 2000: (FUR) Migratory and spawning habitat 3 to 13C, incubation 0 to 8C, rearing up to 17C. USFS 2013: (FA). Updated to FAR due to USFS 2000 rearing temperature.
	Sediment	USFS 2000: (FA) Unclear explanation. USFS 2013: (FA).
	Chemical contaminants/nutrients	USFS 2000: (FA) Appear to be at low levels, supported by invertebrate data. Not 303(d) listed.
	Man-made physical barriers	USFS 2000: (FA) No man-made physical barriers on mainstem. USFS 2013: (FA).
	Substrate embeddedness	USFS 2000: (FA) Fine sediment and embeddedness are generally low.
	Large woody debris	USFS 2000: (FAR) 32 pieces/mile, which is lower than similar reference reaches.
	Pool frequency and quality.	USFS 2000: (FA) Low frequency but there are deep areas with undercut banks. USFS 2013: (FA) Classic E channel that is functioning appropriately.
	Large pool frequency	USFS 2000: (FA) Low frequency but this is consistent with channel type. USFS 2013: (FA) Classic E channel that is functioning appropriately.
	Off-channel habitat	USFS 2000: (FUR) Unclear explanation. The described habitat suggests FA. Updated to FAR to reflect uncertainty.
	Refugia	USFS 2000: (FAR) Connected at baseflow; however, habitat has been altered.
	Scour pool avg width/max depth	USFS 2000: (FA) Channel is able to transport bedload as evidenced by maintenance of E channel.
	Streambank stability	USFS 2000: (FAR) Intact but altered riparian with limited large trees.
	Floodplain connectivity	USFS 2000: (FA) Floodplain accessed each spring although some areas are diked.
	Peak and base flows	USFS 2000: (FA) Floods each spring, which is normal for E channel. Slightly elevated peak flows due to timber harvesting.
	Drainage network length	USFS 2000: (FAR) Some roads in tributaries lack relief culverts and application of BMPs. Comment: This does not address increased active channel length as described in MPI. Updated to FA because other indicators state that it is functioning appropriately with no information to indicate a change in network length.
	Road density/location	USFS 2000: (FAR) 0.8 road miles/ sq mile in drainage. SH 56 runs the length of the mainstem, encroaching in several locations.
	Disturbance history	USFS 2000: (FAR) Equivalent clearcut area is <15% and some localized channel adjustments.
	Riparian conservation areas	USFS 2000: (FAR) Portions of SH 56 are within the mainstem RHCA, moderate loss of connectivity and prime habitat protection in RHCA, and much of mainstem riparian has been converted to canary grass.
	Disturbance regime	USFS 2000: (FAR) Ability of watershed to recover from disturbance is somewhat compromised due to intense management.
	Integrated	USFS 2000: (FUR) Available habitat is generally FAR. USFS 2013: The lower Bull River has one known spawning reach and some dispersed areas. Historically, there was a large concentration of redds roughly 0.5 mile downstream from the confluence with EFBR. Spawners number around 20-40 annually. Rearing habitat is available in the mainstem Bull River but the number of fish utilizing that habitat is unknown. It is well documented that fish from the Bull River move downstream to the lower Clark Fork River. There is limited rearing habitat in Cabinet Gorge Reservoir, which limits productivity. Juveniles move downstream to Pend Oreille and at this point the likelihood of transport back upstream is small. Threats to this local population include interspecific competition with non-natives, poor rearing conditions, and movement over the dams into the Pend Oreille system. Updated to FAR due to mainly FA habitat condition indicators.
PCE	Influences of subsurface water	Of the relevant MPIs, 6 = FA, 3 = FAR, 0 = FUR.
	Migratory habitats	Of the relevant MPIs, 5 = FA, 2 = FAR, 0 = FUR.
	Food base	Of the relevant MPIs, 5 = FA, 3 = FAR, 0 = FUR.

Table 4

Lower Mainstem Bull River Environmental Baseline

2017 Baseline Condition		2017 baseline condition justification based on the Matrix of Pathways and Indicators (MPI) (USFWS 1998) and critical habitat Primary Constituent Elements (PCE) (USFWS MPI-PCE crosswalk, undated)
	Aquatic environment complexity	Of the relevant MPis, 4 = FA, 6 = FAR, 0 = FUR.
	Temperature	Of the relevant MPis, 4 = FA, 5 = FAR, 0 = FUR.
PCE	Substrate	Of the relevant MPis, 3 = FA, 2 = FAR, 0 = FUR.
	Natural hydrograph	Of the relevant MPis, 3 = FA, 4 = FAR, 0 = FUR.
	Water quantity and quality	Of the relevant MPis, 5 = FA, 3 = FAR, 0 = FUR.
	Detrimental non-native fish species	Of the relevant MPis, 1 = FA, 2 = FAR, 0 = FUR.
	Integrated	5 of 9 PCEs are FA.
	Functioning Appropriately	
	Functioning at Risk	
	Functioning at Unacceptable Risk	
	Insufficient Information	

Table 5
East Fork Bull River Environmental Baseline

2017 Baseline Condition		2017 baseline condition justification based on the Matrix of Pathways and Indicators (MPI) (USFWS 1998) and critical habitat Primary Constituent Elements (PCE) (USFWS MPI-PCE crosswalk, undated)
MPI Subpop	Subpopulation size	USFS 2013: 20-40 spawners in EFBR. KNF 2013 = 842 bull trout in EFBR. Updated to FUR because <50 adults.
	Growth and survival	Horn and Tholl 2011: Population has been strong through 10 years of monitoring, but distribution has recently been influenced by non-natives.
	Life history diversity and isolation	WWP 1996: 32% age 1, 27% age 2, 14% age 3.
	Persistence and genetic integrity	USFS 2000: Brown trout in mainstem and EFBR spawn in the same areas that were traditionally used by bull trout. The potential for interspecific competition for spawning and rearing habitat is very high. Superimposition of brown trout redds on bull trout has likely been occurring for many years. USFS 2013: Native fish have been eliminated in the lower reaches of EFBR.
MPI Habitat	Temperature	WWP 1996: At RM 0.5, Max = 16.9C. Avg summer = 10.2, fall = 2.8, winter = 3.5, spring = 6.0. USFS 2013: FA.
	Sediment	WWP 1996: 15-25% in gravel, 7-11% surface fines. There are generally low amounts of fine sediment. USFS 2013: (FA).
	Chemical contaminants/nutrients	WWP 1996: Invertebrate composition indicates unimpaired water quality (81% EPT). Not 303(d) listed. No industry in watershed but potential inputs due to private land.
	Man-made physical barriers	None were described in the available information. USFS 2013: (FA).
	Substrate embeddedness	Insufficient information but FA based on FA for sediment.
	Large woody debris	WWP 1996: Reach averages range from 120-212 pieces/mile for >3 m length. LWC 2001: LWD jams in the wilderness provided complex habitat in the form of deep plunge pools, overhanging cover, and low velocity, off-channel rearing habitat. Kline and Savor 2012: 59-96 pieces/mile (aggregates counted as 1) for >6-inch diameter, >15-foot length.
	Pool frequency and quality	WWP 1996: Primarily riffles and pools, but sediment inupts decrease quality. Surveyed reaches were 21-31% pool habitat. Kline and Savor 2012: Three surveyed reaches exceed FA frequency. USFS 2013: (FA).
	Large pool frequency	WWP 1996: No large pool data, but probably FA because overall pool frequency is high. LWC 2001: Deep plunge pools in wilderness. Kline and Savor 2012: Some reaches have high frequency, some marginal. USFS 2013: (FA).
	Off-channel habitat	LWC 2001: Abundant LWD in reach 3 (managed) and reach 4 (wilderness) resulted in side channel development and off-channel rearing areas.
	Refugia	FA due to LWD, pools, and off-channel habitat.
	Scour pool avg width/max depth	Kline and Savor 2012: Scour pool w/d range = 6-8 for three surveyed reaches.
	Streambank stability	LWC 2001: Reach 1 bank erosion low to moderate. Reach 2 lateral instability caused by logging on private property. Reach 3 bank erosion low. Kline and Savor 2012: 92% to 96% stable for three surveyed reaches.
	Floodplain connectivity	LWC 2001: Unaltered and connected in upper reaches, but presumably altered in reaches that are in need of restoration.
	Peak and base flows	USFS 2013: Peak flows may be increased above natural due to high road densities.
	Drainage network length	Horn and Tholl 2011: In 2001, a ~366 m reach (the Stein property) on lower portion of the stream was modified via rechannelization, revegetation, and large woody debris installation (Horn and Tholl 2011). In spring 2008, an avulsion caused flows to return to a historical channel on the opposite side of the valley from the restored Stein reach. Additionally, a major rechanneling project occurred several hundred meters upstream of the Stein reach (site 1) in 2008, known as the East Fork Slide Project.
	Road density/location	KNF 2013: Road density was not available; however, a road parallels the lower ~4.5 miles.
Disturbance history	Horn and Tholl 2011: Increased sedimentation and decreased channel stability within the drainage have been caused by roads, timber harvest, flooding, and other natural events. Problem areas were identified for potential restoration. In 2001, a ~366 m reach (the Stein property) on lower portion of the stream was modified via rechannelization, revegetation, and large woody debris installation. Periodic vegetation enhancement has occurred along the reach since 2002 to maintain riparian condition. In spring 2008, an avulsion caused flows to return to a historical channel on the opposite side of the valley from the restored Stein reach.	

Table 5
East Fork Bull River Environmental Baseline

2017 Baseline Condition		2017 baseline condition justification based on the Matrix of Pathways and Indicators (MPI) (USFWS 1998) and critical habitat Primary Constituent Elements (PCE) (USFWS MPI-PCE crosswalk, undated)
	Riparian conservation areas	WWP 1996: Riparian habitat is altered but functional and contributes to moderately high amounts of large woody debris, although low-cover, non-woody riparian vegetation is common. USFS 2000: Riparian harvest on private property along the EFBR has resulted in channel degradation, channel migration, and extensive sediment delivery to the lower reaches of the East Fork and the mainstem Bull River. All the major tributaries to the Bull River have had some riparian timber harvest over the last 100 years.
MPI Habitat	Disturbance regime	Horn and Tholl 2011: Increased sedimentation and decreased channel stability within the drainage have been caused by roads, timber harvest, flooding, and other natural events. In spring 2008, an avulsion caused flows to return to a historical channel on the opposite side of the valley from the restored Stein reach.
	Integrated	WWP 1996: Fish habitat in the lower portion of the stream is characterized by low gradient riffles and pools, and transitions to high gradient riffles and pools in the central and upper reaches. Substrate is dominated by cobble and rubble in high gradient reaches, with some minor amounts of sand and silt in low gradient reaches. There are generally low amounts of fine sediment. Riparian habitat is altered but functional and contributes to moderately high amounts of large woody debris, although low-cover, non-woody riparian vegetation is common. Horn and Tholl 2011: Increased sedimentation and decreased channel stability within the drainage have been caused by roads, timber harvest, flooding, and other natural events. In 2001, a ~366 m reach (the Stein property) on lower portion of the stream was modified via rechannelization, revegetation, and large woody debris installation. Periodic vegetation enhancement has occurred along the reach since 2002 to maintain riparian condition. In spring 2008, an avulsion caused flows to return to a historical channel on the opposite side of the valley from the restored Stein reach. FA due to majority FA for MPI habitat indicators and restriction of degraded habitat to lower reaches.
PCE	Influences of subsurface water	Of the relevant MPIs, 3 = FA, 6 = FAR, 0 = FUR.
	Migratory habitats	Of the relevant MPIs, 6 = FA, 1 = FAR, 0 = FUR.
	Food base	Of the relevant MPIs, 6 = FA, 2 = FAR, 0 = FUR.
	Aquatic environment complexity	Of the relevant MPIs, 5 = FA, 5 = FAR, 0 = FUR. See LWD for additional FA justification.
	Temperature	Of the relevant MPIs, 4 = FA, 5 = FAR, 0 = FUR.
	Substrate	Of the relevant MPIs, 4 = FA, 1 = FAR, 0 = FUR.
	Natural hydrograph	Of the relevant MPIs, 0 = FA, 7 = FAR, 0 = FUR.
	Water quantity and quality	Of the relevant MPIs, 3 = FA, 5 = FAR, 0 = FUR.
	Detrimental non-native fish species	Of the relevant MPIs, 2 = FA, 1 = FAR, 0 = FUR.
	Integrated	5 of 9 PCEs are FA.
Functioning Appropriately		
Functioning at Risk		
Functioning at Unacceptable Risk		
Insufficient Information		

Table 6
Copper Gulch Environmental Baseline

2017 Baseline Condition		2017 baseline condition justification based on the Matrix of Pathways and Indicators (MPI) (USFWS 1998)
MPI Subpop	Subpopulation size	LWC 2001: Copper Creek supports resident bull trout (no supporting data). Kline and Savor 2012: Bull trout were absent in lower and upper reach. Kline 2016: Bull trout presence confirmed during 2016 in one of four reaches.
	Growth and survival	Kline and Savor 2012, Kline 2016: Low abundance or absence depending on survey year and reach.
	Life history diversity and isolation	Kline and Savor 2012, Kline 2016: Low abundance or absence depending on survey year and reach and sometimes seasonal dewatering of lower reach.
	Persistence and genetic integrity	Kline and Savor 2012, Kline 2016: Low abundance or absence depending on survey year and reach, and presence of non-natives.
MPI Habitat	Temperature	LWC 2001: Heavily impacted RHCA in the lower reach and somewhat impacted RHCA in the upper reach.
	Sediment	LWC 2001: Erosion was evident in logged areas of the upper reach. Bank stability was low to moderate.
	Chemical contaminants/nutrients	Not 303(d) listed and there is no industry in the watershed.
	Man-made physical barriers	LWC 2001: The lower private bridge crossing was negatively impacting flow conveyance and sediment transport by restricting flow during spring runoff. The existing bridge encroached on the channel and prevented the unimpeded transport of water, sediment, debris, and ice during peak flows. Artificial straightening in the lower reach and construction of flood control berms have altered the sediment transport competency of the stream, leading to aggradation and dewatering.
	Substrate embeddedness	LWC 2001: Lower and upper reach primarily cobble/large gravel with low amounts of suitable spawning gravel and 25% embeddedness.
	Large woody debris	LWC 2001: LWD was cleared from the lower reach (8 pieces/mile, no aggregations). The upper reach had moderate amounts of stable LWD and relatively functional riparian areas. Evidence of logging included slash and eroding high terraces. 227 pieces/mile in the upper reach with abundant aggregates.
	Pool frequency and quality	LWC 2001: Lower reach dominated by long, shallow, fast riffles (95.6%). Pools comprised 4.4%. Pools comprised 7.7% of upper reach length.
	Large pool frequency	LWC 2001: The few pools in the lower reach had a maximum depth of 1.4 foot. Pools in the upper reach had a mean depth of 0.74 foot and maximum depth of 1.5 feet.
	Off-channel habitat	LWC 2001: Off-channel habitat was absent in the lower reach and not reported for the upper reach.
	Refugia	LWC 2001: The upper reach had deep, low velocity areas in the channel and in interstices of large substrate, but the stream is too small to serve as refugia based on the MPI footnote definition and lacks dependable accessibility.
	Scour pool avg width/max depth	LWC 2001: Average w/d (not specific to pools was >40 in lower reach and 11.9 in upper reach).
	Streambank stability	LWC 2001: Streambanks in the lower reach were diked and had no vegetation, resulting in poor stability (32.5 stability rating). The upper reach had low to moderate bank erosion potential (20.2 stability rating).
	Floodplain connectivity	LWC 2011: Flood control berms have been constructed in the lower reach.
	Peak and base flows	LWC 2001: Channel instability has resulted in aggradation and dewatering.
	Drainage network length	LWC 2001: The lower reach has been artificially straightened.
	Road density/location	LWC 2001: A private bridge crosses the lower reach and negatively impacts flow conveyance during spring runoff. This road parallels the stream for most of the potential fish-bearing reach.
	Disturbance history	LWC 2001: Artificial straightening in the lower reach and construction of flood control berms have altered the sediment transport competency of the stream.
	Riparian conservation areas	LWC 2001: Streambanks in the lower reach were diked and had no vegetation. Riparian impacts occur in the upper reach, but there is functional riparian zone.
	Disturbance regime	LWC 2001: Flow conditions and bedload regime have created a dynamic channel. Bedload and debris accumulations reflect an inherently unstable and flashy drainage.
	Integrated	Bermed and straightened lower reach, sometimes dewatered lower reach, low bull trout abundance, and non-native fish.
Functioning Appropriately		
Functioning at Risk		
Functioning at Unacceptable Risk		

Table 7
Possible Changes to Baseflow (Bulk K = 10^{-6} scenario) – Maximum Drawdown
(approximately Year 70)¹

Drainage	Total Baseflow(cfs) ²	Predicted Change in Baseflow (cfs) ³	Percent Reduction in Baseflow
Rock Creek (above confluence with Clark Fork River)	6–7	-0.4	5.7%
East Fork Bull River (above confluence with Bull River)	10	-0.4	4.0%
Bull River (above confluence with Clark Fork River)	100	-0.7	0.7%

Source: Hydrometrics 2014.

Notes:

1. With the data currently available, the model results provide a potential range of dewatering and streamflow impacts. They are the best available estimates of impacts that can be obtained using currently available data in the groundwater models. The 3D model would be refined and rerun after data from Phase I Evaluation were incorporated into the model (see the Water Resources Monitoring Plan in Appendix K of the Draft SEIS (USFS 2016). Following additional data collection and modeling, the predicted impacts on surface water resources in the study area, including simulation of mitigation measures, may change and the model uncertainty would decrease. See Draft SEIS (USFS 2016, Section 4.7.2, Analysis Methods) for more discussion of model uncertainty.
2. Total baseflow reported by Hydrometrics (2014; Table 4-1).
3. Predicted change in baseflow reported in the Draft SEIS (USFS 2016; Table 4-9).
cfs – cubic feet per second

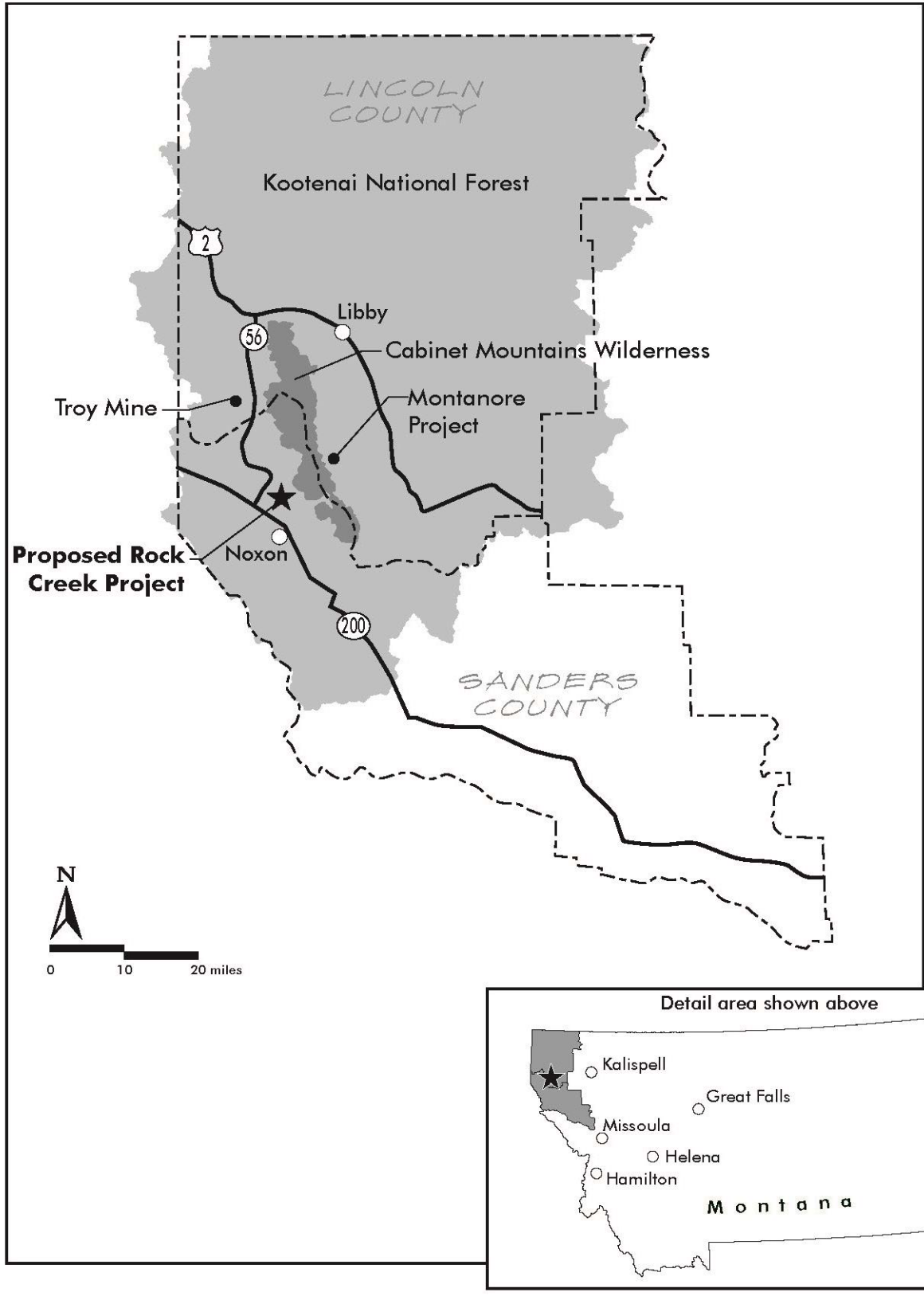


Figure 1
 Location Map
 Supplemental Biological Assessment
 Rock Creek Copper/Silver Mine Bull Trout and Critical Habitat

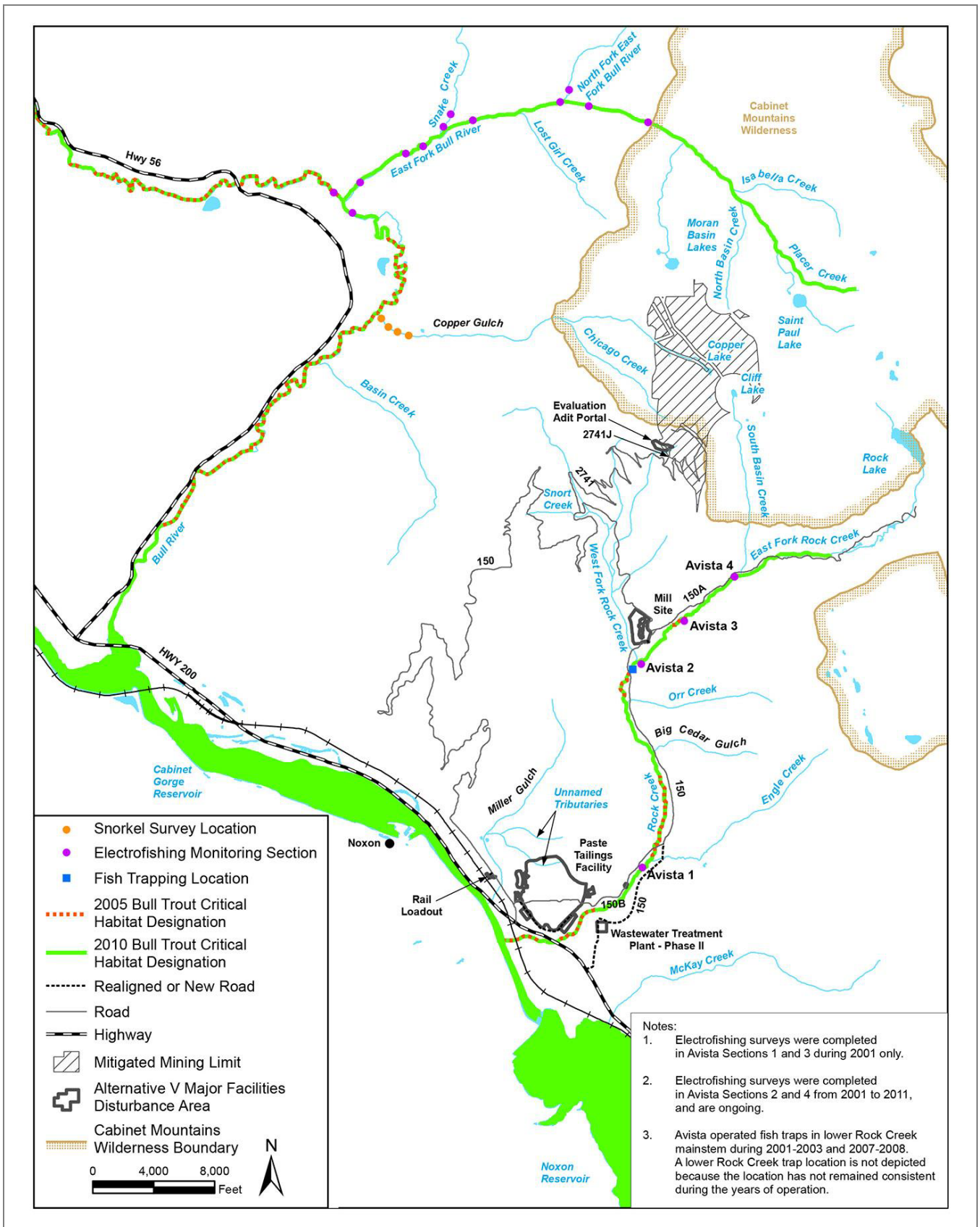


Figure 2
 Bull Trout Critical Habitat and Fish Monitoring Locations
 Supplemental Biological Assessment
 Rock Creek Copper/Silver Mine Bull Trout and Critical Habitat (DSEIS page 3-125)



United States Department of the Interior

Fish and Wildlife Service
Montana Ecological Services Office
585 Shepard Way, Suite 1
Helena, Montana 59601-6287

Phone: (406) 449-5225; Fax: (406) 449-5339



In Reply Refer To:
File: M.19 Kootenai National Forest (F)
06E11000-2017-F-0157 Rock Creek Mine

February 15, 2017

Chris Savage, Forest Supervisor
Kootenai National Forest
31374 US Highway 2
Libby, MT 59923

Dear Mr. Savage,

The U.S. Fish and Wildlife Service (Service) received the supplemental BA for the Rock Creek Mine Project on January 13, 2017. The signed transmittal letter of the same date indicated that the Kootenai National Forest (Forest) believed reinitiation of formal section 7 consultation under the Endangered Species Act (Act) was not necessary, and requested written concurrence with this conclusion from the Service.

Following review and discussion of the new information in the BA, the Service cannot offer our concurrence on this conclusion. Below are the reasons the Service is unable to offer concurrence:

- Recent groundwater modelling efforts conducted for both the Rock Creek Mine and Montanore Mine projects indicate that mining the ore body will result in baseflow depletion in Rock Creek (including main stem, East, and West Forks) and the Bull River (including main stem and East Fork).
- The Service's 2007 biological opinion discusses groundwater depletion in the Rock Creek watershed, but contains no analysis of impacts to the Bull River watershed. The 3D model predictions presented in the Supplemental EIS (pgs. 4-50 & 4-51) show baseflow reductions in the East Fork and main stem Bull River; however, our 2007 biological opinion states (pg. B-81) "No impacts related to this project are anticipated in the Bull River drainage which is considered to be the principle contributor of the core area because it supports relatively strong numbers of adfluvial, fluvial, and resident bull trout. Impacts of this project are anticipated to only affect the local population of bull trout in Rock Creek."
- Additional bull trout critical habitat was designated within the action area in 2010 (after the 2007 section 7 consultation was completed). These areas include the entire East Fork Bull River, the majority of East Fork Rock Creek, and Cabinet Gorge Reservoir. Figure 2 in the supplemental BA provides a good depiction of these new areas.

Our 2007 biological opinion (pg. B-105) states that reinitiation of formal consultation is required when "...(2) new information reveals effects of the agency action that may affect 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." These triggers are derived from regulations implementing the Act at 50 CFR § 402.16. The Service believes that these two conditions have been met given the new 3D groundwater modelling and the 2010 final designation of bull trout critical habitat.

The Forest's biologists may continue the interagency cooperation process on this project with Kevin Aceituno of my staff, phone (406) 758-6871 or email: kevin_aceituno@fws.gov.

The Service appreciates your efforts to ensure the conservation of threatened and endangered species as part of your responsibility under the Endangered Species Act.

Sincerely,



for Jodi L. Bush
Office Supervisor



File Code: 2670
Date: March 21, 2017

Jodi L. Bush
Field Supervisor
U.S. Fish & Wildlife Service
585 Shepard Way, Suite 1
Helena, MT 59601-6287

Dear Jodi,

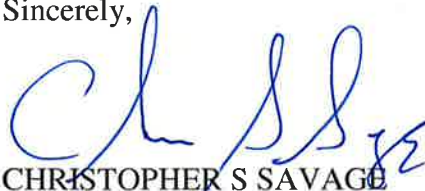
Thank you for your response to our Rock Creek Mine Project transmittal letter of January 13, 2017. Based on your thorough review and subsequent recommendation, I am requesting the reinitiation of formal consultation for the Rock Creek Mine Project. I agree that 50 CFR 402.16 has been triggered. The two specific items triggering reinitiation are, as you state in your letter of February 15, 2017:

- 1) the additional groundwater modelling efforts conducted for the Rock Creek Mine Project indicating that mining the ore body will result in baseflow depletion in the Rock Creek and the Bull River drainages; and
- 2) the additional bull trout critical habitat designated within the action area in 2010 which includes the entire East Fork Bull River, the majority of East Fork Rock Creek, and Cabinet Gorge Reservoir.

Please find enclosed a Summary of Effects to be included with the Supplemental BA for the Rock Creek Mine Project previously sent to your office (January 13, 2017). The determination for the project remains may affect and is **Likely to Adversely Affect** bull trout and bull trout designated critical habitat within the project area. Given our agreement that 50 CFR 402.16 is triggered, I am requesting the reinitiation of formal consultation.

If you have questions or need any assistance as we work through consultation, please do not hesitate to contact either John Carlson, KNF Consultation Biologist, or Bobbie Lacklen, Rock Creek Project Coordinator, at (406) 293-6211. Thank you for your consideration in this matter and we look forward to working with the USFWS as we continue to move forward with this Project.

Sincerely,



CHRISTOPHER S SAVAGE

Forest Supervisor

Enclosure: (1) Summary of Effects



Summary of Determinations

Since the last biological opinion for the Rock Creek Mine Project (2007) there have been two major changes identified. The first being the changed designation of bull trout critical habitat in 2010 by the USFWS that added reaches in the Bull River, East Fork Bull River, the majority of East Fork Rock Creek and Cabinet Gorge Reservoir. The second change is the additional project effects analysis completed for the project indicating the possible groundwater interception to the mine void from Rock Creek (including main stem, East and West Forks) and the Bull River (including main stem and East Fork). For those reasons, the USFWS has recommended (FWS letter dated 2/15/2017) and the USDA Forest Service agrees that 50 CFR 402.16 is triggered and formal consultation, under section 7(a)(2) of the ESA, should be reinitiated.

Determinations made within this supplemental BA are based on the best data and scientific information available at the time of preparation. They remain unchanged from the conclusions of previous effects analysis.

Bull Trout & Designated Critical Habitat.—Implementation of the Rock Creek Mine Project may affect and is **likely to adversely affect** bull trout and bull trout designated critical habitat within the analysis area for the project. The adverse effects associated with the implementation of the proposed action would be site specific and variable based on the proximity of affected resources to the mine void and above ground facilities, roads, pipelines, and activity. Adverse effects associated with actions such as improving stream crossings for connectivity or increasing instream fish habitat would be short term and eventually overcome by the associated benefits to bull trout and critical habitat. Other actions such as new road constructions would potentially have longer lasting adverse effects to be minimized by maintenance and best management practice (BMP) implementation. Lastly, groundwater modeling conducted during the effects analysis of the proposed Rock Creek Mine Project NEPA process has predicted there may be some level of groundwater interception from project area streams into the mine void. This modeling has occurred subsequent to the most recent FWS Biological Opinion (2007).

Effects to the Species - Lower Clark Fork River Core Population

The Rock Creek Mine Project would affect two local populations within the Lower Clark Fork River core population. Both the Rock Creek and Bull River local populations would be affected by activities associated with the proposed mine.

The Rock Creek local population will be affected both directly and indirectly by the proposed action. The Rock Creek population is predominantly a stable resident population distributed throughout Rock Creek, and spawns in an area located from the East and West Fork Rock Creek confluence upstream to an impassable natural barrier. The population also produces migratory individuals indicating that life history strategy is present to some degree within the population.

Direct effects to individuals within the Rock Creek population would result primarily from project related sediment entering Rock Creek from road construction and reconstruction, mine related traffic throughout the life of the project, implementation of BMP's, facility construction, instream

mitigation activities, and rehabilitation activities associated with mine closure. As identified early in the consultation process, increased sediment would be the dominant direct effect to the population.

Indirect effects to both the Rock Creek and Bull River local populations are projected to occur due to groundwater interception by the mine void. The extent of this effect is based on results from the 3-D Model used to determine the percent of groundwater interception by the mine void. The effect, if measurable, would only be noticeable at base flows which is defined as those surface flows sourced only by groundwater with no run-off component. Reduced flows would decrease the volume of available habitat in the affected streams at base flows. Effects often associated with decreased flows, such as increased stream temperatures, are not anticipated as the riparian areas of affected stream reaches in Rock Creek, East Fork Bull River and the mainstem Bull River would remain largely intact and unaffected.

Effects to Designated Critical Habitat

The Rock Creek Mine Project would affect two areas of designated bull trout critical habitat (CH) within the Lower Clark Fork River core area. Critical habitat in both Rock Creek and the Bull River drainage would be affected by activities associated with the proposed mine.

Critical habitat in Rock Creek will be affected both directly and indirectly by the proposed action. Direct effects to Critical Habitat would result primarily from project related sediment entering Rock Creek, which would adversely affect Primary Constituent Element (PCE) #3 "Substrates of sufficient size, amount, and composition for juvenile and egg survival." Again this sediment would be from road construction and reconstruction, mine related traffic throughout the life of the project, implementation of BMP's, facility construction, instream mitigation activities, and rehabilitation activities associated with mine closure.

As with the species effects analysis, indirect effects to both the Rock Creek and Bull River CH were modeled to occur due to groundwater interception by the mine void. The extent of this effect is based on results from the 3-D Model used to determine the percent of groundwater interception by the mine void. Currently model runs are only capable of projecting a percentage of base flow reduction over an entire 6th field watershed with no capacity to show gaining and losing reaches. Groundwater interception to the mine void may affect PCE's 4 & 5 which are "Natural stream flows or artificial flows that are regulated in order to support bull trout" and "Springs, seeps, and groundwater sources, and subsurface flow that contributes to the water quantity and quality as a cold water source." No other CH PCE's would be affected in Rock Creek, East Fork Bull River and the mainstem Bull River or the Cabinet Gorge Reservoir.