Record of Decision

Montanore Project

February 2016

Cabinet Mountains *Photo by M. Holdeman*

United States Department of Agriculture

Forest Service
Northern Region
Kootenai National Forest

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Acronyms

Acronym	Definition
ARM	Administrative Rules of Montana
BHES	Board of Health and Environmental Sciences
BMP	Best Management Practice
BMU	Bear Management Unit
BORZ	(Grizzly) Bear Outside the Recovery Zone
BPA	Bonneville Power Administration
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CMW	Cabinet Mountains Wilderness
CSKT	Confederated Salish and Kootenai Tribes
CYE	Cabinet-Yaak Ecosystem
DEQ	Montana Department of Environmental Quality
DNRC	Montana Department of Natural Resources and Conservation
DSL	Montana Department of State Lands (now DEQ)
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FSM	Forest Service Manual
FWP	Montana Fish, Wildlife, and Parks
INFS	Inland Native Fish Strategy
IRA	Inventoried Roadless Area
KFP	Kootenai National Forest Land Management Plan
KNF	Kootenai National Forest
KTOI	Kootenai Tribe of Idaho
LAD	Land application disposal
LAU	Lynx Analysis Unit
MCA	Montana Code Annotated
MDT	Montana Department of Transportation
MEPA	Montana Environmental Policy Act
MFSA	Montana Major Facility Siting Act
MMC	Montanore Minerals Corporation
MMI	Mines Management, Inc.
MMRA	Metal Mine Reclamation Act
MOU	Memorandum of Understanding
MPDES	Montana Pollutant Discharge Elimination System
NEPA	National Environmental Policy Act
NFS	National Forest System
NHPA	National Historic Preservation Act
NMC	Noranda Minerals Corporation
PSU	Planning Sub-Unit
ROD	Record of Decision
SHPO	State Historic Preservation Office
USC	United States Code
USDA	U.S. Department of Agriculture
USFWS	USDI Fish and Wildlife Service

USDA Forest Service
Record of Decision
Montanore Project

1.1 Introduction

This document is the U.S. Department of Agriculture (USDA), Kootenai National Forest (KNF) Record of Decision (ROD) on the Montanore Project. The KNF intends to approve a Plan of Operations for the Montanore Project, a copper and silver underground mine and associated facilities, including a new transmission line, located near Libby, Montana (Figure 1). Montanore Minerals Corporation (MMC), a wholly owned subsidiary of Mines Management, Inc. (MMI), will be the project operator.

The proposed actions (mine and transmission line) will affect private, state, and National Forest System lands. To operate, the project will require a Plan of Operations approved by the KNF, as well as permits and approvals from the Montana Department of Environmental Quality (DEQ), the Bonneville Power Administration (BPA), the U.S. Army Corps of Engineers (Corps), and other state and local agencies. USDA Forest Service (Forest Service) authorities apply only to National Forest System lands and do not extend to private lands within or adjacent to the KNF.

The Cabinet Mountain Wilderness (CMW) became a unit of the National Forest Wilderness Preservation System with the passage of the Wilderness Act on September 3, 1964. In 2001 the Bureau of Land Management issued two patents for mining claims HR 133 and HR 134 which lie almost entirely within the CMW. Additional detail on the mineral rights within the CMW is contained in the Joint Final EIS in Sections 1.3.1. and 3.24.1. These patented mining claims contain the surface exposure of the ore body proposed for mining by the Montanore Project. Holders of validly existing mining claims within the National Forest Wilderness are accorded the rights provided by the 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 management requirements that are above and beyond those normally imposed on operations ouside of a wilderness, provided those requirements do not prevent the operator form exercising due rights under United State mining laws.

This document is the KNF ROD only. The DEQ, which is a co-lead agency, will document its decisions in a separate document. The DEQ ROD states that it is holding in abeyance a decision on whether to amend the provisions of the current operating permit regarding the construction, operation, closure and post-closure phases of the project to make it consistent with the KNF's selected mine alternative. The DEQ approval of amendments to Operating Permit No. 00150 pertaining to the Evaluation Phase is conditioned on MMC receiving DEQ' s approval of the renewal of MPDEQ Permit No. MT0030279.

Decisions by other agencies, such as cooperating agencies, also will be documented in separate decision documents. 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 those factors were balanced by the KNF Supervisor in the decision-making process. This document also describes KNF requirements that MMC must meet before initiating various mine phases. Key requirements for beginning the Evaluation and Construction Phases are described in Sections 1.4.1.1 and 1.4.1.2 beginning on page 9.

The KNF and DEQ determined that the Montanore Project may significantly affect the quality of the human environment. As a result, these two agencies, as state and federal lead agencies (the agencies), along with the Corps and BPA, as cooperating agencies, prepared an Environmental Impact Statement (EIS) pursuant to the National Environmental Policy Act (NEPA) and the Montana Environmental Policy Act (MEPA).

The KNF and DEQ issued a Draft EIS for the Montanore Project on February 27, 2009 for public comment. In response to public comment, the agencies revised the mine alternatives (Alternatives 3 and 4) and transmission line alignments (Alternatives C, D, and E) and issued a Supplemental Draft EIS on October 7, 2011. On April 1, 2015 the KNF issued a Final EIS and Draft ROD pursuant to the Forest Services' predecisional objection process. A Joint Final EIS was issued by the KNF and the DEQ for the Montanore Project in December 2015. The Notice of Availablity of the Joint Final EIS for the Montanore Project was published in the Federal Regester on December 18, 2015. Both the KNF's Final EIS and the Joint Final EIS include responses to comments on the

Draft EIS and Supplemental Draft EIS and incorporates changes based on those responses. The Joint Final EIS describes the Proposed Action and a number of alternatives to the Proposed Action. All action alternatives meet the purpose and need for the project (summarized in Section 1.2.3 below). The Joint Final EIS also describes the potentially affected environment and discloses the potential environmental consequences of implementing the Proposed Action or alternatives to the Proposed Action. The Joint Final EIS and this ROD are on file and available at the KNF Supervisor's office in Libby, Montana, and the DEQ office in Helena, Montana, as well as on the Internet, and at numerous local libraries in the vicinity of the proposed project area. The Joint Final EIS and this ROD may also be accessed on the internet at lead agencies and EPA's web sites. The objection process implemented for the draft ROD is discussed in Section 1.10, *Pre-decisional Administrative Review.*

1.2 Background

1.2.1 Project History

The permitting process for the Montanore Project began in 1989 when Noranda Minerals Corporation (NMC), a subsidiary of Noranda Finance Inc., obtained an exploration license from the Montana Department of State Lands (DSL) (DEQ's predecessor agency) and other associated permits for construction of an exploration adit from private land in upper Libby Creek. Background on the project's mineral rights is in Chapter 1 of the Final EIS. Soon after obtaining the exploration license, NMC began excavating the Libby Adit. NMC also submitted a "Petition for Change in Quality of Ambient Waters" (Petition) to the Board of Health and Environmental Sciences (BHES) requesting an increase in the concentration of select constituents in surface water and groundwater above ambient water quality, as required by Montana's 1971 nondegradation statute. After constructing about 14,000 feet of the Libby Adit, NMC ceased construction in 1991 in response to elevated nitrate concentration in surface water and low metal prices.

Although exploration adit construction ceased in 1991, the permitting process continued. Specifically, the KNF, the Montana Department of Health and Environmental Sciences, the Montana Department of Natural Resources and Conservation (DNRC), and the DSL prepared a Draft, Supplemental, and Final EIS on the proposed project. The environmental review process culminated in 1992 with BHES's issuance of an Order approving NMC's Petition and the DSL's issuance of a ROD and Hard Rock Operating Permit #00150 to NMC. In 1993, the KNF issued its ROD, the DNRC issued a Certificate of Environmental Compatibility and Public Need under the Major Facilities Siting Act (MFSA), and the Corps issued a 404 permit. These decisions approved mine and transmission line alternative that allowed for the construction, operation, and reclamation of the project.

The BHES Order, issued to NMC in 1992, authorizes degradation and establishes limits in surface water and groundwater in the Libby, Poorman, and Ramsey Creek watersheds adjacent to the Montanore Project for discharges from the project. The BHES Order establishes numeric limits for total dissolved solids, chromium, copper, iron, manganese, and zinc in both surface water and groundwater; nitrate+nitrite in groundwater only; and total inorganic nitrogen (nitrate+nitrite+ ammonia) in surface water only. For the parameters not covered by the authorization to degrade, the applicable nonsignificance criteria established by the 1994 nondegradation rules apply, unless MMC obtains an authorization to degrade under current statute. Pursuant to BHES' Order, these limits apply to all surface water and groundwater affected by the Montanore Project and remain in effect during the operational life of the mine and for so long thereafter as necessary. The BHES Order is presented in Appendix A in the Final EIS.

In 1997, DEQ issued a Montana Pollutant Discharge Elimination System (MPDES) permit to NMC (MT0030279) to allow discharges of water flowing from the Libby Adit to Libby Creek. Three outfalls were included in the permit: Outfall 001 – percolation pond discharging to groundwater; Outfall 002 – drainfield with three infiltration zones discharging to groundwater; and Outfall 003 – pipeline outlet to Libby Creek. Surface discharge from the exploration adit ceased in 1998 and water in the adit flowed to the underlying groundwater.

By 2002, many of NMC's permits for the Montanore Project terminated or expired, such as DEQ's air quality permit, the Corps' 404 permit, KNF's approval, and the state's certification of the transmission line. In 2002, NMC notified the KNF it was relinquishing the authorization to operate and construct the Montanore Project. NMC's DEQ Operating Permit #00150 and MPDES permit remain in effect because reclamation of the Libby Adit was not completed.

1.2.2 Proposed Action

1.2.2.1 Permit Applications

In December 2004, MMI submitted an application for a hard rock operating permit to the DEQ and a proposed Plan of Operations for the Montanore Project to the KNF. MMI also submitted to the DEQ an application for a 230-kilovolt (kV) transmission line certificate of compliance, an application for an air quality permit, and an application for a MPDES permit amendment that covered additional discharges not currently permitted under the existing MPDES permit for the Libby Adit.

In 2006, a subsidiary of MMI acquired NMC and the name of NMC was changed to MMC. MMC (formerly NMC) remains the holder of DEQ Operating Permit #00150 and the MPDES permit for the Montanore Project. MMI and MMC advised the agencies that MMC will be the

owner and operator of the Montanore Project. MMI and MMC have requested that the DEQ consider MMI's application for a hard rock operating permit as an application by MMC for an amendment to DEQ Operating Permit #00150. MMC submitted an updated Plan of Operations to the agencies in 2008 that clarified differences between the 2005 Plan of Operations and DEQ Operating Permit #00150. The updated Plan of Operations also incorporated plans required by DEQ Operating Permit #00150 and additional environmental data collected since 2005. The DEQ approved a revision in 2009 (MR08-001) to MMC's operating permit that involved the relocation of fuel and oil storage areas Adit at the Libby Adit and the addition of more fuel storage capacity.

MMC and the DEQ agreed to hold the request for amendment to the permit in abeyance until completion of the environmental review process. MMC's Plan of Operations is considered a new Plan of Operations by the KNF because NMC relinquished the federal approval to construct and operate the Montanore Project in 2002. Both the KNF and the DEQ consider MMC's proposed 230-kV North Miller Creek transmission line to be part of the Proposed Action as the 1993 Certificate of Environmental Compatibility and Public Need for the 230-kV transmission line expired.

1.2.2.2 Libby Adit Evaluation Program

Following the acquisition of NMC and DEQ Operating Permit #00150, MMC submitted, and the DEQ approved in 2006, two requests for revisions to DEQ Operating Permit #00150 (MR 06-001 and MR 06-002). The revisions involved reopening the Libby Adit and reinitiating the evaluation drilling program that NMC began in 1989. The key elements of the revisions included excavation of the Libby Adit portal, initiation of water treatability analyses, installation of ancillary facilities, dewatering of the Libby Adit decline, extension of the current drift, and underground drilling and sample collection.

The KNF determined the activities associated with the Libby Adit evaluation drilling were a new proposed Plan of Operations, and MMC needed KNF approval before dewatering and continuing excavation, drilling, and development work at the Libby Adit. Under the authority of revision 06-002 of DEQ Operating Permit #00150, which was approved in 2006, MMC installed a Water Treatment Plant and is treating water from the adit.

In 2006, the KNF initiated an analysis that included public scoping for the proposed road use and evaluation drilling at the Libby Adit Site. In 2008, the KNF decided the best approach for disclosing the environmental effects of the Libby Adit evaluation program was to consider the activity as the initial phase of the overall Montanore Project in the EIS. The Libby Adit evaluation program will be the first phase of the Montanore Project in the selected mine alternative.

1.2.3 Purpose and Need

The Forest Service's overall purpose and need is to process MMC's proposed Plan of Operations to develop the Montanore copper and silver deposit and to follow all applicable laws, regulations, and policies pertaining to the proposal. The need is to:

- Respond to MMC's proposed Plan of Operations to develop the Montanore copper and silver deposit
- Ensure the selected mine and transmission line alternatives will comply with applicable federal and state laws and regulations

- Ensure the selected mine and transmission line alternatives, where feasible, will minimize adverse environmental impacts on National Forest System surface resources
- Ensure measures will be included, where practicable, that provide for reclamation of the surface disturbance

1.3 Issues Considered and Addressed

The agencies identified seven key issues through the scoping process; each issue is briefly discussed in the following sections. Each resource section in Chapter 3 of the Final EIS describes how the effects on each resource were evaluated. Discussions of how these issues factored into my (the KNF Supervisor) decision process is found in Section 1.4.4 and Section 1.5.

Issue 1: Potential for acid rock drainage and metal leaching

Drainage from waste rock, tailings, and stormwater runoff may adversely affect water resources in the project area. Effects were assessed through predicted changes in water quality due to acid generation and near-neutral pH metal leaching and release of elevated concentrations of trace elements as a result of weathering of mined materials, based on geochemical characterization data.

Issue 2: Effects on quality and quantity of surface water and groundwater resources

Groundwater Flow and Quality

Underground mining activities may affect groundwater in the mine area, which may indirectly affect Rock Lake and other waters in the CMW located above the mine. Appropriations from or discharges to groundwater, such as from the proposed land application disposal (LAD) areas and the tailings impoundment, may affect groundwater flows and quality. Effects were assessed through two-dimensional and three-dimensional models, which evaluated potential quantity impacts on mine area groundwater and overlying and surrounding surface water during construction, operations, and post-mining periods. Effects on groundwater at other facility locations were assessed through estimating changes in flow path, quantity, and quality from discharges.

Surface Water Flow

Changes in groundwater from underground mining operations, discharges, and altered topography may change surface water flow and lake levels. Effects were predicted by evaluating potential changes in surface water flow in area springs, lakes, and streams. For lower altitude spring and streamflows, changes were estimated for mine operation diversions from or discharges from or to streams.

Surface Water Quality

Discharges or flow from mined areas containing metals, nutrients, or sediments may affect surface water quality in project area lakes, streams, and rivers. Effects were predicted by estimating changes in selected water quality parameters.

Issue 3: Effects on fish and other aquatic life and their habitats

Discharges and changes in surface water flows may affect fish and other aquatic life; the threatened bull trout and designated critical habitat in the project's analysis area are particularly

of concern. Riparian habitat alteration from construction and operation of mine and transmission line facilities may affect Kootenai National Forest Land Management Plan (KFP) Inland Native Fish Strategy (INFS) riparian management objectives for facilities located within riparian habitat conservation areas (RHCAs). The effects were predicted by estimating changes in surface water and groundwater parameters, changes in habitat quality, and changes in abundance and composition of aquatic life.

Issue 4: Changes in the project area's scenic integrity

The proposed mine and transmission line may change the existing visual character of the project area. Effects were predicted by estimating change in line, color, texture, form, and character of the landscape, and evaluating compliance with the 2015 KFP's scenic integrity objectives. Effects were also assessed quantitatively by determining mine facilities and miles of transmission line visible from key observation points, important travel corridors, and the CMW.

Issue 5: Effects on threatened or endangered wildlife species

Grizzly Bear

Construction and operation of mine and transmission line facilities may impact grizzly bear habitat and may increase grizzly bear mortality and displacement. Effects were evaluated by estimating changes in percent of core habitat, percent open motorized route density greater than 1 mile per square mile (mi/mi^2), percent total motorized route density greater than 2 mi/mi^2, and displacement effects in affected Bear Management Units (BMU) in the Cabinet-Yaak Ecosystem (CYE) Recovery Zone. The Final EIS also evaluated effects in the Cabinet Face Bears Outside of the Recovery Zone (BORZ) by estimating changes in the baseline total linear miles of road and total linear miles of open road on National Forest System land. Effects within the Cabinet-Yaak Ecosystem Recovery Zone and Cabinet Face BORZ were also assessed qualitatively by evaluating potential changes in effectiveness of grizzly bear movement corridors, human activity, and attractant availability.

Lynx

Construction and operation of mine and transmission line facilities may disturb or degrade lynx habitat. Effects were evaluated by assessing the proposed activities compliance with the applicable objectives, standards, and guidelines of the Northern Rocky Lynx Management Direction in each affected Lynx Analysis Unit (LAU). Effects on lynx habitat components within the affected LAUs was also assessed. Effects also were assessed qualitatively by evaluating connectivity between habitat blocks in affected and adjacent LAUs, linkage areas between LAUs, habitat for alternative prey, and traffic-related mortality risks in affected LAUs or adjacent LAUs.

Issue 6: Effects on wildlife and their habitats

Key Wildlife Habitats

Construction and operation of mine and transmission line facilities may impact the quality or quantity of old growth, snags, and down wood habitat. Effects were predicted by determining the following:

- Acres of vertical structure removed in old growth
- Acres of edge habitat
- Acres of interior old growth
- Acres of snag habitat

- Coarse woody debris removed

In the Joint Final EIS that was issued in December 2015, Table 185 did not accurately show the impacts on old growth from combined mine and transmission line alternatives. The table has been corrected and is included in Attachment 11.

Pileated Woodpecker

Construction and operation of mine and transmission line facilities may directly or indirectly impact cavity-nesting species, such as the pileated woodpecker. Effects were evaluated based on impacts to important attributes of pileated woodpecker habitat including old growth, down wood and snag habitat and indirect disturbance to pileated woodpeckers.

Issue 7: Effects on wetlands and streams

Construction and operation of mine and transmission line facilities may affect, directly or indirectly, wetlands and streams, altering wetland function and values. Effects were predicted by estimating the number of acres and feet of stream filled, dewatered, or otherwise affected. Changes in wetland function and values were evaluated qualitatively.

1.4 KNF Decisions and Rationale for Decisions

I, the KNF Supervisor, must make a number of decisions on MMC'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 National Forest System lands and does not extend to private lands within or adjacent to the KNF.

1.4.1 KNF Decisions

It is my decision to approve an amended Plan of Operations for the development of the Montanore copper/silver deposit consistent with Mine Alternative 3 (the Agency Mitigated Poorman Impoundment Alternative) and Transmission Line Alternative D-R (the Miller Creek Transmission Line Alternative) of the Final EIS as modified by this ROD. An amended Plan of Operations consistent with this decision must be submitted to me for my approval prior to implementation.

The alternatives I selected for implementation, subsequently called the "selected mine alternative" and "selected transmission line alternative," or collectively "selected mine and transmission line alternatives " are described in Attachment 1. The selected mine and transmission line alternatives include the KNF's December 2015 Terrestrial Threatened and Endangered Species Mitigation Plan (Attachment 4) and Bull Trout Mitigation Plan (Attachment 5). I accept and the KNF will implement or require MMC to implement all terms and conditions from the U.S. Fish and Wildlife Service's (USFWS) Biological Opinion for the grizzly bear (Attachment 6) and the bull trout and bull trout critical habitat (Attachment 7).

My decision also amends the 2015 Kootanai Forest Plan (KFP) to suspend six KFP guidelines and two KFP standards in order to implement Mine Alternative 3 and Transmission Line Alternative D-R while still maintaining consistency with the KFP. Forest Service approval of mineral development must comply with applicable forest plan direction, and the Forest Service cannot prohibit locatable mineral operations on lands subject to the United States mining laws either directly or by regulation amounting to a prohibition. This means that if the operations would not comply with any applicable forest plan component after all reasonable stipulations to

minimize adverse environmental impacts on National Forest surface resources have been included per 36 CFR 228, a forest plan amendment is required. The site-specific KFP amendment for the Montanore Project, suspends the requirement for full consistency with eight KFP guidelines and standards (Attachment 10).

My decision allows MMC to disturb 1,542 acres for mineral operations (Figure 2) and allows the construction and operation of a transmission line across 9.1 miles of National Forest System lands (Figure 3). All plans, mitigation measures, and monitoring requirements must be submitted and approved by the KNF as sequenced and outlined in this decision prior to the Forest Service approving MMC to proceed with those actions affecting National Forest System lands. All disturbances related to the operation will be fully bonded for reclamation (see Section 1.9).

My decision requires MMC to:

- Agree to and submit an amended Plan of Operations consistent with this ROD, Selected Mine Alternative 3 and Transmission Line Alternative D-R, and selected stipulations and mitigation measures (Attachment 2), for my approval.
- Commence activities associated with the amended Plan of Operations when terms associated with each phase of the Plan of Operations have been met and when MMC has received a signed approval from me to proceed.
    - Proceed in phases (evaluation, construction, operations, closure, and post-closure) based on the sequencing of activities for development of the mine. Although this decision approves the entire Plan of Operations for the development of the Montanore copper silver deposit, the Libby Adit evaluation program is the first phase to be implemented. Additional geotechnical, hydrological, and other information is required during the Evaluation Phase to refine a mine plan and to confirm and support the analysis for the Construction and Operation Phases of the mine. Hydrologic data collected during the Evaluation Phase will be used to refine the predictions of the 3D Groundwater Model. After review and evaluation of the data collected during the Evaluation Phase, the Forest Service will determine whether the environmental impacts associated with final design remain within the scope of those impacts identified in the Final EIS, or will determine if additional NEPA analysis is required. The selected mine and transmission line alternatives are summarized in Section 1.4.2 and are described fully in Attachment 1. Key items that MMC must complete prior to the Evaluation and Construction Phases are summarized in Sections 1.4.1.1 and 1.4.1.2, respectively. A list of requirements for all mine phases is in Attachment 2.
- Post a joint reclamation bond to ensure that both federal and state reclamation requirements are met. KNF and DEQ will share responsibility to monitor and inspect the Montanore Project. As stipulated in the 1989 Memorandum of Understanding (MOU) between the Forest Service-Northern Region and the DSL, a joint reclamation bond will be held by the KNF and DEQ to ensure compliance with the reclamation plan, associated approved Plan of Operations, and DEQ's operating permit. If MMC 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. KNF and DEQ will also require a reclamation bond to be posted for

National Forest System lands affected by the transmission line. DEQ also will require the posting of reclamation bond for private lands affected by the transmission line. Financial assurance is discussed in more detail in Section 1.9 below and in Section 1.6.3 of the Joint Final EIS.

- Avoid or minimize, to the extent practicable, locating facilities (such as the Seepage Collection Pond and transmission line structures in the selected mine and transmission line alternatives) in a floodplain. If locating mine facilities in a floodplain cannot be avoided, an application for a floodplain permit will be submitted to the DNRC that provides details on the obstruction or use of a floodway floodplain, and a permit will be required before construction begins. If locating mine facilities in a floodplain cannot be avoided, an application for a floodplain permit will be submitted to the DNRC that provides details on the obstruction or use of a floodway floodplain and a permit will be required before construction. DNRC's permit decision and associated conditions on the floodplain permit for these facilities constitute compliance with requirements of Executive Order (EO) 11988 as amended by EO 13690 (See Section 1.6.19).

MMC requested a transmission line certificate, an air quality permit, and an amendment of its MPDES permit from the DEQ. DEQ's permit decision and associated conditions on the MPDES permit renewal, DEQ's decision and associated conditions on the 401 certification, and DEQ's decision and associated conditions on other state water quality permits constitute compliance with Montana water quality requirements and Clean Water Act requirements regarding water quality. DEQ's permit decision and conditions on the air quality permit constitute compliance with Clean Air Act requirements. Similarly, MMC has pending applications for beneficial water use permits from the DNRC. DNRC's permit decision and associated conditions on any beneficial water use permit constitute compliance with Montana water use requirements.

My decision is based on a thorough review of the Joint Final EIS, 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 3 of the Joint Final EIS for the Montanore Project. I considered relevant scientific information, public concerns and opposing viewpoints, scientific uncertainty, and risk, which are discussed in the resource sections in Chapter 3 of the Joint Final EIS. I met with interested members of the public to listen to their concerns and issues to help me in formulating my decisions.

1.4.1.1 Key Requirements Before Evaluation Phase Initiation

The Libby Adit evaluation program will be the initial phase of the project and will be completed before construction of any other project facility. The objectives of the evaluation program are to:

- Expand the knowledge of the mineralized zones of the deposit
- Assess and define the mineralized zone within established valid existing rights
- Collect, provide, and analyze additional geotechnical, hydrological, and other information required to refine a mine plan and to confirm and support the analysis for the Construction and Operation Phases of the mine.

MMC must comply with the following key items and receive KNF approval prior to proceeding with the Evaluation Phase (a list of requirements is in Attachment 2). Certain monitoring and

mitigation are required before MMC starts the Evaluation Phase. Such activities are described as occurring in the Pre-Evaluation Phase.

- Amend and update the Plan of Operations for the Evaluation Phase to make it consistent with the selected mine alternative (Attachment 1) and stipulations and mitigation measures (Attachment 2);
- Amend and update the reclamation portion of the Plan of Operations for the Evaluation Phase consistent with the selected mine alternative;
- Submit a reclamation performance bond acceptable to the agencies for the first 5 years of mine life (Evaluation and Construction Phases);
- Submit plans for monitoring during the Pre-Evaluation and Evaluation Phases consistent with 1) revised Appendix C of the Final EIS (Attachment 3 of this ROD); 2) the KNF's Threatened and Endangered Species Mitigation Plan (Attachment 4); 3) the Terms and Conditions in the USFWS Biological Opinions (Attachment 6 and Attachment 7); and 4) conditions of any other permit or approval, such as a 404 permit, a 401 certification, or a beneficial water use permit;
- Implement the monitoring for any resource, such as water resources, required in the Pre-Evaluation and Evaluation Phases, consistent with the approved monitoring plans;
- Submit final mitigation plans consistent with selected mine and transmission line alternatives, the KNF's mitigation plans, the terms and conditions of the Biological Opinions, and other state and federal permits or approvals;
- Implement all mitigation for all resources (such as fisheries or wildlife) and modifications required before initiating the Evaluation Phase, as outlined in the selected mine and transmission line alternatives (Attachment 1) and listed in Attachment 2;
- Implement the Terms and Conditions relative to the Evaluation Phase as required by the 2014 Biological Opinions (Attachment 6 and Attachment 7); and
- Obtain a 404 permit from the Corps and a 401 certification from the DEQ for pre-Evaluation Phase or Evaluation Phase activities if they include the discharge of fill material into waters of the U.S.

1.4.1.2 Key Requirements Before Construction Phase Initiation

Mine and transmission line construction can commence only after the KNF has reviewed and approved final design and monitoring plans, and informed MMC in writing that MMC is allowed to proceed with the Construction Phase.

MMC must comply with the following key items prior to being allowed to proceed with the Construction Phase (A list of project requirements is in Attachment 2. Transmission line requirements are in Attachment 8). Certain monitoring and mitigation are required before MMC starts the Construction Phase. Such activities are described as occurring in the Pre-Construction Phase.

- Complete all requirements of the Final Design Phase described in Section 1.1.1.6 of Attachment 1). All final designs require acceptance and approval by the agencies. Final design requirements include the forming of one or more technical advisory groups to review and evaluate information and data from the Evaluation Phase, including hydrologic and geotechnical information, and to advise the lead agencies as to whether the environmental impacts associated with final design remain within the scope of those impacts identified in the Final EIS.
- Update and amend the Plan of Operations for the mine and transmission line consistent with the selected mine and transmission line alternatives (Attachment 1) and any changes identified during final design.
- Amend and update the reclamation portion of the Plan of Operations for the mine and transmission line consistent with the selected mine and transmission line alternatives (Attachment 1) and any changes identified during final design.
- Submit the reclamation performance bond to ensure federal reclamation requirements for the construction of the mine and transmission line are met.
- Implement all pre-construction environmental specifications for the transmission line (Attachment 8).
- Submit plans for monitoring required during all remaining phases consistent with 1) the revised Appendix C of the Final EIS (Attachment 3 of this ROD); 2) the KNF's Threatened and Endangered Species Mitigation Plans (Attachment 4 and Attachment 5); 3) the Terms and Conditions in the USFWS Biological Opinions (Attachment 6 and Attachment 7) 4) conditions of any other permit or approval, such as a 404 permit, a 401 certification, or a beneficial water use permit.
- Implement all monitoring for any resource, such as water resources, required before initiating the Construction Phase, consistent with the approved monitoring plans;
- Comply with terms and conditions and mitigations relative to the Construction Phase as required by the 2014 Biological Opinions (Attachment 6 and Attachment 7);
- Implement mitigation for all resources (e.g., wetlands, bull trout, and wildlife) and modifications required before initiating the Construction Phase as outlined in the Selected Alternative (Attachment 1) and listed in Attachment 2; and
- Obtain a 404 permit from the Corps and a 401 certification from the DEQ, unless certification is waived by DEQ.

The KNF will conduct additional NEPA analysis if 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), are identified during final design.

1.4.1.3 Modifications Made to the Final EIS Alternatives in the Selected Mine and Transmission Line Alternatives

My decision makes several modifications to the Final EIS selected mine and transmission line alternatives. These modifications include changes needed to comply with the terms and conditions of the Biological Opinions (see Attachment 6 and Attachment 7). I am making these modifications because the KNF must comply with the terms and conditions in order to be consistent with the Endangered Species Act. Effects of these modifications are discussed in Attachment 9.

In January 2015, the Regional Forester approved a new forest plan for the KNF. The Montanore Project will be implemented in accordance with the new KFP. Attachment 10 describes the amendments to the KFP for the Selected mine and transmission line alternatives. Forest Service approval of mineral development must comply with applicable forest plan direction and the Forest Service cannot prohibit locatable mineral operations on lands subject to the United States mining laws either directly or by regulation amounting to a prohibition. This means that if the operations would not comply with any applicable forest plan component after all reasonable stipulations to minimize adverse environmental impacts on National Forest surface resources have been included per 36 CFR 228, a forest plan amendment is required.This decision will suspend the following six 2015 KFP guidelines and two standerds in order to implement Mine Alternative 3 and Transmission Line Alternative D-R while still maintaining consistency with the KFP: FW-GDL-WL-08 and FW-GDL-WL-09 for moose and deer winter range; FW-GDL-AR-01, MA5a,b,c-GDL-AR-06, and MA6-GDL-AR-05 for scenery; FW-STD-RIP-01 and FW-STD-RIP-02 for RHCAs; FW-GDL-VEG-02 for old growth (Attachment 10).

Modification 1—The KNF's December 2015 Terrestrial Threatened and Endangered Species Mitigation Plan grizzly bear mitigation plan (Attachment 4) which is included in Appendix C of the Biological Opinion was modified by the terms and conditions of the grizzly bear Biological Opinion (Attachment 6). Two terms and conditions (1.a and 1.b) modify the public outreach (information and education) plan described in the Final EIS and in Attachment 4 as item A.1.c. I am modifying the selected mine and transmission line alternatives by requiring MMC to develop a public outreach (information and education) plan in detail for KNF approval before starting the Construction Phase. Appendix I of the Biological Opinion for the grizzly bear outlines essential features of the public outreach plan. The KNF will review and approve, with USFWS advice, MMC's detailed program for public outreach before the start of the Construction Phase. Modification 1 incorporates the two terms and conditions 1.a and 1.b. I am making this modification because the KNF must comply with the terms and conditions in order to be exempt from prohibitions in the Endangered Species Act against the taking of listed species.

Modification 2—I am modifying the KNF's grizzly bear mitigation plan described in the Final EIS and in Attachment 4 as item D.2.a to require MMC to fund or implement, under Forest Service direction, the construction of an earthen barrier on the East Fork Rock Creek Trail #935, which will convert it from motorized to non-motorized, before the Evaluation Phase rather than before the Construction Phase. Modification 2 incorporates the requirements of term and condition 2.a. I am making this modification because the KNF must comply with the terms and conditions in order to be exempt from prohibitions in the Endangered Species Act against the taking of listed species.

Modification 3—I am modifying the selected mine and transmission line alternatives by requiring MMC to use NFS roads #231, #278, #2317, #4781, #6210, and #2316 as the main access roads from US 2 to the Libby Plant Site and Libby Adit Site (Figure 4). Modification 2 incorporates the requirements of term and condition 2.b. The Final EIS indicates the KNF would transfer ownership and responsibilities for maintenance of NFS road #278 (Bear Creek Road) to Lincoln County after the road was reconstructed for use as the main access road. Because of this modification, NFS road #278 will not be reconstructed and used for access, and the KNF will discuss with Lincoln County if it still wants ownership of the Bear Creek Road. I am making this modification because the KNF must comply with the terms and conditions of the Biological Opinion in order to be exempt from prohibitions in the Endangered Species Act against the taking of listed species.

Modification 4—I am modifying the KNF's grizzly bear mitigation plan regarding access management strategies on acquired mitigation land parcels described in the Final EIS. This modification will require MMC to plan, fund and implement access management strategies on acquired mitigation land parcels consistent with the intent of the mitigation plan to improve core habitat and access parameters (road densities) before the parcels are transferred to the Forest Service. MMC will develop the strategies in coordination with the Forest Service and USFWS and the strategies will be approved by both agencies. Modification 4 incorporates the requirements of term and condition 2.c. I am making this modification because the KNF must comply with the terms and conditions in order to be exempt from prohibitions in the Endangered Species Act against the taking of listed species.

In conjunction with Modification 4, I am modifying two requirements of the KNF's grizzly bear mitigation plan for the grizzly bear. Items C.2.c.ix and C.2.d.ix of the mitigation plan require MMC to plan and fund any habitat enhancement activities needed to improve the mitigation properties, such as the trail conversion, road access changes or removal of buildings and debris before the Construction Phase. According to the plan, implementation "would occur as soon as feasible." With the change I am approving, MMC will implement these enhancement activities before the title or a conservation easement is conveyed to the Forest Service. I am making this modification to ensure the mitigation plan objectives are met and that all enhancement implementation occurs in a timely and specified manner.

Modification 5— I am modifying the grizzly bear mitigation plan described in the Final EIS and in Attachment 4 as item A.3.a.viii regarding reporting requirements, by changing the implementation timeframe of this item to prior to the Evaluation Phase, rather than prior to the Construction Phase. An earlier establishment of the mandatory reporting system is required in order to comply with the reporting requirements E.a and E.b in the grizzly bear Biological Opinion.

I am further modifying A.3.a.viii by requiring MMC to submit an annual summary report to the Forest Service each December, beginning in the year in which the Evaluation Phase activities start, which will describe any grizzly bear and black bear sanitation incidents that have occurred involving MMC personnel, and corrective measures taken during the previous year associated with project. Modification 5 incorporates the requirements of reporting requirement E.a. I am making this modification because the KNF must comply with the reporting requirements in order to be exempt from prohibitions in the Endangered Species Act against the taking of listed species.

Modification 6—The KNF's bull trout mitigation plan has been updated by the terms and conditions of the bull trout Biological Opinion (Attachment 7). I am therefore modifying the bull trout mitigation plan described in the Final EIS. I am making this modification because the KNF must comply with the terms and conditions in order to be consistent with the Endangered Species Act. In addition to the USFWS's modifications to the bull trout mitigation plan described in the Final EIS, I am requiring MMC to coordinate with the Corps and DEQ during the development of any bull trout mitigation action that will require a discharge of fill into a water of the U.S. I am requiring coordination with the Corps and DEQ to ensure all agencies with regulatory responsibilities are involved in finalizing bull trout mitigation projects. This coordination requirement is consistent with term and conditions of the bull trout Biological Opinion, which requires coordination and consultation with "other appropriate regulatory agencies and stakeholders as determined by the Forest Service."

1.4.2 Description of the Selected Mine and Transmission Line Alternatives

1.4.2.1 Alternative 3—Agency Mitigated Poorman Impoundment Alternative

Alternative 3, the selected mine alternative, is fully described in Attachment 1. The selected mine alternative incorporates modifications and mitigating measures proposed by the agencies to reduce or eliminate adverse environmental impacts (Table 2).

Development of the Montanore Project will require construction of an underground mine and adits (underground access) and surface facilities, such as a mill, tailings impoundment (Figure 2), and access roads (Figure 4). The Libby Plant Site will be on a ridge between Poorman Creek and Ramsey Creek, with mine production and ventilation adits in the upper Libby Creek drainage, about 1 mile from the CMW boundary. An additional ventilation adit on private land owned by MMC east of Rock Lake will be used for ventilation. A Poorman Tailings Impoundment Site will be north of Poorman Creek and south of Little Cherry Creek. The Libby Creek Road (NFS road #231) will be the main access road. The operating permit area, as described in the Joint Final EIS, will be 2,157 acres, and the disturbance area will be 1,542 acres. The permit area will encompass 75 acres of private land owned by MMC at the Libby Adit Site and the Rock Lake Ventilation Adit Site. The Libby Adit evaluation program will be the initial phase of the project and will be completed before the Construction Phase of the project.

MMC will develop and implement a final Road Management Plan consistent with the terms and conditions of the grizzly bear Biological Opinion (Attachment 6). During the Evaluation Phase, MMC will access the Libby Adit Site via NFS road #231 (Libby Creek Road) starting at US 2 to the intersection with NFS road #2316. NFS road #2316 will then be used to reach the Libby Adit Site. During all other mine phases, with the exception of road upgrades during the Construction Phase, access to the Montanore Mine (Figure 4) will be via NFS road #231 (Libby Creek Road) starting at US 2 to the intersection with NFS road #278 (Bear Creek Road). From there, NFS road #278 and a short segment of NFS road #4781 south of Poorman Creek will be used until it intersects the proposed mine haul road between the Libby Plant Site and the Poorman Tailings Impoundment Site. The mine haul road (NFS roads #4781 and #6210) will be used to access the Libby Plant Site and the Poorman Tailings Impoundment Site, and NFS road #2316 west of the intersection with NFS road #6210 will be used to access the Libby Adit Site. During the Construction Phase, upgrading of the three mine access roads, bridge construction, and other necessary closures of Libby Creek Road, the Bear Creek Road starting at US 2 will be the temporary approved access route to the mine, private property, and recreation sites along the Libby Creek Road south of the closure.

The agencies' required monitoring plans are presented in Attachment 3. The mitigation plan for grizzly bear and lynx (Attachment 4) as modified by the terms and conditions of the grizzly bear Biological Opinion (Attachment 6) and the mitigation plan for bull trout and bull trout critical habitat (Attachment 5) is replaced by the terms and conditions of the bull trout Biological Opinion (Attachment 7).

1.4.2.2 Alternative D-R—Miller Creek Transmission Line Alternative

Alternative D-R, the selected transmission line alternative, is fully described in Attachment 1. The selected transmission line alternative incorporates modifications and mitigating measures proposed by the agencies to reduce or eliminate adverse environmental impacts (Table 3). As part

of the selected transmission line alternative, MMC is required to implement the agencies' Environmental Specifications to guide line construction, operation, maintenance, and decommissioning activities (Attachment 8).

The BPA will design, construct, own, operate, and maintain the Sedlak Park Substation and loop line that will connect the substation to the Noxon-Libby 230-kV transmission line. BPA's proposed Sedlak Park Substation Site at the Noxon-Libby 230-kV transmission line is in an area known locally as Sedlak Park, 30 miles southeast of Libby on US 2. MMC will be responsible for funding construction of the transmission line, substation, and loop line. The BPA is prohibited by law from directly serving the mine; Flathead Electrical Cooperative will be the retailer of power to the mine project.

From the Sedlak Park Substation, the alignment will traverse an east-facing ridge immediately north-northwest of the substation and will cross Hunter Creek 2 miles north-northwest of the substation (Figure 3). After crossing Hunter Creek, the alignment will head west, crossing US 2, the Fisher River, West Fisher Creek, and NFS road #231 (Libby Creek Road). The alignment then will head northwest, up and over the ridge between West Fisher Creek and Miller Creek. After the alignment crosses the ridge between West Fisher Creek and Miller Creek, the alignment will follow NFS road #4724 (South Fork Miller Creek Road) to a ridge separating Miller Creek from the Standard Creek drainage. The alignment will traverse the ridge into the Howard Creek drainage. The centerline will be about 500 feet east of the northeast corner of a private land parcel about 0.5 mile south of Howard Lake. North of the private land, the alignment will generally parallel Howard Creek, then cross Libby Creek and end at a substation at the Libby Plant Site selected as a component of Alternative 3. The transmission line will be 13.7 miles long and will cross primarily National Forest System lands and lands owned by Plum Creek Timberlands LLP (Table 1).

Wooden H-frame structures will be used to reduce structure height. H-frame structures also provide for longer span lengths and consequently fewer structures and access roads. Using H-frame structures will require more right-of-way and tree clearing. To eliminate the need to use or construct roads that may affect core grizzly bear habitat, a helicopter will be used for structure construction at 16 locations in the Miller Creek and Howard Creek drainages (Table 1).

1.4.3 Environmentally Preferred Alternatives

The identification of an environmentally preferred alternative is required by NEPA (40 Code of Federal Regulations (CFR) 1505.2(b)) and the Forest Service's regulations implementing NEPA (36 CFR 220.3). The environmentally preferred alternative is the alternative that has the least impact on the physical and biological environment and which best protects, preserves, and enhances historic, cultural, and natural resources. The mine no action alternative (Alternative 1) and the transmission line no action alternative (Alternative A) are the alternatives that best meet this definition. Mining would not occur and there would be no mining-related disturbances or the associated construction of the transmission line under these alternatives. Mine Alternative 3 (the Agency Mitigated Poorman Impoundment Alternative) and Transmission Line Alternative D-R (the Miller Creek Transmission Line Alternative) are the environmentally preferable action alternatives. These alternatives meet the purpose and need for the proposal and include feasible and practicable measures to minimize adverse environmental impacts on KNF surface resources. See Chapter 3 of the Joint Final EIS for a detailed discussion of impacts under the various alternatives.

Table 1. Characteristics of Selected Transmission Line Alternative.

Characteristic	Alternative D-R – Miller Creek
Length (miles)	13.7
Number of structures[‡]	91
Average span length (ft.)	793
Land Ownership (miles) National Forest System Lands State Private (Plum Creek Timberlands LLP)	 9.1 0.2 4.4
Helicopter use Structure placement Vegetation clearing Line stringing	 16 structures, primarily in Miller Creek and Howard Creek drainages 2.5 miles at selected locations; see Figure 3 Yes, entire line
Estimated cost in millions $[§] Construction Mitigation	 $5.4 $10.8

[‡]Number and location of structures based on preliminary design and may change during final design. The lead agencies' analysis of MMC's preliminary design and structure locations indicates additional structures and access may be needed to avoid long spans.
[§]Estimated cost used reasonable assumptions regarding costs of construction materials, clearing, land acquisition, and engineering. Final cost could vary from those shown. Estimated construction cost by HDR Engineering, Inc. 2012; estimated mitigation cost by KNF.

1.4.4 KNF Rationale

The following sections discuss how the selected mine and transmission line alternatives address the seven scoping issues (Section 1.3) considered in the Final EIS. Table 2 and Table 3 provide a summary comparison of alternatives by issues. The selected mine and transmission line alternatives provide the best balance among the seven key issues and other concerns identified during the public involvement process. The selected mine and transmission line alternatives will have greater effect than the other action alternatives on some National Forest System surface resources; Section 1.5 discusses my rationale for not selecting the other alternatives.

Table 2. Comparison of the Effects of Mine Alternatives Relative to Key Scoping Issues.

Analysis Indicator, Mitigation, and Monitoring	Alternative 2 MMC's Proposed Mine	Selected Mine Alternative	Alternative 4 Agency Mitigated Little Cherry Creek Impoundment Alternative
Issue 1-Acid Rock Drainage and Metal Leaching			
Acid Rock Drainage	Moderate potential for acid rock drainage exists within the altered waste zones of the Revett Formation (particularly of the barren lead zone); low potential for rock exposed in underground workings or tailings; low potential risk exists for some of the waste rock from the Prichard Formation, with moderate potential suggested by static tests for a portion of this rock type	Similar potential for acid rock drainage as Alternative 2; risks mitigated by selective handling procedures, revised waste rock management plan, and the agencies' Geochemical Sampling and Analysis Plan	Same as Selected Alternative
Metal Leaching	Some potential for release of select metals under near-neutral pH	Same as Alternative 2; risks mitigated by selective handling procedures, revised waste rock management plan, and the agencies' Geochemical Sampling and Analysis Plan	Same as Selected Mine Alternative
Monitoring	Collection of representative rock samples from the adits; ore zones; above, below, and between the ore zones; and tailings	Develop and implement agencies' Geochemical Sampling and Analysis Plan designed to reduce risk of acid rock drainage associated with waste rock, tailings and ore	Same as Selected Mine Alternative

Analysis Indicator, Mitigation, and Monitoring	Alternative 2 MMC's Proposed Mine	Selected Mine Alternative	Alternative 4 Agency Mitigated Little Cherry Creek Impoundment Alternative
Issue 2-Water Quality			
Wastewater Treatment and Discharges	Uncertainty over effectiveness of land application; Libby Adit Water Treatment Plant, or additional Water Treatment Plant at plant site, as necessary; proposed capacity inadequate	Libby Adit Water Treatment Plant used and capacity expanded to accommodate all discharges; Modified as necessary to treat parameters such as nutrients or metals to meet MPDES permitted effluent limits	Same as Selected Alternative
Stormwater Management	Implementation of BMPs and Stormwater Pollution Prevention Plan; stormwater ponds sized for 10-year/24-hour event	Implementation of BMPs and Stormwater Pollution Prevention Plan; stormwater ponds containing mine drainage or process water sized for 100-year/24-hour event; other ponds sized for 10-year/24-hour event, more extensive BMP monitoring (Attachment 3)	Same as Selected Alternative
Stormwater Discharges	All facility discharges subject to 24 tons/year of sediment wasteload allocation; levels of sediment generated would be small in volume and duration based on implementation of the BMPs and design features of the mine facilities; reduced sediment delivery from grizzly bear mitigation roads	All facility discharges subject to 24 tons/year of sediment wasteload allocation; decreased sediment delivery from paved Libby Creek Road; reduced sediment delivery from grizzly bear mitigation roads; specific road BMPs identified; more extensive BMP monitoring (Attachment 3)	Same as Selected Alternative
Stream Temperatures	Similar to Selected Alternative; no discharges during Operations; no instream temperature monitoring	Discharges to groundwater at Libby Adit Site expected to attenuate any thermal effects; instream monitoring above and below wastewater treatment plant; reduction in bedrock groundwater inflows to analysis area streams may increase stream temperatures where and when bedrock groundwater is the major component of baseflow, such as in the upper streams in the mine area where alluvial and colluvial deposits are thin or absent (see groundwater effects and mitigation)	Same as Selected Alternative

Analysis Indicator, Mitigation, and Monitoring	Alternative 2 MMC's Proposed Mine	Selected Mine Alternative	Alternative 4 Agency Mitigated Little Cherry Creek Impoundment Alternative
Tailings Impoundment Groundwater Quality	Same as Selected Alternative	Predicted antimony and manganese concentrations greater than BHES Order limits or applicable nondegradation criteria; DEQ may approve a mixing zone	Same as Selected Alternative
Tailings Impoundment Groundwater Quality Monitoring	Same as Selected Alternative	Wells up- and downgradient of impoundment	Same as Selected Alternative
LAD Area Groundwater Quality	Predicted total dissolved solids, nitrate, antimony, arsenic, barium, cadmium, manganese, and mercury concentrations greater than BHES Order limits or applicable nondegradation criteria without additional primary treatment before land application	LAD not proposed	Same as Selected Alternative
LAD Area Groundwater Quality Monitoring	Wells downgradient of LAD Areas	Monitoring not required	Same as Selected Alternative

Analysis Indicator, Mitigation, and Monitoring	Alternative 2 MMC's Proposed Mine	Selected Mine Alternative	Alternative 4 Agency Mitigated Little Cherry Creek Impoundment Alternative
Issue 2-Water Quantity			
Mine Area Groundwater Drawdown Predicted by Model	Without mitigation, model-predicted groundwater drawdown ranges between 100 and 500 feet to the north and east of Rock Lake and between 10 and 500 feet or greater along the adits at the end of mining; permanent model-predicted reduction in groundwater levels between 10 and 100 feet in some locations	Agencies' mitigation (see below) not modeled; effects less than Alternative 2; agencies' mitigation would minimize the risk of high water inflow rates and resulting reduction in groundwater levels	Same as Selected Alternative
Mine Area Groundwater Mitigation	Buffer of 500 feet from Rock Lake and 100 feet from Rock Lake Fault	Buffer of 1,000 feet from Rock Lake and 300 feet from Rock Lake Fault until additional data collection and analysis completed; leave one or more barrier pillar within mine if needed to minimize post-mining changes in East Fork Rock Creek and East Fork Bull River streamflow and water quality during Operations Phase; construct concrete bulkheads at limited access openings in barrier pillars, if left in place, during Closure Phase	Same as Selected Alternative
Mine Area Groundwater Monitoring	Monitoring Rock Lake lake levels and Rock Lake water budget	Monitoring Rock Lake and Wanless Lake lake levels before Evaluation Phase and continuing throughout project; Monitoring GDEs and streamflow before Evaluation Phase and continuing throughout project; Monitoring water levels in underground piezometers ahead of drilling during Evaluation Phase and continuing throughout project; Action levels that trigger corrective measures (Attachment 3)	Same as Selected Alternative

Analysis Indicator, Mitigation, and Monitoring	Alternative 2 MMC's Proposed Mine	Selected Mine Alternative	Alternative 4 Agency Mitigated Little Cherry Creek Impoundment Alternative
Tailings Impoundment Groundwater Drawdown Predicted by Model Effects	Pumpback well system, if required to comply with standards; effects not modeled; drawdown may affect Libby, Poorman, Bear and Little Cherry creeks; bedrock ridge may limit effect on Poorman Creek	Pumpback well system required; drawdown would affect Libby, Poorman, Ramsey and Little Cherry creeks; bedrock ridge may limit effect on Little Cherry Creek	Same as Alternative 2
Model Update	Groundwater model not proposed	Groundwater model updated before Construction Phase (Attachment 3)	Same as Selected Alternative
Tailings Impoundment Groundwater Monitoring	Wells up- and downgradient of impoundment	Wells up- and downgradient of impoundment; Groundwater capture maintained; Monitoring of potentially affected springs and wetlands north of impoundment (Attachment 3); Action levels that trigger corrective measures (Attachment 3)	Same as Selected Alternative
LAD Area Groundwater Levels	Proposed application rates may increase groundwater levels and springs in LAD Areas	LAD not proposed	Same as Selected Alternative
LAD Area Groundwater Monitoring	Use of standard groundwater modeling techniques and tracer compounds to evaluate the effects of discharges to the local groundwater system	Monitoring not required	Same as Selected Alternative

Analysis Indicator, Mitigation, and Monitoring	Alternative 2 MMC's Proposed Mine	Selected Mine Alternative	Alternative 4 Agency Mitigated Little Cherry Creek Impoundment Alternative
Streamflow	Model-predicted baseflow in East Fork Rock Creek, Rock Creek, and East Fork Bull River reduced during Operations and permanently at Closure; Adverse effect on Forest Service instream flow water right in Libby Creek	Model-predicted baseflow in East Fork Rock Creek, Rock Creek, and East Fork Bull River reduced during Operations; model-predicted baseflow in East Fork Rock Creek and Rock Creek below the lake return to pre-mine conditions or increase slightly, and in the East Fork Bull River slightly reduced long-term, ; Increased Libby Creek streamflow below Libby Adit during Operations; reduced streamflow in four small drainages in Poorman Impoundment Site; No effect on Forest Service instream flow water right	Same as Selected Alternative
Perennial Stream Diversion	10,800-foot long diversion of Little Cherry Creek around impoundment to Libby Creek	None	Same as Alternative 2
Stream Mitigation	None proposed	Reconstruct three existing channels and removing culverts at the Swamp Creek site to add meanders and to raise the channel bottom, adding 6,500 linear feet of stream; replace culverts and restore riparian habitat and fish passage; remove bridge across Poorman Creek and re-establish floodplain; stabilize 400 feet of eroding area on NFS road #6212; other requirements identified by the Corps	Similar to Selected Alternative; finalized during final design
Streamflow Monitoring	MMC proposed monitoring plans	Revised monitoring plans, including action levels that trigger corrective measures (Attachment 3)	Same as Selected Alternative

Analysis Indicator, Mitigation, and Monitoring	Alternative 2 MMC's Proposed Mine	Selected Mine Alternative	Alternative 4 Agency Mitigated Little Cherry Creek Impoundment Alternative
Issue 3-Aquatic Life			
Riparian Areas within Mine Disturbance Areas (acres)	418	265	383
Bull Trout KNF Determination Fish and Wildlife Service Biological Opinion	 Same as Selected Alternative Not consulted on	 May affect, and is likely to adversely affect Will not jeopardize the continued existence of the bull trout	 Same as Selected Alternative Not consulted on
Bull Trout Critical Habitat KNF Determination Fish and Wildlife Service Biological Opinion	 Same as Selected Alternative Not consulted on	 May affect, and is likely to adversely affect Is not likely to destroy or adversely modify bull trout critical habitat	 Same as Selected Alternative Not consulted on
White Sturgeon	Same as the Selected Alternative	No effect	Same as the Selected Alternative
Sensitive Species Redband Trout	 Redband population in Little Cherry Creek likely eliminated; May affect individuals or habitat within the analysis area, but would not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species	 No impact	 Same as Alternative 2
Westslope Cutthroat Trout	Same as Selected Alternative	May affect individuals or habitat within the analysis area, but would not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species	Same as Selected Alternative
Western Pearlshell Mussel	Same as Selected Alternative	No impact	Same as Selected Alternative
Mitigation and Monitoring Plans	Feasibility of MMC's proposed mitigation plan to mitigate effects is uncertain	Extensive agency revision of MMC-proposed bull trout and fisheries mitigation plans; Biological Opinion terms and conditions (Attachment 7); agency monitoring plan (Attachment 3)	Same as Selected Alternative

Analysis Indicator, Mitigation, and Monitoring	Alternative 2 MMC's Proposed Mine	Selected Mine Alternative	Alternative 4 Agency Mitigated Little Cherry Creek Impoundment Alternative
Issue 4-Scenery			
Mine Facilities	Same as the Selected Alternative	All mine facilities except the access roads, and segments of the transmission line to vary from the mapped scenic integrity objective; tailings impoundment footprint will not return to its existing scenic integrity of low or moderate after revegetation was successful because of the permanent change in landform.	Same as the Selected Alternative
Mitigation for Scenic Values	Some proposed measures	Mitigation measures reduce the visual contrasts at most facility locations; reduced night lighting effects	Same as the Selected Alternative
Issue 5-Threatened or Endangered Wildlife Species			
Grizzly Bear Core Habitat (acres) impacted	566	248	73
Total New and Additional Displacement (acres)	9,756	7,664	8,200
Mitigation Core Created (acres) (includes mitigation for transmission line)	274	7,006	7,006
Land Acquisition (acres) (see Table 3 for additional mitigation of transmission line effects)	2,758	5,341	6,151
Other Measures	See Final EIS for MMC's plan	See Attachments 4 and 5 for full plan	Same as Selected Alternative
Effect Determination KNF Determination Fish and Wildlife Service Biological Opinion	 May affect and likely to adversely affect Not consulted on	 May affect, is likely to adversely affect Will not jeopardize the continued existence of the grizzly bear	 Same as Selected Alternative Not consulted on

Analysis Indicator, Mitigation, and Monitoring	Alternative 2 MMC's Proposed Mine	Selected Mine Alternative	Alternative 4 Agency Mitigated Little Cherry Creek Impoundment Alternative
Lynx Habitat Removed (acres)	447	159	84
Mitigation (when added to Table 3 mitigation, acreage is slightly greater than that required in combined alternatives due to overlap)	None proposed	Fund habitat enhancement on 318 acres of lynx stem exclusion habitat	Fund habitat enhancement on 168 acres of lynx stem exclusion habitat
Lynx KNF Determination Fish and Wildlife Service Biological Opinion Transmittal Letter	May affect, and is likely to adversely affect Not consulted on	May affect, but is not likely to adversely affect Concurred the project is not likely to adversely affect the species.	Same as Selected Alternative Not consulted on
Lynx Critical Habitat KNF Determination Fish and Wildlife Service Biological Opinion Transmittal Letter	Same as Selected Alternative Not consulted on	No effect Acknowledged the Forest Service's analysis that the project will have no effect	Same as Selected Alternative Not consulted on
Issue 6-Wildlife Habitat			
Effective Old Growth Effects (physical loss and edge effects) (acres)	596	486	436
Snag Density (snags per acre in Crazy PSU) Old Growth Untreated Forest Partial Cut Forest	 2.25 2.25 1.35	 2.25 2.25 1.35	 2.25 2.25 1.35
Potential Population Level of Cavity Dependent Species in (current % and % change)	72.0 (-1.2)	72.2 (-1.0)	72.3 (-0.9)
Pileated Woodpecker (General Habitat Loss) (acres)	204	68	139

Analysis Indicator, Mitigation, and Monitoring	Alternative 2 MMC's Proposed Mine	Selected Mine Alternative	Alternative 4 Agency Mitigated Little Cherry Creek Impoundment Alternative
Issue 7-Wetlands and Streams			
Jurisdictional and Isolated Direct and Indirect Wetland Effects of Impoundment and Roads (acres)	39.9	12.9	40.1
Streams Direct and Indirect Effects of Impoundment and Roads (linear feet)	33,753	19,058	34,063
Wetland Mitigation and Monitoring Plans for Effects on Jurisdictional and Isolated Wetlands and Streams	Feasibility of MMC's proposed Wetland Mitigation Plan to replace the lost functions of all potentially affected wetlands is uncertain	Extensive agency revision of MMC-proposed wetland mitigation and monitoring plans; plans will more effectively replace lost functions than Alternative 2; monitoring and performance standards required for compensatory mitigation, final mitigation requirements for jurisdictional wetlands and other waters of the U.S. determined by Corps; final mitigation requirements for isolated wetlands determined by KNF	Insufficient mitigation sites identified to achieve the Corps' minimum ratios for effects on jurisdictional wetlands and additional mitigation sites will be necessary; final mitigation requirements for isolated wetlands determined by KNF
Potential Indirect Effect of Pumpback Well System on Groundwater-supported Wetlands (acres)			
Separated by Bedrock Ridge†	0.8	14.1	0.4
Not Separated by Bedrock Ridge	1.2	2.5	1.2
†These wetlands may not be affected if a bedrock ridge and hydrologic divide separates the impoundment from the wetlands			
Monitoring Potential Indirect Effect of Pumpback Wells	None proposed	Specific hydrologic and geotechnical studies to examine bedrock ridge Monitoring of potentially affected springs and wetlands north of impoundment (Attachment 3)	Same as Selected Alternative

Analysis Indicator, Mitigation, and Monitoring	Alternative 2 MMC's Proposed Mine	Selected Mine Alternative	Alternative 4 Agency Mitigated Little Cherry Creek Impoundment Alternative
Conceptual Mitigation Options for Indirect Effects of Pumpback Wells	Similar to Selected Alternative; 2,758 acres of private land acquired for grizzly bear mitigation	Mitigation would depend on affected functions and services. Options include providing hydrology support from groundwater wells or surface water; creating new wetlands on either National Forest System lands or private land adjacent to impoundment; creating, restoring or rehabilitating existing wetlands on 5,341 acres of private land acquired for grizzly bear mitigation	Similar to Selected Alternative; 6,151 acres of private land acquired for grizzly bear mitigation
Potential Indirect Effect of Mine Dewatering	Similar to Selected Alternative but with less mitigation (see groundwater effects discussion)	Potential reduction of hydrologic support for Groundwater-Dependent Ecosystems within groundwater drawdown area; Agencies' mitigation (see below) not modeled; effects less than Alternative 2; agencies' mitigation would minimize the risk of high water inflow rates and resulting reduction in groundwater levels	Same as Selected Alternative
Monitoring Potential Indirect Effect of Mine Dewatering	None proposed	Inventory and monitoring of potentially affected Groundwater-Dependent Ecosystems, Rock Lake and upper watershed streams	Same as Selected Alternative
Conceptual Mitigation Options for Indirect Effects of Mine Dewatering	None proposed	Mitigation would depend on affected functions and services. Options include remove culverts and restore the floodplain, restore disturbed riparian buffer areas by removing roads and revegetating, add woody debris to the floodplain, remove riprap and bridge abutments below the ordinary high water mark, remove berms and other impervious fill material, and install instream habitat features to increase the value to aquatic life	Same as Selected Alternative

Table 3. Comparison of the Effects of Transmission Line Alternatives Relative to Key Scoping Issues.

Analysis Indicators/MFSA Location Criteria	Alternative B – North Miller Creek	Alternative C-R – Modified North Miller Creek	Selected Transmission Line Alternative	Alternative E-R – West Fisher Creek
Issue 2-Water Quality and Quantity				
Severe Erosion Risk Centerline (miles) Roads (acres)	 6.7 8.9	 1.8 2.4	 1.3 1.8	 3.4 2.3
High Sediment Delivery Centerline (miles) Roads (acres)	 5.1 6.3	 Same as Selected Alternative	 0.5 0.6	 Same as Selected Alternative
Issue 3-Aquatic Life				
New access roads (miles)	9.9	3.1	5.1	3.2
Clearing in riparian areas (acres)	65	37	48	60
Number of structures within riparian areas	21	7	9	17
Number of structures within 1 mile of bull trout critical habitat	36	28	25	67
Road disturbance (acres)	10	4	4	7
Issue 4-Scenery				
Visibility (miles of line) No Visibility	 2.1	 2.5	 1.5	 1.7
Low	2.5	2.8	4.1	2.8
Moderate	8.0	5.8	6.6	8.1
High	3.8	2.1	1.6	2.7

Analysis Indicators/MFSA Location Criteria	Alternative B – North Miller Creek	Alternative C-R – Modified North Miller Creek	Selected Transmission Line Alternative	Alternative E-R – West Fisher Creek
Mitigation for scenic values	Not specified	Same as the Selected Alternative	Shorter H-frame structures; vegetation-clearing measures	Same as Selected Alternative
Issue 5-Threatened or Endangered Wildlife Species				
Grizzly bear habitat physically removed (acres)	34	13	20	15
Acquired lands for mitigation (acres)	0	26	40 see Attachments 4 and 5 for full mitigation plan	30
Grizzly bear habitat cleared on all lands (acres)	297	316	330	362
Core habitat temporarily removed during construction (acres)	0	0	18	18
Habitat acquired for temporary core habitat loss (acres)	0	0	36	36
New temporary displacement effects on grizzly bears due to helicopter use in currently undisturbed habitat (acres)	5,973	5,139	5,178	5,701
Clearing maintained in core habitat during operations (miles)	0	3	0	0
Core habitat created (acres) Pre-construction Post-construction	 0 0	 0 1,503	 1,053 0	 1,053 0
Lynx Clearing in or loss of habitat (acres)	85	63	107	86
Mitigation (when added to Table 2 mitigation, acreage is slightly greater than that required in combined alternatives due to overlap)	None proposed	Fund habitat enhancement on 126 acres of lynx stem exclusion habitat	Fund habitat en-hancement on 214 acres of lynx stem exclusion habitat	Fund habitat enhancement on 172 acres of lynx stem exclusion habitat

Analysis Indicators/MFSA Location Criteria	Alternative B – North Miller Creek	Alternative C-R – Modified North Miller Creek	Selected Transmission Line Alternative	Alternative E-R – West Fisher Creek
Issue 6-Wildlife Habitat				
Old Growth (acres) Effects (physical loss and edge effects)	128	7	8	4
Snags (cavity habitat) Effect (% change) Crazy PSU Silverfish PSU	73.1 (-0.1) 90.5 (0)	73.2 (0) 90.3 (-0.2)	73.2 (0) 90.5 (0)	73.2 (0) 90.4 (-0.1)
Mitigation (down wood habitat) on National Forest System lands and state lands	Not specified	Same as Selected Alternative	Leave up to 30 tons per acre of coarse woody debris within clearing area	Same as Selected Alternative
Pileated Woodpecker (general habitat loss) (acres)	9	12	27	27
Issue 7-Wetlands and Streams				
Effects and mitigation	Wetlands avoided during line construction; minor effect of new road construction			
Design Issues				
Length (miles)	16.4	13.1	13.7	15.1
Number of structures	108	80	91	104
Average span length (feet)	799	862	793	767
Helicopter use (miles of alignment based on preliminary design) For vegetation clearing at selected locations	Contractor's discretion	4.8 miles	2.5 miles	4.3 miles
For structure placement	Contractor's discretion	26 structures	16 structures	31 structures
Estimated cost (in millions $) Construction (2012 $) Mitigation (2015 $)	$7.3 $3.9	$5.4 $10.8	$5.4 $10.8	$6.6 $10.8

1.4.4.1.1 (Issue 1) Potential for acid rock drainage and metal leaching

The risk of acid generation for rock exposed in underground workings or for tailings will be low, with some potential for release of select metals at a near-neutral pH (around pH 7) and a high potential for release of nitrogen compounds due to blasting. Low acid generation potential exists for a fraction of the total waste rock volume in portions of the Prichard Formation and moderate potential exists within the altered waste zones of the Revett Formation, which will be managed through selective handling (particularly of the barren lead zone) and additional evaluation by sampling and characterization during mine development and operations. Portions of the waste rock at Montanore have the potential to release trace elements at a near-neutral pH. Additional geochemical data will reduce the uncertainty associated with acid rock drainage and near-neutral pH metal leaching. MMC will complete testing of waste rock stored on a liner at the Libby Adit Site. The information collected by these tests will assist in determining if waste rock storage at the Poorman Tailings Impoundment Site should be lined. If monitoring results or other waste rock testing indicated treatment will be necessary, the waste rock stockpile will be lined with clay or a geomembrane to achieve a permeability of less than or equal to 10^{-6} cm/sec. At the end of operations, any waste rock not used in construction will either be placed back underground or used in regrading the tailings impoundment.

The agencies' facility relocations, mitigations and monitoring in the selected mine and transmission line alternatives adequately address Issue 1.

Issue 1 does not apply to the transmission line alternatives.

1.4.4.1.2 (Issue 2) Effects on quality and quantity of surface water and groundwater resources

Selection of Alternative 3, which uses the Poorman Tailings Impoundment Site instead of the Little Cherry Creek Tailings Impoundment Site, avoids the diversion of a perennial stream, which would have been necessary under both Alternative 2 (Proposed Action) and Alternative 4. The selected mine alternative also modifies MMC's proposed water management plan to address the uncertainties about the quality of the mine and adit inflows, the effectiveness of LAD for primary water treatment, the quantity of water that the LAD Areas would be capable of receiving, and the effect on surface water and groundwater quality. In the Selected Mine Alternative, all discharges of wastewater will be treated at a water treatment plant subject to MPDES permitted effluent limits.

The selected mine alternative incorporates additional feasible and practicable measures to minimize adverse environmental impacts on groundwater and surface water resources. The measures include refining the three-dimensional groundwater models to assess effects, increasing mining buffer zones, installing multiple adit plugs at closure, grouting, and (if necessary) leaving mine void barriers. Using thickened tailings will reduce MMC's appropriation of groundwater and surface water for mill use and reduce effects on Libby Creek streamflow. Pumpback wells downgradient of the tailings impoundment to collect tailings seepage not collected by the underdrain system are required in Alternative 3. To avoid adversely affecting senior water rights, MMC will cease diversions from Libby Creek and discharge treated water to Libby Creek from the Water Treatment Plant during low flows. Discharges to Ramsey Creek from the Water Treatment Plant at low flows also may be needed for the same reason.

The selected transmission line alternative (D-R) minimizes the crossing of areas with highly erosive soils and those with potential for high sediment delivery. The selected transmission line

alternative modifies MMC's North Miller Creek alignment by routing the line on an east-facing ridge immediately north of the Sedlak Park Substation instead of following closer to the Fisher River. The selected transmission line alternative will use a helicopter for vegetation clearing and structure construction in some locations, reducing the number and length of new access roads that will be needed. Also, under this alternative, MMC will submit a final Vegetation Removal and Disposition Plan for agency approval during final design that will minimize vegetation clearing, particularly in riparian areas.

The selected mine and transmission line alternatives expanded MMC's proposed monitoring plans and will include action levels on mine inflows and changes in surface water flow and lake levels that will trigger corrective measures to be implemented by MMC (Attachment 3).

The agencies' facility relocations, mitigations and monitoring in the selected mine and transmission line alternatives adequately address Issue 2.

1.4.4.1.3 (Issue 3) Effects on fish and other aquatic life and their habitats

The selected mine alternative minimizes impacts on RHCAs by locating the mine plant (mill and other mine facilities) between Libby and Ramsey Creeks (the Libby Plant Site) rather than in the upper Ramsey Creek drainage (the Ramsey Plant Site) as under Alternative 2 (Proposed Action). The Poorman Tailings Impoundment Site also will have less effect on RHCAs. The access changes in the selected mine and transmission line alternatives substantially reduce sediment delivery to streams from roads used by the project.

The selected mine alternative minimizes effects on bull trout and sensitive species. In its 2014 bull trout Biological Opinion, the USFWS found that the selected mine and transmission line alternatives are not likely to jeopardize the continued existence of the bull trout, and are not likely to destroy or adversely modify bull trout critical habitat. The USFWS acknowledged the Forest Service's analysis that the selected mine alternative will have no effect on the Kootenai River white sturgeon. The selected mine and transmission line alternatives may impact westslope cutthroat trout individuals or their habitat but will not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species. The selected mine and transmission line alternatives will have no effect on the interior redband trout or the western pearlshell mussel.

The selected transmission line alternative minimizes the crossing of areas with highly erosive soils and those with potential for high sediment delivery. The selected transmission line alternative modifies MMC's North Miller Creek alignment by routing the line on an east-facing ridge immediately north of the Sedlak Park Substation instead of following closer to the Fisher River. The selected transmission line alternative will use a helicopter for vegetation clearing and structure construction in some locations, reducing the number and length of new access roads that will be needed. Also under this alternative, MMC will submit a final Vegetation Removal and Disposition Plan for agency approval during final design that will minimize vegetation clearing, particularly in riparian areas.

MMC's proposed monitoring and mitigation plans for bull trout and other fisheries were revised extensively in the selected mine and transmission line alternatives. The agencies' monitoring plans in Appendix C of the Final EIS (Attachment 3) replace MMC's proposed monitoring plans. The KNF's bull trout mitigation plan is in Attachment 5. The KNF's bull trout mitigation plan is replaced by the terms and conditions of the bull trout Biological Opinion (Attachment 7).

The agencies' facility relocations, mitigations and monitoring in the selected mine and transmission line alternatives adequately address Issue 3.

1.4.4.1.4 (Issue 4) Changes in the project area's scenic integrity

The selected mine alternative minimizes visual effects by reducing the acres that will be disturbed (1,542 acres). The selected mine and transmission line alternatives include a number of measures to harmonize operations with scenic values, such as requiring vegetation clearing methods that minimize changes to scenic integrity, painting of structures, and modifying the reclamation plan for the tailings impoundment. All other mine alternatives would have greater visual effects.

The selected transmission line alternative reduces the visibility of the transmission line from US 2 because the alignment will be on an east-facing ridge immediately north of the Sedlak Park Substation generally paralleling, but a further distance from US 2 than Alternative B. Selection of this alternative also minimizes views of the transmission line from the CMW. Fewer residences will be within 0.5 mile of the line than under Alternative B (Proposed Action for the Transmission Line).

The selected transmission line alternative uses an alignment that will be visible from Howard Lake, a popular recreation site in the project area. By using H-frame structures, which are shorter than steel monopoles, the selected transmission line alternative mitigates some of the visual impact above the tree line. More detailed engineering will be completed during final design to minimize, where possible, the visibility of the line, especially at areas such as from Howard Lake.

1.4.4.1.5 (Issue 5) Effects on threatened or endangered wildlife species

The selected mine and transmission line alternatives mitigation and monitoring requirements minimize impacts on threatened and endangered wildlife and their habitats. The selected mine and transmission line alternatives include additional feasible and practicable measures to minimize adverse environmental impacts on habitat that benefits grizzly bear and lynx, such as minimizing the disturbance areas for the mine and transmission line, implementing a Vegetation Removal and Disposition Plan, and requiring Environmental Specifications for transmission line construction (see Attachment 8). In its 2014 Biological Opinion on the grizzly bear, the USFWS indicated that it was the USFWS' biological opinion that the selected mine and transmission line alternatives are not likely to jeopardize the continued existence of the grizzly bear (USFWS 2014a). No critical habitat has been designated for this species, and therefore none would be affected. The USFWS concurred with the Forest Service's determination that the project may affect, but is not likely to adversely affect the Canada lynx. The USFWS does not review or provide concurrence on no effect determinations but acknowledged the Forest Service's analysis that the project would have no effect on lynx critical habitat.

MMC will fund or implement access management changes on roads in the vicinity of the mine and transmission line facilities and on replacement grizzly bear habitat, reducing displacement and improving habitat security (Figure 5). To improve the baseline grizzly bear habitat parameters for core, open motorized route densities, and total motorized route densities within the Recovery Zone, and improve habitat in the Cabinet Face BORZ, the selected mine and transmission line alternatives road access changes for wildlife mitigation are implemented prior to the Evaluation Phase and prior to the Construction Phase. Due to the grizzly bear road access mitigation, the directly affected BMUs 2, 5 and 6 either maintain or improve to better than the individual BMU standards prior to the Evaluation Phase (BMU 2) or improve prior to the Construction Phase (BMUs 5 and 6). The road access mitigation also increases minimum core width from 0.9 miles

to 3.4 miles in the constricted area of the north-south corridor in the Cabinet Mountains, reducing fragmentation and improving connectivity for grizzly bears within the Recovery Zone. Access changes in the Cabinet Face BORZ improve conditions and decrease displacement on spring range for grizzly bears.

As described in Attachment 4 KNF's December 2015 Terrestrial Threatened and Endangered Species Mitigation Plan, to compensate for physical removal of habitat and off-set long-term mine-related displacement effects, MMC will secure or protect private lands in the Cabinet-Yaak Ecosystem or linkage area. These mitigation lands will be managed in perpetuity for the grizzly bear. Mitigation lands and associated access management on both mitigation lands and National Forest System lands will improve grizzly bear habitat parameters, including core, open motorized route density and total motorized route densities and reduce potential for grizzly bear mortality. Mitigation lands will reduce fragmentation and improve connectivity. Changing the primary access and haul route to the Libby Creek Road will maintain existing movement corridors towards the linkage area with the Northern Continental Divide Grizzly Bear Ecosystem.

The selected transmission line alternative will use a helicopter for vegetation clearing and structure construction in some locations, such as areas adjacent to core grizzly bear habitat, reducing the number and length of new access roads that will be needed and minimizing clearing and wildlife displacement associated with new access roads. Minimizing clearing will also reduce effects on lynx habitat. Any access roads that are constructed on National Forest System lands will be placed into intermittent stored service after construction. Construction and decommissioning activities associated with the selected transmission line on National Forest System and State trust lands will be limited to between June 16 and October 14. This timing restriction will minimize displacement of grizzly bears and reduce mortality risk during the important spring use and denning periods.

The agencies revised MMC's proposed monitoring and mitigation plans for grizzly bear and lynx in the selected mine and transmission line alternatives. The KNF's monitoring plans in Attachment 3 replace MMC's proposed monitoring plans. Attachment 4, KNF's Terrestrial Threatened and Endangered Species Mitigation Plan is modified by the terms and conditions of the USFWS' Biological Opinion for the grizzly bear (Attachment 6).

1.4.4.1.6 (Issue 6) Effects on wildlife and their habitats

The selected mine and transmission line alternatives may impact individuals or their habitat but will not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species for these species: bald eagle, black backed woodpecker, Coeur d'Alene salamander, fisher, flammulated owl, gray wolf, harlequin duck, North American wolverine, Townsend's big-eared bat, and western toad. The selected mine and transmission line alternatives will have no impact on these species: American peregrine falcon, bighorn sheep, common loon, northern bog lemming, and northern leopard frog. The selected mine and transmission line alternatives will decrease the amount of cover, and in some locations (i.e. the transmission line) will increase forage. The impacts of motorized use on elk security will not change from existing conditions, as no additional routes will be open to the public during hunting season. Elk and other big game may be displaced from locations adjacent to project activities while workers are present. This means that areas adjacent to the mine site will likely receive less use by big game during the life of the mine, but areas near facilities that will be seldom visited by workers after construction (e.g., the transmission line) may only have temporary reductions in use by big game. Land acquisition associated with grizzly bear mitigation will potentially benefit big game as well.

The mitigation and monitoring requirements of the selected mine and transmission line alternatives, along with the Environmental Specifications for the selected transmission line alternative (Attachment 8), minimizes effects on wildlife and their habitats. The selected mine and transmission line alternatives required mitigation lands for grizzly bear may improve connectivity for wildlife and provide additional habitat for all wildlife species and their prey (see Section 3.25 in the Joint Final EIS).

1.4.4.1.7 (Issue 7) Effects on wetlands and streams

There is no practicable alternative to new construction located in jurisdictional and isolated wetlands. The selected mine alternative minimizes wetland effects by using the Poorman Tailings Impoundment Site rather than the Little Cherry Creek Impoundment Site (Alternatives 2 and 4). The selected mine alternative will affect 13 acres of wetlands and 19,000 linear feet of streams. During final design of the selected mine and transmission line alternatives, MMC will avoid or minimize, to the extent practicable, filling wetlands and streams, particularly by the tailings impoundment and ancillary facilities.

In the selected transmission line alternative, 2.0 acres of wetlands and 2,935 linear feet of streams will be within the transmission line clearing area. Direct effects on wetlands will be avoided by placing transmission line facilities and roads outside of wetlands and streams. No wetlands or streams will be affected by new or upgraded road construction. Indirect effects will be minimized through BMPs and appropriate stream crossings.

The KNF extensively revised MMC's proposed mitigation plans for wetlands in the selected mine and transmission line alternatives. All unavoidable effects on wetlands (jurisdictional and isolated) will be mitigated through implementation of these agency mitigation measures (described in Attachment 1). The agencies' wetland and water resources monitoring plans in Appendix C of the Final EIS (Attachment 3) replace MMC's proposed monitoring plans for wetlands. The Corps will be responsible for developing final mitigation requirements for jurisdictional waters of the U.S. including wetlands, depending on the functions and services of the affected wetlands.

The KNF's practicable measures to minimize harm to isolated wetlands include the following: 1) during final design for the tailings impoundment, MMC will be required to avoid or minimize, to the extent practicable, filling wetlands and streams; 2) the KNF will use the Corps' mitigation ratios in determining compensation requirements for isolated wetlands; and 3) use the three Little Cherry Creek sites and the gravel pit site as mitigation for isolated wetlands (see Attachment 1 for a more detailed description of mitigation measures). The KNF's final mitigation requirements for isolated wetlands will be based on final facility designs and the updated groundwater models.

1.4.4.1.8 Wilderness Character Concerns

In making my decision, I also considered the proximity of the selected mine and transmission line alternatives to the CMW and the potential to adversely affect wilderness character. The mine and transmission line will not physically disturb any lands within the CMW. The experience of wilderness visitors might be affected by activities outside the wilderness boundary (disturbances include sound and visual impacts; see Sections 3.24.1.4.3 and 3.24.1.4.6 of the Final EIS) that may affect wilderness character. The selected mine alternative has the potential to indirectly affect wilderness qualities of untrammeled, natural, undeveloped, and solitude or a primitive and unconfined type of recreation in the following manner:

- Untrammeled: temporary disturbances to wildlife from blasting; displacement effects on grizzly bear, changes in streamflow, decreases in bull trout habitat availability, and reductions in the level and volume of Rock Lake, all of which will not be noticeable to the average CMW user
- Natural: minor impacts to air quality, some risk of subsidence, some operational noise
- Undeveloped: installation of some types of measuring equipment, such as data loggers, and survey monuments, most will not be visible to the average CMW user
- Potential for solitude or a primitive and unconfined type of recreation: increased use of the CMW by project personnel conducting monitoring in Opportunity Class II areas around Rock Lake, Lower Libby Lake, and Wanless Lake and in Opportunity Class I areas in the East Fork Rock Creek, East Fork Bull River, and Swamp Creek drainages

Although the agencies' monitoring activities have the potential to affect wilderness character, the KNF will use the Minimum Requirements Decision Guide, a tool to complete a minimum requirement analysis, for all monitoring activities within the CMW. In addition, a wilderness specialist will be included, as appropriate, on technical advisory groups (TAG) formed for the Montanore Project to advise on wilderness issues and to help monitor potential impacts to wilderness character.

Monitoring required for the selected mine alternative (see Attachment 3), including the requirement for a Special Provision Monitoring plan (See Section C.12.2.2 in Attachment 3) will allow any potential effects to wilderness character to be detected. The KNF will develop a Special Provision Monitoring plan covering both management and monitoring within the CMW boundary. The final monitoring plans, once submitted to the agencies by MMC, will be used as a basis for the KNF Special Provision Monitoring Plan. The Special Provisions Monitoring Plan will be interactive and collaborative with MCC in determining priority management issues. If monitoring of the Special Provisions indicates resources are not in conformance with the plan, corrective actions will be taken.

Mitigation measures (see Attachment 1) required for the selected mine alternative will be implemented to minimize changes in wilderness character. Mitigation measures such as increasing the buffer zones near Rock Lake and the Rock Lake Fault, and the agencies' monitoring coupled with final design criteria submitted for the agencies' approval, will reduce the risk of subsidence and measurable hydrological indirect effects on the surface within the wilderness. In the selected mine alternative, potential air quality indirect impacts on wilderness lakes and wilderness character will be minimized by mitigation measures such as limiting generator use and using Tier 4 engines, if available, and low sulfur diesel fuel in generators and underground mobile equipment.

1.4.4.1.9 Private Land Concerns

I am aware that in selecting Alternative 3 over Alternative 4 that the tailings impoundment will be considerably closer to private property along Libby Creek than it would have been in the other two alternatives. Although the impoundment will be entirely on National Forest System lands, I can understand the concern about potential direct and indirect effects of constructing and operating an impoundment near private property. Effects on private property were identified during the public review of the Draft and Supplemental Draft EISs. The following sections

describe the required mitigations and monitoring that I believe minimize adverse effects on private property.

One concern is blowing tailings, particularly during the summer months. The tailings from the mill will be slurried through a pipeline to the tailings impoundment site. Spigots distributing wet tailings material and water will cover about one-half of the total tailings at any time. The spigots will be moved regularly and will cause wetting of all non-submerged portions of the tailings impoundment to occur each day. This wetting will be supplemented by sprinklers as necessary when weather conditions could exist to cause fugitive dust. Although the tailings will be wetted with a sprinkler system, some drying may occur in the summer months.

The decision to operate sprinklers at the tailings impoundment will be made based on regular inspection of the tailings impoundment during the day and on weather criteria to be established as part of the fugitive dust-control plan. The presence of visible emissions, observed through shift inspection of the tailings impoundment on a regular basis during the day by environmental personnel trained in visual opacity monitoring and by shift operators staffing the tailings impoundment, will prompt sprinkler operation. In addition, specific thresholds for weather conditions such as wind speed, precipitation, and humidity will be developed as part of the fugitive dust-control plan to indicate the potential for fugitive dust emissions to occur, prompting sprinkler operation.

MMC will develop a general operating plan for the tailings impoundment site including a final fugitive dust control plan to control wind erosion from the tailings impoundment site. Before commencing operations, MMC will submit to the KNF and the DEQ for approval a general operation plan for the tailings impoundment site including the fugitive dust control plan. The plan will include, at a minimum, the embankment and cell (if any) configurations, a general sprinkler arrangement, and a narrative description of the operation, including tonnage rates, initial area, and timing of future enlargement. Should these measures not be adequate to control wind erosion from the impoundment, MMC will submit a revised plan to the KNF and the DEQ for approval, incorporating alternative measures, such as a temporary vegetative cover. At closure, MMC will maintain wind erosion control during the interim period after the end of active tailings deposition and before final reclamation of the site. Any revisions to these requirements in the final air quality permit will be implemented.

MMC will begin air monitoring at the commencement of mill facilities or the tailings impoundment and continue air monitoring for at least 1 year after normal production is achieved. After a year of monitoring, the KNF and the DEQ will review the air monitoring data and determine if continued monitoring or additional monitoring is warranted. The DEQ and the KNF may require continued air monitoring to track long-term impacts of emissions for the project or require additional ambient air monitoring or analyses if any changes take place regarding quality and/or quantity of emissions or the area of impact from the emissions.

Another concern is tailings seepage into underlying groundwater. Unlike the Little Cherry Creek impoundment site, the Poorman impoundment site does not appear to have a buried channel within the impoundment footprint, which reduces the concern of having a very deep, high hydraulic conductivity conduit beneath an impoundment that could become a preferential flow path for seepage from the impoundment. Section 1.1.1.6.3, Final Tailings Impoundment Design Process, of Attachment 1 describes the process MMC and the KNF will use in developing final design for the impoundment. The design process will include a preliminary design phase and a

final design phase. Site information will be collected during field exploration programs during the design phase. MMC will submit a tailings impoundment site exploration plan for my approval before commencing activities. A preliminary site exploration program will be completed to confirm the geotechnical suitability of the Poorman Tailings Impoundment Site. The field exploration program will include a site reconnaissance and a drilling and sampling program to evaluate site geology and foundation conditions, groundwater conditions and water quality, and geotechnical characteristics of foundation area.

Site data to be collected will include an assessment of artesian pressures and their potential influence on impoundment stability, an assessment of a subsurface bedrock ridge between the Poorman site and Little Cherry Creek and the effect it may have on pumpback well performance, aquifer pumping tests to refine the impoundment groundwater model and update the pumpback well design, and site geology to identify conditions such as preferential pathways that may influence the seepage collection system, the pumpback well system, or impoundment stability. Based on these data, a preliminary design of the facility sites will be completed to confirm the site layout and design/operation feasibility. A field exploration program will be completed to collect data and material samples necessary for the final design.

MMC will install a pumpback well system downgradient of the impoundment that will be designed to capture all seepage from the impoundment that was not collected by the underdrain system. The pumpback well system will consist of a series of groundwater extraction wells designed to provide 100 percent capture of all groundwater moving from beneath the footprint of the impoundment. MMC has designed a preliminary pumping well system, based on existing site data, that has 16 extraction wells. The KNF and the DEQ established actions levels to provide an early detection of adverse groundwater conditions and to verify the effectiveness of the tailings impoundment pumpback well system (see Attachment 3). Parameters selected for development of action levels are based on their presence at low concentrations in the downgradient aquifers, but at elevated concentrations in tailings water.

In addition to assessing relationship of detected concentrations to action levels, MMC will present a trend analysis of all data for all parameters with action levels in its annual report. A statistically significant increasing trend in concentration of any parameter will be discussed. If monitoring indicates that these action levels had been exceeded in any compliance well, MMC will notify the agencies of the exceedance within 5 working days. If the agencies decide that additional actions are necessary, the procedures regarding a work plan described in Attachment 4 will be implemented.

The DEQ may authorize a mixing zone beneath the impoundment to allow for changes in groundwater quality. Under DEQ's mixing zone regulations, (ARM 17.30.508), mixing zones for ground water are to be limited and human health based groundwater standards must not be exceeded beyond the boundaries of the mixing zone. These limitations at the Poorman impoundment site will protect beneficial uses of groundwater downgradient of the impoundment. Should DEQ not grant a mixing zone, MMC will develop a revised approach to tailings disposal that does not require a mixing zone. If this occurs, the KNF and the DEQ, with assistance with the tailings technical advisory group, will decide if the revised approach to disposal constitutes 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).

A third concern with the Poorman impoundment site is stability of the impoundment and the potential for catastrophic failure. Section 3.14.3.2.3 of the Joint Final EIS describes the stability analysis the KNF and the DEQ completed for the EIS. Based on the analysis, the Poorman tailings impoundment can be designed as a safe and stable structure. Impoundment stability will be reassessed during the final design process. The KNF and the DEQ conducted a Failure Modes Effects Analysis of both the Little Cherry Creek and Poorman impoundment sites in Section 3.14.3.2 of the Joint Final EIS. The Failure Modes Effects Analysis is an engineering reliability technique used to systematically identify, characterize, and screen risks that derive from the failure of an engineered system to operate or perform as intended. The term "risk" encompasses the concepts of both the likelihood of failure (the expected frequency of failure), and the severity of the expected consequences if such events occurred. The Poorman impoundment has a similar risk profile to the Little Cherry Creek impoundment. The probability of catastrophic failure of the Poorman or Little Cherry tailings impoundment is low. The potential effects of such a failure are described in Section 3.14.3.2 of the Joint Final EIS.

A fourth concern with the Poorman impoundment site is final reclamation and closure of the impoundment. MMC will develop a design to recontour faces of the tailings impoundment dams to more closely blend with the surrounding landscape than proposed in Alternative 2. Sand deposition will be varied during final cycloning and placement of sand on the dams. This design will incorporate additional rocky borrow at selected locations on the dam face and use benches in some locations. Islands of trees and shrubs will be planted in the rocky areas. The seed mixture on the dam face will vary to reduce uniformity of the revegetated dam. The agencies' mitigation will include increasing the salvage and replacement of suitable soil materials for reclamation; removing a majority of coniferous forest debris before soil removal; using primarily native species in revegetation and requiring more stringent revegetation success criteria. These measures will minimize erosion and ensure reclamation success of the tailings impoundment.

1.5 Alternatives Not Selected and the KNF Rationale

Alternatives were developed to respond to the issues identified during public scoping and requirements for alternatives under regulations implementing NEPA, MEPA, MFSA, and Section 404 of the Clean Water Act. To develop a range of reasonable alternatives, the agencies separated the proposed Montanore Project into components. Components are discrete activities or facilities (e.g., plant site or tailings impoundment) that, when combined with other components, form an alternative. Options were identified for each component. An option is an alternative way of completing an activity, or an alternative geographic location for a facility (component), such as alternative geographic locations for a tailings impoundment or transmission line, or an alternative method of tailings disposal, such as paste tailings. Options generate the differences among alternatives. The combination of a mine facility and transmission line alternative is a complete project that has all components necessary to fulfill the project purpose and need.

Besides a no action and a proposed action for both the mine facilities and transmission line, the agencies analyzed in detail two mine alternatives and three transmission line alternatives. As discussed in Section 1.3 above, seven key issues drove alternatives development and provide the basis for the KNF to select Mine Alternative 3 and Transmission Line Alternative D-R (see Section 1.4 above).

Below are summaries of Mine Alternatives 1, 2, and 4 and Transmission Line Alternatives A, B, C-R, and E-R and the issue-based rationale for not selecting them. These alternatives are

described in detail in Chapter 2 of the Final EIS. A comparison of the components and characteristics of these alternatives and the selected mine and transmission line alternatives by scoping issues is presented in Table 2 (mine alternatives) and in Table 3 (transmission line alternatives).

1.5.1 Mine Alternatives

1.5.1.1 Alternative 1—No Action, No Mine

1.5.1.1.1 Description of Alternative

In this alternative, MMC would not develop the Montanore Project, and no surface resource-disturbing activities on National Forest System lands associated with the project would occur. Although MMC holds DEQ Operating Permit #00150, the Montanore Project, as permitted by DEQ, cannot be implemented without a corresponding Forest Service approval of a Plan of Operations. Under Alternative 1, the existing environmental, social, and economic conditions described in Chapter 3 of the Final EIS would continue, unaffected by this mine or transmission line. DEQ's Operating Permit #00150, as revised in revisions 06-001, 06-002, and 08-001, would remain in effect. MMC could continue with the permitted activities on private land associated with the Libby Adit evaluation program that did not affect National Forest System lands. The No Action Alternative provides a baseline for estimating the effects of other alternatives and is required by NEPA.

1.5.1.1.2 Rationale for Not Selecting Alternative 1

I did not select Alternative 1, the No Action Alternative because it does not meet the KNF's purpose and need for the action. Alternative 1 fails to respond to MMC's proposed Plan of Operations to develop the Montanore copper and silver deposit. The 1964 Wilderness Act specifically contemplated that private interests under the mining laws would be established within wilderness areas and that mineral development could occur in Wilderness. As summarized above in Section 1.6.16 and discussed in detail in Section 1.3.1 of the Joint Final EIS, MMC has valid mineral rights in the CMW for the Montanore Project.

The role of the KNF under its primary authorities from the Organic Administration Act (Section 1.6.1), Locatable Minerals Regulations 36 CFR 228 Subpart A (1.6.2), and the Multiple Use Mining Act is to ensure that mining activities minimize adverse environmental effects on National Forest System lands and comply with all applicable environmental laws. While the KNF may reasonably regulate mining activities to protect National Forest System surface resources, laws and regulations limit to its discretion. The KNF has no authority to unreasonably circumscribe or prohibit reasonably necessary activities under the General Mining Law that are otherwise lawful.

1.5.1.2 Alternative 2—MMC's Proposed Mine

1.5.1.2.1 Description of Alternative

Alternative 2 is MMC's proposed Plan of Operations. MMC would construct, operate, and reclaim the Montanore Project as proposed in their 2004 Plan of Operations and as updated in 2008. This plan was not modified to respond to the key issues. Rather, scoping was conducted to gather public comment on the proposed Plan of Operations. Key issues (Section 1.3) were identified from the resulting comments.

As proposed by MMC, the Montanore Project would consist initially of a 12,500-ton-per-day underground mining operation that would expand to a 20,000-ton-per-day rate. The surface mill (the Ramsey Plant Site) would be on National Forest System lands outside of the CMW in the Ramsey Creek drainage. The proposed project also would require constructing about 16 miles of high-voltage electric transmission line from a new substation adjacent to BPA's Noxon-Libby transmission line to the project site. The 230-kV transmission line alignment would be from the Sedlak Park Substation in Pleasant Valley along US 2 and then up the Miller Creek drainage to the Ramsey Plant Site. The proposed transmission line is considered as a separate alternative below (see Alternative B).

The orebody would be accessed from two adits adjacent to the mill in the Upper Ramsey Creek drainage. Two other adits, an evaluation/ventilation adit and a ventilation adit, both with entrances located on private land, also would be used during the project. The evaluation/ventilation adit would be located in the upper Libby Creek drainage. The ventilation adit would be located on MMC's private land (patented claim HR 134) in the upper East Fork Rock Creek drainage near Rock Lake.

Ore would be crushed underground and conveyed to the surface plant located near the Ramsey Adits. Copper and silver minerals would be removed from the ore by a flotation process. Tailings from the milling process would be transported through a pipeline to a tailings impoundment located in the Little Cherry Creek drainage, about 4 miles from the Ramsey Plant Site.

Access to the mine and all surface facilities would be via US 2 and the existing NFS road #278, the Bear Creek Road. With the exception of the Bear Creek Road, all open roads in the proposed operating permit areas would be gated and restricted to mine traffic only. MMC would upgrade 11 miles of the Bear Creek Road and build 1.7 miles of new road between the Little Cherry Creek Tailings Impoundment Site and the Ramsey Plant Site. Silver/copper concentrate from the plant would be transported by truck to a rail siding in Libby, Montana. The rail siding and Libby Loadout facility are near one of the facilities considered in the 1992 Final EIS. The concentrate would then be shipped by rail to an out-of-state smelting facility.

In Alternative 2, MMC's proposed tailings impoundment would be in Little Cherry Creek, a perennial stream, and the impoundment would require the permanent diversion of the upper watershed of Little Cherry Creek. Numerous wetlands and springs are in the Little Cherry Creek Tailings Impoundment Site.

MMC would discharge excess mine and adit wastewater at one of two LAD Areas. Additional water treatment would be conducted as necessary before discharge at the LAD Areas. Water treatment also would continue at the Libby Adit Site, if necessary. MMC would be required to submit a complete MPDES application for all additional outfalls. Additional proposed discharges include the LAD Areas, the Ramsey Plant Site, and the Little Cherry Creek Tailings Impoundment Site should this alternative be selected. MMC would not discharge mine and adit inflows during operations, and would use them in the mill for ore processing.

Mining operations would continue for an estimated 16 to 19 years once facility development was completed and actual mining operations started. Three additional years may be needed to mine 120 million tons. The mill would operate on a three-shifts-per-day, seven-days-per-week, yearlong schedule. At full production, an estimated 7 million tons of ore would be produced

annually during a 350-day production year. Employment numbers are estimated to be 450 people at full production. An annual payroll of $12 million is projected for full production periods.

The operating permit area would be 3,628 acres and the disturbance area would be 2,582 acres. The operating permit area would encompass 425 acres of private land owned by MMC at the Little Cherry Creek Tailings Impoundment Site, the Libby Adit Site, and the Rock Lake Ventilation Adit Site. All surface disturbances would be outside the CMW. MMC developed a reclamation plan to reclaim disturbed areas. See Table 2 for a comparison of alternative components by scoping issues.

1.5.1.2.2 Rationale for Not Selecting Alternative 2

Mine Facilities

MMC proposed developing the Little Cherry Creek Tailings Impoundment Site for tailings disposal, using a plant site in the upper Ramsey Creek drainage and accessing the orebody from two adits adjacent to the mill in the Ramsey Creek drainage. Construction of the tailings impoundment at the Little Cherry Creek Site would have required the permanent diversion of Little Cherry Creek, a perennial stream (Issue 2) and resulted in the loss of aquatic habitat (Issue 3) and numerous wetlands and springs at the site (Issue 7). Alternative 2 would affect 27 more acres of wetlands than the selected alternative. The feasibility of MMC's proposed wetland mitigation plan to replace the lost functions of all potentially affected wetlands is uncertain. MMC's wetland mitigation plan for Alternative 2 was conceptual and would have to be refined during the 404 permitting process. MMC did not update its mitigation plan for Alternative 2 to reflect new wetland and stream mitigation regulations and procedures. As proposed, MMC's wetland mitigation plan for Alternative 2 would not comply with the Corps' and EPA's compensatory mitigation regulations for aquatic resources.

MMC's proposed use of waste rock in plant site construction raised concerns about acid rock drainage and metal leaching (Issue 1). MMC's proposed waste rock management and sampling and analysis were not adequate to address concerns about metal leaching (Issue 1). Alternative 2 would have more effect on riparian areas than the selected alternative and would not be as effective in reducing sediment delivery from roads (Issue 3). The Forest Service's analysis of MMC's proposed fisheries mitigation plan to mitigate for the effect on redband trout, a Forest Service sensitive species found in the Little Cherry Creek, indicated that the plan would not likely be successful. MMC did not update its fisheries mitigation plan for Alternative 2 to reflect the listing of the bull trout as threatened or designation of bull trout critical habitat in project area streams. As proposed, MMC's fish mitigation plan for Alternative 2 would not adequately mitigate for adverse effects on bull trout and bull trout critical habitat (Issue 3).

Alternative 2 would have significantly more effect on core grizzly bear habitat and mine development would increase the risk of displacement on 9,900 acres of grizzly bear habitat. MMC's proposal also would affect about three times more lynx habitat than the selected alternative. MMC did not update its wildlife mitigation plan for Alternative 2 to reflect current analysis indicators for grizzly bear and lynx. As proposed, MMC's wildlife mitigation plan for Alternative 2 would not adequately mitigate for adverse effects on the grizzly bear or lynx (Issue 5).

Water Management (Issues 2 and 3)

MMC proposed buffers of 500 feet from Rock Lake and 100 feet from Rock Lake Fault, buffers established during the previous Montanore Project permitting in the 1990s. For the current FEIS, two groundwater models were used to assess effects. With the data currently available, the model results provide a potential range of dewatering rates and streamflow impacts. They are the best currently available estimates of impacts and associated uncertainty that can be obtained using currently available data in the groundwater models. In Alternatives 3 and 4, the mine groundwater flow models will be refined and rerun after data from the Evaluation Phase were incorporated into the models (see Attachment 4).

MMC proposed to discharge excess mine and adit wastewater at one of two proposed LAD Areas. Additional water treatment would have been conducted as necessary before discharge at the LAD Areas. Water treatment also would have continued at the Libby Adit Site, if necessary. MMC would have been required to submit a complete MPDES application for all additional outfalls. MMC would not have discharged mine and adit inflows during operations and would have used them in the mill for ore processing. Use of mine and adit inflows during operations would adversely affect Forest Service instream flow water rights.

I am concerned that MMC's proposed water management plan did not address the uncertainties about quality of the mine and adit inflows, that LAD may not be an effective primary treatment method, that the LAD Areas would not be capable of receiving the quantity of water necessary, and that, consequently, there would be adverse effects on surface water and groundwater quality (Issue 2). Under the selected mine alternative (and Alternative 4 had it been selected), the LAD Areas will not be used. Any excess water will be treated at the Water Treatment Plant at the Libby Adit Site and discharged at existing permitted outfalls.

MMC holds two surface water rights and one groundwater right. These rights likely would have been sufficient to meet anticipated potable water use and dust control, but insufficient for mining uses. MMC estimated that water rights of 200 to 300 gallons per minute would be sufficient to cover water deficits. MMC would not have discharged mine and adit inflows during operations, and would have used them in the mill for ore processing. MMC did not apply for any beneficial water use permits for Alternative 2. The Forest Service has a year-round 40-cfs instream flow right with a 2007 priority date for a segment of Libby Creek that starts at Bear Creek and goes to above Hoodoo Creek. The use of the right is to provide adequate flows for bull trout to migrate from Libby Creek into Bear Creek and spawn. MMC's water management plan, as described in Alternative 2, would adversely affect senior water rights, including those held by the Forest Service.

Mitigation and Monitoring Plans

MMC's proposed mitigation and monitoring plans in Alternative 2 were based on the 1993 approved Plan of Operations held by MMC's predecessor, NMC. Environmental issues on the KNF have changed substantially in 20 years and the requirements for mitigation and monitoring are greater. MMC's mitigation plans would not fully comply with 36 CFR 228.8 to minimize adverse environmental impacts on KNF surface resources and to take all practicable measures to maintain and protect fisheries and wildlife habitat. I did not select Alternative 2 because MMC's proposed monitoring plans would not be adequate to monitor the project's effects and did not include adequate adaptive management measures that could be implemented in response to monitoring results.

1.5.1.3 Alternative 4—Agency Mitigated Little Cherry Creek Impoundment Alternative

1.5.1.3.1 Description of Alternative

In Alternative 4, MMC would use the Libby Plant Site between Libby and Ramsey creeks, construct two additional adits in upper Libby Creek, and modify the proposed Little Cherry Creek Tailings Impoundment Site operating permit and disturbance areas to avoid RHCAs (Issue 3) and old growth (Issue 6) in the Little Cherry Creek drainage. Borrow areas would be reconfigured to maximize disturbance within the impoundment footprint, and to reduce disturbance of RHCAs (Issue 3), core grizzly bear habitat (Issue 5), and old growth (Issue 6). Waste rock would be stored temporarily within the impoundment footprint to address potential acid rock drainage and metal leaching (Issue 1) and water quality and quantity (Issue 2). The proposed permanent Little Cherry Creek Diversion Channel below the engineered upper section would be modified so it would adequately convey anticipated flows. At closure, surface water runoff would be directed toward the Little Cherry Creek Diversion Channel, and not Bear Creek, an important bull trout stream. The operating permit area would be 2,979 acres and the disturbance area would be 1,924 acres. The operating permit area would encompass 276 acres of private land owned by MMC at the Little Cherry Creek Tailings Impoundment Site, the Libby Adit Site, and the Rock Lake Ventilation Adit Site.

Much of the mitigation developed for the selected mine alternative would apply to Alternative 4. Mitigation plans for bull trout, grizzly bear, lynx, gray wolf, mountain goat, migratory birds, old growth and snags would be the same or similar between the two alternatives. The Forest Service developed a conceptual mitigation plan for wetlands and streams for Alternative 4 for analysis purposes in the Final EIS. A total of 48.8 acres of off-site mitigation were identified for Alternative 4. MMC would implement the wetland rehabilitation and stream restoration at Swamp Creek, the culvert replacement and the bridge replacement on NFS road #278 at Poorman Creek, and culvert removal on lands acquired for grizzly bear mitigation. Jurisdictional wetlands would be replaced at a ratio determined by the Corps while isolated wetlands would be replaced using the Corps' 2005 ratios. Insufficient mitigation sites were identified to achieve the Corps' minimum ratios for effects on jurisdictional wetlands, and additional mitigation sites would be necessary. If I would have selected Alternative 4, MMC would have developed a mitigation design report for unavoidable effects on jurisdictional waters of the U.S.

1.5.1.3.2 Rationale for Not Selecting Alternative 4

The key issues that lead me to select Alternative 3 over Alternative 4 were differences in effects on aquatic life (Issue 3), wildlife habitat (Issues 5 and 6) and wetlands and streams (Issue 7). Alternative 4 would affect more riparian areas than the selected alternative because of the larger disturbance area and the proposed location of the tailings impoundment in Little Cherry Creek. Alternative 4 would have required the diversion of Little Cherry Creek, a perennial stream (Issue 2) and home to a population of redband trout, a Forest Service sensitive fish species. Despite improvements in the proposed design of the diverted creek from that in Alternative 2, I am uncertain if the diverted creek would provide similar habitat as the existing creek over the long-term. The diverted creek may not provide adequate habitat or flow to support a transplanted population of redband trout.

Differences between the selected alternative and Alternative 4 regarding wildlife habitat are mixed. Effects on core grizzly bear habitat would be 175 acres less than the selected alternative, but the mine activities would create 558 acres of new or additional displacement. Lynx habitat

effects would be less in Alternative 4 than the selected alternative. Based on my consultation with the USFWS, I am confident that the mitigation plans proposed for the grizzly bear and lynx will adequately compensate for the effects on the bear and lynx.

Alternative 4 would have significantly more effects on wetlands (27 acres) and streams (15,000 linear feet) than the selected alternative. Although the Corps is responsible for determining appropriate mitigation for jurisdictional wetlands and streams, I am concerned that insufficient mitigation sites were identified to achieve the Corps' minimum ratios for effects on jurisdictional wetlands. I am aware that the Corps can only issue a Section 404 permit for the least environmentally damaging practicable alternative. Based on my consultation with the Corps and the EPA, I am not certain that the Corps could issue a 404 permit for Alternative 4.

1.5.2 Transmission Line Alternatives

1.5.2.1 Alternative A—No Transmission Line, No Mine

1.5.2.1.1 Description of Alternative

In this alternative, MMC would not build a 230-kV transmission line to provide power. The BPA would not tap the Noxon-Libby 230-kV transmission line nor would it build the Sedlak Park Substation. The environmental, social, and economic conditions described in Chapter 3 of the Final EIS would continue, unaffected by the construction and operation of the transmission line. DEQ's approval of the mine, as permitted by DEQ Operating Permit #00150, would remain in effect. MMC could continue with the permitted activities on private land associated with the Libby Adit evaluation program that did not affect National Forest System lands and that did not require a transmission line for power.

1.5.2.1.2 Rationale for Not Selecting Alternative A

I did not select Alternative A because it does not meet the purpose and need to respond to a Plan of Operation to develop the Montanore copper and silver deposit. Although a mine could be developed without a transmission line for power, the KNF eliminated on-site generation because of high capital costs and the likelihood of other environmental concerns, such as air quality. The agencies' estimate the capital cost of on-site generation to be $37 million. It would increase concentrations of priority air pollutants, such as nitrogen and sulfur oxides. Although on-site generation was not modeled, I am uncertain that on-site generation could comply with the Clean Air Act or the Montana Clean Air Act. In the selected alternative, the operation of emergency generators at the mill after power was available from a transmission line will be limited to 16 hours during any rolling 12-month period.

1.5.2.2 Alternative B—MMC's Proposed Transmission Line (North Miller Creek Alternative)

Alternative B reflects MMC's proposed transmission line alignment. It was not developed to respond to the key issues. Rather, scoping was conducted to gather public comment on the proposed alignment, and the key issues (Section 1.3) were identified from the resulting comments.

1.5.2.2.1 Description of Alternative

MMC's proposed transmission line alignment would be in the watersheds of the Fisher River, Miller Creek, a tributary to Miller Creek, Midas Creek, Howard Creek, Libby Creek, and Ramsey

Creek. The proposed alignment would head northwest from the substation for about 1 mile east and uphill of US 2 and private homes and cabins, and then follow the Fisher River and US 2 north 3.3 miles. The alignment would then turn west and generally follow the Miller Creek drainage for 2.5 miles, and then turn northwest and traverse up a tributary to Miller Creek. The alignment would then cross into the upper Midas Creek drainage, and then down to the Howard Creek and Libby Creek drainages. The alignment would cross the low ridge between Libby Creek and Ramsey Creek, and then would generally follow Ramsey Creek to the Ramsey Plant Site. Access roads on National Forest System lands would be closed and reseeded after the transmission line was built, and reclaimed after the transmission line was removed at the end of operations.

Characteristics of MMC's proposed North Miller Creek Alternative (Alternative B) and the agencies' three other transmission line alternatives (Alternatives C-R, D-R, and E-R) are summarized in Table 3. MMC's proposed alignment would end at a substation at the Ramsey Plant Site; the lead agencies' alternatives would end at a substation at the Libby Plant Site, making the lead agencies' alternatives shorter.

1.5.2.2.2 Rationale for Not Selecting Alternative B

I did not select Alternative B because it did not address all of the applicable key issues. Alternative B would have crossed more areas with highly erosive soils and those with potential for high sediment delivery, affecting water quality and aquatic life (Issues 2 and 3). Alternative B also would have more structures and more road construction within 1 mile of critical bull trout habitat (Issue 3) and would have impacted more wetlands and streams (Issue 7).

By following the Fisher River, the Alternative B alignment would have been more visible from US 2 and would have been within 0.5 mile of more residences, affecting scenic integrity. Alternative B also would have been more visible from the CMW (Issue 4).

Alternative B would have used steel monopoles. Specifically, Alternative B would have required 17 more structures and twice as many miles of new access roads than the selected transmission line alternative (Issues 2, 3, 5, and 6). Helicopter use for structure placement would have been up to the contractor's discretion under Alternative B, and there was no assurance that effects on core grizzly bear habitat and lynx habitat would be minimized.

MMC's proposed mitigation and monitoring plans in Alternative B were based on the 1993 approved Plan of Operations held by MMC's predecessor, NMC. Environmental issues on the KNF have changed substantially in 20 years and the requirements for mitigation and monitoring are greater. MMC's mitigation plans would not fully comply with 36 CFR 228.8 to minimize adverse environmental impacts on KNF surface resources and to take all practicable measures to maintain and protect fisheries and wildlife habitat. MMC's proposed monitoring plans would not be adequate to monitor the project's effects and did not include adequate adaptive management measures that could be implemented in response to monitoring results.

1.5.2.3 Alternative C-R—Modified North Miller Creek Transmission Line Alternative

Alternative C-R was developed to respond to key issues regarding potential adverse effects of the proposed alignment.

1.5.2.3.1 Description of Alternative

The agencies developed two primary alignment modifications to MMC's proposed North Miller Creek alignment in Alternative B (Table 3). One modification would route the line on an east-facing ridge immediately north of the Sedlak Park Substation instead of following the Fisher River. The modification would address issues associated with water quality and aquatic life (Issues 2 and 3) by crossing less area with soils that are highly erosive and subject to high sediment delivery. The modification also addresses the issue of scenic integrity (Issue 4) by reducing the visibility of the line from US 2. Fewer residences would be within 0.5 mile of the line. The other alignment modification was developed following comment on the Draft EIS. The modification, which would use an alignment up and over a ridge between West Fisher Creek and Miller Creek, would increase the use of public land and reduce the length of line on private land. During final design, MMC would submit a final Vegetation Removal and Disposition Plan to minimize vegetation clearing, particularly in riparian areas.

Wooden H-frame structures, which generally allow for longer spans and require fewer structures and access roads, would be used on Alternative C-R. In some locations, a helicopter would be used for vegetation clearing and structure construction. The lead agencies selected helicopter use so the need to use or construct roads in or adjacent to core grizzly bear habitat was eliminated. Helicopter use also would reduce effects on lynx habitat. Access roads on National Forest System lands would be placed into intermittent stored service after construction, and decommissioned after the transmission line was removed at the end of operations. Unless otherwise specified by a landowner, new roads on private land would be managed in the same manner as on National Forest System lands. These modifications would address issues associated with water quality, aquatic life, threatened or endangered species, and wildlife (Issues 2, 3, 5, and 6) by reducing clearing and wildlife displacement associated with new access roads. Modifications described under the selected mine alternative for the mine, such as seed mixtures, revegetation success, and weed control, would be implemented in Alternative C-R.

The agencies developed mitigation measures that would reduce or minimize the effects of the transmission line in Alternatives C-R, D-R, and E-R. Snags and up to 30 tons per acre of coarse woody debris would be left in the clearing area. No transmission line construction in elk, white-tailed deer, or moose winter range would occur between December 1 and April 30 unless approved by the agencies. No additional motorized routes would be open to the public during hunting season. MMC would fund or conduct field and/or aerial reconnaissance surveys to locate any new bald eagle or osprey nests along specific segments of the transmission line corridor, or would not remove vegetation in the nesting season. MMC would secure or protect replacement grizzly bear habitat on 28 acres of private lands in the CYE. Transmission line construction and decommissioning on National Forest System and State trust lands would be limited to between June 16 and October 14. The KNF would restrict access on 2.8 miles of NFS road #4725 in an unnamed tributary of Miller Creek in Alternative C-R after construction.

1.5.2.3.2 Rationale for Not Selecting Alternative C-R

Alternative C-R better addresses some issues, such as some analysis indicators for threatened and endangered species (Table 3). Alternative C-R would have between 22 and 44 acres of less clearing or loss of lynx habitat than the other transmission line action alternatives. I did not find these differences significant because 66,000 acres of lynx habitat are available in the planning subunits affected by the transmission line. In the selected alternative, lynx habitat will be

improved with habitat enhancement in stem exclusion habitat. Vegetation retained in the clearing area of transmission line corridor will provide hiding cover and allow for lynx movement.

Alternative C-R would have less effect on some grizzly bear analysis indicators than the other transmission line action alternatives. Alternative C-R would not remove any core grizzly bear habitat temporarily during the transmission line construction phase. Although the selected alternative would temporarily remove 18 acres of core habitat during transmission line construction, the temporary loss would be mitigated through land acquisition at a 2:1 ratio before construction. Alternative C-R would defer the access change on NFS road #4725 in an unnamed tributary of Miller Creek until after construction, delaying creation of 1,053 acres of core to after construction. As a result, BMU 6 core would remain at 55 percent during construction and less secure habitat would be available during this phase compared to Alternatives D-R and E-R. Alternative C-R would have 19 more acres of clearing in grizzly bear habitat than Alternative B, 14 fewer acres than Alternative D-R and 46 fewer acres than Alternative E-R. In the agencies' alternatives, implementing a Vegetation Removal and Disposition Plan would minimize vegetation removal within the transmission line corridor and riparian zones. Three miles of the clearing in Alternative C-R would be in core grizzly bear habitat, providing for easier recreational/hunter access. Alternative C-R would have a higher risk of mortality and displacement compared to Alternatives D-R and E-R.

Alternative C-R would cross and require more road construction in more areas with highly erosive soils and those with potential for high sediment delivery (Issues 2 and 3) than the selected transmission line alternative. Alternative C-R would have the least clearing and fewest structures in riparian areas. It also would have fewer structures within 1 mile of critical bull trout habitat (Issue 3) than the selected alternative. I did not consider the differences in effects on aquatic life to be significant. The effects of clearing and number of structures are based on a preliminary design. In all of the agencies' alternatives, clearing in riparian areas will be minimized through implementing a Vegetation Removal and Disposition Plan. Structure type in Alternatives C-R, D-R, and E-R will be H-frame wooden poles (except for a short segment on Alternative E-R), which generally allow for longer spans and require fewer structures and access roads in RHCAs. During final design, MMC will locate all structures outside of riparian areas if alternative locations were technically and economically feasible.

I did not find the differences in effects on threatened and endangered species to be significant and, on balance, Alternative C-R will have greater effect on National Forest System lands than the selected alternative.

1.5.2.4 Alternative E-R—West Fisher Creek Transmission Line Alternative

Alternative E-R also was developed to respond to key issues regarding potential adverse effects of the proposed alignment.

1.5.2.4.1 Description of Alternative

This alternative includes modifications to MMC's transmission line proposal regarding H-frame structures, helicopter use, vegetation clearing, and other modifications described under Alternative C-R (Table 3). Some steel monopoles will be used in the steep section 2 miles west of US 2. This alternative could be selected with any of the mine alternatives. For analysis purposes, the lead agencies assumed this alternative will terminate at the Libby Plant Site.

As in the Modified North Miller Creek Alternative (Alternative C-R), this alternative modifies MMC's proposed North Miller Creek alignment by routing the line on an east-facing ridge immediately north of the Sedlak Park Substation. The modification will address issues associated with water quality (Issue 2) by crossing less area with soils that are highly erosive and subject to high sediment delivery. The issue of scenic integrity (Issue 4) was addressed by this modification by reducing the visibility of the line from US 2. Fewer residences will be within 0.5 mile of the line.

The primary difference between the West Fisher Creek Alternative (Alternative E-R) and the North Miller Creek Alternative (Alternative B) is routing the line on the north side of West Fisher Creek drainage to Miller Creek to minimize effects on core grizzly bear habitat. As in the Miller Creek Alternative (the selected transmission line alternative), this alternative will use an alignment about 0.5 mile east of Howard Lake, a popular recreation facility in the project area. Wooden H-frame structures, which generally allow for longer spans and require fewer structures and access roads, will be used on this alternative in most locations to minimize the visibility of the line from Howard Lake (Issue 4). In some locations, a helicopter will be used for timber clearing and structure construction. New access roads on National Forest System lands will be managed in the same manner as Alternative C-R. These modifications will address issues associated with water quality, aquatic life, threatened or endangered species, and wildlife (Issues 2, 3, 5, and 6) by reducing clearing and wildlife displacement associated with new access roads. Mitigation described for Alternative C-R will be implemented. MMC will secure or protect replacement grizzly bear habitat on 30 acres of private lands in the CYE.

1.5.2.4.2 Rationale for Not Selecting Alternative E-R

Alternative E-R has many of the same features and mitigations as the selected transmission line alternative. Like Alternative C-R, this alternative did not address some of the key issues (Issues 2 and 3, in particular) as well as the selected transmission line alternative. Alternative E-R will cross more areas with highly erosive soils and those with potential for high sediment delivery (Issues 2 and 3) than the selected transmission line alternative. Based on preliminary design, clearing in riparian areas will be greater than the other two agency alternatives. It would have eight more structures in riparian areas and 42 more structures within 1 mile of critical bull trout habitat than the selected alternative. During final design, MMC would locate all structures outside of riparian areas if alternative locations were technically and economically feasible. Clearing in riparian areas will be minimized through implementing a Vegetation Removal and Disposition Plan. Alternative E-R would be slightly more visible from the CMW (Issue 4) and would affect more streams than the selected transmission line alternative (Issue 7).

1.5.3 Alternatives Eliminated from Detailed Consideration

A number of alternatives to the Proposed Action were evaluated but were eliminated from detailed consideration. An in-depth discussion of these alternatives appears in Section 2.13 of the Joint Final EIS along with the agencies' rationale for dismissal. These potential alternatives were identified as a result of public participation as well as agency concerns. Alternatives in each of the following categories were evaluated and dismissed from detailed consideration due to technical, operational, economic, or environmental considerations; alternative mine location or combined mine operations; tailings backfill options; tailings impoundment location options; plant site and adit location options; surface tailings disposal method options; LAD areas; access road; transmission line alignment options; underground installation of transmission line; change in transmission line voltage; and KFP consistency.

1.6 Selected Alternative Compliance with Federal and State Laws and Regulations

1.6.1 Organic Administration Act

The Organic Administration Act authorizes the Forest Service to regulate use and occupancy, such as mineral operations, on National Forest System lands and to develop mineral regulations. The Forest Service's mineral regulations are promulgated at 36 CFR 228, Subpart A (see Section 1.6.2 below). The regulations apply to operations conducted under the U.S. mining laws as they affect surface resources on National Forest System lands under the jurisdiction of the Secretary of Agriculture. Compliance with the Forest Service's mineral regulations is discussed in the next sections. If MMC's proposal can be approved in a manner that will comply with all applicable environmental laws, the Forest Service has no authority to prohibit or to deny proposals that are reasonably necessary to mining of private mineral estate or the use of unpatented claims on National Forest System lands subject to the General Mining Act (see Section 1.6.9).

All waters within the boundaries of national forests may be used for domestic, mining, or irrigation purposes, under applicable state laws. The selected mine and transmission line alternatives include feasible and practicable measures to minimize adverse environmental impacts on water flow. The measures will include increasing mining buffer zones, installing multiple adit plugs at closure, grouting, and (if necessary) leaving mine void barriers. Using thickened tailings will reduce MMC's appropriation from the Libby Creek and minimize effects on Libby Creek streamflow. The selected mine and transmission line alternatives expanded MMC's proposed monitoring plans and will include action levels on mine inflows and changes in surface water flow and lake levels that will trigger corrective measures to be implemented by MMC (Attachment 3).

I find that the selected mine and transmission line alternatives comply with the 1897 Organic Administration Act.

1.6.2 36 CFR 228 Subpart A

Forest Service regulations (36 CFR 228, Subpart A) apply to locatable mineral operations conducted under the U.S. mining laws as they affect surface resources on National Forest System 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)).

1.6.2.1 228.4 Plan of Operations—notice of intent requirements

MMC submitted a Plan of Operations that met the informational requirements of this regulation. MMC'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 EIS fulfills the environmental analysis requirement of this regulation.

1.6.2.2 228.5 Plan of Operations—approval

Completion of the Final EIS 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 mine and transmission line alternatives and the modifications of this ROD complies with 36 CFR 228.5.

1.6.2.3 228.6 Availability of information to the public

Except for specifically identified information and data submitted by MMC as confidential concerning trade secrets or privileged commercial or financial information, information and data submitted by MMC 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) and documented in the project record. The KNF is in compliance with 36 CFR 228.6 regarding availability of information to the public.

1.6.2.4 228.7 Inspection and compliance

My decision is to approve an amended Plan of Operations for the Montanore Project that is consistent with the selected mine and transmission line alternatives and the modifications of this ROD. Consistent with 36 CFR 228.4(e), the KNF will stipulate the reasons that MMC will be required to modify the mine plan and to submit the changes to the KNF for approval (see Attachment 2). MMC will not be allowed to proceed with surface-disturbing activities associated with any phase of the project that impacts National Forest System lands until the KNF confirms in writing to MMC that MMC has amended its Plan of Operations with all stipulations, mitigation plans, and monitoring plans consistent with the alternatives selected in this ROD.

The selected mine and transmission line alternatives include provisions to ensure that MMC will protect resources and comply with applicable laws and regulations. MMC's approved Plan of Operations will include reporting requirements, measures to provide for third-party reviews, and submittal of plans and reports for agency review. The Forest Service and other designated management agencies, such as the DEQ, will conduct inspections of operations to ensure compliance with the approved Plan of Operations and applicable regulations.

In addition, the KNF will designate a Forest Staff Minerals Coordinator to ensure that the Montanore Project, as outlined in the selected mine and transmission line alternatives, is implemented according to the approved Plan of Operations. The selected mine and transmission line alternatives as modified by the ROD comply with 36 CFR 228.7 regarding inspection and compliance.

1.6.2.5 228.8 Requirements for environmental protection

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 National Forest System surface resources. The agencies developed the selected mine and transmission line alternatives 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 mine and transmission line alternatives require reasonable mitigation measures for anticipated adverse impacts and require reclamation of lands disturbed by proposed mining activities. Key mitigation measures

are discussed in the sections below by resource. With the agencies' mitigation measures required under the selected mine and transmission line alternatives, the Montanore Project complies with 36 CFR 228.8.

1.6.2.5.1 Air Quality

The selected mine and transmission line alternatives include feasible measures to minimize adverse environmental impacts on KNF surface resources (36 CFR 228.8(a)) and to comply with applicable state and federal air quality standards. These measures, which include limiting generator use at the mill after power was available from a transmission line to 16 hours during any rolling 12-month period, and using Tier 4 engines and ultra-low sulfur diesel fuel in underground mobile equipment, will substantially reduce emissions. Other conditions and limitations on air emissions are described in DEQ's Supplemental Preliminary Determination. MMC will develop a general operating plan for the Poorman Tailings Impoundment Site including a final fugitive dust-control plan to control wind erosion from the tailings impoundment. Spigots distributing wet tailings material and water will cover about one-half of the total tailings at any time. The spigots will be moved regularly and will cause wetting of all non-submerged portions of the tailings impoundment each day. This wetting will be supplemented by sprinklers, as necessary, when weather conditions could exist to cause fugitive dust. These measures will minimize windblown tailings at the tailings impoundment.

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 Clean Air Act requirements and 36 CFR 228.8(a).

1.6.2.5.2 Aquatic Life and Fisheries

The selected mine and transmission line alternatives include 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 the disturbance area, developing and implementing a final Road Management Plan, using BMPs to reduce sediment and runoff from roads, developing and implementing a final Vegetation Removal and Disposition Plan, decommissioning unused roads or placing them into intermittent stored service to reduce sediment delivery, constructing all stream crossings in compliance with INFS standards and guidelines, removing culverts in Little Cherry Creek, implementing measures such as increased buffer zones and using multiple adit plugs at closure to minimize changes in streamflow, and implementing the Bull Trout Mitigation Plan. The selected mine and transmission line alternatives minimizes disturbance in RHCAs and other riparian areas, minimizing effects on bull trout and other aquatic life. The selected transmission line alternative will minimize fewer structures and new roads within 1 mile of bull trout critical habitat and less vegetation clearing in watersheds with occupied bull trout habitat.

1.6.2.5.3 Water Quality

In accordance with 36 CFR 228.8(b), DEQ's permit decision and associated conditions on the MPDES permit, the 401 certification or other water quality permit, and the Corps' permit decision and associated conditions on the 404 permit constitute compliance with Clean Water Act requirements. Any activity that may result in any discharge into waters of the U.S. cannot proceed

until MMC provides the KNF a 401 certification from the DEQ, unless the DEQ waives its issuance.

The selected mine and transmission line alternatives include feasible measures to minimize adverse environmental impacts on water quality. The agencies' mitigation in the selected mine and transmission line alternatives (using a water treatment plant for all discharges, modifying the existing treatment plant to treat nitrogen compounds and possibly dissolved metals, increasing the capacity of the existing treatment plant, and requiring a pumpback well system around the impoundment) are designed to minimize changes in surface water quality in the Libby Creek watershed, eliminate changes to groundwater quality by avoiding land application, and ensure compliance with state and federal water quality standards. The selected mine and transmission line alternatives expanded MMC's proposed monitoring plans and will include action levels on mine inflows and changes in surface water flow and lake levels that will trigger corrective measures to be implemented by MMC (Attachment 3).

1.6.2.5.4 Scenery

The selected mine and transmission line alternatives include feasible and practicable measures to minimize adverse environmental impacts and harmonize operations with scenic values. Mitigation measures in the selected mine alternative include regrading and shaping of flat surfaces to blend with the adjacent landscape and have natural dendritic drainages. Additional fill will be used as necessary to create smooth transitions between human-made and natural landforms. MMC also will develop a design to recontour faces of the tailings impoundment dams to closely blend with the surrounding landscape. Additional mitigation measures include baffling or shielding night light, painting of structures to blend in with surrounding landscape, and minimizing the visibility of the clearing edges. The selected transmission line alternative addresses visual issues with an alignment away from private property and the US 2 corridor and using H-frame structures.

1.6.2.5.5 Soils and Reclamation

The selected mine and transmission line alternatives include feasible and 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 developing and implementing a final Road Management Plan consistent with the terms and conditions of the grizzly bear Biological Opinion (Attachment 6), developing and implementing a final Vegetation Removal and Disposition Plan, using BMPs to reduce sediment and runoff from roads, increasing the salvage and replacement of suitable soil materials for reclamation, removing a majority of coniferous forest debris before soil removal, consolidating soil stockpiles and reclaiming them incrementally, and salvaging disturbed wetland soils for use in constructing new wetlands. These measures will minimize erosion and ensure reclamation success.

MMC will be required to update its Closure Plan, including a long-term monitoring plan, in accordance with the requirements of the selected mine and transmission line alternatives, during the Construction Phase in sufficient detail to allow adjustments to the reclamation bond. MMC will periodically revise its Closure Plan to incorporate new reclamation techniques. The agencies will update bond calculations to conform to any modifications to the operating plan. MMC will submit for agencies' approval a final Closure and Post-Closure Plan, including a long-term monitoring plan, 3 to 4 years before mine closure.

1.6.2.5.6 Solid Wastes

The selected mine and transmission line alternatives will dispose of tailings and reclaim the tailings impoundment in a manner to minimize adverse impacts on the environment and KNF surface resources. Solid waste (excluding domestic/sanitary) will be transported off-site to the Lincoln County landfill. MMC will manage and dispose of any hazardous waste in accordance with applicable federal and state regulations. MMC 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 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 certain conditions outlined in Section 2.5.4.4 of the Final EIS. 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.

The Minerals Management (MM-3) Standard prohibits solid and sanitary waste facilities, including mine waste (waste rock, spent ore, and tailings), in RHCAs. Although the selected mine alternative minimizes effects on RHCAs and inland native fish, no alternatives exist that eliminate the need to site facilities, specifically the tailings impoundment, in RHCAs. If no alternative to locating mine waste facilities in RHCAs exists, then MM-3 directs that certain mitigation measures be taken (see Section 3.6.4.11.4 in the Final EIS). The selected mine alternative complies with MM-3 by incorporating these mitigation measures.

The selected mine and transmission line alternatives comply with 36 CFR 228.8(c).

1.6.2.5.7 Transportation and Roads

In the selected mine and transmission line alternatives, 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 developing and implementing a final Road Management Plan consistent with the terms and conditions of the grizzly bear Biological Opinion (Attachment 6). Sediment and runoff from all roads will be minimized through the use of BMPs developed in accordance with the Forest Service's BMPs. The Environmental Specifications (see Attachment 8) describe how transmission line roads will be constructed and maintained to ensure adequate drainage and to minimize or eliminate damage to resource values. The selected transmission line alternative will have less new road development in the watersheds of impaired streams, in watersheds of Class 1 streams, and on soils with severe erosion risk, high sediment delivery, and slope failure. The predicted delivery of sediment from roads to streams in the selected mine and transmission line alternatives will be less than in MMC's Proposed Action. The agencies' mitigation provides specificity regarding management of roads no longer needed for operations. Such roads will be placed either in intermittent stored service, or decommissioned using a variety of treatment options. Removal of roads, culverts, and bridges will be addressed in MMC's Closure and Post-Closure Plan.

1.6.2.5.8 Fisheries and Wildlife Habitat

In the selected mine and transmission line alternatives, MMC will implement all practicable measures to maintain and protect wildlife habitat (36 CFR 228.8(e)). The selected mine and transmission line alternatives 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 will have no effect on the white sturgeon. The selected mine and transmission line alternatives 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 to the population or species. The selected mine and transmission line alternatives will maintain viable populations of all wildlife species potentially affected by the project.

1.6.2.6 228.9 Maintenance during operations and public safety

Hazardous sites or conditions resulting from operations will be marked by signs, 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 mine and transmission line alternatives comply with 36 CFR 228.9 regarding maintenance during operations and public safety.

1.6.2.7 228.10 Cessation of operations and removal of structures and equipment

MMC is required to update its Closure Plan in accordance with the closure and post-closure requirements of the selected mine and transmission line alternatives. MMC will periodically revise its Closure Plan to incorporate new reclamation techniques and to enable the agencies to update their bond calculations appropriately. Before temporary closure, or 3 to 4 years before final closure, MMC will submit a final Closure and Post-Closure Plan, including a long-term monitoring plan, to the KNF and DEQ for approval. The requirements meet the objective of this regulation for permanent cessation.

For temporary cessations of operations (other than seasonally, up to 1 year), MMC will be required to file a statement (annually in the event operations are not reactivated) with the KNF District Ranger and DEQ that verifies intent to maintain the structures, equipment, and other facilities in a neat and safe condition; states the expected reopening date; and provides an estimate of extended duration of operations. This requirement meets the objective of this regulation for temporary cessation.

After 5 years of any cessation of mine development or operation, for reasons other than litigation, KNF will consult with MMC, DEQ, USFWS, Corps, tribal representatives, and other interested agencies on interim or final reclamation plans to be implemented as outlined in the selected mine and transmission line alternatives, and the timeframes for implementation.

1.6.2.8 228.11 Prevention and control of fire

MMC is 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 operations; and require employees, contractors, and subcontractors to do likewise within the permit area boundary. With this requirement, the selected mine and transmission line alternatives comply with 36 CFR 228.11 regarding prevention and control of fire.

1.6.2.9 228.12 Access

Use of NFS roads to access patented mining claims must be approved in writing by the KNF Supervisor through an approved Plan of Operation that complies with the selected mine and transmission line alternatives. As discussed above under 36 CFR 228.8 Requirements for environmental protection, MMC is required to develop and implement a final Road Management

Plan consistent with the terms and conditions of the grizzly bear Biological Opinion. In the selected mine and transmission line alternatives, the agencies also modified MMC's use of NFS roads for mine access as outlined above in Section 1.4.1.3 and described in detail in Section 1.1.1.6.6, Final Road Design Process, in Attachment 1. With the agencies' mitigation, the selected mine and transmission line alternatives comply with 36 CFR 228.12 regarding access.

1.6.2.10 228.13 Bonds

The Forest Service and DEQ have executed a MOU allowing the agencies to accept a joint bond that satisfies both federal and state reclamation requirements (see Section 1.9).

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 1.9 of this ROD and explained in greater detail in Section 1.6.3 of the Final EIS. Before the KNF allows MMC to proceed with any mine phase, MMC will be required to furnish a bond conditioned with compliance of the reclamation of National Forest System lands.

1.6.2.11 228.15 Operations within National Forest Wilderness

The Wilderness Act allows mineral exploration and development under the General Mining Law 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 and existing rights. The discovery of mineral deposits for the Montanore Project dates back to the early 1980s and is discussed in detail in Section 1.3.1 and shown in Figure 11 of the Final EIS. The mine and transmission line will not physically disturb any lands within the CMW (see discussion on the Wilderness Act below in Section 1.6).

Mitigation measures (see Attachment 1) and monitoring required for the selected mine alternative (Attachment 3) will be implemented to minimize changes in wilderness character and are consistent with the use of the land for mineral development. Mitigation measures, such as increasing the buffer zones near Rock Lake and the Rock Lake Fault, and the agencies' monitoring coupled with final design criteria submitted for the agencies' approval, will reduce the risk of subsidence and measurable hydrological indirect effects on the surface within the CMW. In the selected mine alternative, potential air quality indirect impacts on CMW lakes and wilderness character will be minimized by mitigation measures such as limiting generator use and using Tier 4 engines and low sulfur diesel fuel in underground mobile equipment.

The selected mine and transmission line alternatives comply with 36 CFR 228.15 regarding operations within National Forest System wilderness.

1.6.3 Alaska National Interest Lands and Conservation Act

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

In the proposed Plan of Operations, MMC requested access to develop mineral resources located inside and outside the CMW. I find that the KNF has met the requirements of Alaska National Interest Lands and Conservation Act by approving an amended Plan of Operations as defined by the selected mine and transmission line alternatives. The reasonable use is defined in the selected

mine and transmission line alternatives (Attachment 1), and mitigation that minimize impacts on federal surface resources will be required as listed in Attachment 1 and in Attachment 2.

1.6.4 American Indian Religious Freedom Act

The American Indian Religious Freedom Act requires the United States to protect and preserve for the American Indian the inherent right of freedom to believe, express, and exercise traditional religions; to use sacred objects; and to worship through ceremonies and ritual. The Forest Service complies with this act by consulting with and considering the views of Native Americans when a proposed land use might conflict with traditional Native American religious beliefs or practices. The act does not require that land uses that conflict with Native American religious beliefs or practices be denied.

While the Native American tribes were afforded the opportunity to provide comments on all alternatives, they declined, stating that their opposition to the mine negated the need to determine which alternatives were more preferable to them.

The Confederated Salish and Kootenai Tribes (CSKT) considered the effects of the Montanore Project and the Rock Creek Project as one. The CSKT submitted the following comment regarding the Montanore Project: “The expansion of the Montanore Mine has the potential to impact Tribal ancestral sites, including trails, fishing and gathering areas, as well as occupation sites. Both mines have the potential to degrade water quality, thus impacting aquatic habitats that provide Tribal members with traditional plants and medicines. The degradation of the surrounding watershed should have far-reaching impacts on culturally significant fish and wildlife, including the endangered bull trout and white sturgeon.”

The CSKT have chosen not to identify specific effects, so I cannot address specific direct or indirect impacts on these undisclosed resources. Analysis of cumulative effects described in other resource sections indicates that increased access to the general project area could increase the use of resources by the general public as well as tribal members. Vegetation removal as a result of construction of the proposed project or other permitted activities within the Libby Creek watershed could impact areas with plant species associated with tribal use. These potential effects on resources identified by CSKT are outlined in the various resource sections of Chapter 3 of the Final EIS.

Access to the Montanore Project area occupied by active mine operations will be restricted during the life of the mine. Road management changes are described Chapter 2 of the Joint Final EIS. Access to the CMW will not change with implementation of the project.

The selected mine and transmission line alternatives address resource concerns including resources identified by CSKT members; however, complete mitigation is not possible because the impacts may be as much spiritual as it is physical. This decision does not limit the Native Americans’ freedom to believe, express, or exercise their traditional religious beliefs, their right to possession of sacred objects, or freedom to worship through ceremonies and traditional rites. I find that the selected mine and transmission line alternatives comply with the American Indian Religious Freedom Act.

1.6.5 Clean Air Act

The Forest Service is responsible for ensuring that mine operators on National Forest System lands comply with applicable federal and state air quality standards, including the requirements of the Clean Air Act (see 36 CFR 228.8 *Requirements for environmental protection* discussion above).

The State of Montana administers the Federal Clean Air Act. The limits in the approved Montana air quality permit #3788-00 are necessary to ensure that all potential sources of air pollutants comply with the Clean Air Act of Montana. The DEQ's ROD discusses compliance with the Clean Air Act of Montana. DEQ's permit decision and conditions on the air quality permit constitute compliance with Clean Air Act requirements.

1.6.6 Clean Water Act

The Forest Service is responsible for ensuring that mine operators on National Forest System 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 Clean Water Act (see 36 CFR 228.8 *Requirements for environmental protection* discussion above). Compliance with applicable water quality regulations including water quality standards and nondegradation rules, the subsequent Fact Sheet for the MPDES permit renewal, and the subsequent 401 certification are discussed in DEQ's ROD. DEQ's permit decision and conditions on the MPDES permit renewal, the 401 certification or other applicable water quality permit, and the Corps' permit decision and conditions on the 404 permit constitute compliance with Clean Water Act requirements. My decision to approve the amended Plan of Operations requires that MMC obtain all necessary Clean Water Act permits prior to implementing each phase of the mine development. Any activity that may result in a discharge of fill into waters of the U.S. cannot proceed until MMC provides the KNF a 401 certification from the DEQ, unless the DEQ waives its issuance.

1.6.7 Endangered Species Act

The KNF is required by the Endangered Species Act to ensure that any actions it takes will not jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of critical habitat. Numerous mitigation measures have been incorporated into the selected mine and transmission line alternatives to reduce, eliminate, avoid, or minimize the potential impacts on threatened or endangered species including the grizzly bear, lynx, and bull trout, and sturgeon.

The Forest Service prepared two BAs and submitted them to the USFWS for review and consultation: one BA evaluated the potential effect of the agencies' preferred alternatives on threatened or endangered aquatic species (bull trout and its designated critical habitat and Kootenai River white sturgeon), and the other BA evaluated the potential effect of the agencies' preferred alternatives on threatened or endangered terrestrial species (grizzly bear, Canada lynx and its designated critical habitat). Both BAs included measures the KNF will require to minimize or compensate for effects.

In its 2014 Biological Opinion on the bull trout, the USFWS indicated that the project as proposed in the agencies' preferred alternatives is not likely to jeopardize the continued existence of the bull trout, and is not likely to destroy or adversely modify bull trout critical habitat. The

USFWS does not review or provide concurrence on no effect determinations but acknowledged the Forest Service's analysis that the project will have no effect on the Kootenai River white sturgeon.

In its 2014 Biological Opinion on the grizzly bear, the USFWS indicated that the Montanore Project as proposed in the Forest Service's preferred Mine Alternative 3 and the agencies' preferred Transmission Line Alternative D-R is not likely to jeopardize the continued existence of the grizzly bear. No critical habitat has been designated for this species and, therefore, none will be affected. The USFWS concurred with the Forest Service's determination that the project may affect, but is not likely to adversely affect, the Canada lynx. The USFWS does not review or provide concurrence on no effect determinations but acknowledged the Forest Service's analysis that the project will have no effect on lynx critical habitat.

Both Biological Opinions concluded that the project will result in "take" as defined under the Endangered Species Act, and included reasonable and prudent measures to reduce the likelihood of incidental take and minimize adverse effects on both bull trout and designated critical habitat. Both Biological Opinions contained terms and conditions that implement the reasonable and prudent measures (Attachment 6 and Attachment 7). In its 2014 Biological Opinion on the grizzly bear, The USFWS indicated that it believes that no more than one grizzly bear will be incidentally taken as a result of the Montanore Project as proposed in the Forest Service's preferred Mine Alternative and the agencies' preferred Transmission Line Alternative D-R. The reasonable and prudent measures are designed to minimize the likelihood of incidental take that might otherwise result from the actions associated with this proposal. If, during the course of the action, this level of take is exceeded, such incidental take represents new information requiring reinitiating consultation and review of the reasonable and prudent measures provided in the BO. According to the BO, the Federal agency must immediately provide an explanation of the causes of the taking and review with the USFWS the need for possible modification of the reasonable and prudent measures. The USFWS determined that the actual amount or extent of the anticipated incidental take of bull trout due to changes in habitat conditions in the affected streams is unquantifiable.

I find that the KNF has met the requirements of the Endangered Species Act. This determination is based on the review of data presented in the Biological Opinions and the Final EIS. The reasonable and prudent measures and terms and conditions described in the Biological Opinions and incorporated into this ROD will protect threatened or endangered species.

1.6.8 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. The selected mine and transmission line alternatives will not affect any important farmland.

I find that the selected mine and transmission line alternatives comply with the Farmland Protection Policy Act.

1.6.9 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 National Forest System lands open to mineral entry.

MMI has two patented (HR-133 and HR-134) mining claims, and unpatented mining claims, mill sites, and tunnel sites that cover proposed mine development on National Forest System lands. The selected mine alternative (Attachment 1) and the additional mitigations described in this ROD demonstrate that the project area can be developed in a manner to meet the required applicable laws. I find that the selected mine and transmission line alternatives have met the intent of the 1872 General Mining Act.

1.6.10 Mining and Minerals Policy Act

This act states that the continuing policy of the Federal Government is to foster and encourage private enterprise in the development of economically sound and stable domestic mining and minerals industries and the orderly economic development of domestic mineral resources. I find that the KNF has met the objective of this act by approving the Plan of Operations as outlined in the selected mine and transmission line alternatives of the Final EIS and as modified by the ROD (Attachment 1). The KNF has ensured that the exploration, development, and production of this mineral resource will be conducted in an environmentally sensitive manner, and that these activities are integrated with the KFP and are compatible with other resources. The KNF has achieved this by developing alternatives to the Proposed Action in response to resource issues and requiring the mitigations summarized in Attachment 2, the monitoring plans described in Attachment 3, the KNF's threatened and endangered species mitigation plans (Attachment 4 and Attachment 5), and the terms and conditions of the Biological Opinions (Attachment 6 and Attachment 7).

1.6.11 Montana Noxious Weed Act and County Weed Control Act

The Lincoln County Weed Board administers the County Noxious Weed Control Act (7-22-2101 through 2153, MCA) for any land-disturbing activities within their jurisdiction. MMC has a Weed Control Plan approved by Lincoln County Weed Control District. The plan will be modified as described in Attachment 1 and submitted to the KNF and DEQ during final design for their approval. Following KNF's and DEQ's approval of the final Weed Control Plan, MMC will submit it to the Lincoln County Weed Control District for approval. Weed control measures will be applied to all mine permit areas. Weed control measures along the transmission line are described in the agencies' Environmental Specifications (Attachment 8). The weed BMPs and other measures described will address the treatment and control of noxious weeds throughout all mine and transmission line facilities. The Lincoln County Weed Board's decision regarding a Weed Control Plan for the Montanore Project will constitute compliance with the Montana Noxious Weed Act and County Weed Control Act.

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

DNRC administers the Montana Water Use Act, which 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 commencing to construct a new

or additional diversion, withdrawal, impoundment, or distribution works for appropriations of groundwater or surface water. 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 National Forest System lands in relation to water appropriations to avoid conflict between state and federal permitting (see Section 3.12 in the Final EIS).

The Forest Service has an in-stream water right for 40 cfs in Libby Creek at the confluence of Bear Creek with a 2007 priority date. Any new water right obtained by MMC associated with its Plan of Operations will be junior to the Forest Service right and will terminate when the Plan of Operations expires. Senior rights have an earlier priority date and claimants who hold them have a higher priority to divert water from a stream or water body than those with later, or junior, rights.

The selected mine alternative will comply with the Montana Water Use Act and the Montana Reserved Water Rights Compact since mine and adit inflows will not be used beneficially during any mine phase, and treatment and discharge of all mine and adit inflows will not require a beneficial use permit. MMC will discharge treated water to Libby Creek and Ramsey Creek, as necessary, to avoid adversely affecting senior water rights. At closure, MMC will install two or more plugs in each of the three Libby Adits. As long as MMC appropriates or diverts water from Libby Creek whenever flow at LB-2000 is less than 40 cfs, MMC will treat, if necessary to meet MPDES permitted effluent limits, stored adit water and discharge it to Libby Creek at a rate equal to all of MMC's Libby Creek appropriations or diversions occurring at that time. Discharges to Ramsey Creek also will be required if the modeling indicates adit inflows during the Closure Phase will adversely affect the senior water right on Ramsey Creek. Any new water right for water use issued pursuant to Montana law for water use in the selected mine alternative will be consistent with the terms of an approved Plan of Operations. Any water right acquired solely for the purposes of mineral development in an approved Plan of Operations will terminate when the Plan of Operations is terminated. MMC must request and obtain prior written approval from the KNF for any change in beneficial use or place of use of water allowed under an approved Plan of Operations or the water use allowed under an approved Plan of Operations will terminate.

DNRC's permit decision and associated conditions on any beneficial water use permit will constitute compliance with Montana water use requirements.

1.6.13 National Environmental Policy Act

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 (CEQ), as authorized under NEPA, direct implementation of NEPA by federal agencies. CEQ 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 CEQ regulations is contained in Chapter 20 of USDA Forest Service Handbook 1909.15 (Environmental Policy and Procedures).

To meet the requirements under NEPA and the 2015 KFP, the KNF has prepared the Montanore Project Final EIS jointly with the DEQ. I find that the Montanore Project Final EIS complies with the procedural and analytical requirements of NEPA.

1.6.14 National Forest Management Act

The National Forest Management Act (NFMA) requires the development, maintenance, and, as appropriate, the revision of land and resource management plans (forest plans) for units of the National Forest System. 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 this Montanore project, is not regulated by NFMA, or by the KFP which was developed and revised pursuant to NFMA (16 USC 528, 16 USC 1604(e), 36 CFR 219.1), per se, an approved plan of operations cannot be inconsistent with applicable KFP standards and guidelines. However, 16 USC 478 bars the Forest Service from prohibiting locatable mineral operations on lands subject to the United States mining laws either directly or by regulation amounting to a prohibition. This means that if applicable 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 the KFP purports to prohibit locatable mineral operations on lands open to the United States mining laws, or if the 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 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 (January 2015) KFP (see 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.

My decision requires a site-specific amendment to the 2015 Kootenai Forest Plan (KFP) that suspends four forestwide guidelines (FW-GDL-WL-08, FW-GDL-WL-09, FW-GDL-AR-01, FW-GDL-VEG-02), two forestwide standards (FW-STD-RIP-01 and FW-STD-RIP-02), and two Management Area-specific guidelines (MA5a,b,c-GDL-AR-06, and MA6-GDL-AR-05) for the life of the project in order to implement Mine Alternative 3 and Transmission Line Alternative D-R while still maintaining consistency with the KFP. Attachment 10 describes the amendments to the KFP for the Selected mine and transmission line alternatives.

1.6.15 National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations under 36 CFR 800 require all federal agencies to consider effects of federal actions on cultural

resources eligible for or listed in the National Register of Historic Places. Traditional cultural properties are also protected under Section 106 of the NHPA.

Two currently identified cultural resources within the mine area defined by the selected mine alternative will require mitigation. Along the selected transmission line alternative transmission line alignment, six or seven currently identified cultural resources may require mitigation, depending on the outcome of eligibility determination. The selected mine and transmission line alternatives require additional cultural resource inventories to satisfy requirements of Section 106 of the NHPA. The number of cultural resources that will require mitigation may increase pending the results of these additional inventory efforts. The appropriate type of mitigation will depend on the nature of the cultural resource involved and will be determined during consultation among MMC, the KNF, and the SHPO.

A Programmatic Agreement addresses remaining Section 106 compliance, the mitigation of unavoidable historic properties, and inadvertent cultural resource discoveries. Any mitigation plan will be developed by MMC and approved by both the KNF and SHPO under a Programmatic Agreement, and will include consulting American Indian tribes if affected cultural resources were prehistoric or of recent cultural significance. Cultural resources will be monitored to ensure protection for cultural resources or human remains not identified during initial surveys from adverse effects during construction, and that all cultural resources that were to be avoided are not adversely affected during construction. The KNF will afford the CSKT and Kootenai Tribe of Idaho (KTOI) the opportunity to monitor construction activities associated with the mine and any ground-disturbing activities (construction and reclamation) associated with the transmission line on state and federal lands.

I find that the selected mine and transmission line alternatives comply with the NHPA.

1.6.16 Wilderness Act

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 1964 Wilderness 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 CMW boundary. The Montanore Project mineral rights predate the withdrawal and are discussed in detail in Section 1.3.1 of the Joint Final EIS.

Section 4(d)(3) of the 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 National Forest System lands designated by the Act as a wilderness area will be accorded rights under the 1872 General Mining Law. The same section states that all patents issued on National Forest System lands designated as a wilderness area will convey only title to the mineral deposits within the claims and the United States 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 United States mining laws. Forest Service mineral regulations (36 CFR 228, Subpart A) provide direction for administering locatable minerals operations on National Forest System lands. Specifically, 36 CFR 228.15 provides direction for operations within the National Forest Wilderness. Holders of validly existing mining claims within the National Forest Wilderness are accorded the rights provided by the 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 consistent with the use of the land for mineral development and production.

Mitigation measures and monitoring requirements in the selected mine and transmission line alternatives are reasonable stipulations for protection of the wilderness character and are consistent with the use of the land for mineral development. The selected mine and transmission line alternatives will 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 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 mine and transmission line alternatives comply with the Wilderness Act.

1.6.17 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 National Forest System lands in Montana, inventoried roadless areas are those areas mapped under the 2001 Roadless Area Conservation Rule (36 CFR 294 Subpart B, 66 Fed Reg. 3244-3273). These areas are identified in Appendix C of the FEIS for the revised 2015 Forest Plan. The official set of maps is maintained at the national headquarters office of the Forest Service. The Chief of the Forest Service indicated in 2012 that he will continue to review projects involving road construction or reconstruction and the cutting, sale, or removal of timber in IRAs, except for some projects he delegated to Regional Foresters.

1.6.17.1 Cabinet Face East IRA

The selected mine alternative will avoid all surface disturbance in the Cabinet Face East IRA. Increased noise levels from the Libby Plant Site will be audible from within the IRA between Libby and Ramsey Creeks. Similar noise levels will be audible from within the IRA adjacent to the Libby Adit Site and Libby Plant Site. To minimize equipment noise, MMC will supplement backup beepers on surface equipment with strobe light-type warning devices and the sound level of the backup beepers will be reduced to the minimum level necessary to comply with safety regulations. Changes in natural integrity and apparent naturalness will occur at the edges of the Cabinet Face East IRA in the Libby Creek drainage by the Libby Plant Site and Libby Adits. Opportunities for solitude and primitive recreation will be eliminated in the IRA near the Libby Plant Site and Libby Adits.

Emissions from the mill and adits will increase concentrations of priority air pollutants in the IRA adjacent to Libby and Ramsey Creeks: concentrations of all pollutants will be below applicable standards. The increased concentrations will reduce the natural integrity of the IRA adjacent to Libby and Ramsey Creeks. The agencies' mitigation, such as limiting generator use at the mill

after power was available from a transmission line to the mill after power was available from a transmission line to 16 hours during any rolling 12-month period and using Tier 4 engines, if available, and ultra-low sulfur diesel fuel in underground mobile equipment, will substantially reduce emissions. IRA attributes will return to pre-mine conditions after mine closure and reclamation. IRA attributes will return to pre-mine conditions after mine closure and reclamation.

MMC will fund or implement access changes on five roads leading into the Cabinet Face East IRA in the Bear, Poorman, Ramsey, Libby, and Standard Creek drainages. These roads will be barriered and converted into trails. These access changes will improve the opportunities for solitude and primitive recreation as well as manageability and boundaries of the Cabinet Face East IRA.

1.6.17.2 Rock Creek and McKay IRAs

Indirect effects on baseflow will reduce the natural integrity of the Rock Creek and McKay Creek IRAs. The agencies' mitigation of increasing the buffer zones near Rock Lake and the Rock Lake Fault, which was not modeled, and leaving one or more barrier pillars inside the mine, is designed to minimize effects on East Fork Rock Creek streamflow.

The agencies' proposed water resources monitoring will require monitoring of water resources in the East Fork Rock Creek, East Fork Bull River, and Swamp Creek drainages (Attachment 3). Increased use by project personnel conducting the monitoring will decrease opportunities for solitude or a primitive and unconfined type of recreation in the East Fork Rock Creek, East Fork Bull River, and Swamp Creek drainages.

Access on Rock Lake Trail #935, which currently separates the Rock Creek IRA from the McKay IRA, will change from being open to snow vehicles December 1 through April 30 to being restricted to all motorized vehicles, including over-snow vehicles. The change will improve the wintertime opportunities for solitude and primitive recreation. Forest Service acquisition of 5 acres of replacement habitat near Rock Creek Meadows between the Rock Creek IRA and the McKay IRA, coupled with the access change on Rock Lake Trail #935, will improve the manageability and boundaries of the Rock Creek and McKay IRAs.

The selected transmission line alternative will avoid physical disturbance in the IRAs. No road construction or timber harvest will occur in the IRAs. Transmission line construction to the Libby Plant Site will be audible in the Cabinet Face East IRA between Libby and Ramsey Creeks. Views from the IRA will be affected by new H-frame transmission lines, particularly from high, open vistas. Cabinet Face East IRA attributes will return to pre-transmission line conditions after transmission line decommissioning. Attributes of the Rock Creek and McKay Creek IRAs will not be affected.

1.6.17.3 Finding

I find that the selected mine and transmission line alternatives comply with the Roadless Area Conservation Rule. Road construction or reconstruction and the cutting, sale, or removal of timber will not occur in an IRA and, therefore, review by the Chief of the Forest Service is not required.

1.6.18 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 or Congressionally authorized study rivers. The analysis area has no designated rivers or Congressionally authorized study rivers. The KNF identified the East Fork Bull River and the entire Bull River as eligible for addition to the National Wild and Scenic Rivers System. 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 project will not alter the free-flowing character 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 mine alternative will have no effect on the scenic and historic values of the East Fork Bull River or Bull River. The historic resources in the three eligible river segments, such as trails or the Bull River Guard Station, will not be affected. The scenic quality of the three segments will not be affected by a modeled reduction in baseflow. The selected transmission line alternative will not affect the free-flowing characteristics, water quantity, water quality, or the outstandingly remarkable values of any of the three eligible segments.

I find that the selected mine and transmission line alternatives comply with the Wild and Scenic Rivers Act and the appropriate analysis was conducted in compliance with Forest Service policy.

1.6.19 Executive Order 11988 – Floodplains

EO 11988, 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. Federal agencies must take floodplain management into account, consistent with the Federal Flood Risk Management Standard, when formulating or evaluating water and land use plans and require land and water resources use appropriate to the degree of flood hazard involved. During final design, MMC is required to avoid or minimize, to the extent practicable, locating facilities (such as the Seepage Collection Pond and transmission line structures in the selected mine and transmission line alternatives) in a floodplain. If locating mine facilities in a floodplain cannot be avoided, an application for a floodplain permit will be submitted to the DNRC that provides details on the obstruction or use of a floodway floodplain, and a permit will be required before construction begins. The agencies' monitoring and mitigation plans include construction of some facilities in the Libby Creek floodplain, such as wood structures for bull trout mitigation and continuous flow measurement devices in Libby Creek.

MMC will be required to avoid locating these facilities in a floodplain during final design and will locate facilities in a floodplain only if no practicable alternative exists to avoid doing so.

DNRC's permit decision and associated conditions on the floodplain permit will constitute compliance with the requirements of EOs 11988 and 13690.

1.6.20 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.

There is no practicable alternative to new construction located in jurisdictional and isolated wetlands. The Corps' wetland mitigation requirements will fulfill the EO's requirements to minimize harm to jurisdictional wetlands (see Attachment 1 for a more detailed description of mitigation measures). The KNF's practicable measures to minimize harm to isolated wetlands include the following: 1) during final design for the tailings impoundment, MMC will be required to avoid or minimize, to the extent practicable, filling wetlands and streams; 2) the KNF will use the Corps' mitigation ratios in determining compensation requirements for isolated wetlands, and will use the Corps and EPA's compensatory mitigation regulations as a guide to offset unavoidable impact on wetlands to ensure performance standards and the effectiveness of isolated wetland mitigation. Performance standards for juristictional wetland mitigation sites described in the Corps" 404 permit will be used as a guide in developing performance standards to assess the success of the isolated wetland mitigation sites; and 3) use the three Little Cherry Creek sites and the gravel pit site as mitigation for isolated wetlands (see Attachment 1 for a more detailed description of mitigation measures). The KNF's final mitigation requirements for isolated wetlands will be based on final facility designs and the updated groundwater models.

I find that the selected mine and transmission line alternatives include all practicable measures to minimize harm to jurisdictional and isolated wetlands. The Corps' permit decision and associated conditions on the 404 permit will constitute compliance with EO 11990 requirements to minimize harm to jurisdictional wetlands.

1.6.21 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 KNF's analysis of environmental justice follows the CEQ'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 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 and/or non-low-income population.

Minority or low-income populations will not be disproportionately affected by the Montanore Project American Indians are a minority population, and although the proposed mine is not located within or adjacent to any tribal reservations, it is located within the boundaries of land covered by the Hellgate Treaty (see Section 3.5, *American Indian Consultation*, of the Final EIS). The selected mine alternative will restrict access to mine facility sites to all members of the public, including tribal members. Required mitigations will reduce the effects of access

restrictions. The access restrictions will not be disproportionately high or adverse on any minority or low-income population.

I find that the selected mine and transmission line alternatives comply with EO 12898.

1.6.22 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.

As disclosed in Section 3.16.4.3.1 of the Final EIS, channels affected by the Poorman Tailings Impoundment Site are not fish-bearing and do not provide recreational fishing access. The selected mine alternative will not affect recreational fishing opportunities. The selected transmission line alternative will be consistent with the recreation-related management direction in the KFP.

I find that the selected mine and transmission line alternatives comply with EO 12962.

1.6.23 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. No sacred sites, as defined in EO 13007, will be disturbed by implementation of the selected mine and transmission line alternatives.

I find that the selected mine and transmission line alternatives comply with EO 13007.

1.6.24 Executive Order 13112 – Invasive Species

EO 13112 directs federal agencies (in part) to prevent the introduction of invasive species; provide for their control; and minimize the economic, ecological, and human health impacts that invasive species cause.

The selected mine and transmission line alternatives require the implementation of all weed BMPs discussed in Section 2.5.3.2.5, *Noxious Weed Mitigation Measures*, of the Final EIS and stipulated in Attachment 2 of this ROD to reduce the establishment and spread of noxious weeds. The weed BMPs and other measures described will address the treatment and control of noxious weeds throughout all mine and transmission line facilities.

I find that the selected mine and transmission line alternatives comply with EO 13112.

1.6.25 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 CSKT and KTOI on a government-to-government basis since 1989.

I find that the selected mine and transmission line alternatives comply with EO 13175.

1.6.26 Executive Order 13186 – Migratory Birds

EO 13186 requires analysis of effects of federal actions on migratory birds as part of the environmental analysis process. Under a 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.

All action alternatives will result in the loss of or disturbance to habitat supporting migratory birds. Following successful reclamation, with the exception of old growth communities, most disturbed habitats and their associated bird communities will eventually be restored to pre-mine or pre-transmission line conditions. The effects of the selected mine and transmission line alternatives are disclosed in Chapter 3 of the Final EIS.

The selected mine and transmission line alternatives include mitigations and monitoring requirements that will lessen the impact on migratory birds. To limit effects on nocturnally migrating birds and nocturnally active bird species, MMC will use fixture baffles and directional light sources to minimize ambient light emanating from the mine facilities during operations. Some ambient light will remain, however, and movements of some nocturnally migrating birds could be disrupted.

I find that the selected mine and transmission line alternatives comply with EO 13186.

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

In addition to the Forest Service, other federal and state agencies require permits or have review authority for the Montanore Project. Federal agencies include the USFWS, Corps, BPA, and EPA. State and local agencies include DEQ, FWP, DNRC, Montana Department of Transportation, SHPO, and Lincoln County Weed Board. The roles and responsibilities for each of these agencies are described in Chapter 1 of the Final EIS. Table 4 lists the permits, licenses, and approvals required from each agency for the Montanore Project.

Table 4. Permits, Licenses, and Approvals Required for the Montanore Project.

Permit, License, or Approval	Purpose
Kootenai National Forest	
Approval of Plan of Operations (36 CFR 228, Subpart A)	To allow MMC to explore, construct, and operate a mine and related facilities, such as the 230-kV transmission line, on National Forest System lands. Approval incorporates management requirements to minimize or eliminate effects on other surface resources that include final design of facilities, and mitigation and monitoring plans as described in the ROD. Review of the proposed plans is coordinated with the DEQ and other appropriate agencies. Approval of the Plan of Operations is contingent on MMC accepting and incorporating the stipulations and mitigation measures (Attachment 2) into the Plan of Operations.
Special Use Permit(s) (36 CFR 251)	To allow construction and operation of facilities not otherwise covered by the approved Plan of Operations.
Road Use Permit	To specify operation and maintenance responsibilities on NFS roads not covered by an approved Plan of Operations.
Mineral Material Permit	To allow MMC to take borrow material from National Forest System lands not covered by an approved Plan of Operations.
Timber Sale Contract	To allow MMC to harvest commercial timber from the project area on National Forest System lands. Harvesting would be conducted to clear the area for project facilities.
U.S. Fish and Wildlife Service	
Biological Opinion	To protect threatened or endangered species and any designated critical habitat. Consultation with the KNF.
404 Permit Review	To comment on the 404 permit to prevent loss of, or damage to, fish or wildlife resources. Consultation with the Corps.
U.S. Army Corps of Engineers	
404 Permit (Clean Water Act)	To allow discharge of dredged or fill material into wetlands and other waters of the U.S. Subject to review by the EPA, USFWS, KNF, and DEQ. Coordinate with the SHPO.

Permit, License, or Approval	Purpose
Montana Department of Environmental Quality	
Hard Rock Operating Permit Modification (MMRA)	To allow a change in an approved operating plan. Proposed activities must comply with state environmental standards and criteria. Approval may include stipulations for final design of facilities and monitoring plans. A sufficient reclamation bond must be posted with the DEQ before implementing an operating permit modification. Coordinate with the KNF.
Transmission Line Certificate (MFSA)	To allow the construction and operation of a 230-kV transmission line more than 10 miles long. Reclamation plans and a bond can be required. Coordinate with the KNF, FWP, DNRC, Montana Departments of Commerce, Revenue, and Transportation, and Montana Public Service Commission.
Montana Air Quality Permit (Clean Air Act of Montana)	To control criteria air pollutants when the potential to emit is more than 25 tons per year.
MPDES Permit (Montana Water Quality Act)	To establish effluent limits, treatment standards, and other requirements for point source discharges, including stormwater discharges to state waters including groundwater. Coordinate with the EPA.
Public Water Supply and Sewer Permit	To allow construction of public water supply and sewer system and to protect public health.
Short-Term Water Quality Standard for Turbidity (318 authorization) (Montana Water Quality Act)	To allow for short-term increases in surface water turbidity during construction. Request may be forwarded from the FWP.
401 Certification (Clean Water Act)	To ensure that any activity that requires a federal license or permit (such as the Section 404 permit from the Corps) complies with Montana water quality standards.
Hazardous Waste and Solid Waste Registration (various laws)	To ensure safe storage and transport of hazardous materials to and from the site and proper storage, transport, and disposal of solid wastes. Some classes of solid waste disposal are covered under the MMRA. Solid wastes may be addressed under the operating permit.

Permit, License, or Approval	Purpose
Montana Department of Natural Resources and Conservation	
Beneficial Water Use Permit (Montana Water Use Act)	To allow the beneficial use of groundwater or surface water.
Floodplain Development Permit (Montana Floodplain and Floodway Management Act)	To allow construction of mine facilities within a 100-year floodplain.
310 Permit (Montana Natural Streambed and Land Preservation Act)	To allow mine-related activities that physically alter or modify the bed or banks of a perennially flowing stream.
Streamside Management Zone Law	To control timber harvest activities within at least 50 feet of any stream, lake, or other body of water.
Burning Permit	To control slash or open burning outside the open burning season.
Access Road Easement	To allow road construction on State lands.
Montana State Historic Preservation Office	
Cultural Resource Clearance (Section 106 Review)	To review and comment on federal compliance with the NHPA.
Montana Fish, Wildlife and Parks	
310 Permit (Natural Streambed and Land Preservation Act)	To allow mine-related construction activities by nongovernment entities within the mean high water line of a perennial stream or river. Coordinate with the DNRC and Lincoln County Conservation District. The FWP works with conservation districts to review permit and determine if a Water Quality Waiver of Turbidity (318 Permit) from the DEQ is needed.
Transmission Line Approval	To allow construction of the 230-kV transmission line across the Thompson Fisher conservation easement.
Montana Department of Transportation	
Approach Permit	To allow safe connection of mine-related roads to state highways.
Utility Occupancy and Location Agreement or Encroachment Permit	To allow mine-related utility or construction access roads within MDT rights-of-way.
Montana Department of Commerce, Hard Rock Impact Board/Lincoln County	
Fiscal Impact Plan (Hard Rock Mining Impact Act)	To mitigate fiscal impacts on local government services.
Lincoln County Weed District	
Noxious Weed Management Plan	To minimize propagation of noxious weeds.

1.8 Public, Agency, and American Indian Participation

1.8.1 Public Participation

Public participation has and continues to play an important role in project decision making. Four stages of public participation led to the ROD. The first stage was the initial scoping that was conducted to identify significant issues and to develop key mitigation and monitoring measures. The second stage consisted of receiving and responding to public comments received during the official public comment period on the Draft and Supplemental Draft EISs. The third stage consisted of reviewing comments and input received from the public and other agencies and tribal representatives throughout the NEPA process. The fourth stage was a period for objection after release of the Final EIS and the draft ROD (see Section 1.10 for a discussion of the Forest Service's objection process).

Opportunity for public involvement began when scoping was initiated on MMC's proposal. A Notice of Intent was published on July 14, 2005, in the Federal Register. This notice described the Forest Service's and DEQ's intent to prepare an EIS for the proposed Montanore Project, set the dates for public scoping meetings, and solicited public comments. In addition, as part of the public involvement process, the lead agencies issued press releases, mailed scoping announcements, and held three public meetings.

The dates of all public meetings, as well as copies of notices and news releases that invited comment or provided informational updates on the EIS process can be found in the project record, which is available for public review at the KNF Supervisor's office in Libby, Montana. Meetings and hearings were held to provide information and receive comment on the Draft EIS and Supplemental Draft EIS. Notification of comment periods, open houses, hearings, and meetings were published or broadcast in numerous papers and television/radio stations between Missoula and Kalispell. Notices of Availability and copies of the Draft and Supplemental Draft EIS were emailed or mailed to interested individuals and organizations. Notices of Availability were published in the Federal Register. In addition to holding public meetings, the agencies hosted field trips for the interdisciplinary team and meetings to discuss and resolve issues and concerns for alternatives development.

During the public comment period for the Draft EIS, the agencies received 40,097 letters, comment sheets, and transcripts, including 39,923 form letters. During the public comment period for the Supplemental Draft EIS, the agencies received 44,759 letters, comment sheets, and transcripts, including 44,641 form letters. The responses to Draft EIS and Supplemental Draft EIS comments are included in Appendix M of the Final EIS.

All interested and affected parties who provided specific written comments, as defined in 36 CFR 218.2 during scoping or the comment period, were eligible to participate in the objection process (see Section 1.10, *Pre-decisional Administrative Review*).

Public participation does not end with the permitting of the Montanore Project. The public has the right to review permit files and monitoring reports at any time. If a person or organization believes there is an unreported violation or potential for environmental harm, that person has the right to file a complaint with the agencies and expect it to be investigated.

1.8.2 American Indian Participation

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 NHPA (Section 2), NEPA, the Native American Graves Protection and Repatriation Act, the American Indian Religious Freedom Act and the Religious Freedom Restoration Act, among other executive orders and policy. Federal guidelines direct federal agencies to consult with modern American Indian tribal representatives and traditionalists who may have concerns regarding federal actions potentially affecting religious practices, and other traditional cultural uses. Consultation also may involve cultural resource sites and remains associated with American Indian heritage. Any tribe whose aboriginal territory falls within an analysis area is afforded the opportunity to voice concerns for issues governed by NHPA, the Native American Graves Protection and Repatriation Act, the American Indian Religious Freedom Act and the Religious Freedom Restoration Act.

The Montanore Project lies within the aboriginal territory of the Kootenai Tribe. The CSKT and KTOI are the federally recognized tribes representing the members of the Kootenai Tribe. In addition, the project is located within lands encompassed by the Hellgate Treaty of 1855. The Hellgate Treaty was signed between the United States and the Flathead, Upper Pend d'Oreilles, and Kootenai Tribes; and the federal government has consultation responsibilities to ensure the tribes' reserved rights are protected.

Consultation with the KTOI and CSKT has taken place from 1989 until present. In addition, the Coeur d'Alene and Kalispel tribes were notified and an offer made for discussion about the project. The KTOI responded to the request and met for discussion. The Kalispel Tribe responded that due to the project being on the east side of the Cabinet Mountains, it was well outside of Kalispel aboriginal territory, but wanted to continue to receive correspondence about the project. The early consultation from 1989 to 1992 was conducted during the NEPA work associated with the original Montanore Project. While the Final EIS updates the NEPA analysis, the 1992 Montanore Project Final EIS initially outlined the analysis area and, therefore, early consultation is relevant. The Montanore Project consultation resumed and extends from January 2005 until the present.

The KNF will contact the CSKT and KTOI, and the tribes will be afforded the opportunity to monitor construction activities associated with the mine and any ground-disturbing activities (construction and reclamation) associated with the transmission line on state and federal lands.

Additional information about consultation can be found in Section 3.5, *American Indian Consultation*, of the Joint Final EIS. Detailed correspondence is located in either the project record for MMI's or NMC's Montanore projects. Both project records are located in the KNF Supervisor's Office.

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

Comment letters received from Native American tribes and federal, state, and local agencies on the Draft EIS and Supplemental Draft EIS are included in Appendix M to the Final EIS. The agencies' responses are presented alongside each comment. MMC's comments on the Draft EIS and Supplemental Draft EIS were also reproduced and responded to in the same manner.

Substantive comments received by individuals and organizations on the Draft EIS and Supplemental Draft EIS were organized for response according to 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 M to the Final EIS. Responses to substantive comments are organized by issue codes and can be found in the same appendix. Where appropriate, the text of the Final EIS was revised and the section where the change was made is noted in the response to comments.

The agencies 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 EIS and Supplemental Draft EIS that the agencies received are available for public inspection at the addresses listed in the abstract at the front of the Joint Final EIS.

Throughout the NEPA process, the KNF and DEQ have worked collaboratively with the EPA on issues relating to the Montanore Project. Collaboration has included technical work group meetings, site tours, conference calls, and meetings. The EPA provided comments on the Draft EIS, the Supplemental Draft EIS, and the KNF Final EIS. As discussed above, substantive comments were addressed in the Joint Final EIS in appendix M and in revisions to the EIS text. On January 29, 2016, the EPA issued a letter to the KNF regarding the Joint Final EIS, stating that EPA has completed its review consistent with its responsibilities and authorities.

1.9 Reclamation Bond (Financial Assurance)

The Forest Service and DEQ executed a 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.

1.9.1 Authorities

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 the mining activity. Similarly, pursuant to the MMRA and administrative rules adopted thereunder, a mine operator is required to submit a reclamation bond to the DEQ before DEQ may issue an operating permit, an amendment, or modification for the mining activity. The DEQ can also require a bond for the reclamation of transmission line construction disturbances pursuant to the MFSA and administrative rules adopted thereunder. 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, the Montana Water Quality Act, the MMRA, the administrative rules adopted under the MMRA, the operating permit, the MFSA, the administrative rules adopted under the MFSA, and

the transmission line certificate. Thus, a reclamation bond represents the public's "insurance policy" that reclamation will be performed.

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 ROD or decision is issued by each agency. In addition, the Forest Service requires that all bonds pertaining to plans of operations on National Forest System 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 the DEQ must be in place before the issuance of an operating permit, an amendment, or modification unless the applicable plan identifies phases or increments of disturbance that may be individually identified and for which individual incremental bonds may be calculated. 36 CFR 228.13 requires submittal of a bond for reclaiming disturbances on National Forest System lands before approval of a plan of operations. The bond for the transmission line will be determined after a decision is made and an alternative is selected.

The Forest Service is required to review reclamation bonds annually for adequacy (FSM 2817.24b). Similarly, the 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. The 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, the 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, the DEQ is required to modify the bonding requirements. A complete description of DEQ's bond review 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 agencies and the appropriate level of environmental analysis is performed. If the modification is approved, the agencies then determine whether the modification affects the estimated cost to the Forest Service and the 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. Bond release is performance based and is granted or denied based on the agencies' 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), the 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, the DEQ is required to provide reasonable

statewide and local notice of a proposed bond release or decrease. The 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 bond amount is the agencies' estimated cost to complete site reclamation in the event the operator cannot or will not perform the required reclamation. Reclamation at the Montanore Project will not be limited only to near-term reclamation activities such as facilities removal, site regrading, and revegetation. The reclamation may include requirements to collect and treat mine-impacted waters, as well as site maintenance and monitoring for as long as necessary to ensure the protection of environmental resources. Additional information on the reclamation bond and how it is calculated can be found in Chapter 1 of the Joint Final EIS.

1.10 Pre-decisional Administrative Review (Objection Process)

Under current Forest Service regulations (36 CFR 218) that were issued on March 27, 2013, eligible parties may seek administrative review of unresolved concerns before a project decision has been made. When scoping was conducted for the Montanore Project in 2005, a post-decision appeals process, as outlined in 36 CFR 215, was applicable. Because the ROD for the Montanore Project comes more than 6 months after the effective date of the new regulations (36 CFR 218.16(b)(2)), the new objection process, as outlined in 36 CFR 218 Subparts A and B, was applicable. All interested and affected parties who provided specific written comments, as defined in 36 CFR 218.2 during scoping or the comment period, were eligible to participate in the objection process.

I provided legal notice of the "Opportunity to Object" in the paper of record (36 CFR 218.24). Eligible commenters (36 CFR 218.25(a)(3)) had 45 days from the date of publication to submit written objections to the responsible official (36 CFR 218.25). Issues raised in the objection must be based on previous comments unless they are based on new information that arose after the opportunity to comment (36 CFR 218.8 (c)).

The reviewing officer, the Regional Forester as defined by CFR 218.3, responded in writing to all objections, and held an Objectors Meeting in Libby, MT on June 30, 2015. All objectors received invitations to this meeting. The written response provided the reasons for the response, but was not a point-by-point. The reviewing officer's letter contained instructions to me, which I addressed in the Joint Final EIS and in this ROD. No further review from any other Forest Service or USDA official of the reviewing officer's written response to an objection is available (36 CFR 218.11(b)(2)).

1.11 Additional Information

Copies of the Montanore Project Joint Final EIS are available for review at the KNF Supervisor's Office in Libby; the Montana Department of Environmental Quality, Lee Metcalf Building in Helena; the Montana State Library in Helena; the Mansfield Library, University of Montana in Missoula; the Lincoln County Library in Libby; and the Montana Tech Library in Butte. The joint Final EIS may also be accessed on the internet at lead agencies and EPA's web sites.

Additional printed or electronic (on compact disc) copies of this ROD and the Joint Final EIS are available upon request. The supporting project record is available for review at the Forest Service Supervisor's Office for the Kootenai National Forest, 31374 US 2, Libby, MT 59923.

1.12 Approvals

This ROD is effective on signature.

Christopher S. Savage
Forest Supervisor
Kootenai National Forest

February 12, 2016
Date

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

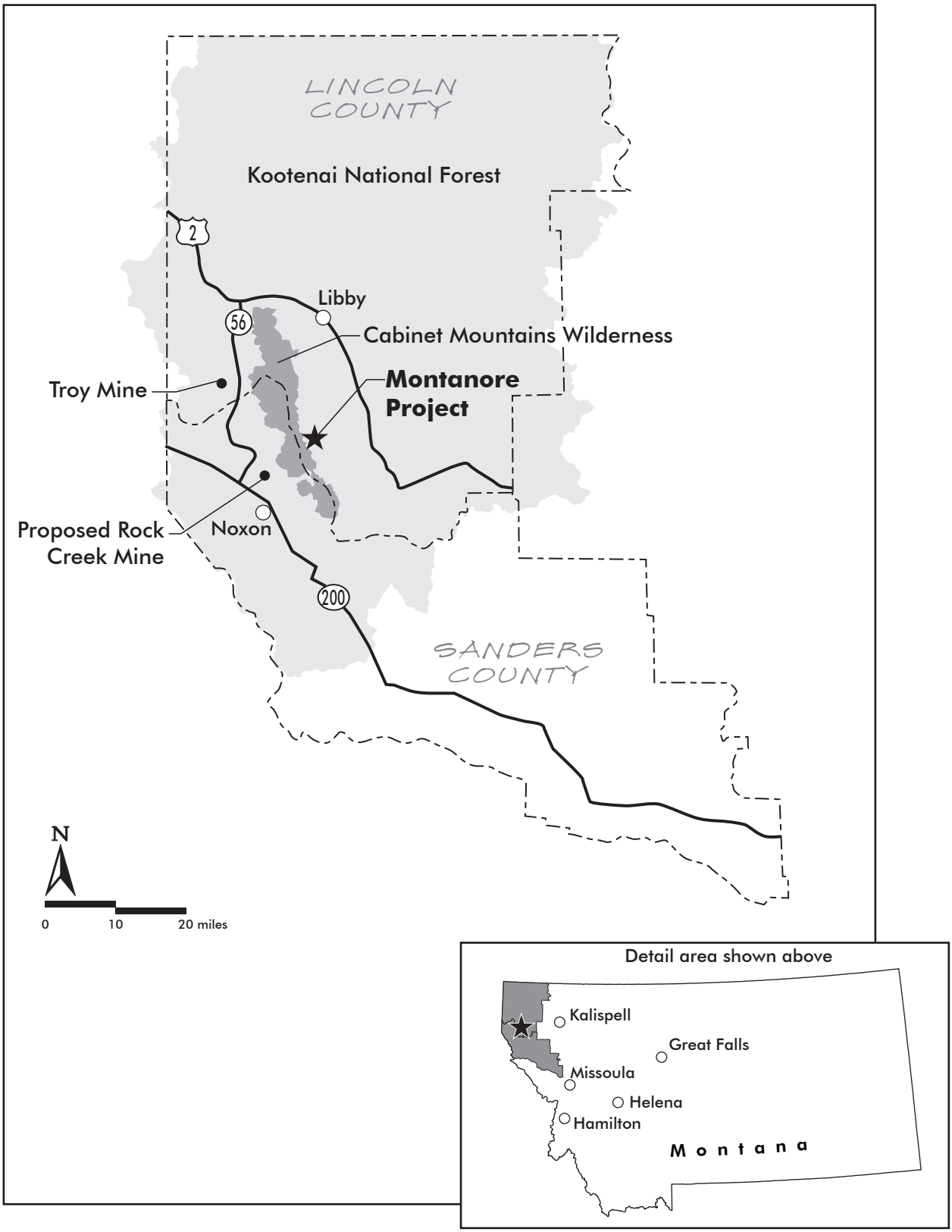

Figure 1. Location Map, Montanore Project, Kootenai National Forest.

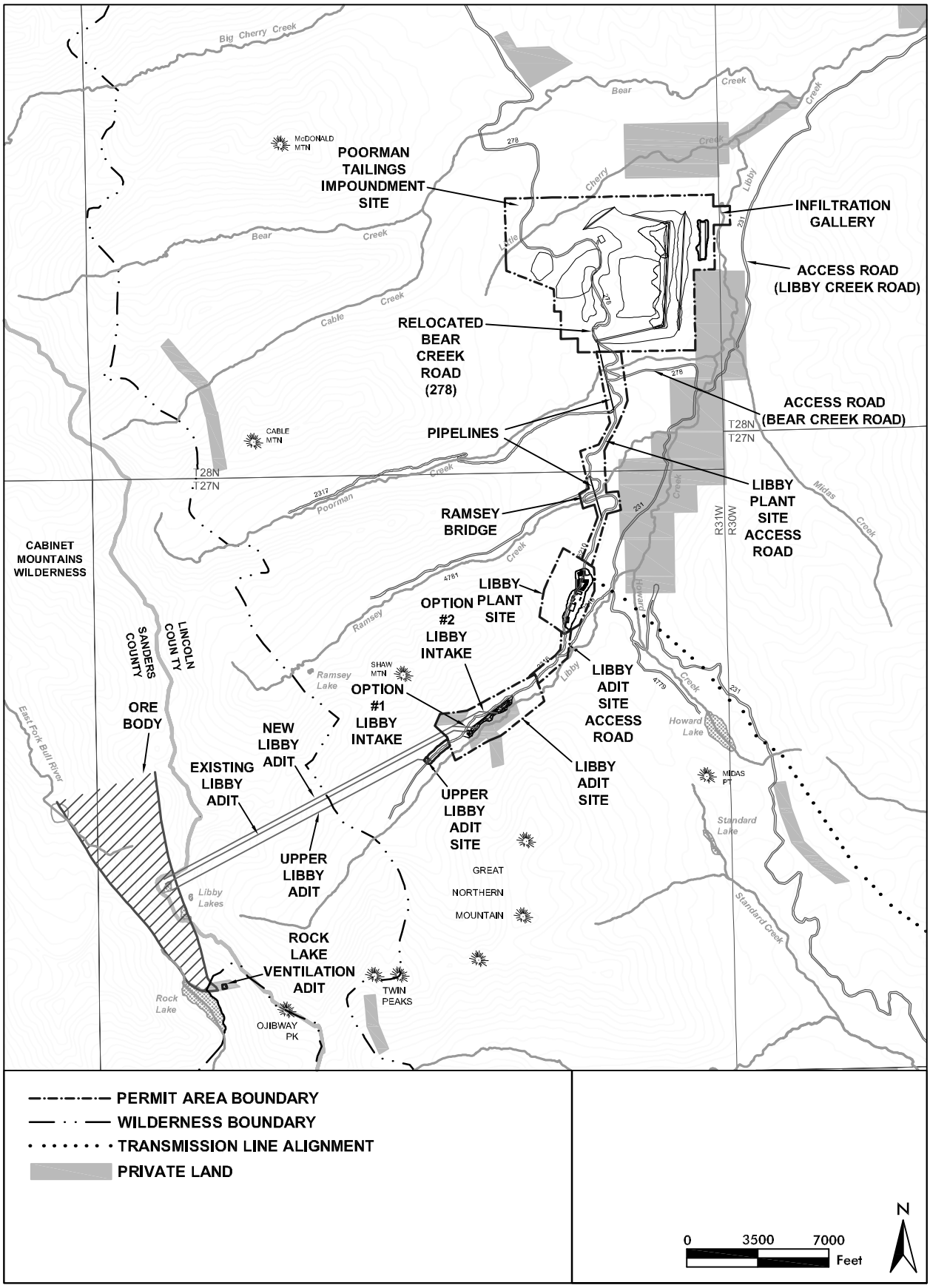

Figure 2. Selected Mine Alternative Facilities

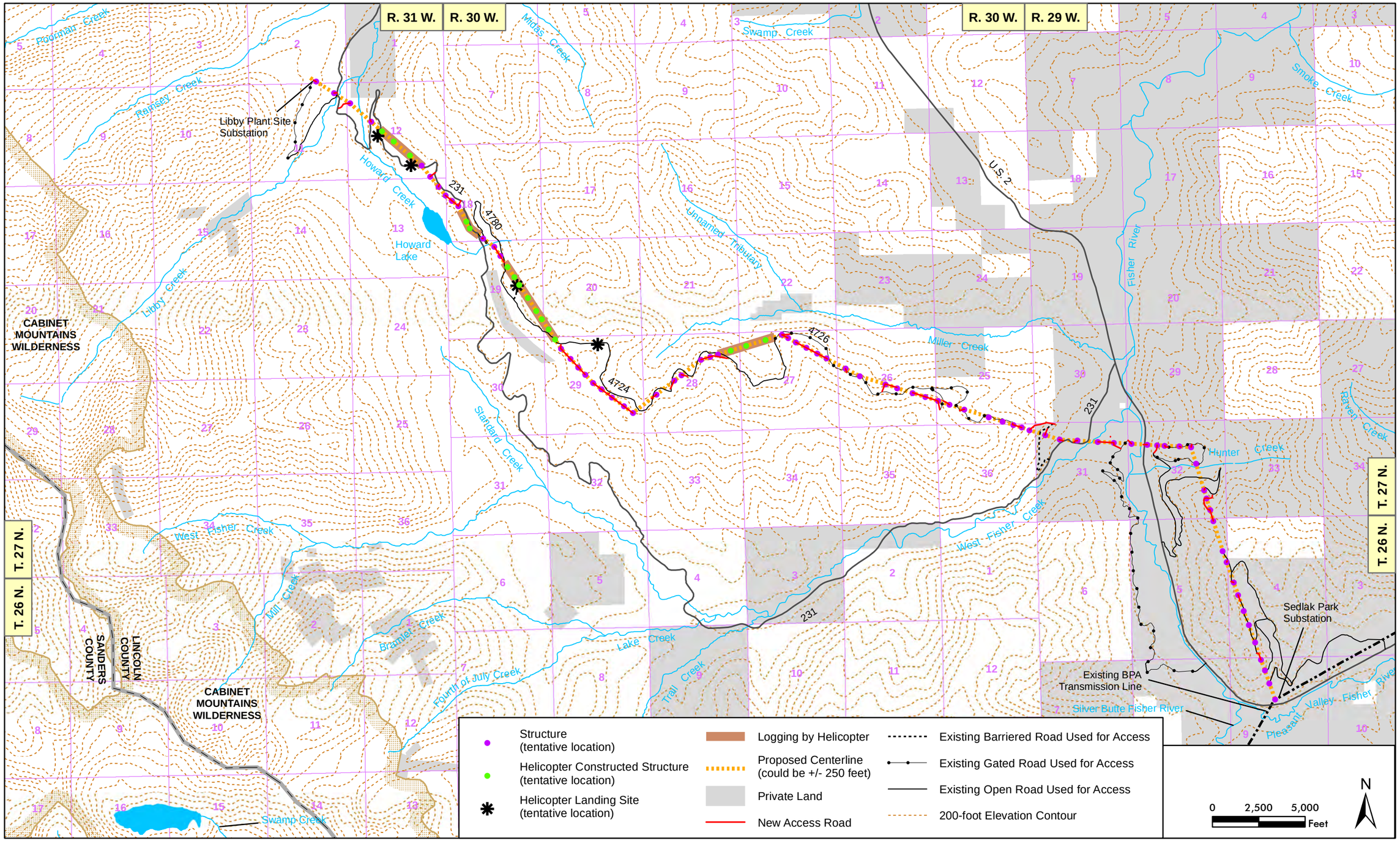

Figure 3. Selected Transmission Line Alignment, Structures, and Access Roads

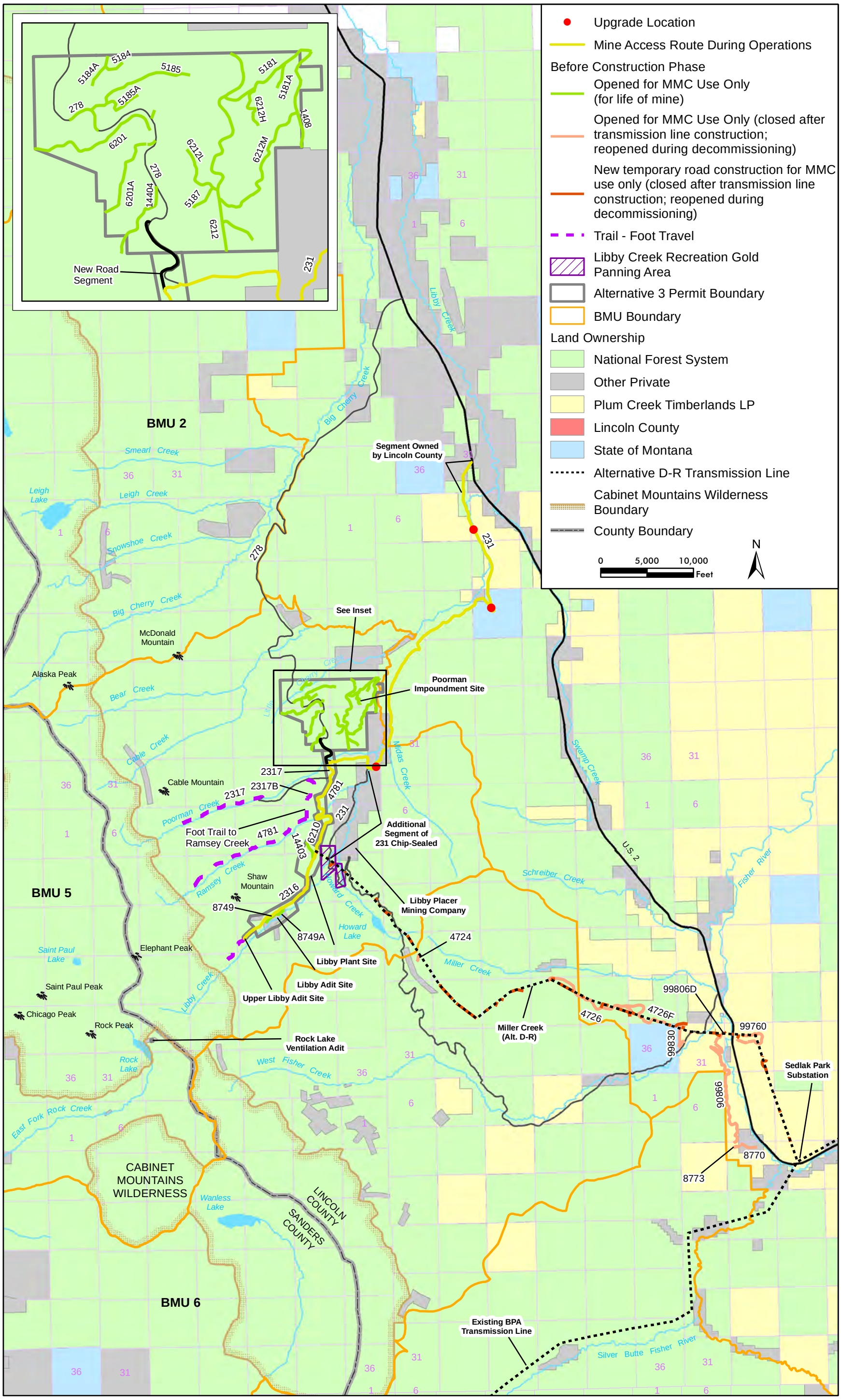

Figure 4. Mine Access Road Changes

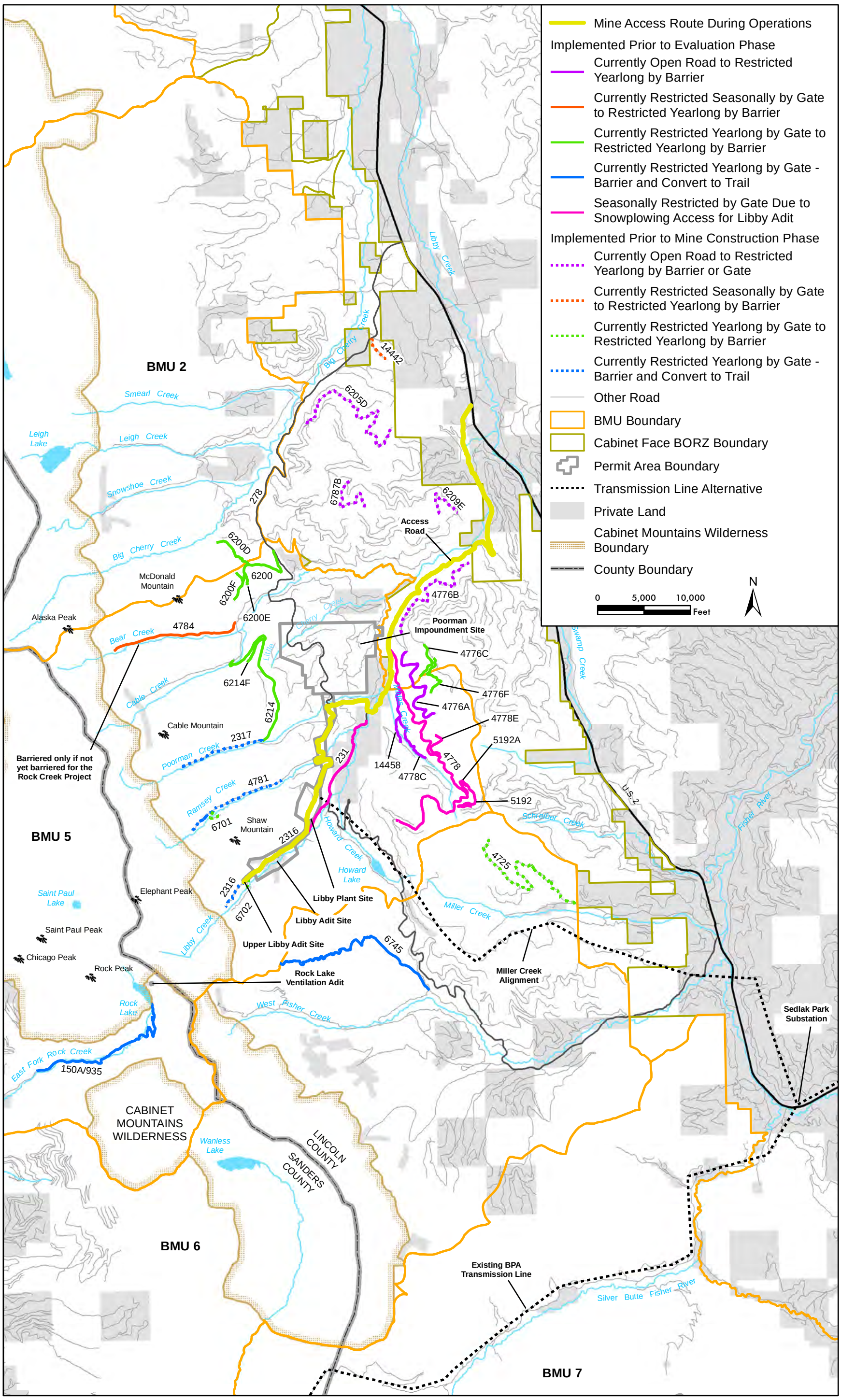

Figure 5. Road and Trail Access Changes for Wildlife Mitigation

Attachment 1 – Selected Mine and Transmission Line Alternatives

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1.1 Agencies' Selected Mine Alternative (Agency Mitigated Poorman Impoundment Alternative)

1.1.1 Evaluation Phase

1.1.1.1 Objectives

The Libby Adit evaluation program will be the first phase of the Montanore Project. The objectives of the evaluation program will be to:

- Expand the knowledge of the mineralized zones of the deposit
- Assess and define the mineralized zone within established valid existing rights
- Collect, provide, and analyze additional geotechnical, hydrological, and other information required to finalize a mine plan and to confirm and support the analysis for the Construction and Operation Phases of the mine

1.1.1.2 Proposed Activities

The evaluation drilling program is designed to delineate the first 5 years of planned production. An estimated 35,000 feet of primary drilling and 12,800 feet of infill drilling are planned. The drill core will be used to support resource modeling, mine planning, metallurgical testing, preliminary hydrology assessment, and rock mechanic studies for the full Montanore Project. Supporting surface facilities are located on private lands at the Libby Adit Site and include an office, shop, generators, waste rock stockpile, and other ancillary facilities.

If adit closure and site reclamation are necessary after completion of the evaluation drilling program, MMC will install a concrete-reinforced hydraulic plug in bedrock, reconstruct the original adit plug, remove all surface facilities, and regrade and revegetate the disturbed areas. Additional information about the evaluation drilling program and site operations and reclamation can be found in MMC's Notification to Resume Suspended Exploration and Drilling Activities for the Montanore Project, Revision 2, on file with the lead agencies.

MMC will use Tier 4 generators, if available, or Tier 3 generators for all Evaluation Phase activities. MMC will also use Tier 4 engines, if available, or Tier 3 engines on underground mobile equipment and use ultra-low sulfur diesel fuel in generator and underground mobile equipment engines during the Evaluation Phase.

MMC will dewater the full extent of the existing Libby Adit, extend the adit 3,300 feet to beneath the ore zones, and develop an additional 7,100 feet of drifts and 16 drill stations under the currently defined ore zones. Because drill stations will be located under the deposit, the majority of the drillholes will be drilled upward; a few holes will be drilled below the drill station to test mineralization at depth.

MMC will drill ahead of the drifts and keep all drill stations 300 feet from the Rock Lake Fault and 1,000 feet from Rock Lake. During the dewatering of the Libby Adit, an array of small diameter boreholes will be installed from within the Libby Adit, and instrumented with continuous recording pressure transducers. Because the intent of the underground piezometers will be to obtain pre-mining pressure data and to track drawdown as the mine void is dewatered, the piezometers will be drilled out in front of the existing working face. At each station, the two

inclined piezometers will be drilled from a cutout as close to the working face as possible without causing risk to the piezometers during subsequent blasting. The piezometers will be equipped with pressure recording devices before the drift or adit is advanced. Additional description of the Pre-Evaluation and Evaluation Phase monitoring is presented in Attachment 3 of the ROD.

MMC will not appropriate any mine or adit water for beneficial use during any phase of the mining operation, including the Evaluation Phase. All mine and adit water will be treated and discharged at the Water Treatment Plant. MMC will use either its groundwater right with a year-round diversion or its surface water right with a diversion between April 1 and December 19. MMC will install a DNRC-approved water use measuring device at both point of diversion locations. Water must not be diverted until the required measuring device is in place and operational. On a form provided by the DNRC, MMC will keep a written monthly record of the flow rate and volume of all water diverted including the period of time. Records will be submitted to the KNF, DEQ and DNRC by January 31 of each year and upon request at other times during the year. MMC will maintain the measuring device so it always operates properly and measures flow rate and volume accurately.

Under the General Mining Law, a lode mining claim is ideally a rectangle of maximum dimensions 1,500 feet by 600 feet. A lode claim cannot exceed these dimensions and the opposing sides need to be parallel to obtain extralateral rights. The short side (600 feet) is known as the endline and the long side (1,500 feet) is referred to as the sideline. The apex provision of the mining law entitles the owner of a mining claim a right to mineralization extending in a downward course beyond the sidelines, but within the endlines of the claims. This entitlement is referred to as extralateral rights. MMC's extralateral rights are defined by the west endline of HR 133 and the east endline of HR 134. In revision 06-002 to its Hard Rock Mine Operating Permit #00150, MMC proposed areas of exploration outside of its extralateral rights. MMC will not explore or mine for any ore outside of its extralateral rights. MMC will notify the KNF within 48 hours when ore is encountered during either the extension of the Libby Adit, development of any drifts, or exploration drilling. MMC will isolate underground any ore encountered outside of its extralateral rights from waste rock in case a future authority provides for the disposal of those valuable minerals.

Because the Rock Lake Fault is a major geologic structure adjacent to the ore deposit, MMC will determine the following parameters by exploratory drilling ahead of development and flow testing:

- Fault location and dip (slope)
- Hydraulic conductivities and storage capacities for the fault zone and adjacent transition zones
- Width of the fault and transition zones
- Water pressures in the fault and transition zones

Similar studies will be conducted on the Rock Lake barrier pillar. These studies will be reviewed by the lead agencies and approval will be required before MMC could mine within a smaller buffer area. Microseismic and conventional monitoring will be used to evaluate long-term stability. Monitoring will be located in operating and abandoned sections of the mine. The sensors will be connected to a continuous monitoring system and will record the size and approximate

location of seismic events. Additional description of the Pre-Evaluation and Evaluation Phase monitoring is presented in Attachment 3 of the ROD.

An estimated 545,300 tons (256,000 cubic yards) of waste rock will be generated and stored on private land at the Libby Adit Site. The waste rock storage areas will be lined to collect runoff from the area and seepage through the waste rock. The DEQ's approval of revision 06-002 (the Libby Adit evaluation program) contained two conditions regarding testing of waste rock: analysis of water that infiltrated and ran off of the waste rock stockpile and nitrate column leaching tests. MMC completed both testing requirements. In 2008, MMC excavated 66,000 tons of rock for sumps in the Libby Adit was placed onto a lined area. A sump was constructed that collected runoff and seepage from the waste rock stockpile. Collected water was pumped to the Water Treatment Plant and discharged in the MPDES permitted outfall. Runoff and seepage from the waste rock pile was analyzed for metals, nutrients and other parameters. Data from water in the sump at the Libby Adit waste rock stockpile (Appendix K-10) were used to represent changes in water quality related to waste rock to be used at the impoundment site. The available results of metal and nutrient release testing on the Prichard Formation as waste rock, particularly for arsenic, copper, lead, antimony and nitrate, confirm that additional monitoring will be required (see geochemistry sampling and analysis plan in Appendix C.9). As part of the nitrate column leaching test, MMC completed three blasts of waste rock and collected the blasted rock for column leach testing for nitrogen compounds. Nitrate concentrations ranged from 5.5 mg/L to 25.5 mg/L and ammonia concentrations ranged from 2.8 mg/L to 14.1 mg/L. Nitrogen values decreased with each shot, which may reflect a refinement of the loading or explosive handling technique.

The Libby Adit will be dewatered and water will be treated before discharging to MPDES-permitted outfalls. The MPDES permit MT0030279 regulates wastewater discharges from the Libby Adit Water Treatment Plant, and sets effluent limits for both surface water and groundwater. Treated water will be discharged to a percolation pond located at the Libby Adit Site.

The underground evaluation is anticipated to last 18 to 24 months. MMC will employ 30 to 35 people at the Libby Site and will work two 10-hour shifts 7 days per week. The hours of operation will fluctuate based on daily requirements, but will operate 7 days per week.

During all phases of the project, MMC will maintain the structures, equipment, and other facilities in a safe, neat, and workmanlike manner. Hazardous sites or conditions resulting from operations will be marked by signs, and will be fenced or otherwise identified to protect the public in accordance with federal and state laws and regulations. MMC also will 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.

1.1.1.3 Transportation and Access

1.1.1.3.1 Development of Plans

MMC will develop a Transportation Plan for life of the mine to be approved by the agencies before the Evaluation Phase. The plan's objectives will be to minimize mine-related vehicular traffic traveling between US 2 and the plant site, and minimize parking at the plant site. Busing employees to the plant site, requiring managers to car pool to the extent practicable, and

establishing a supply staging area in Libby to consolidate shipments to the mine site will be a part of the plan. The bus hub will be located in a convenient location in Libby, Montana, most likely the Kootenai Business Park. The plan will specify that exceptions to staging and consolidation of supplies will include full load shipments, expedited shipments to repair equipment and other emergencies as specified in the plan. Deliveries of supplies will be scheduled for day shift, Monday through Friday only.

The Inland Native Fish Strategy (INFS) standard RF-2 requires the development and implementation of a Road Management Plan. MMC will develop for the lead agencies' approval a final Road Management Plan before the Evaluation Phase that will address roads used, closed or stabilized during the Evaluation Phase, and other roads affected by the Evaluation Phase of the project, including roads with access changes required to be implemented for wildlife mitigation. The plan will describe:

- Criteria that govern road operation, maintenance, and management
- Requirements for pre-, during-, and post-storm inspections and maintenance
- Regulation of traffic during wet periods to minimize erosion and sediment delivery and accomplish other objectives
- Implementation and effectiveness monitoring plans for road stability, drainage, and erosion control
- Mitigation plans for road failures
- Analysis of any new road constructed in a Riparian Habitat Conservation Areas (RHCA), documenting it is the minimum necessary for the approved mineral activity

The plan will describe management of road surface materials during plowing, such as snow and ice. Sidecasting of snow mixed with soil will be avoided. Sidecasting of road material will be prohibited on road segments within or abutting RHCAs in priority bull trout watersheds. MMC will install or fund the installation of signage where sidecasting will be avoided.

1.1.1.3.2 Road Use and Improvements

MMC will use Libby Creek Road (NFS road #231), and Upper Libby Creek Road (NFS road #2316) as the primary year around access to the surface facilities at the Libby Adit Site during the Evaluation Phase. These roads will continue to be snow plowed to allow access during winter. MMC installed a gate on the Libby Creek Road. Unless as directed by the KNF or the Oversight Committee discussed in the grizzly bear mitigation plan, MMC will continue to maintain the gate and the KNF will continue to seasonally restrict access on the two roads as long as MMC uses and snowplows the two roads during the Evaluation Phase.

MMC will implement prior to the Evaluation Phase and maintain during the Evaluation Phase the BMPs listed in Table 1, such as installing, replacing, or upgrading culverts, to bring the Evaluation Phase access roads (NFS roads #231 and #2316) up to applicable standards and guidelines. All ditches on NFS roads #231 and #2316 will be cleaned out to enhance drainage and reduce sedimentation. MMC will implement and maintain BMPs on roads required to be closed or stabilized for wildlife mitigation.

Some of the BMPs listed in Table 1 may require a 404 permit from the Corps. Any activity that may result in any discharge into waters of the U.S. cannot proceed until MMC provides the KNF a 401 certification from the DEQ, unless the DEQ waives its issuance. MMC will implement the

mitigation described for culvert removals on grizzly bear mitigation lands in section 1.1.6.2.2, *Jurisdictional Waters (Streams)*, p, 68.

1.1.1.4 Noise Mitigation

Beginning in the Evaluation Phase and continuing throughout the project's life, MMC will operate all surface and mill equipment so that sound levels will not exceed 55 dBA, measured 250 feet from the mill for continuous periods exceeding an hour. Backup beepers may exceed 55 dBA 250 feet from the mill. MMC will install silencers on intake and exhaust ventilation fans in the three Libby Adits so that they generate sounds less than 85 dBA measured 3 feet downwind of the portal. MMC also will locate all fans a minimum of 500 feet from the portals during operations unless alternative locations will not increase noise levels in the CMW from the Libby Adit Site by 5 decibels or more. Changes smaller than 5 dB will be considered insignificant. The following mitigation will apply to the project during all phases:

- Minimize nighttime construction, operation and reclamation activities that occur outside, as well as surface blasting
- Install high-grade mufflers on all diesel-powered equipment
- Install critical silencers on emergency generators (Cummins Power Generation, Inc. 2007)
- Combine noise-generating operations to occur for short durations simultaneously during the same time period whenever possible.
- Implement a semi-annual maintenance and lubrication schedule to ensure that equipment is operating properly.
- Use an exterior warning signal prior to blasting at or near the surface, per MSHA requirements.
- Keep noise-generating sources from approaching animals on a directed course where possible
- Provide safe cover noise-generating on-site sources where possible

1.1.1.5 Reclamation

MMC will reclaim facilities associated with the Evaluation Phase in the following manner if the full project is not approved, or if MMC decided not to proceed with the project. MMC may retain the dewatering pumps and operation of the Water Treatment Plant beyond the Evaluation Phase. Dewatering and water treatment will continue until a bedrock portal plug is installed. As part of permanent closure and site reclamation, a portal plug will be installed in bedrock near the bedrock/colluvial contact point 800 feet from the portal opening. To ensure long-term stability, waste material will be backfilled into the adit from the bedrock plug out to the surface opening where another plug will be re-installed as originally designed. Once this surface plug is installed, excavated material will be placed back over the portal plug and general opening and regraded to match the surrounding topography. Other surface features, such as the waste rock stockpiles and the percolation pond will be regraded. All surface facilities, buildings, power supply and equipment will be removed. The stockpiled 18 inches of soil will be placed over the regraded and scarified areas. The disturbed sites will be reseeded.

Table 1. Required Road Improvements on NFS roads #231 and #2316.

Milepost from Junction with NFS Road #4778	Required Activity
MP 0.05	Install 24-inch ditch-relief culvert
MP 0.10	Replace existing 18-inch corrugated metal pipe (CMP) with 24-inch CMP
MP 0.13	Install 24-inch CMP; scoured channel enters ditch; no pipe present to allow water to cross road
MP 0.30	Install surface drainage; drain to the east side of road
MP 0.40	Surface drainage needed; drain to the east
MP 0.50	Lower existing 18-inch CMP and replace if necessary
MP 0.60	Clean out existing CMP
MP 0.70	Replace CMP and armor outlet
MP 0.84	Replace existing CMP with a 24-inch CMP
MP 0.90	Provide surface drainage needed; drain to south
MP 0.91	Repair or replace existing 18-inch CMP inlet
MP 1.03	Provide road surface drainage; drain to the south
MP 1.20	Provide road surface drainage; drain to the south
MP 1.30	Armor inlet of existing 24-inch CMP inlet
MP 1.41	Install 24-inch CMP; install a drainage ditch on private property
MP 1.43	Provide road surface drainage; drain to the south

1.1.1.6 Final Design Process

This section describes the agencies' requirements during final design. The final design process and surveys will be completed during the Evaluation Phase prior to the Construction Phase. MMC will collect the necessary data for final design and develop final facility design, monitoring, and mitigation plans. Once approved by the KNF, the final designs and plans will be a component of the Amended Plan of Operations. The KNF will conduct additional NEPA analysis if 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), are identified during final design. If MMC submitted final designs that were not materially different from the conceptual designs of Alternative 3, the DEQ would approve the final designs. If the analysis of the data collected during the Evaluation Phase caused MMC to submit final designs that are materially different from the conceptual designs of Alternative 3, the DEQ would require MMC to submit an application to modify its operating permit. The DEQ would conduct the appropriate level of MEPA review on the application.

1.1.1.6.1 Pre-construction Surveys

Before any ground-disturbing activities occur and receiving agency approval to implement the Construction Phase, MMC will complete an intensive cultural resources survey and a jurisdictional wetland delineation on all areas where such surveys have not been completed and that will be disturbed by the alternative. Similarly, MMC will update surveys for threatened, endangered, and Forest and state sensitive plant species on National Forest System lands for any areas that will be disturbed by the alternative where such surveys have not been completed or for any species listed as threatened, endangered, or Forest Service or state sensitive since 2005.

Survey reports will be submitted to the appropriate agency for review and any necessary agency consultation. If wetlands or species of concern are identified and adverse effects cannot be avoided, MMC will develop appropriate mitigation plans for the agencies' approval. MMC will implement the mitigation plan and receive agency concurrence of mitigation implementation before any ground-disturbing activities.

MMC will complete an intensive cultural resource inventory of the Area of Potential Effect that will meet the requirements of the 36 CFR 800, the guidelines in the 2009 KNF Site Inventory Strategy, and Montana SHPO. An intensive cultural resource inventory is a pedestrian survey with transects no more than 100 feet apart that covers the entire Area of Potential Effect. The adequacy of past intensive cultural resource inventories will be decided by the KNF in consultation with the Montana SHPO. Following completion of a cultural resources survey, MMC will follow the requirements of a Programmatic Agreement between the KNF and the Montana SHPO. MMC will submit to the KNF an inventory report meeting Montana SHPO requirements. The report will include eligibility for listing on the National Register of Historic Places recommendations for all identified historic properties. When an adverse effect to an eligible historic property is anticipated, MMC may choose to redesign the project to avoid the property. If avoidance is not feasible, MMC will undertake actions to mitigate any adverse effect following the requirements of 36 CFR 800.6. A mitigation plan will be developed by MMC, reviewed by the KNF, reviewed by culturally affiliated tribes, and submitted to the SHPO and the Advisory Council on Historic Preservation for approval. Upon the conclusion of the consultation with the SHPO, the documentation needed to formalize the conclusion will be determined by the KNF, in consultation with the SHPO and the Corps. MMC will implement the mitigation plan and receive KNF concurrence of mitigation implementation before any ground-disturbing activities.

MMC also will complete a detailed Order I soil survey for all areas that have not been intensively surveyed and from which soils will be salvaged. During final design and after all areas were intensively surveyed, MMC will submit a final Soil Salvage and Handling Plan to the lead agencies for approval before any ground-disturbing activities (see next section).

1.1.1.6.2 Plan Development, Updates and Implementation

Mitigation Plans

The agencies' mitigation plans are summarized in section 1.1.5, *Mitigation Plans*. Each plan describes the timing of implementation. For example, the grizzly bear mitigation plan specifies the timing of required land acquisition, some of which must be acquired before the Evaluation Phase commences. In all cases, the mitigation will be in place before the effect for which the mitigation applied occurs. MMC will submit final mitigation plans as part of its amended Plan of Operations, Operating Permit and other permits or approvals.

Monitoring Plans

The agencies' conceptual monitoring plans are summarized in Attachment 3. Each plan describes the timing of implementation. In all cases, the monitoring will begin before or concurrently with the effect for which the monitoring applied occurs. MMC will submit plans for monitoring during the Pre-Evaluation and Evaluation Phases consistent with 1) the revised Appendix C of the Final EIS; 2) the terms and conditions in the USFWS Biological Opinions (Attachment 6 and Attachment 7) 3) conditions of any other permit or approval, such as the 404 permit, the 401 certification, or a beneficial water use permit.

Road-Related Plans

During the Evaluation Phase, MMC will develop and implement a Road Management Plan for the two roads (NFS road #231 and #2316) used during Evaluation Phase and other roads affected during the Evaluation Phase of the project, including roads with access changes required to be closed or stabilized for wildlife mitigation. Before initiating the Construction Phase, MMC will update the plan for the lead agencies' approval to address all new and reconstructed roads used during the Construction and Operations Phases or stabilized, including all roads with proposed access changes. The plan's elements will be the same as described in section 1.1.1.3.1, *Development of Plans*. The plan will include the timing and level of management for each road depending upon the determined purpose for that road. The plan will incorporate posting of safety signing such as "Caution Truck Traffic" signs at several locations on both Libby Creek and Bear Creek roads between US 2 and the mine facilities (Poorman Tailings Impoundment Site, Libby Adit sites, and Libby Plant Site). MMC will post warning signs for speed limits and other important road conditions and require all mine-related vehicles to follow all traffic control restrictions, such as speed. Other appropriate wording may be used as approved in the Road Management Plan. MMC also will continue to implement the Transportation Plan described for the Evaluation Phase.

Before initiating the Construction Phase, MMC will submit a traffic impact study report to the agencies and Montana Department of Transportation (MDT) that address the requirements of MDT's System Impact Action Process. The purpose of the traffic impact study will be to:

- Identify the traffic loads (i.e., traffic impacts) that the project will contribute to the roadway system
- Provide a credible basis for estimating site access requirements and off-site roadway improvements that are attributable to the project
- Assess whether on-site functions will compromise off-site operations
- Assess compatibility with State and local transportation plans

The report will describe anticipated traffic generated by the project, anticipated impacts on capacity and level of service and traffic safety, and recommendations for improvements. Final decisions regarding necessary road improvements will be made by the road owner (MDT, County, Forest Service). MMC will fund all road improvements required by the project.

Soil Salvage and Handling Plan

During final design and after all areas are intensively surveyed, MMC will submit a final Soil Salvage and Handling Plan to the lead agencies for approval. The plan will include means to ensure that the necessary amount of suitable soil will be salvaged in disturbed areas, that soils will be stockpiled and redistributed properly, and that losses from handling and erosion on stockpiles and in reclaimed areas will be minimized. Also, the timing and sequencing of stockpile use (for respreading) will be detailed to ensure that visual impacts will be mitigated, and that direct-haul methods will be maximized. The plan also will describe management of wetland soils.

Stormwater Pollution Prevention Plan

In accordance with the final MPDES permit, MMC will submit a final Stormwater Pollution Prevention Plan (SWPPP) for the agencies' approval no later than the 28th of the following month 60 days after the effective date of the MPDES permit. The SWPPP will describe the facility, BMPs, control measures, and monitoring procedures that will ensure compliance with the

terms and conditions of their MPDES permit. The SWPPP will address stormwater runoff from mine-related facilities including topsoil stockpiles, access/haul roads, adit pads not constructed of waste rock, and parking lots. The plan also will address stormwater runoff from transmission-related facilities. The plan will include, at a minimum, the components described in the final MPDES permit:

- Storm Water Pollution Prevention Team and SWPPP Administrator
- Site description
- Site map
- Summary of any potential pollutant sources
- Description of control measures and BMPs
- Any schedules and/or standard operating procedures
- SWPPP modifications and updates
- Corrective actions
- Employee training

Vegetation Removal and Disposition Plan

As part of final design and submittal of an amended Plan of Operations and permit application before the Construction Phase, MMC will prepare a Vegetation Removal and Disposition Plan for the agencies' approval. The plan will evaluate the opportunities to minimize tree and other vegetation clearing, particularly in RHCAs, and consider potential uses of vegetation removed from disturbed areas, and describe disposition and storage plans during mine life. The plan will apply to all National Forest System lands covered by the Plan of Operations and all private lands covered by the operating permit and transmission line certificate. It will not apply to private or State lands along the mine access road. Vegetation removal and disposition on private lands along the access road will be governed by the easement between the Forest Service and the private land owner. It also will address vegetation removal along the transmission line.

Weed Control Plan

MMC has a Weed Control Plan approved by Lincoln County Weed Control District. The plan will be modified as described in section 1.1.2.2.5, *Noxious Weed Mitigation Measures* and submitted to the lead agencies during final design for their approval. Following KNF's and DEQ's approval of the final Weed Control Plan, MMC will submit it to the Lincoln County Weed Control District for approval. These measures will be applied to all areas disturbed by the project activities including the mine permit areas. Weed control measures along the transmission line are described in the agencies' Environmental Specifications (Attachment 8).

1.1.1.6.3 Final Tailings Impoundment Design Process

The design developed for project facilities, such as the Poorman Tailings Impoundment Site, is conceptual and is based on the available geotechnical investigations. The need for the specific design features at the Poorman Tailings Impoundment Site (e.g., Rock Toe Berm) described in the subsequent section on the impoundment is uncertain because the tailings facility design will be based on additional site information obtained during the design process. The design process will include a preliminary design phase and a final design phase. Site information will be collected during field exploration programs during the design phase. MMC will submit a tailings impoundment site exploration plan to the agencies for their approval before commencing activities. A

preliminary site exploration program will be completed to confirm the geotechnical suitability of the Poorman Tailings Impoundment Site. A similar process will be used for the Libby Plant Site. The field exploration program will include a site reconnaissance and a drilling and sampling program to evaluate:

- Site geology and foundation conditions
- Groundwater conditions and water quality
- Borrow material availability
- Geotechnical characteristics of foundation and borrow materials

Site data to be collected will include an assessment of artesian pressures and their potential influence on impoundment stability, an assessment of a subsurface bedrock ridge between the Poorman site and Little Cherry Creek and the effect it may have on pumpback well performance, aquifer pumping tests to refine the impoundment groundwater model and update the pumpback well design, and site geology to identify conditions such as preferential pathways that may influence the seepage collection system, the pumpback well system, or impoundment stability. Based on these data, a preliminary design of the facility sites will be completed to confirm the site layout and design/operation feasibility. A field exploration program will be completed to collect data and material samples necessary for the final design.

With the exception of tailings density at initial deposition, design criteria for the Little Cherry Creek tailings impoundment (Klohn Crippen 2005) will be used unless alternative criteria are approved by the agencies. MMC will, during final impoundment design:

- Update the seismic stability analysis using the most recent attenuation relationships that are based on instrumental records of attenuation collected in the United States and internationally (e.g., Spudich et al. 1999, Boore and Atkinson 2007, or Petersen et al. 2008) (All literature cited is listed in the Final EIS.)
- Complete circular failure and block failure assessments through various critical dam sections, and through the foundation
- Update the pumpback well design and analysis using geologic and hydrologic data collected as part of the field exploration plan, with a focus on minimizing drawdown north of impoundment
- Avoid or minimize, to the extent practicable, filling wetlands and streams, such as described in Glasgow Engineering Group, Inc. (2010) (All literature cited is listed in the Final EIS.)
- Avoid or minimize, to the extent practicable, locating facilities, such as the Seepage Collection Pond, in a floodplain
- Submit final design to the lead agencies for approval
- Fund an independent technical review of the final design as determined by the lead agencies

The functionality of the tailings impoundment will depend on determination and design of the water removal system (such as deep tank or high compression thickeners) and the strict control of final slurry parameters such as moisture content, deposition sequences, and impoundment water management. During final design, MMC will determine the proper thickener and distribution system and deposition plan for the tailings (see section 1.1.3.3.1, *Tailings Deposition* for a

discussion of target tailings density). MMC will develop an optimum filling plan and operation and monitoring manual that addresses plant operations, tailings thickening parameter tolerances, contingencies for tailings density not meeting specifications, monitoring of the thickening process, and reporting to the lead agencies. The monitoring and reporting for the tailings impoundment is described in Attachment 3 of the ROD.

MMC will develop a general operating plan for the tailings impoundment site including a final Fugitive Dust Control Plan to control wind erosion from the tailings impoundment site. Before commencing operations, MMC will submit to the agencies for approval a general operation plan for the tailings impoundment site including a Fugitive Dust Control Plan. The plan will include, at a minimum, the embankment and cell (if any) configurations, a general sprinkler arrangement, and a narrative description of the operation, including tonnage rates, initial area, and timing of future enlargement. Should these measures not be adequate to control wind erosion from the impoundment, MMC will submit a revised plan to the agencies for approval, incorporating alternative measures, such as a temporary vegetation cover.

As part of final design, MMC will submit an Operations, Maintenance and Surveillance Manual for the Libby Plant and tailings impoundment. The manual will identify maintenance requirements and operation guidelines to reduce risks of system upsets, describe the leak detection system for tailings and reclaim water lines, and outline spill response procedures. MMC also will submit and implement a comprehensive Environmental Health and Safety Plan.

Technical review of the final tailings facility design will be made by a technical advisory group (TAG) established by the lead agencies. The tailings TAG will be comprised of agency experts in geotechnical, geochemical, and water quality issues related to current practices in the construction, operation, and closure of tailings facilities. The tailings TAG's review will encompass the technical aspects of tailings design including impoundment groundwater model, the pumpback well system, and the short- and long-term stability of the tailings storage facility.

The TAG will advise on the development of the quality assurance/quality control protocols for the tailings facility. The tailings TAG will also advise the lead agencies as to whether the environmental impacts associated with final design remain within the scope of those impacts identified in the Final EIS. The lead agencies will review and approve the final design prior to construction.

The lead agencies will guide, organize, and chair the tailings TAG meetings, and consolidate and document the consensus review recommendations. The lead agencies may also retain the services of a third-party tailings consultant if they determine additional technical expertise is required. MMC will fund any required third-party services. During the review process, MMC may be asked to provide additional information or clarification to the tailings TAG on certain aspects of the plan, as determined by the KNF and the DEQ. Possible members of the TAG include the KNF, the DEQ, the EPA, U.S. Army Corps of Engineers, Confederated Salish Kootenai Tribe, and Lincoln County.

The lead agencies may form additional TAGs if they determine a need. Appropriate agency specialists will be included on the TAGs (ex. wilderness specialist to monitor effects to wilderness character). As explained previously, the KNF and the DEQ may also consider retaining the services of third-party consultants with expertise on specific issues. The third-party services will be funded by MMC. The lead agencies will determine whether a TAG will be formed and which approach will be used with a particular issue on a case-by-case basis. The lead

agencies will decide this based on where the most expert review will best be obtained for the specific issue being considered, and the complexity and significance of that issue.

1.1.1.6.4 Final Underground Mine Design Process

MMC will submit a detailed final mine plan, including final plans for underground geotechnical monitoring, for agencies' approval before any underground development begins in the Construction Phase. The mine plan will:

- Include the physical setting of the ore body (for each ore zone, the elevation of the floor or back, thickness, depth below surface) and the planned extent of mining.
- Use a variety of pillar strength estimation approaches such as Obert and Duvall (1967), Wilson and Ashwin (1972), Hedley and Grant (1972), Hardy and Agapito (1975), Bieniawski (1981), Stacey and Page (1986), Abel (1988) and Esterhuizen (2008) to calculate pillar strength and corresponding factor of safety. (All literature cited is listed in the Final EIS.) This will allow the agencies to better evaluate the MMC design in relation to other standard approaches.
- Use a minimum 0.8 pillar width to height ratio as a preliminary numeric criterion. Pillars with less than a 0.8 width to height ratio will require justification by MMC as to their stability.
- Explicitly assess sill pillar stability during all mine planning phases.
- Identify two barrier pillars 20 feet wide across the width of the ore body that will be left in place (except for openings needed for access) until additional refinement of the hydrologic model is completed and the need for barrier pillars is evaluated. The purpose of the barrier pillars will be to minimize post-mining changes in East Fork Rock Creek and East Fork Bull River streamflow and water quality.
- Maintain at least a 1,000-foot buffer from Rock Lake and a 300-foot buffer from the Rock Lake Fault. MMC also will maintain during mining a 100-foot buffer from faults identified on Final EIS Figure 61. MMC will keep the size and number of drives through the faults identified on Final EIS Figure 61 to the minimum necessary to achieve safe and efficient access across the fault. MMC will update the 3D groundwater models to assess if the buffers should be increased or could be decreased. Any request to modify the buffers will require review and approval by the lead agencies.
- Include an Explosive Handling and Blasting Plan that describes measures to minimize pillar size reduction from overblasting.
- Explicitly state that no secondary mining (reduction in pillar width or length, or increase in pillar height from designed final dimensions) will be allowed.
- Exclude the mining of ore outside MMC's extralateral rights defined by the west endline of HR 133 and the east endline of HR 134.

MMC will implement the following measures to reduce the risk of subsidence:

- Perform a pre-mining topographic survey over the ore body using aerial methods (LiDAR, InSAR, or equivalent) approved by the agencies. Surveys will 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, landslides, etc.), and (b) as a reference point for measuring any suspected mining-related subsidence.
- Complete and provide to the agencies a detailed surficial geologic survey of lands overlying the mine area to identify structures that could affect subsidence potential and implement the Evaluation Phase activities described in the Rock Mechanics Monitoring Plan (Attachment 3).
- Reference the Troy Mine experience in its proposal for future Montanore pillar designs, and highlight how the new designs account for and differ from failed designs at the Troy Mine. As pillar designs are refined, numerical modeling will be undertaken to further evaluate expected underground mine design performance, including the potential for shear failure at the pillar/roof or pillar/floor interface.
- Increase the understanding of the structural setting, including faulting, jointing, bedding, and the horizontal stress regime, which will improve the geotechnical design. The description of one Troy Mine pillar collapse indicates that adverse pillar orientation with regard to bedding dip may have played a role, and the Troy Mine sinkhole events appear to be related to faulting. Hydrologic effects could be exacerbated by reactivation of fault zones, such as the Rock Lake Fault or any sympathetic and/or undocumented faulting that may exist. A better understanding of the structural environment at Montanore will benefit the mine design effort and improve the understanding of potential impacts that may arise. These data will be obtained through lineament analysis of surface features, joint mapping, and statistical analysis of joint frequency and attitude, strain-relief overcoring to measure the horizontal stress field, and further exploratory drilling.
- Use the best science to study the interaction of workings. Initial numerical modeling for the Montanore Project in 1989 studied the issue of pillar columnization and sill pillar stability between the two ore zones. More sophisticated and powerful modeling approaches have become available since that time. Such approaches will be used, along with current design assumptions, to further study candidate designs for the two ore zones, as interaction of workings may be crucial to overall pillar/sill stability.
- Complete a roof support analysis to finalize the support plan and mining span.

- Retain the services of an independent third party technical advisor. This advisor will be similar to third-party consultants retained by the lead agencies for review of the tailings impoundment. MMC will fund this independent technical advisor to assist the agencies in review of the final subsidence monitoring plan, underground rock mechanics data collection, and mine plan. The technical advisor also will assist the agencies with underground mine quality assurance and quality control oversight during construction and operations. The technical advisor will be selected and directed by the agencies through an agreement with MMC. MMC will provide the agencies and their representatives access to the underground workings to observe data collection and mine development. MMC will provide mine access, logistical support, and all information required by the technical advisor to complete a review of underground rock mechanics data and MMC's mine plan. The advisor will review monitoring reports submitted by MMC and may engage in monitoring independent of that required under MMC's monitoring program. 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 MMC. The technical advisor will have no financial interest in the Montanore Project.

1.1.1.6.5 Final Groundwater Model Development Process

MMC developed separate 3D groundwater models for the mine area and the Poorman Impoundment Site. Before the Construction Phase starts, MMC will update both models, incorporating the hydrologic and geologic information collected during the Evaluation Phase. The tailings impoundment groundwater model will consider the seasonal withdrawal of Libby Creek alluvial groundwater in its development. The required monitoring of the underground mine and at the tailings impoundment site during the Evaluation Phase is described in Attachment 3. Required characterization data at the tailings impoundment site during the Evaluation Phase is described in section 1.1.1.5.3, *Final Tailings Impoundment Design Process.* Effects on surface resources will be re-evaluated based on the updated mine and tailings impoundment modeling. The agencies will modify the monitoring requirements, such as the Groundwater Dependent Ecosystem (GDE) inventory and monitoring, described in Attachment 3 of the ROD for the Construction and Operations phases if necessary to incorporate the revised model results. Similarly, the agencies will use adaptive mitigation to modify the mitigation plans described in Section 1.1.6, *Mitigation Plans,* if necessary to incorporate the revised model results. Similarly, the agencies will use adaptive mitigation to modify the mitigation plans described in Section 1.1.6, *Mitigation Plans,* if necessary to incorporate the revised model results.

1.1.1.6.6 Final Road Design Process

The following sections describe the agencies' design requirements for US 2 and National Forest System roads used in the selected mine alternative. During final design, MMC will complete a preliminary and final road design using these specifications for KNF approval. MMC will use appropriate road design and construction techniques and standards to minimize the amount of disturbance within the road prism on National Forest System lands, and private lands where the Forest Service holds a right-of-way easement.

Design Requirements for US 2 Improvements

The Libby Creek Road is a public approach to US 2. MMC will evaluate the approach for the largest design vehicle and modify the intersection if the approach does not meet the design requirements for that vehicle. The approach will be designed to maintain the transportation system level of service and safety along US 2. This mitigation also will apply to the intersection of US 2 and Kootenai Business Park access road to the Libby Loadout. All US 2 improvements will be identified in the traffic impact study report to be submitted to the agencies and MDT.

Design Requirements for Reconstruction of Access Road (US 2 to Main Haul Road)

MMC will use segments of NFS roads #231, #278, and #4781 as the main access between US 2 and the main haul road between the Libby Adit Site and the Poorman Impoundment Site. These three roads currently are not wide enough to accommodate mine traffic and will need to be widened prior to use during operations. MMC will widen those segments of NFS roads #231, #278, and #4781 to be used for access to two 12-foot-wide travel lanes and two 1-foot shoulders, for a total width of 26 feet. The KNF may decide during final design that a narrower width will be sufficient to provide for safe and efficient use. Additional widening will be needed on curves. The disturbed area, including ditches and cut-and-fill slopes, may be up to 100 feet wide. The two existing bridges across Libby Creek, which currently are 14 feet wide, also will be replaced and widened to a width compatible with a 26-foot wide Libby Creek Road. The existing arched culvert at Midas Creek will be lengthened to accommodate the reconstructed road. All other existing culverts will be removed and replaced with arched culverts designed in accordance with the KNF guidance and 404 permit conditions. Any work in a RHCA along the mine access roads will be completed in compliance with INFS standards and guidelines and Forest Service guidelines. The roadway will be paved with hot mix asphalt, and the asphalt road surface will then be chip-sealed.

The “8-Mile Hill” area is along the Libby Creek Road at about the 8-mile mark where the road traverses across a steep slope (Figure 4 of the ROD). The right-of-way width is variable in the 8-Mile Hill area, ranging from 66 to 135 feet. MMC will implement every reasonable mitigation, such as the use of retaining walls, to accommodate two-way traffic if the road cannot be reconstructed within the existing right-of-way width. If two-way traffic cannot be accommodated with reasonable mitigation, MMC will consult with the KNF on a one-way traffic management plan.

The road will be designed to handle speeds of 35 to 45 mph. Design exceptions for slower speeds will be needed on some curves. Mine Safety and Health Administration regulations (30 CFR 56, Subpart H) require that all mines establish and follow rules governing speed, right-of-way, direction of movement, and the use of headlights to assure appropriate visibility, and that equipment operating speeds be consistent with conditions of roadways, grades, clearance, visibility, traffic, and the type of equipment used. MMC will post warning signs for speed limits and other important road conditions and require all mine-related vehicles to follow all traffic control restrictions, such as speed.

MMC will include in the plan methods for accommodating continued access by local landowners and recreational forest users during Libby Creek Road reconstruction. To the extent practicable, one lane of traffic will be maintained during reconstruction. If road closures are necessary, closure will be restricted to Monday through Friday. MMC will develop signage on US 2 notifying road users of construction conditions, possible delays, or necessary detours. Signage on

US 2 will be posted north of the Bear Creek Road intersection, and north and south of the Libby Creek Road intersection. Detour information will include alternative route directions. If both of the two required bridge replacements across Libby Creek require road closures, they will not be completed at the same time, which will allow continuous access to lower Libby Creek Road.

MMC will hold a field review with KNF after completion of preliminary road and utility corridor design. Individual property owners will be invited to attend the preliminary design field review in the event the reconstructed road will exceed the current right-of-way width. The design will include a plan for accommodating continued access by local landowners and recreational forest users during road reconstruction.

Right-of-Way Easements

The Forest Service holds an easement with non-Federal property owners along the Libby Creek Road for use and maintenance of the road. Non-Federal property owners include the State of Montana, corporate landowners, and private individuals. Some easements indicate the right-of-way "shall be variable feet on each side of the centerline with such additional width as required for accommodation and protection of cuts and fills." The accommodation for additional width is for the original construction of the Libby Creek Road and does not apply to any reconstruction required by MMC. MMC will reconstruct the Libby Creek Road within the existing right-of-way, or obtain easements from the existing owner for reconstruction outside of the existing right-of-way.

If preliminary design indicates the reconstructed road will exceed the current right-of-way width, MMC will make a reasonable effort during the Evaluation Phase to secure all necessary easements to accommodate the needed road right-of-way width. A "reasonable effort" is one in which MMC offers the current property owner a fair market offer, according to the Forest Service's appraisal processes, for a right-of-way no wider than the minimum necessary to accommodate the needed road width.

MMC will be responsible for all costs, including legal fees, associated with the acquisition of easements. Any easement obtained by MMC for additional right-of-way will be established until final bond release, will be conveyed to the Forest Service, and will be consistent with the Forest Service's standard right-of-way easement language. MMC will submit all proposed easements to the KNF for approval before purchase. In cases where a landowner is unwilling to grant an easement to MMC but is willing to grant an easement directly to the Forest Service, MMC will still be responsible for all costs associated with acquisition of the easement. MMC also will make a reasonable effort during the Evaluation Phase to reconcile areas where the access road is outside existing right-of-way easements. MMC will be responsible for all costs associated with easement reconciliation.

In those areas where MMC cannot obtain additional right-of-way width or achieve easement reconciliation after a reasonable effort has been made, MMC will submit written documentation of MMC's reasonable efforts. MMC will concurrently submit for KNF approval design changes for a road that could be constructed with the existing right-of-way. The necessary specifications that could be implemented without obtaining additional right-of-way will be incorporated into the design.

MMC will be subject to all terms and conditions of existing easements. The State of Montana (DNRC) to the United States (Forest Service) easement allows the Forest Service to maintain the

right-of-way clearing by means of chemicals only after the DNRC has given specific written approval. Application for such approval must be in writing and must specify the time, method, chemicals, and the exact portion of the right-of-way to be chemically treated. This term and condition will be a stipulation to MMC's Plan of Operations.

Some easements, such as the DNRC easement, some of the Plum Creek easements (547 and 711) and one of the Libby Placer Mining Company easements (reception #48011), indicate the property owner maintains ownership of all timber. In these easements, the Forest Service is allowed to cut timber within the right-of-way to the extent necessary for constructing, reconstructing, and maintaining the road. Timber is to be cut into logs of lengths specified by the owner and decked along the road for disposal by the owner. These terms and conditions will be a stipulation to MMC's Plan of Operations. Other easements (Plummer easement 72 now held by Plum Creek and the 1941 easement for NFS road #231 and the 1957 easement for NFS road #278 on lands owned by Libby Placer Mining Company) do not discuss timber ownership and management. In all easements, whether explicit or silent, timber within the right-of-way is wholly owned by the land owner. MMC will develop written agreements regarding timber management with those property owners holding easements that do not address timber management.

The DNRC has a Habitat Conservation Plan (HCP) that covers State land in Section 16, T28N, R30W. (The State land owned on behalf of the Montana Department of Transportation in Section 31, T29N, R30W is not covered by the HCP). The effect on grizzly bear and lynx habitat from using the Libby Creek Road for access and any required mitigation is discussed in the Record of Decision (ROD). MMC will be required to implement the mitigation necessary to ensure compliance with the HCP.

A buried 34.5-kV transmission line along Libby Creek Road and the Libby Plant Access Road may be installed if it is needed and if MMC acquires easements for its construction across private land along the access road. If MMC is unable to acquire easements along the Libby Creek Road, the Bear Creek Road will be used if MMC acquires easements for its construction across private land along it. Flathead Electrical Cooperative will provide power for the 34.5-kV line and MMC will become a Cooperative member. Flathead Electrical Cooperative provides power to private owners along both the Libby Creek Road and the Bear Creek Road via above- and underground electric lines. MMC will upgrade the existing line to 34.5 kV and then extend the line if all necessary easements are acquired. Under Flathead Electrical Cooperative policies, an existing member cannot unreasonably withhold approval to extend the powerline to other members. The Forest Service will consent to any utilities in its right-of-way once MMC obtains all necessary easements.

Design Requirements for Main Haul Road

MMC will use segments of NFS roads #2317, #4781, #6210, and #2316 as the main haul road between the Libby Adit Site and the Poorman Impoundment Site. Except for a segment of the Upper Libby Creek Road (NFS road #2316) and the Poorman Creek Road (NFS road #2317) south of the impoundment, mine haul roads will be restricted to mine traffic only. These two segments will require joint public and mine traffic. During final design, MMC and the KNF will determine the most appropriate method to accommodate joint traffic. The Mine Safety and Health Administration recommends a road width of 56 feet wide when using a 16-foot haul truck to accommodate joint-use traffic safely. For the Poorman Creek Road (NFS road #2317), joint-use traffic may be segregated by building a new road parallel to the existing road. A parallel road may have less effect than a 56-foot wide road.

For the segment on the Upper Libby Creek Road (NFS road #2316) that will have joint use, the agencies anticipate low public traffic use. An alternative to a 56-foot wide road at this location will be the development of administrative procedures either to eliminate or accommodate through traffic control mine hauling when public use occurs.

South of Little Cherry Creek, MMC will build 0.7 miles of new road west of and parallel to the Bear Creek Road that will connect Bear Creek Road with Ramsey Creek Road (NFS road #4781) (Figure 4 of the ROD). MMC will construct a new bridge crossing of Poorman Creek just upstream and adjacent to the existing crossing. The road will have a chip-seal surface and be constructed to a width to accommodate haul traffic. Mine traffic will use the Libby Plant main haul road and the public will use the existing Bear Creek Road. The crossing of the new mine access road across Poorman Creek will be built to accommodate the 100-year flow event and be constructed in compliance with INFS standards and guidelines. The crossing width will be consistent with the roadway width.

A new bridge across Ramsey Creek will be needed. The bridge will accommodate the 100-year flow event and be constructed in compliance with INFS standards and guidelines. Bridge width will be compatible with the roadway width.

MMC will develop a small (4 to 5 vehicle) graveled recreational parking area at the gate on the Poorman Creek Road (NFS road #2317). The parking area will facilitate non-motorized access to the Poorman Creek drainage via the Poorman Creek Road. MMC also will develop a new hiking trail between Poorman and Ramsey creeks to provide non-motorized access to upper Ramsey Creek (Figure 4 of the ROD).

Design Requirements for Upper Libby Adit Site Access

MMC will use a segment of NFS road #2316 west of the Libby Adit Site for access to the Upper Libby Adit Site. MMC will install a gate on NFS road #2316 west of the Libby Adit Site and maintain the existing hiking trail beyond the Upper Libby Adit Site.

Design Requirements for Libby Creek Road South of Junction with Bear Creek Road

The Libby Creek Road will be either chip-sealed or surfaced with 6 inches gravel at its existing width (a minimum of 16 feet) from the junction with the Bear Creek Road to the junction with NFS road #2316, just north of the Ramsey Creek bridge, a distance of 2 miles (Figure 4 of the ROD).

1.1.2 Construction Phase

The Construction Phase will begin after MMC analyzes the data from the Evaluation Phase, collects the necessary data for final design, submits final design plans to the agencies for their approval, and receives agency approval to implement the Construction Phase. Possible additional NEPA and MEPA analysis is described in section 1.1.1.6, *Final Design Process.*

1.1.2.1 Permit and Disturbance Areas

Development of the Montanore Project will require construction of an underground mine and adits (underground access), and surface facilities, such as a mill, tailings impoundment, and access roads (Figure 2 of the ROD). The Plant Site will be on a ridge between Libby Creek and Ramsey Creek, with mine production and ventilation adits in the upper Libby Creek drainage,

about a mile from the CMW boundary. An additional ventilation adit on private land owned by MMC east of Rock Lake will be used for ventilation. The Poorman Tailings Impoundment Site will be north of Poorman Creek and south of Little Cherry Creek. Permit area boundaries will be established around each of these facilities. In addition, disturbance area boundaries around the plant site and tailings impoundment site will be marked in the field with fenceposts or will be fenced and signed to limit potential disturbance outside permitted disturbance areas. Fences, if used, will be designed and built to avoid debris jams at stream crossings. The operating permit area will total 2,157 acres and the disturbance area will total 1,542 acres (Table 2). For maximum flexibility, MMC will bond to cover the full disturbance area even if no activities are currently planned. This will allow MMC to construct temporary and seasonal roads and other facilities within these disturbance area boundaries as needed.

The production rate will be 12,500 tons of ore daily and will be up to 20,000 tons of ore daily, or 7 million tons per year at full production. Currently delineated mineral resources, estimated at about 135 million tons, extend from Rock Lake to St. Paul Lake beneath the CMW. These estimates are based on 27 drill holes. The deposit has not been fully delineated and likely extends farther north than the available drilling information. Considering an expected ore extraction of 65 to 75 percent, waste rock dilution, and initial production rates, the mine is anticipated to have a production life of about 16 years. Three additional years may be needed to mine 120 million tons.

1.1.2.2 Vegetation Clearing and Soil Salvage and Handling

1.1.2.2.1 Vegetation Removal and Disposition

MMC will implement the approved Vegetation Removal and Disposition Plan during the

Table 2. Mine Surface Area Disturbance and Operating Permit Areas.

Facility	Disturbance Area† (acres)	Permit Area (acres)
Existing Libby Adit	18	219
Upper Libby Adit	1	1
Rock Lake Ventilation Adit	1	1
Libby Plant Site and Adits	76	172
Poorman Tailings Impoundment Site and Surrounding Area	1,272	1,506
Poorman Tailings Impoundment and Seepage Collection Pond	608	
Borrow areas outside impoundment footprint	92	
Soil stockpiles	48	
Other potential disturbance (roads, storage areas, ditches, etc.)	524	
Access and Other Roads†		
Libby Creek Road (NFS road #231 from US 2 to Libby Plant Site access road)	67	0
Tailings Impoundment permit area to Libby Plant Site (NFS roads #278, #2317, #4781, #6210 and new road)	66	214
Libby Plant Site to Libby Adit Site and Upper Libby Adit Site (NFS roads #6210 and #2316)	41	44
Total	1,542	2,157

†Disturbance area shown for roads excludes 33 feet of existing disturbance along roads.

Construction Phase and continue to implement the plan whenever vegetation is cleared or removed.

To minimize metal leaching problems and low pH seepage from soil stockpiles containing large amounts of coniferous vegetation, the coniferous forest debris will be removed before soil removal to the extent feasible. Merchantable timber will be measured, purchased from the KNF, and then cleared before soil removal. Non-merchantable trees, coniferous forest debris, and slash from vegetation clearing in the mine disturbance areas and along the transmission line will be managed in accordance with Montana law regarding reduction of slash (76-13-407, MCA) and, on National Forest System lands, KNF objectives regarding fuels reduction. Except where used in wildlife or fisheries mitigation, excess slash will be removed or burned in all timber clearing areas and within 0.5 mile of any residence. Slash management on Plum Creek and other private lands not owned by MMC will be in accordance with Montana law and the landowner/MMC easement agreement. Non-merchantable trees and coniferous forest debris will be removed using a brush blade or excavator to minimize soil accumulation. MMC will comply with DNRC open burning requirements. Where possible, slash of non-coniferous forest debris or dead coniferous forest snags will be salvaged and chipped to be sold, used as mulch, or used as an additive to stored soil. All mulching materials will be certified noxious weed-seed free.

1.1.2.2.2 Soil Salvage

MMC will implement the approved Soils Salvage and Handling Plan during the Construction Phase and continue to implement the plan whenever soil is removed, stockpiled, or replaced. MMC will salvage soils in all disturbed areas, with the exception of slopes exceeding 50 percent and soil stockpiles. Suitability of soils to be used for reclamation will be determined from physical and chemical data collected during the soils survey described in the Pre-construction Survey section. Soils will be salvaged in two lifts in the tailings impoundment site, borrow areas, and Libby Plant Site. The first lift will include the relatively organic-rich surface layers (topsoil), and the second lift will include the subsoil immediately below the topsoil to a depth based on need and suitability. At road disturbances, soils will be salvaged in one lift. Soils with more than 50 percent rock fragment generally will not be salvaged. Soils with rock fragment contents up to 60 percent by volume will be salvaged in some areas to provide erosion protection on the tailings impoundment embankments. Soil stockpiles will be located in areas to minimize impacts from wind and water erosion, impacts from ongoing operations, and away from sensitive areas (i.e., wetlands and streams). If necessary, stockpile locations will be modified to meet field conditions and accommodate quantities of soils actually salvaged. Reclamation soil thicknesses will be adjusted, if necessary, according to results of interim reclamation and site-specific conditions, as determined by the lead agencies.

1.1.2.2.3 Soil Stockpiles

Most soils will be stockpiled as close as possible to redistribution sites. Soil stockpiles will be constructed with 40 percent side slopes and 33 percent sloping ramps, where possible. The two-lift soil salvage will segregate soils according to erodibility (i.e., rock fragment content) and first lift versus second lift. For example, glaciolacustrine soils, having the greatest erodibility and few rock fragments, will be stockpiled separately from first lift materials that contain a large amount of rock fragments, and second-lift glaciolacustrine clay-rich soils will be stockpiled separately from other second-lift soils. The stockpiles will be signed, based on the use in the post-mining landscape.

MMC will incrementally stabilize soil stockpiles (rather than waiting until the design capacity is reached) to reduce erosion and maintain soil biological activity in the surface. Seeding should be done as soon after disturbance as possible rather than waiting until the next appropriate season. Immediate seeding of road cuts-and-fills will reduce erosion on Forest Service roads regardless of planting time. To the extent possible, MMC will stockpile soils in clearings or recent timber harvest areas that are immediately adjacent to new roads, which will be operational for mine life, rather than stockpiling along the entire road corridor.

Soil stockpiles will have organic matter and fertilizer added to help retain soil quality and promote successful revegetation. Noxious weeds on stockpiles will be controlled throughout the stockpile life, and sprayed before soil redistribution.

MMC will report soil stockpile volumes and disturbance acres in each annual report to the lead agencies. MMC will prepare an annual soil reconciliation report to document that the soils in stockpiles are sufficient to reclaim the current disturbed acres. If a shortfall existed, MMC will submit a plan to make up for the soil shortfall in the following year (see section 1.1.5.2.3, *Soil Replacement and Handling* regarding replaced soil thickness).

1.1.2.2.4 Direct Haul and Temporary Storage of Soil

Direct haul soil salvage and replacement will be required for use whenever, and as much as possible, to enhance revegetation success of native unseeded species. Direct haul will be done primarily at the tailings impoundment.

Areas such as road cut-and-fill slopes, transmission line structure locations, access roads, and other disturbances that will remain post-mine should be reclaimed as soon as final grades are achieved with direct haul soil or soil that had been stockpiled for less than 1 year. This will increase the chances of direct transplantation and propagation of many of the local ecotypes on the reclaimed surface.

1.1.2.2.5 Noxious Weed Mitigation Measures

MMC will implement all weed BMPs identified in Appendix A of the KNF Invasive Plant Management Final EIS (KNF 2007a) for all weed-control measures. MMC will focus mitigation on prevention as the most effective and least expensive weed management strategy, and early detection and eradication as the best alternative once a new species had been introduced. For established invaders, treatment and containment of noxious weeds species will be the main objective. MMC will include integrated noxious weed management in the environmental training.

MMC will comply with state and local laws and agencies' guidelines for all noxious weed-control activities. All herbicides used in the project area 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, site factors (such as soil types and distance to water), and with the objective to minimize impacts on non-target species. MMC will coordinate with the KNF Weed Specialist for use of biocontrol agents as they become available.

To the extent possible, MMC will survey all planned ground disturbance areas for noxious weeds before initiating disturbance. Where noxious weeds are found, MMC will treat infestation the season before the activity is planned. For example, if timber clearing is planned to be in the spring or early summer, the survey and control will be implemented the previous fall. Areas

surveyed will include roads, borrow areas, tailings impoundment, transmission line, and any other areas designated for timber removal. MMC will describe in final design plans the extent of which surveys and pretreatment will not be feasible. The survey and treatment approach will be a part of the final Weed Control Plan, to be reviewed and approved by the lead agencies.

MMC will include road-related weed mitigation in any road access that is approved for the project (including access routes to the transmission line). MMC will treat noxious weeds along all haul and access roads yearly with the appropriate herbicide mix for the target species. MMC will broadcast treat every other year and spot treat the alternate years.

MMC will minimize soil disturbance and mineral soil exposure during ground-disturbing activities. Ground disturbance should be no more than needed to meet project objectives. MMC will prevent road maintenance machinery from blading or brushing through known populations of new invading noxious weed species. In areas where noxious weeds are established and activities require blading, MMC will brush and blade areas with uninfested segments of road systems to areas with noxious-weed infested areas. MMC will limit brushing and mowing to the minimum distance and height necessary to meet safety objectives in areas of heavy weed infestations.

MMC will pressure wash all off-road equipment including equipment for mining, vegetation clearing, road construction and maintenance, and reclamation before entering the project area to help prevent the introduction of new invader noxious weed species to the area.

MMC will continue to monitor/survey the project area for existing and new invader weed species and populations annually. MMC will monitor weed population levels with particular emphasis on haul routes, access routes, borrow areas, soil stockpiles, and the transmission line corridor. MMC will treat weed infestations as needed.

In areas where timber is to be removed, MMC will consider winter vegetation clearing to reduce mineral soil exposure and the chance of spreading existing noxious weeds.

MMC will develop and implement site-specific guidelines to be followed for weed treatments within or adjacent to known sensitive plant populations. MMC will evaluate all future treatment sites for sensitive plant habitat suitability; suitable habitats will be surveyed as necessary before treatment.

MMC will submit an annual report to the lead agencies describing weed control efforts. The report will provide a map showing areas of weed infestation that were treated in the preceding year. It also will provide a qualitative evaluation of the weed control efforts.

1.1.2.2.6 Stormwater Control and Discharges

Discharges

The DEQ issued a draft MPDES permit in July 2015 and held a public hearing on the draft permit in August 2015. The DEQ will issue a final MPDES permit with its ROD. MMC also held MPDES permit MTR104874 for stormwater discharges from the Libby Adit Site. These discharges were incorporated into the draft renewal MPDES permit. This section discusses stormwater control and discharges during the Construction Phase; discharges of water during the Operations Phase are discussed under the Operations Phase. The five outfalls in the draft renewal permit are:

- Outfall 004—stormwater-only outfall for runoff from the Upper Libby Adit pad and access road discharging into Libby Creek
- Outfall 005—stormwater-only runoff from a 3.8-acre road segment between the Libby Adit Pad and the Libby Plant Site discharging into Libby Creek
- Outfall 006—stormwater-only runoff from a 6.2-acre road segment north of the Libby Plant Site discharging into Ramsey Creek
- Outfall 007—stormwater-only runoff from a 2.8-acre road segment south of the Poorman Tailings Impoundment Site discharging into Poorman Creek; this outfall is unlikely to be used because the access road alignment changed after MMC submitted its MPDES renewal permit application
- Outfall 008—stormwater-only runoff from a 2.9-acre road segment south of the Poorman Tailings Impoundment Site discharging into Poorman Creek

The draft renewal MPDES permit contains the following requirements or restrictions regarding stormwater discharges from outfalls 004 through 008:

- The Upper Libby Adit pad and portal will be constructed such that any waste rock produced and/or any mine drainage encountered will be directed to the existing Libby Adit for removal and treatment. The discharge of any process wastewater or any water resulting from mine dewatering activities at Outfall 004 is prohibited.
- Outfalls 005-008 are stormwater only outfalls for runoff from access roads and haul roads which are not part of the active mine area. The discharge of any process wastewater or any water resulting from mine dewatering activities at Outfalls 005-008 is prohibited.
- Oil and grease cannot exceed 10 mg/L daily and pH must be within the range of 6.5 and 8.5 at all times.
- All stormwater ditches and sediment ponds associated with Outfalls 004 through 008 will be sized to contain the 10-year/24-hour storm event.
- MMC will implement an approved SWPPP described in 1.1.1.6.2, *Stormwater Pollution Prevention Plan.*
- MMC will install and maintain site-specific BMPs that are an effective method for controlling the discharge of stormwater and that will minimize or eliminate any potential short-term stormwater impacts associated with the discharge of stormwater.
- MMC will conduct stormwater discharge monitoring summarized in Appendix C and described in detail in the draft renewal permit, including the requirement to collect grab samples within 30 minutes of discharge and flow-weighted samples over the course of the discharge.
- Effluent limits for metals and whole effluent toxicity testing on the discharge from Outfalls 004 through 008 is not required due to the expected nature and constituents (runoff driven sediment) of any discharges from these outfalls.

MMC has not applied for and is not authorized to discharge stormwater from any areas other than those described for Outfalls 001 through 008. Before the KNF and DEQ will allow MMC to start construction, MMC will have to obtain a permit to discharge stormwater from other disturbances associated with the project. MMC could either amend its MPDES permit or obtain coverage under Montana's General Permit for Storm Water Discharges Associated with Construction

Activity if the project was eligible for coverage under the General Permit. The disturbances from which the agencies anticipate MMC will require authorization to discharge stormwater may include, but not necessarily be limited to:

- Libby Plant Site during construction
- Poorman Impoundment Site during construction
- Soil stockpiles during construction and operations
- Access roads, such as NFS road #278, and all other access roads used for the mine or transmission line
- Libby Loadout during construction if loadout construction is considered construction activity

In addition to the disturbances described above from which the agencies anticipate MMC will require authorization to discharge stormwater, MMC may need to obtain authorization to discharge stormwater that came in contact with waste rock. Waste rock excavated extending the Upper Libby Adit and the new Libby Adit will be hauled to a temporary waste rock stockpile within the Poorman Tailings Impoundment footprint, the location of which will be determined during final design. Runoff and seepage from waste rock stockpiles will be subject to the ELGs. Before the KNF or the DEQ will allow MMC to create a temporary waste rock stockpile within the Poorman Tailings Impoundment footprint, MMC will submit data regarding the concentrations of potential pollutants in runoff and seepage from waste rock to the DEQ. Based on data collected through 2006, MMC indicated metal concentrations in waste rock runoff will be the ELGs (Geomatrix 2007b). The DEQ will use a reasonable potential analysis to determine whether a discharge, alone or in combination with other sources of pollutants to a water body, could lead to an excursion above an applicable water quality standard. The DEQ will establish effluent limits during the MPDES permitting process if runoff from the waste rock stockpile was not sent to the Water Treatment Plant (Outfalls 001 through 003) for treatment.

Best Management Practices

Sediment and runoff from all disturbed areas will be minimized through the use of BMPs developed in accordance with the Forest Service's *National Best Management Practices for Water Quality Management on National Forest System Lands* (USDA Forest Service 2012a) and the BMP requirements in the MPDES permit. All BMPs will be monitored throughout the project (see Attachment 3) and remain in place until the DEQ approved MMC's Notice of Termination. MMC could submit a Notice of Termination when the disturbance associated with the construction activity had achieved final stabilization. Final stabilization means the time at which all soil-disturbing activities at a site have been completed and a vegetative cover has been established with a density of at least 70 percent of the pre-disturbance levels, or equivalent permanent, physical erosion reduction methods have been employed. Final stabilization using vegetation must be accomplished using seeding mixtures or forbs, grasses, and shrubs that are adapted to the conditions of the site. Establishment of a vegetative cover capable of providing erosion control equivalent to pre-existing conditions at the site will be considered final stabilization.

The KNF completed an analysis of BMPs that will be required for the Bear Creek Road that will be used for mine access during all phases except the Evaluation Phase and the first year of Construction. On the Libby Creek Road, the agencies will require that the road length contributing sediment will be no longer than 150 feet. During final design, BMPs other than

paving at stream crossings on the Bear Creek Road where modeling predicted paving will increase sediment will be evaluated. Appropriate BMPs will be determined on a site-specific basis and will be monitored to determine their effectiveness. Appropriate BMPs may include:

- Locating outlets for road drain dips, surface water deflectors and open top box culverts in non-erosive buffer areas
- Stabilizing disturbed areas with vegetative cover
- Erosion control treatment on fillslopes and cutslopes such as erosion control mats, rocks, hydromulching, and sodding
- Placement of filter windrows (such as logging slash) on or just below fillslopes
- Capture of road runoff in settling ponds
- Prevention of ruts in roadways that channel runoff
- Regular road maintenance
- Addition of at least 6 inches of good aggregate to roads (if not paving)
- Dust control on roads
- Prevention of erosion from roadside ditches using riprap, mats or paving
- Aligning culverts with the natural course and gradient of a stream
- Controlling scouring at culvert outlets
- Replacing buried or damaged culverts
- Replacing culverts or bridges with larger structure to prevent road flooding and channel and bank scouring
- Monitoring and maintaining culverts to prevent clogging and flooding of roads

The proposed stream mitigation in Alternatives 3 and 4 includes instream activity in Swamp Creek near US 2, Little Cherry Creek, Poorman Creek and at 21 stream crossings on land acquired for grizzly bear mitigation. The proposed mitigation is section 1.1.6.2.2, *Jurisdictional Waters (Streams).* Appropriate BMPs will be determined on a site-specific basis and will be monitored to determine their effectiveness. Placing straw bales in the stream below the construction area will significantly reduce sediment concentrations in the stream below the bales. The most effective way to prevent short-term turbidity and sediment concentration increases will be to route stream water around the construction area until completion.

1.1.2.2.7 Interim and Concurrent Reclamation

To maximize site stabilization, weed control, and early completion of final reclamation, MMC will identify appropriate areas each year for interim and concurrent reclamation. Interim reclamation will be conducted in areas where disturbance is required during construction and/or operations. Potential interim reclamation areas include soil stockpiles, road cut/fill sections, borrow pits, plant site fill slopes, and other similar areas. Concurrent reclamation will be completed in areas where mine activities are completed and where no additional disturbance is anticipated. Potential concurrent reclamation areas include the tailings impoundment dam face, borrow pits, temporary roads, and other similar features. Interim and concurrent reclamation will be carried out using the same techniques, seed mixtures, and fertilizer types/application rates as described in the final reclamation activities for the project. Where possible, interim and concurrent reclamation will occur within the same year of disturbance. The necessity for

additional reclamation in areas where interim reclamation had occurred will be evaluated by the lead agencies at closure.

1.1.2.3 Libby Plant Site and Adits

The Libby Plant Site will be located on a ridge separating Libby and Ramsey creeks (Figure 2 of the ROD). Access to the plant site will be via NFS roads #2316 and #6210. A permanent bridge will be constructed across Ramsey Creek to provide access to NFS road #6210 from the Ramsey Creek Road. The bridge will be built in compliance with the INFS standards and guidelines. Soil from the Libby Plant Site will be salvaged and stored in a stockpile at the Plant Site. The plant site will consist of the following facilities:

- Mill and administration building and associated parking
- Tailings thickener tank
- Mine/yard pond
- Coarse ore stockpile building
- Warehouse
- Explosives storage
- Electrical substation
- Other miscellaneous facilities

During adit construction, a lined mine/yard pond will be constructed at the Plant Site. The pond will provide storage of 62 acre-feet of water (1 week's storage of temporary inflows of 2,000 gallons per minute (gpm)). After the Starter Dam is built and the area behind the Starter Dam is lined at the impoundment site, water will be diverted to the impoundment area for storage and mill startup. The pond will then be enlarged and relined, once storage at the tailings impoundment is available, to the final size required for operations. The pond will be available for use during construction and will provide additional storage capacity/surge storage during mill start-up and other periods.

Underground development will include excavation of a crusher station and related ore and waste rock bins, and development of main mining benches, haulage drifts, and ore and waste passes. At the terminal end of the adits, MMC will build an underground primary rock crusher. The existing Libby Adit will be enlarged to about 30 feet wide by 30 feet high. An additional adit will be constructed on MMC's private land near the existing Libby portal and will be 17,000 to 18,000 feet long and decline to the ore body at 5 percent grade, depending on the portal location selected. One adit will serve as the main conveyor adit for ore extraction and an exhaust airway. The other adit will provide an intake for fresh air underground and access for personnel and materials during operations. The exact location of the second adit on private land will be determined during final design.

A third adit (Upper Libby Adit) will be west of the Libby Adit Site and will provide ventilation and emergency access. This adit will be 13,700 feet long, parallel the existing Libby Adit, decline to the ore body at about a 7 percent grade, and terminate at the proposed mine void. The Upper Libby Adit will be constructed from underground, and waste rock will be hauled out and stored at the Libby Adit Site, and not the Upper Libby Adit site. The adit portal pad will be constructed of on-site soil and rock materials with no waste rock used. Ditches and a sediment pond also will be

constructed at this site, with excess stormwater from the pad surface being discharged to a permitted stormwater outfall at Libby Creek.

MMC will excavate a ventilation raise, the Rock Lake Ventilation Adit, beginning vertically from the center of the ore body and then horizontally to private land 800 feet east and 600 feet higher than Rock Lake. Air will be drawn into the ventilation raise to supply fresh air for underground workers. No fans or other facilities will be on the surface. The Rock Lake ventilation adit will be used only as an air intake adit and pollutant emissions from the adit are prohibited. The Rock Lake Ventilation Adit will be a combination of a drift from the ore body, a vertical raise, and a short adit to the surface. The portal opening will be about 15 feet wide by 15 feet high and gated with a steel grate or similar structure. The short adit from the vertical raise to the portal will be sloped back into the mine, collecting any water inflow back into the mine. Grouting and other water management techniques will be used to minimize inflow of subsurface water into the raise. The ventilation raise will be constructed from inside the mine and will not require any surface activities, with the exception of creating the surface opening. Total surface disturbance associated with the Rock Lake Ventilation Adit will be about 1 acre. The ventilation adit is not anticipated to be required to support mine construction activities but will be installed during the initial mine production period.

Geotechnical investigations of the Libby Plant Site have not been completed. If the depth to bedrock at the site is similar to the Libby Adit Site, preliminary evaluation indicates the Libby Plant Site may be built out of fill material from the large cut on the west side of the plant site. The cut and fill materials will be balanced, and waste rock will not be used in plant site construction. Consequently, the fill slopes at the plant site will not be subject to the ELGs, and a MPDES-permitted outfall will not be needed at the site.

As part of final design, MMC will submit an Operations, Maintenance, and Surveillance Manual for the Libby Plant and tailings impoundment. The manual will identify maintenance requirements and operation guidelines to reduce risks of system upsets, describe the leak detection system for tailings and reclaim water lines, and outline spill response procedures.

Electrical power for the Construction Phase will be supplied by two diesel, Tier 4 generators, if available, or Tier 3 generators at the Libby Adit. The combined total maximum rated design capacity of the diesel engine/generators will not exceed 1,500 brake horsepower. A buried 34.5-kV transmission line along Bear Creek Road and the Libby Plant Access Road may be installed to replace the generators before the installation of the main transmission line. If the buried 34.5-kV line are installed, the generators will be used as standby power during construction. If constructed, the 34.5-kV line along Bear Creek Road and the Libby Plant Access Road will connect to a substation at the Libby Plant Site. MMC also will use Tier 4 engines, if available, or Tier 3 engines on underground mobile equipment and use ultra-low sulfur diesel fuel in those engines during the Construction Phase and throughout the remaining project life.

A buried 34.5-kV transmission line along the Libby Creek Access Road may be installed to replace the generators before the installation of the main 230-kV transmission line. The line may be installed if it is needed and MMC acquires easements for its construction across private and State lands on the Libby Creek Road. If MMC cannot acquire all necessary easements, an alternative will be to install the line in the Bear Creek Road right-of-way. MMC will also need to acquire easements across private land if the Bear Creek Road is used. Flathead Electrical Cooperative will provide power for the 34.5-kV line and MMC will become a Cooperative

member. Flathead Electrical Cooperative provides power to private owners along both the Libby Creek Road and the Bear Creek Road via above- and underground electric lines. MMC will upgrade the existing line to 34.5 kV and then extend the line if all necessary easements are acquired. Under Flathead Electrical Cooperative policies, an existing member cannot unreasonably withhold approval to extend the powerline to other members. If the buried 34.5-kV line is installed, the generators will be used as standby power during construction after the line is installed. A temporary substation will be installed at the Libby Plant Site and a line conveying power to the Libby Adit will be along NFS roads #6210 and #2316. Power will also be distributed to the Poorman Impoundment Site. If installed, the 34.5-kV line will connect to this substation.

Once the power is available from a transmission line (either the buried 34.5-kV line or the overhead 230-kV line), the generators at the Libby Adit Site will be moved to the Libby Plant Site and used as a backup power source. The backup generators at the mill after power was available from a transmission line will not be used more than 16 hours during any rolling 12-month time period.

MMC will design, construct, own, operate, maintain, and reclaim the mill site substation. Peak demand is expected to be 50 megawatts; a transformer of the same size will be needed. A 50-MW transformer may weigh 50 tons, which will necessitate reinforcing bridges and culverts on stream crossings on the Libby Creek Road and other access roads. The method and requirements of transporting the substation transformer and other mining equipment on access roads will be considered during final road design.

For full operations, a 230-kV transmission line (discussed under section 1.1.6) will be installed that ties with the Noxon-Libby transmission line near Sedlak Park (Figure 3 of the ROD) to the Libby Plant Site Substation.

1.1.2.4 Waste Rock Management

Before the KNF or the DEQ will allow MMC to create a temporary waste rock stockpile within the Poorman Tailings Impoundment footprint, MMC will submit data regarding the concentrations of potential pollutants in runoff and seepage from waste rock to the DEQ. The DEQ will use a reasonable potential analysis to determine whether a discharge, alone or in combination with other sources of pollutants to a water body, could lead to an excursion above an applicable water quality standard. The DEQ will establish effluent limits during the MPDES permitting process if runoff from the waste rock stockpile was not sent to the Water Treatment Plant (Outfalls 001 through 003) for treatment.

MMC will store the ore at the Libby Adit Site. MMC will cover the stockpile to minimize contact with stormwater runoff.

Table 3. Estimated Schedule for Waste Rock Production and Disposal.

Phase	Pritchard, Burke, and Revett Waste Rock (tons)		Revett Barren Lead Waste Rock (tons)	Total Waste Rock (tons)	Ore (tons)
Current	424,400	0	0	424,400	0
Evaluation	545,300	0	0	545,300	0
Construction	0	2,115,900	134,900	2,250,800	333,000
Operations (Years 1-5)	0	85,000	245,000	330,000	0
Operations (Years 6+)	0	121,400	231,300	352,700	0
Total	0	3,292,000	611,200	3,903,200	0
Placement Pending Analysis	Temporary lined Libby Adit stockpile; then to tailings impoundment	Tailings impoundment construction	Underground		Temporary unlined storage pile near the Libby Adit portal, then to mill

Conversion from bank cubic yards presented in MMC 2009 based on a density of 12.18 cubic feet/ton

Source: Table C-3 in Attachment 3 of the ROD, MMC 2009.

Limited pre-mining access to subsurface portions of the deposit makes additional sampling of waste and ore during the Evaluation Phase necessary. Further sampling and analysis also will be conducted during mine construction and operation. Together with baseline information, these data will be used to confirm and/or refine MMC's plans for operational waste rock sampling, selective handling and management of mined rock and tailings. The required Geochemistry Sampling and Analysis Plan is in Attachment 3 of the ROD. During the Evaluation Phase, MMC will:

- Collect representative samples from previously unexposed zones of waste rock. Specifically, these zones should include any unsampled, altered waste zones within the Revett, Burke, and Wallace formations, as well as portions of the Prichard Formation to be exposed during construction of new adits. Samples will be analyzed using acid base accounting (ABA), multi-element whole rock analyses, and petrography to determine (1) conformity of new sample populations with previously analyzed samples and described field-scale geochemical analogs; (2) overall adequacy of sampling; and (3) relative need for additional metal mobility and/or kinetic testing. The number of samples required to be collected during the Evaluation Phase and an approach to assessing sample adequacy are described, in Attachment 3 of the ROD.
- Collect representative samples of ore within the portion of the Revett Formation to be exposed in the evaluation adit, for additional evaluation of metal release potential. The number of required ore samples is also estimated in Attachment 3 of the ROD.

- Collect a bulk ore sample for metallurgical test work, to obtain representative tailings for additional geochemical analysis using ABA, whole rock, synthetic precipitation leaching procedure (SPLP), and mineralogy methods. The primary goal of these analyses is to refine estimates of metal release potential for tailings. Five tailings samples are estimated in Attachment 3 of the ROD, but the number required will be contingent upon the metallurgical test design.
- Re-evaluate predicted water quality using Evaluation Phase kinetic and metal mobility test results. Kinetic test methods will reflect the geochemical environment of rock management facilities (e.g., saturated or unsaturated, aerobic or anaerobic conditions). In particular, MMC will use geochemistry data to further refine the predicted volume and quality of groundwater flow post-closure and assess potential for solute attenuation downgradient of the tailings impoundment.
- If appropriate, update operational sampling and analysis plans based on all available data.
- Identify operationally achievable handling criteria for waste management.
- Re-evaluate methods of managing exposed underground workings (e.g., grouting, barrier pillars), backfilling waste rock, and managing impounded tailings using data obtained during the Evaluation Phase.

Until water quality predictions, operational geochemistry, and rock management plans are finalized using Evaluation Phase data, MMC will:

- Isolate and place waste rock on a liner as described in section 1.1.1, *Evaluation Phase*
- Continue to treat water from the adit and waste rock stockpiles at the Water Treatment Plant

RC Resources, Inc. is the proposed operator of the Rock Creek Project, a proposed mine on the west side of the Cabinet Mountains. RC Resources 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 Rock Creek Project, such as the Revett, Pritchard, and Burke formations. The database is part of the Montanore and Rock Creek project records. MMC will fund the maintenance and updating of the database. Should RC Resources continue the development of the Rock Creek Project, funding for the maintenance and updating of the database will be shared equally by MMC and RC Resources.

1.1.2.5 Tailings Management

1.1.2.5.1 Impoundment Site Location

The Poorman Tailings Impoundment Site is a broad, east-facing slope about 0.25 mile west of Libby Creek. The Poorman Tailings Impoundment Site, which will be between Little Cherry and Poorman creeks in an ephemeral watershed tributary to Libby Creek, will be developed to hold 120 million tons of tailings and support facilities. The site will be entirely on National Forest System lands. Private property not owned by MMC is located 300 feet east of the southern two-thirds of where the tailings dam alignment will be located. The Poorman site is in Sections 24 and 25, Township 28 North, Range 31 West. Tailings will be transported to the site from a mill as a slurry. At the site, the tailings will be sent to a thickener plant and deposited in the impoundment as high-density tailings.

1.1.2.5.2 General Facilities

Site development will include site stripping and foundation preparations followed by construction of a Starter Dam built from waste rock and borrow materials, a Rock Toe Berm from waste rock and borrow materials under the toe of the Main Dam for stability, a drainage system within the impoundment area, a Seepage Collection Pond and associated pumpback well system, a Saddle Dam on the north side of the impoundment, a tailings thickening plant, a waste rock stockpile, topsoil and subsoil stockpile areas, and relocation of a segment of NFS road #278. The need for the specific design features at the Poorman tailings impoundment site (e.g., Rock Toe Berm) is uncertain because the tailings facility design will be based on additional site information obtained during the design process. During impoundment construction and operations, MMC will fund a third party technical advisor to assist the agencies with tailings impoundment quality assurance and quality control oversight.

The tailings dam will consist of three sections, the Starter Dam along the upstream toe of the Main Dam section, a Rock Toe Berm to buttress/support the sand dam along the Main Dam section, and a Main Dam section consisting of the sand fraction cycloned from the tailings. The dam will have a final crest length of 10,300 feet at an estimated elevation of 3,664 feet. The dam will have a vertical height of 230 feet above the Rock Toe Berm and 360 feet including the Rock Toe Berm. The dam layout is designed to maximize the height of the dam section based on estimated quantities available from the cyclone operations and to minimize fill requirements to balance the fill volume required for the total dam. Based on initial evaluation, the layout is considered feasible, but will be revised in final design, if possible, to reduce total fill quantities.

An impoundment with a Main Dam crest of 3,664 feet will contain almost all of the thickened tailings. With an average in-place density of 85 pcf at completion of tailings deposition (91.4 million tons), about 1 foot of additional dam crest will be required for complete storage of the tailings at a level surface. Assuming a level tailings surface, the impoundment capacity at the estimated dam crest elevation in the final years of operation will not allow for water storage within the impoundment area nor account for lost capacity due to the slope of the tailings surface. The dam maximum crest will be set at about 3,664 feet based on the Starter Dam and Rock Toe Berm layouts and the volume of cyclone sand available for construction of the Main Dam. Perimeter tailings deposition from an elevated position along the back slope of the impoundment will be required to store all of the tailings and allow for water storage within the impoundment during the final years of operation as discussed in subsequent sections.

Foundation Preparations

Additional field exploration will be required to assess foundation conditions at the Poorman site. This field work will be completed during the Evaluation Phase. Based on available field data, there are indications that there may be deposits of low strength, highly compressible glaciolacustrine clay may underlie the Poorman site. No unsuitable foundation conditions relative to dam stability are anticipated in the Poorman Site. The extent of the glaciolacustrine clay and its strength will be assessed during final design to assess the need for shear keys. Other soft, unsuitable materials under the footprint of the Starter and Main Dams, will be either excavated and transported as backfill for the borrow areas, or filled with suitable foundation material, such as general fill from borrow areas. Final design for management of these types of materials will be submitted to the agencies for approval.

An average of 24 inches of surface soils and 12 inches of subsoils at all wetlands will be excavated and used at isolated wetland mitigation sites. Final design for management of wetland soils will be submitted to the agencies for approval. No tailings will be deposited directly into waters of the U.S. because other materials will first be placed in these areas before depositing the tailings.

Rock Toe Berm

A Rock Toe Berm constructed as a compacted rock fill structure in the toe area of the Main Dam is currently part of the conceptual design. The Rock Toe Berm is designed to reduce the volume of cyclone sand required to construct the dam to the design height, and limit the height of the sand dam to allow a steeper downstream face to reduce the required sand volume. The Rock Toe Berm will be a free draining structure to prevent buildup of a water surface in the toe of the Main Dam. The Rock Toe Berm will have a 30-foot wide crest at an elevation of 3,440 feet with a 2.5H:1V downstream slope and a 3H:1V upstream slope. The upstream face of the Rock Toe Berm will be of screened material to create a surface that is filter compatible with the tailings sand to prevent the tailings sand from migrating into the Rock Toe Berm. The crest length is 4,400 feet and the vertical height at the maximum section is 140 feet. The total estimated volume of the Rock Toe Berm is 2.7 million cubic yards. About 1.2 to 1.5 million cubic yards of waste rock will be available from initial mine development and early mine operations. The balance of material will be obtained from either a rock borrow quarry developed in the upper elevations of the site where soil cover is minimal or from suitable sand and gravel lenses noted in the glacial deposits located at the site (Morrison-Knudsen Engineers, Inc. 1989a). During final design, MMC or the tailings TAG may identify alternatives to the Rock Toe Berm.

Starter and Saddle Dams

The Starter Dam will be a compacted earthfill embankment with a 70-foot wide crest at an elevation of 3,480 feet. Upstream and downstream slopes will be 2.5H:1V. The wide crest is selected to reduce sand requirements in the Main Dam. The estimated crest length is 6,000 feet and the maximum section about 100 feet high. The Starter Dam will be constructed with waste rock and borrow material excavated from surface and near surface glacial deposits within or adjacent to the impoundment. The conceptual layout volume of the Starter Dam is estimated to be 1.7 million cubic yards. The fill will be placed in maximum uncompacted lifts of 1 foot or less and compacted with suitable equipment. All boulders larger than 8 inches diameter will be removed from the fill. A Saddle Dam of similar construction will be required in the north perimeter of the impoundment area. The Saddle Dam volume is estimated to be 730,000 cubic yards. The estimated volume of available borrow within the impoundment area is in excess of 5 million cubic yards; an estimated 1.2 million cubic yards of waste rock also will be available (Table 3). A high-density polyethylene (HDPE) geomembrane liner will be placed beneath a portion of the tailings impoundment and keyed into the low permeability zone of the dam. During Starter Dam construction, a temporary water reclaim/storage pond will be constructed upstream from the Starter Dam to hold water until the Starter Dam is complete.

Borrow Materials

The primary source for borrow materials for the Starter and Saddle Dams will be local borrow materials from within the impoundment footprint. The borrow source for the Rock Toe Berm will be waste rock from the mine stockpiled at the site supplemented by local borrow within or adjacent to the impoundment area. Borrow for the Rock Toe Berm from within the impoundment site will consist of sands and gravels obtained for lenses in the underlying glacial alluvial material

or bedrock obtained from a quarry site that may be developed in the higher elevations where soil cover appears to be shallow compared to most of the impoundment area.

Drain materials will be obtained from on-site crushing and screening of suitable borrow (such as the sand and gravel lenses referenced in the glacial alluvial deposits) or obtained from a commercial source. Table 4 is a summary of anticipated material and volumes based on the conceptual design.

Table 4. Estimated Tailings Impoundment Facility Volumes.

Facility	Volume (million cubic yards)
Starter Dam	1.7
Rock Toe Berm	2.7
Cyclone Sand Dam	22.2
Saddle Dam	0.7
Seepage Collection Pond Fill	<0.1

1.1.2.5.3 Seepage Collection

A system of trunk drains and smaller lateral drains over the impoundment floor and beneath the tailings dam will convey seepage to the toe of the dam. Smaller secondary drains will convey water laterally into the trunk drains. MMC requested a mixing zone beneath and downgradient of the impoundment for changes in groundwater quality. Requested boundaries of the groundwater mixing zone beneath and downgradient of the Poorman Impoundment are 5,000 feet in length (east-west) downgradient of the west upper edge of the tailings impoundment; and 7,000 feet in width extending north-south. A mixing zone a limited area of a surface water body or a portion of an aquifer, where initial dilution of a discharge takes place and where water quality changes may occur and where certain water quality standards may be exceeded (ARM 17.30.502(6)).

Artesian conditions are present along the toe area of the dam footprint. A drainage collection system will be designed and installed under the Rock Toe Berm and extend upstream under the Main and Starter dam footprints as necessary to collect and control groundwater. The Rock Toe Berm will be designed as a separate facility, but with its base layer compatible with the underlying drain system. Design of the groundwater drain system in the toe area of the dam will be separate from the tailings impoundment seepage collection system to enable separate monitoring of the two systems before flowing into the Seepage Collection Pond. Final design of the groundwater drain system will consider the need and benefit of a seepage collection trench along the toe of the dam upstream of the private property.

Drain designs (both gravity and pressure relief drains) will be used. Drains within the impoundment will be installed in trenches into the native ground and covered with a permeable protective layer to prevent erosion and plugging of the drains during initial placement of the tailings. During construction of the seepage collection and drain system, any wetlands uphill of the Main Dam will be filled. All drains will be placed in a geomembrane-lined trench and consist of a core of highly pervious 1- to 4-inch rock wrapped in geotextile and surrounded by sand and gravel filter material. Locally available sand and gravel alluvial material will be used to cover the drains to prevent the fine tailings from piping into the drain materials during operations. Seepage collection drains through and under the dam footprint will be designed as integral parts of the dam foundation and compatible with each of the overlying dam sections. MMC will install pumpback recovery wells to collect tailings seepage not intercepted by the Seepage Collection System. The pumpback recovery wells will be located beyond the dam toe, and will be designed to collect seepage not collected by the drain system.

A Seepage Collection Pond and return facility will be 500 feet west of Libby Creek and 500 feet downstream of the impoundment. The facility design will include collection of water from the impoundment seepage collection drains, the groundwater relief drains, and runoff from the downstream slope and toe area of the tailings dam facility. The pond will have a crest elevation of 3,240 feet and be lined with HDPE (or equivalent). The outside compacted fill slopes will consist of material excavated from the pond area and graded to have 2.5H:1V slopes. The perimeter crest will be 30 feet wide for maintenance purposes. The design criteria for the pond will be to contain up to 30 days of drain flow plus runoff from the 6-hour PMP storm event. The capacity of the Seepage Collection Pond is 153 acre-feet (50 million gallons).

A pump station will be located on the west side of the Seepage Collection Pond. The return water pipelines will plumb either into the return water lines in the thickener plant, or into the tailings facility where the water will combine with the tailings water and then will be recovered through the tailings impoundment return water system. The pumps will be rated at 125 percent of the estimated maximum flow into the ponds.

1.1.2.6 Transportation and Access

1.1.2.6.1 Road Construction and Access

MMC will fund and implement roadway improvements to US 2 and intersections with US 2 required by MDT. MMC will construct all access roads in accordance with the design specifications in the approved plan of operations. MMC will implement the plan for maintaining continued access by local landowners and recreational forest users during the Libby Creek Road reconstruction.

South of Little Cherry Creek, MMC will build 0.7 miles of new road west of and parallel to the Bear Creek Road that will connect Bear Creek Road with Ramsey Creek Road (NFS road #4781) (Figure 4 of the ROD). Once oversized haul vehicles are no longer needed between the tailings impoundment and Libby Plant Site, the mine and public traffic will both use the new alignment parallel to the existing Bear Creek Road. When the road is used jointly, the primary road use will be mine traffic (vendors, concentrate haulage, deliveries, and personnel) similar to the use patterns on the lower segment of Bear Creek Road. The segment of the Bear Creek Road parallel to the new haul road will be decommissioned, and the culvert crossing Poorman Creek will be removed.

During upgrading of the three mine access roads, MMC will use the Bear Creek Road to access the Libby Adit Site during the summer construction season. MMC will continue to snowplow the Libby Creek Road to provide winter-time access. Public access will be eliminated on the Little Cherry Loop Road (NFS road #6212) during the construction, operation, and closure phases and used exclusively for mine traffic. The bridge on NFS road #6212 across Poorman Creek will be removed during construction and the road south of Poorman Creek to the intersection of NFS road #278 will be decommissioned. A gate on the road will be installed near the tailings impoundment permit area boundary on the north end. Depending on timing of project construction, the KNF may need administrative access to NFS road #6212P to allow access to a gravel pit at the road’s terminus.

With the exception of the Bear Creek Road, all open roads in the impoundment permit area will be gated and restricted to mine traffic only for the life of the project. Non-motorized public access will be restricted within each permit area by signage at the permit area boundary. Table 5 lists

those roads with a change in road status during operations. MMC will be responsible for maintaining all existing or new roads and stream crossings used by the operation.

Some currently open roads will be gated. MMC will be responsible for installing and maintaining gates at each closure. The agencies' wildlife mitigation includes access changes, either with gates or barriers. MMC will be responsible for installing and maintaining each closure. MMC will check the status of the closures twice-a-year (spring and fall), and repair any gate or barrier that is allowing access. Gates will have dual-locking devices to allow the KNF fire or administrative access. When accessing areas regulated by the Mine Safety and Health Administration, KNF personnel will check in at the mine office before entering regulated areas.

1.1.2.6.2 Ownership of Bear Creek Road

The Final EIS indicated the KNF will transfer ownership and responsibilities maintenance of the Bear Creek Road to Lincoln County after the road is reconstructed for use as the main access road. Because the road will not be reconstructed if the Libby Creek Road is used for access, the KNF will discuss with Lincoln County if it still wants ownership of the Bear Creek Road.

1.1.2.7 Other Requirements

1.1.2.7.1 Updated Closure Plan

MMC will update the closure plan, including a long-term monitoring plan, during the Construction Phase in sufficient detail to allow development of a reclamation bond for the Closure Phase. A final closure and post-closure plan, including a long-term monitoring plan, will be submitted 3 to 4 years before mine closure.

1.1.2.7.2 Scenery and Recreation

MMC will design and construct a scenic overlook with information and interpretive signs on NFS road #231 (Libby Creek Road) downstream of the Midas Creek crossing with views of the tailings impoundment. MMC will develop two interpretative signs, one on the mining operation and another one on the mineral resource and geology of the Cabinet Mountains. Parking will be developed in cooperation with the KNF.

Table 5. Change in Road Status for Roads used during Construction, Operations, and Closure Phases.

Road #	Road Name	Location	Existing Status	Length (miles)	Operational Status
1408	Libby Creek Bottom	Tailings Impoundment	Open	0.8	Gated, mine traffic only
2316	Upper Libby Creek	Libby Adit Site	Open	2.2	Mixed mine haul and public traffic
2316	Upper Libby Creek	Libby Adit Site	Gated year-long to motor vehicles, open to snow vehicles 12/1-4/30	0.3	Gated, mine traffic only
2316	Upper Libby Creek	Libby Adit Site	Gated year-long to motor vehicles, open to snow vehicles 12/1-4/30	0.7	Trail
2317	Poorman Creek	Up Poorman Creek	Gated year-long to motor vehicles, open to snow vehicles 12/1-4/30	1.8	Trail
2317	Poorman Creek	Up Poorman Creek	Open	0.3	Mixed mine haul and public traffic
2317B	Poorman Creek B	Up Poorman Creek	Impassable, open to snow vehicles 12/1-4/30	0.5	Trail
4781	Ramsey Creek	Up Ramsey Creek	Open	0.7	Gated, mine traffic only
4781	Ramsey Creek	Up Ramsey Creek	Open	0.5	Decommission
4781	Ramsey Creek	Up Ramsey Creek	Gated year-long to motor vehicles, open to snow vehicles 12/1-4/30	2.2	Trail
5181	L Cherry Loop H Cowpath	Tailings Impoundment	Gated year-long to motor vehicles, open to snow vehicles 12/1-4/30	0.5	Gated, mine traffic only
5181A	L Cherry Loop H Cowpath A	Tailings Impoundment	Gated year-long to motor vehicles, open to snow vehicles 12/1-4/30	0.2	Gated, mine traffic only
5184	Bear-Little Cherry	Tailings Impoundment	Gated year-long to motor vehicles, open to snow vehicles 12/1-4/30	0.2	Gated, mine traffic only
5184A	Bear-Little Cherry A	Tailings Impoundment	Gated year-long to motor vehicles, open to snow vehicles 12/1-4/30	0.2	Gated, mine traffic only
5185	S Bear-Little Cherry	Tailings Impoundment	Gated year-long to motor vehicles, open to snow vehicles 12/1-4/30	0.9	Gated, mine traffic only
5185A	S Bear-Little Cherry A	Tailings Impoundment	Gated year-long to motor vehicles, open to snow vehicles 12/1-4/30	0.3	Gated, mine traffic only
5187	L Cherry Loop L Clearing	Tailings Impoundment	Barriered year-long to motor vehicles, open to snow vehicles 12/1-4/30	0.2	Gated, mine traffic only
6201	Cherry Ridge	Tailings Impoundment	Barriered year-long to motor vehicles, open to snow vehicles 12/1-4/30	1.2	Gated, mine traffic only

Road #	Road Name	Location	Existing Status	Length (miles)	Operational Status
6201A	Cherry Ridge A	Tailings Impoundment	Barriered year-long to motor vehicles, open to snow vehicles 12/1-4/30	0.6	Gated, mine traffic only
6210	Libby Ramsey	Libby Adit Access Road	Gated year-long to motor vehicles, open to snow vehicles 12/1-4/30	2.95	Gated, mine traffic only
6210	Libby Ramsey	Libby Adit Access Road	Open	0.4	Gated, mine traffic only
6212	Little Cherry Loop	Tailings Impoundment	Open	2.1	Bridge across Poorman Creek removed during construction; road south of Poorman Creek decommissioned; Gated, mine traffic only
6212H	Little Cherry Loop H	Tailings Impoundment	Gated year-long to motor vehicles, open to snow vehicles 12/1-4/30	0.6	Gated, mine traffic only
6212L	Little Cherry Loop L	Tailings Impoundment	Barriered year-long to motor vehicles, open to snow vehicles 12/1-4/30	0.4	Gated, mine traffic only
6212M	Little Cherry Loop M	Tailings Impoundment	Gated year-long to motor vehicles, open to snow vehicles 12/1-4/30	1.1	Gated, mine traffic only
6212P	Poorman Pit	Tailings Impoundment	Gated year-long to motor vehicles, open to snow vehicles 12/1-4/30	0.3	Gated, mine traffic only
8749	Noranda Mine	Libby Adit Site	Private, gated	0.5	Gated, mine traffic only
8749A	Noranda Mine A	Libby Adit Site	Private, gated	0.2	Gated, mine traffic only
14403	Lower Ramsey	Libby Plant Site	Barriered year-long to motor vehicles, open to snow vehicles 12/1-4/30	0.4	Gated, mine traffic only
14404	Bare Road	Tailings Impoundment	Barriered year-long to motor and snow vehicles	0.6	Gated, mine traffic only

MMC will gate certain roads currently open in the mine permit areas during beginning during the Construction Phase for the life of the project. The KNF will change the access to other roads for wildlife mitigation (see section 1.1.6.1, *Grizzly Bear, Lynx and Bull Trout*). MMC will check the status of the closures twice-a-year (spring and fall), and repair any gate or barrier that is allowing access.

MMC will pay the reimbursement funding for a volunteer campground host from Memorial Day through Labor Day at Howard Lake Campground using an Volunteer Services Agreement for Natural Resources Agencies (Optional Form 301a), during the construction and operation phases of the mine. MMC will shield or baffle night lighting at all facilities.

MMC will complete vegetation clearing operations under the supervision of an agency representative with experience in landscape architecture and revegetation. Where practicable, MMC will create clearing edges with shapes directly related to topography, existing vegetation community densities and ages, surface drainage patterns, existing forest species diversity, and view characteristics from Key Observation Points. MMC will avoid straight line or right-angle clearing area edges. MMC will not create symmetrically-shaped clearing areas.

MMC will transition forested clearing area edges into existing treeless areas by varying the density of the cleared edge under the supervision of an agency representative. MMC will mark only trees to be removed with water-based paint, and not mark any trees to remain. MMC will cut all tree trunks at 6 inches or less above the existing grade in clearing areas located in sensitive foreground areas such as within 1,000 feet of residences, roads, and recreation areas. These locations will be determined and identified by an agency representative before clearing operations.

MMC will submit plans and specifications to the agencies to locate above-ground facilities, to the greatest extent practicable, without the facilities being visible above the skyline as viewed from the Key Observation Points.

1.1.2.7.3 Reporting

MMC will submit as part of its annual report to the lead agencies a discussion of its compliance with all the monitoring and mitigation requirements specified in the DEQ Operating Permit and the KNF's approved Plan of Operations. Each monitoring and mitigation requirement of the Selected Alternative will be listed in the report.

1.1.2.7.4 Monitoring

MMC will submit amended monitoring plans for all remaining phases consistent with 1) the revised Appendix C of the Final EIS; 2) the terms and conditions in the USFWS Biological Opinions; 3) conditions of any other permit or approval, such as the 404 permit, the 401 certification, or a beneficial water use permit. MMC will implement all monitoring for all resources required before initiating the Construction Phase, such as water resources, consistent with approved monitoring plans.

1.1.3 Operations Phase

1.1.3.1 Mining

1.1.3.1.1 Ore Body Characteristics

The ore body is composed of two nearly parallel mineralized horizons that range from 14 to 140 feet thick and are separated by a waste zone called the barren zone. In the 1980s, Noranda Minerals Corp. originally designated the upper zone of the ore deposit as the B-1 Zone and the lower zone as the B Zone. Mine and Quarry Engineering Services in the Preliminary Economic Assessment indicated the B zone is subsequently renamed Zone 2 and the B1 zone is subsequently renamed Zone 1. The average thickness of the Zone 1 is 30 feet and Zone 2 averages 34 feet. A barren lead zone, ranging in thickness from 0 to 200 feet and averaging about 30 feet, separates the two ore zones. The ore body outcrops near the northern end of Rock Lake, and plunges about 15 degrees to the north and northwest. The ore body may extend farther to the north and northwest. Overburden thickness ranges from 0 feet at the ore outcrop near the northern end of Rock Lake to more than 3,000 feet near St. Paul Lake. The ore consists of quartzite, silty

quartzite, and siltite of the lower Revett Formation. Rock strength tests are conducted on samples collected from drill cores collected in the early 1980s. Data from the test work are used in mine design, pillar sizes, and other important criteria.

1.1.3.1.2 Mining Method

The ore deposit will be mined using conventional room-and-pillar methods, with both diesel and diesel-electric underground equipment. A room-and-pillar method is where some ore is not mined to provide pillars or columns of ore. MMC's preliminary mine design is based on a rigid-pillar approach. Rigid-pillar design means that all the pillars are designed to carry loads in excess of their strength and are designed not to yield.

Preliminary mine planning is based on a standard pillar size of 40 feet wide by 60 feet long, laid out in a regular grid basis. Average mining height of 48 feet and a panel width (area between pillars) of 40 feet are assumed for initial mine planning. The agencies' requirements for the final mine plan, such as using a minimum 0.8 pillar width to height ratio as a preliminary numeric criterion and funding an independent technical advisor to assist the agencies in review of MMC's subsidence monitoring plan, underground rock mechanics data collection, and mine plan, are described in section 1.1.1.6.4, *Final Underground Mine Design Process*. Until a sill analysis can be conducted, pillars will be aligned between the upper and lower zones. Actual pillar sizes will vary depending on the ore thickness, overburden thickness, local rock quality, and hydrologic conditions. MMC will develop the final pillar design after the Libby Adit and subsequent underground testing are complete. As part of the Libby Adit Evaluation Phase, MMC will conduct additional underground core drilling before developing final mine plans. The drilling will be used to collect detailed information on underground geologic structures, ore thicknesses, ore grades, and hydrology.

For the purpose of analyzing the effects of possible mitigations to minimize effects on surface water from mine dewatering, MMC simulated two options in its 3D groundwater model: grouting, during Operations Phase, of the sides of the three uppermost mine blocks and corresponding access ramps, as well as installing two 20-foot thick concrete pressure grouted wall bulkheads with a hydraulic conductivity of 1 x 10-9 cm/sec in two mining blocks in the mine at Closure. The agencies' evaluation of the constructed bulkheads, discussed in more detail in the Groundwater Hydrology section in the Final EIS, concluded that man-made concrete bulkheads will unlikely provide the necessary mitigation over the long-term, assuming the hydrologic modeling is representative of underground conditions. The agencies also concluded that leaving a "pillar" of unmined ore with characteristics similar to the constructed bulkheads simulated in the modeling will likely provide the necessary mitigation over the long-term, again assuming the hydrologic modeling is representative of underground conditions. Consequently, by the fifth year of operations, MMC will assess the need for barrier pillars to minimize post-mining changes in East Fork Rock Creek and East Fork Bull River streamflow and water quality. If needed, MMC will submit a revised mine plan with one or more barrier pillars with constructed bulkheads at access openings to the agencies for approval. One or more barriers will be maintained underground, if necessary based on the hydrologic monitoring, after the plan's approval. The underground barriers are described in section 1.1.1.2, *Proposed Activities* in the discussion of the Evaluation Phase.

Initial mine development will start in the central section of the deposit. Mining will progress generally toward the outcrop area and take 7 to 8 years to reach the upper portion of the deposit

near Rock Lake. MMC will be required to maintain at least a 1,000-foot buffer from Rock Lake and a 300-foot buffer from the Rock Lake Fault.

During full production, ore will be hauled from the ore passes to the primary underground crusher using 26- and 50-ton electric haul trucks. Ore will be conveyed via an above-ground covered conveyor from the Libby Adit Site 6,000 or 7,500 feet (depending on the adit location) to the covered coarse ore stockpile at the Libby Plant Site. The conveyor will parallel NFS roads #2316 and #6210. The agencies identified two options for the conveyor: one will be about 10 feet wide and 10 feet high, and the other will be lower (8 feet), but wider (16 feet). The conveyor and three transfer points will be fully enclosed to minimize emissions, contact with precipitation and loss of ore. Any spillage will be promptly cleaned up to avoid contact with precipitation.

The DEQ's Supplemental Preliminary Determination on MMC's air quality permit contains a number of limitations on air emissions. MMC will adhere to all emission limitations in the final air quality permit.

1.1.3.1.3 Underground Mining Boundary Monitoring

To ensure MMC only mined ore within its valid existing rights and that the underground mine development adhered to required buffer zone boundaries, the Plan of Operations and DEQ operating permit will include requirements for underground monitoring. MMC will fund and facilitate biannual surveys of the underground workings that will be completed by an independent qualified mine surveyor. The surveyor will be selected and directed by the agencies through an agreement with MMC. The surveyor will have no financial interest in the Montanore Project. The agencies may also require more frequent surveys and/or as-built drawings if discrepancies arise. MMC will provide mine access, logistical support, and all information required by the surveyor to complete independent inspections and resulting documentation for the identified tasks. This will include all company-conducted mine surveys of the underground workings. After completing the monitoring survey, the independent surveyor will submit maps of the workings to the agencies and will report any ground disturbances that crossed the established extralateral rights boundary, entered into designated buffer zones, or deviated from agency approved mine design.

MMC will fund a third party technical advisor to assist the agencies with underground mine quality assurance and quality control oversight during operations. The technical advisor will assist the agencies in evaluating underground mine stability and adherence to the approved mine plan. MMC will provide mine access, logistical support, and all information required by the technical advisor to complete a review of underground rock mechanics data and MMC'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 will incorporate data collected as part of the ongoing monitoring program, and will be in addition to the annual report prepared by MMC. The technical advisor is described in section 1.1.1.6.4, *Final Underground Mine Design Process*.

MMC will compile the results from its surface and underground monitoring programs as developed during the final design process, and provide the results to the agencies in an annual report.

1.1.3.2 Milling

1.1.3.2.1 Ore Processing

The mill will operate 7 days per week, 350 days per year for a total processing capacity of 7 million tons per year (20,000 tons of ore per day). Initial production will be 12,500 tons per day (tpd). The milling process will involve five major steps: crushing, grinding, flotation, concentrate dewatering, and tailings storage. Crushing will occur underground while the remaining processes will occur in the mill facility. Reagents added during the flotation process will separate the copper and silver minerals (sulfides) from the host rock (generally quartzite), producing a copper-silver concentrate.

Ore will be processed into a concentrate using a conventional milling process known as froth flotation. In froth flotation milling, finely ground ore is mixed with water and various reagents and air is forced through the mixture in a series of large tanks called flotation cells. Sulfide minerals, such as copper, attach to air bubbles (or froth) that float to the top of the cell and are skimmed off the surface of the flotation cells and collected. Silver is found in its native form and is attached to the sulfide minerals, such as bornite, associated with the ore deposit. Silver will be collected concurrently with the sulfide minerals. Potassium amyl xanthate will be used as the collector and methyl isobutyl carbinol as the frother. These will be the only reagents required for flotation of the Montanore ore minerals. A polyacrylamide flocculant, such as Percol 352, will be used to assist the settling of the concentrate and the fine fraction of the final tailings in their respective thickeners. Percol 352 contains acrylamide, a regulated volatile organic chemical in Montana. These reagents are the same reagents used at the nearby Troy Mine.

The non-mineralized rock, called tailings, which will consist mainly of quartzite, will sink to the bottom of the flotation cells (see section 1.1.3.3, *Tailings Management*). Bench-scale testing of Montanore Project ore and evaluation of the Troy Mine milling process, which processes an ore similar to Montanore ore, indicate that the mill process will operate at a near-neutral pH. MMC does not anticipate the need for pH control. Process chemicals may be required periodically for testing, pH modification, or cleaning the flotation circuit and other process circuits in the mill. The flotation process will continue through cleaner flotation cells and will be repeated several times to improve mineral recovery and concentrate quality. After the flotation circuit, the concentrate will be sent to a dewatering system and stored until it is transported to the Libby Loadout for shipment to the smelter. The concentrate will be the final economic product of the milling process.

1.1.3.2.2 Concentrate Shipment

After dewatering, the concentrate will be stored in a covered building and then loaded into 20-ton, covered, highway trucks by a front-end loader. Truck covers will be used to minimize loss of concentrate. At peak production, about 420 tons of concentrate, or 21 trucks per day, will be trucked daily via NFS road #4781, a new access road (the Libby Plant Site Access Road, NFS road #231 (Libby Creek Road), and US 2 to Libby, and then to an unnamed road accessing the Kootenai Business Park to a loadout facility. The loadout will be next to the Troy Mine loadout. MMC will limit concentrate haulage to daylight hours and not during major shift changes. Concentrates will be stored at the loadout inside an enclosed building with rail access on private land at the Kootenai Business Park in Libby, Montana, and then shipped via rail to a smelter. For storage and handling of concentrates, a new building will be erected and either an existing concrete pad or a new pad constructed for the building will be used. The facility will be covered to eliminate any precipitation and runoff issues. Trucks will back onto a concrete pad and dump

concentrate into the concentrate building. A front-end loader will stack the concentrate in the building for shipping. Rail cars will be loaded by a conveyor belt fed by a front-end loader. Dust control devices will be used during rail loading activities to minimize fugitive dust. The rail car will be located inside an enclosed area to minimize fugitive dust associated with concentrate handling and loading. The openings of the rail car loadout building will be covered with heavy plastic strips or other similar devices. The railroad track will be extended to permit storage of rail cars. Covers for the rail cars will be used to minimize loss of concentrate.

MMC and the Kootenai Business Park have signed a letter of intent to operate the loadout facility. During final design, MMC will finalize this agreement and discuss retention of the facility for future use by the Kootenai Business Park. For purposes of planning, Kootenai Business Park and MMC expect the building will be retained.

1.1.3.3 Tailings Management

1.1.3.3.1 Tailings Deposition

All tailings deposited into the impoundment will be routed through a thickener plant and deposited as high-density tailings. This will allow a higher average in-place tailings density and stacking of tailings along perimeter areas above the Main Dam crest. Both parameters lead to a reduction in the total impoundment volume required to store conventional tailings slurry.

Tailings will be thickened to a target density of 70 percent solids at a thickener plant at the impoundment site. Slurry density can vary between deposition methods depending on the physical and geotechnical characteristics of site-specific tailings. The cyclone overflow (the fine tailings fraction after the sand is removed to build the Main Dam) will be deposited as high-density tailings slurry with an average slurry density of 70 percent. At a 70 percent slurry density, the average settled density of the tailings over the life of the project is estimated to be 85 pounds per cubic foot (pcf). As excess water drains from the fine tailings mass and the mass consolidates under long-term conditions, the average mass density could exceed 90 pcf. The time frame for such consolidation and the final average tailings density will depend upon the characteristics of the tailings and deposition patterns around the impoundment. The tailings slope is estimated to be 5 percent and the tailings' shear strength sufficient to remain stable. During final design, laboratory tests will be run to confirm the slurry densification and shear strength characteristics, and seepage-induced consolidated tests will be performed on representative tailings samples to determine the appropriate slurry density, slope at deposition, and expected consolidation behavior of the tailings.

Tailings Pipelines

Tailings from the milling process will be separated at the mill and tailings impoundment into coarse-textured sand (sand tailings) and fine-textured clay (fine tailings) fractions. The sand fraction and water will flow as a slurry by gravity through buried 10-inch diameter double-walled, HDPE or HDPE/steel combination pipelines from the mill at the Libby Plant Site to a thickener facility west of the impoundment. MMC will construct a second sand fraction tailings line to use when the first line is in need of repair or replacement. Fine tailings from the mill will be transported to the tailings impoundment through a buried 14-inch double-walled, HDPE or HDPE/steel combination pipeline. Reclaimed process water will be returned to the mill from the tailings impoundment in a 14-inch to 16-inch HDPE pipe or similar pipe. The pipeline corridor will parallel the road except where it curves.

MMC will bury tailings pipelines adjacent to the main haul road between the Libby Plant Site and the Poorman Impoundment Site in most locations. Unless it is impracticable, pipelines will be buried at least 3 feet deep adjacent to the access road.

The pipelines will be double-walled and fitted with air release/vacuum valves to ensure consistent flow. An automated leakage sensing system will continuously monitor line operation, and the sensing system will include the installation of magnetic flowmeters on the tailings line at the mill and at the tailings pond. If a flow differential signal is received at the control room, an alarm will sound, and the mill will be systematically shut down, starting with the feed conveyors to the grinding mills. Valves on the tailings line at the mill will be closed. The final tailings pump will by-pass the cyclones and pump directly to the tailings thickener. Sensors will also be installed along each pipeline to monitor the space between the inner and outer pipes. If a leak is detected, the signal will be sent to the control room, and the shutdown procedures will be initiated. The surface pipelines between the mill and the tailings impoundment will be visually inspected each shift. An additional inspection will take place during scheduled maintenance shutdowns. The pipelines will be routed in a 24-foot-wide flat bottom ditch to contain any leakage from the pipelines. An unlined 6-foot-wide ditch paralleling the entire length of the road and pipelines will intercept any released tailings. Containment and surface water runoff ditches will be constructed with an earthen berm between them. This berm will ensure that in the event of a rupture of the double-walled pipe, all tailings will remain in the ditch and not come in contact with surface waters.

The pipelines will not be buried at the Ramsey Creek and Poorman Creek crossings, but will set in a lined, covered trestle adjacent to the bridge. The creek crossings will have secondary containment built into the crossings besides the double-walled pipe. The containment will be covered and drain toward a designed sump or tank system. Valves will be installed on either side of the crossings to minimize the potential quantity of tailings that could reach the creek in the event of a tailings line leak. MMC will prepare an as-built drawing showing pipeline depths. Burying the pipelines will provide better protection from vandalism, eliminate the visible presence of the pipelines, and facilitate concurrent reclamation in the pipeline corridor along most of the route between the mill and the tailings thickener plant. Two pump stations will be needed: one at the Poorman Creek crossing and one at the Ramsey Creek crossing. These pump stations will be outside of the 100-year floodplain to comply with INFS requirements. Once the pipelines are no longer needed, they will be flushed out into the tailings impoundment. They will be removed from all stream crossings and anywhere they are less than 3 feet below the surface. For other segments of the pipelines, the pipelines will be left in place. They will be cut at 0.5-mile intervals, and capped.

Thickener Facility

The thickener facility will remove water, or dewater, the tailings to a target slurry density of about 70 percent solids and deposited to achieve an average in-place tailings density of 85 pcf or greater. Water removed from the tailings will be sent to the water storage pond on the north end of the Poorman Tailings Impoundment. It is anticipated that either a high compression thickener or a deep tank thickener system will be required. A high compression thickener is basically a high rate thickener with higher sidewalls so that a higher mud level is maintained in the thickener. This produces a higher percent solids underflow, referred to as high-density slurry. The deep tank thickener has a high sidewall so that the aspect ratio of diameter to height is about 1:1. A higher mud level and residence time results in higher percent solids than the high compression thickener.

The appropriate selection will be based on a series of rheology tests (test to evaluate the physical relationship between the slurry density and size/material type of the pipe to determine the "pumpability" of the slurry) using representative tailings samples. The number of thickeners will depend on the test results coupled with the production rate. The plant will be expanded in stages to accommodate the increasing tailings production rate over time (from 12,500 to 20,000 tons of tailings per day). The water removed from the tailings slurry will be routed to the storage pond in the impoundment and then returned to the mill as make-up water.

The area required for the facility will depend on final design and arrangement of the thickeners. An area up to 300 feet by 200 feet will be located above the impoundment area. The main building and any exterior thickeners/facilities will be painted to help reduce visual impacts. Vegetation surrounding the thickener plant will be retained or planted to help visually blend the plant site with adjacent hillsides. The thickener plant will be designed to receive, dewater, and pump up to 20,000 tons of tailings per day.

Pumping and Deposition

The selection of pumping equipment will depend largely on the type of thickener selected, the pumping pressures required, and rheology of the tailings. Either centrifugal pumps or positive displacement pumps likely will be required. The selection will be determined as part of final design studies.

Initially, the high-density slurry will be applied to the ground surface from the crest of the Starter Dam and initial raises of the Main Dam, and retained by a Starter Dam and subsequent Main Dam. Deposition from the dam crest will continue through about Year 5 of operation to establish a back slope for the upstream side of the sand dam and a contact with the tailings slurry. After about Year 5, the thickened tailings will be deposited to the ground from multiple points upslope of the tailings impoundment area to form several mounds of tailings. As tailings deposition continues, the slope of the mounded tailings will overlap and migrate down into the impoundment area. The thickened tailings will form a surface at about a 3 to 5 percent gradient to create a slope of tailings graded down into the impoundment area. The mass of tailings deposited to form the slope will be balanced with the tailings volume within the impoundment area so as not to exceed the height of the Main Dam and provide adequate solution and stormwater management capacity within the impoundment area. The last year or two of operation, tailings will be deposited to facilitate final closure of the facility with surface water drainage reporting to the northern corner of the impoundment. Distribution pipelines around the impoundment will be surface mounted for maintenance and operation purposes.

Dust Control at Impoundment

The DEQ's Supplement Preliminary Determination has specific requirements for tailings dust management. Spigots distributing wet tailings material and water will cover about one-half of the total tailings at any time. The spigots will be moved regularly and will cause wetting of all non-submerged portions of the tailings impoundment to occur each day. This wetting will be supplemented by sprinklers as necessary when weather conditions could exist to cause fugitive dust. MMC will implement the Fugitive Dust Control Plan throughout operations. At closure, MMC will maintain wind erosion control during the interim period after the end of active tailings deposition and before final reclamation of the site. Any revisions to these requirements in the final air quality permit will be implemented.

1.1.3.3.2 Main Dam

The Main Dam will be a compacted cyclone sand dam constructed by the centerline method to an elevation of 3,664 feet. A crest width of 70 feet is used to account for the upstream slope of the sand deposition and working crest area for the cyclone towers. The downstream slope is set at 2.75H:1V and will be buttressed by a Rock Toe Berm described above. Based on the height and position of the Rock Toe Berm, the vertical height of the Main Dam will be 230 feet above the Rock Toe Berm crest. The final crest length will be 10,300 feet, and the main north-south axis will be 5,000 feet long. The left and right abutment sections will be both angled back at about 75 degrees from the main section centerline and tie into the existing ground at the crest elevation. The dam will be raised with cyclone underflow sand hydraulically placed and compacted in cells. The cyclone overflow (fine tailings fraction) will be routed to the tailings thickener plant and combined with the primary thickener underflow and thickened to a target density of 70 percent solids. The density will be determined during final design.

The dam will be raised using up to 30 million tons of cyclone underflow (sand tailings) hydraulically placed and compacted in cells. The cyclone overflow (fine tailings) will be discharged in the impoundment to form a tailings beach on the dam face, forcing water away from the dam. If necessary, mine waste rock will be used in dam construction to supplement the volume of cycloned sands.

The sand shell of the dam will be constructed by hydraulic sluicing of the sand into cells oriented parallel to the dam crest. Dikes of sand pushed up by bulldozers will confine the perimeter of the cells. The cells will range between 100 feet to 150 feet wide, up to 400 feet long, and a maximum of 3 feet thick. Cell construction will begin at the toe of the dam and progress back and forth across the dam face until the downstream slice reaches the dam crest. For each year of construction, sand placement will start at the downstream toe of the dam and be raised up the dam slope to the required crest elevation. Because the final crest elevation will not be achieved until October at the end of each season, each year's dam raise will provide the required storage needed until October of the following year. This will ensure that adequate dam freeboard and tailings storage capacity will be available at all times.

A collection system will be installed at the downstream end of the cells to decant the runoff water and segregated finer tailings out of the cells. The outflow will be carried in a pipeline to the dam toe where the fines will be settled in the Seepage Collection Pond, before pumping the water back the tailings facility. When the sand built up at the discharge end of the cells to between 10 feet to 15 feet, the cell deposition will be advanced along the dam slope. The cycle will be repeated when the full length of the dam had been raised 10 feet to 15 feet.

1.1.3.4 Water Use and Management

1.1.3.4.1 Project Water Requirements

MMC will maintain a detailed water balance that will be used to monitor water use. Actual volumes for water balance variables (e.g., mine and adit inflows, precipitation and evaporation, and dust suppression) will vary seasonally and annually from the volumes shown in Table 6. Mine and adit water will not be used beneficially in any phase, and will be treated and discharged from the Water Treatment Plant during all phases. In all phases except the Evaluation Phase when water is used beneficially, water will be discharged whenever flow in Libby Creek at LB-2000 is less than 40 cfs. The capacity of the existing Water Treatment Plant will be expanded to accommodate operational discharges (see section 1.1.3.4.3, *Water Treatment*). Diversions from

Libby Creek will be necessary to provide adequate water for project use. Section 1.1.3.4.2, *Water Rights*, discusses appropriations and discharges associated with water rights.

Using thickened tailings may affect the ability to use the impoundment as a reservoir to maintain a water balance. In final design, MMC will re-evaluate the water balance and the tailings deposition plan. Several options for water storage will be available. One option will use the drainage in the northern end of the impoundment area as a dedicated water storage area and readjust the dam alignment and deposition plan. If chosen, during the final few years of operation, the dedicated water storage area may be infilled if needed as part of final tailings deposition and contouring for reclamation. Preliminary evaluation of this option indicates that this may be possible with only minor changes to the layout and site development. A second option will be to use the Seepage Collection Pond for excess water storage. A third option will be to use one or more borrow areas for storage. The water balance assumes that all collected water will be returned to the impoundment and no water storage will occur in the Seepage Collection Pond.

1.1.3.4.2 Water Rights

MMC submitted four beneficial water use permit applications to the DNRC for the use of surface water and groundwater associated with the project (MMC 2012a). One application was subsequently withdrawn and two applications were modified. If permitted, the three rights will be in addition to MMC's two existing surface water rights and one groundwater right in Libby Creek. The three permit applications are summarized in Table 7.

Table 6. Average Water Balance.

Phase—>	Evaluation Phase 2 Years		Construction Phase 3 Years			Operations Phase 1st 5 Years	Operations Phase 2nd 5 Years	Operations Phase 3rd 5 Years	Closure Phase 1st 5 Years	Post-Closure Phase 2nd 5 Years
Project Year—>	Project Year 1	Project Year 2	Project Year 3	Project Year 4	Project Year 5	Project Years 6-10	Project Years 11-15	Project Years 16-24	Project Years 25-29	Project Years 30-35
Production Rate—>	0 tpd	0 tpd	0 tpd	0 tpd	0 tpd	12,500 tpd	17,000 tpd	20,000 tpd	0 tpd	0 tpd
Component	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)
Mine and Adit Flow										
Adit inflow	230	230	340	395	450	270	270	200	135	0
Mine inflow	30	30	30	30	30	110	110	170	0	0
Total flow	**260**	**260**	**370**	**425**	**480**	**380**	**380**	**370**	**135**	**0**
Water Treatment Plant										
Inflows - mine and adit flows	260	260	370	425	480	380	380	370	135	0
Runoff from Libby Adit waste rock stockpile	3	3	0	0	0	0	0	0	0	0
Water from tailings impoundment seepage/runoff collection	0	0	98	75	20	0	0	0	405	270
Mitigation water from impoundment during low flow (August-March) ‡								**395**		
Water treatment plant discharge †	**263**	**263**	**468**	**500**	**500**	**380**	**380**	**765**	**540**	**270**
Mill Inflow										
Flows from mine/adit	0	0	0	0	0	0	0	0	0	0
Water from tailings impoundment seepage/runoff collection	0	0	0	0	0	498	815	1,044	0	0
Make-up water from Libby Creek alluvium stored in tailings impoundment‡	0	0	0	0	0	380	380	370	0	0
Subtotal	**0**	**0**	**0**	**0**	**0**	**878**	**1,195**	**1,414**	**0**	**0**
Mill Outflow										
Water transported with tailings at deposition	0	0	0	0	0	872	1,186	1,405	0	0
Water in concentrate	0	0	0	0	0	6	9	9	0	0
Subtotal	**0**	**0**	**0**	**0**	**0**	**878**	**1,195**	**1,414**	**0**	**0**
Tailings Impoundment Inflow*										
Precipitation on stored water pond	0	0	2	33	33	181	357	323	67	9
Seepage collection pond net precipitation	0	0	84	165	165	139	139	139	32	5
Runoff captured from impoundment dam/ beach/catchment area	0	0	18	24	24	212	138	162	44	0
Runoff from waste rock stockpile within impoundment	0	0	4	4	4	3	10	0	0	0

Phase—>	Evaluation Phase 2 Years		Construction Phase 3 Years			Operations Phase 1st 5 Years	Operations Phase 2nd 5 Years	Operations Phase 3rd 5 Years	Closure Phase 1st 5 Years	Post-Closure Phase 2nd 5 Years
Project Year—>	Project Year 1	Project Year 2	Project Year 3	Project Year 4	Project Year 5	Project Years 6-10	Project Years 11-15	Project Years 16-24	Project Years 25-29	Project Years 30-35
Production Rate—>	0 tpd	0 tpd	0 tpd	0 tpd	0 tpd	12,500 tpd	17,000 tpd	20,000 tpd	0 tpd	0 tpd
Component	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)
Water transported with tailings at deposition	0	0	0	0	0	872	1,186	1,405	0	0
Water released from fine tailings consolidation	0	0	0	0	0	28	101	137	102	20
Water released from sand tailings consolidation (dams)	0	0	0	0	0	133	181	214	0	0
Groundwater interception/ seepage collection	0	0	0	0	0	221	221	221	221	221
Make-up water from Libby Creek alluvium‡								765		
Subtotal	**0**	**0**	**108**	**226**	**226**	**1,789**	**2,333**	**3,366**	**466**	**255**
Tailings Impoundment Outflow*										
Dust control	0	0	5	6	6	12	24	24	6	0
Evaporation	0	0	8	45	45	216	444	423	81	10
Water retained by tailings voids	0	0	0	0	0	710	965	1,143	0	0
Water recycled to mill (to Water Treatment Plant in pre/post operations)‡§	0	0	72	75	20	498	815	1,414	405	270
Seepage to groundwater	0	0	0	0	0	15	25	25	25	25
To Water Treatment Plant during August-March‡								395		
Change in water stored in impoundment	0	0	23	100	155	338	59	(59)	(51)	(50)
Subtotal	**0**	**0**	**108**	**226**	**226**	**1,789**	**2,333**	**3,366**	**466**	**255**

gpm = gallons per minute

†Water Treatment Plant discharge rates are based on current plant capacity, which will be increased in the selected mine alternative

‡Rates of water to the impoundment and from the impoundment to Water Treatment Plant for water rights mitigation discussed in section 1.1.3.4.2, *Water Rights* were calculated for full operations

§Rates of water to Water Treatment Plant during Closure and Post-Closure phases are based on current plant capacity, which will be increased in the selected mine alternative

Table 7. Summary of MMC's Beneficial Water Use Permit Applications.

Variable	Water Source		
	Groundwater	Groundwater	Surface Water
General Description	Groundwater from pumpback wells	Groundwater from Libby Creek alluvium	Precipitation captured by impoundment
Purpose	Mining	Mining	Mining
Period of Use	1/1-12/31	4/1-7/31	1/1-12/31
Point of Diversion	Poorman Impoundment Site	Libby Creek alluvial groundwater near Poorman Impound-ment Site	Poorman Impoundment Site
Point of Use	Libby Plant Site and Poorman Impoundment Site	Libby Plant Site and Poorman Impoundment Site	Libby Plant Site and Poorman Impoundment Site
Average Flow Rate over Period of Use (gpm)	250	765	625
Maximum Flow Rate (gpm)	250	1,125	1,950
Maximum Volume (acre-feet/year)	403	410	1,038

The values shown for each water source is what MMC requested and may be different from those in any beneficial water use permit issued.
Source: MMC 2012a.

Any new water right for water use issued pursuant to Montana law for water use in the selected alternatives will be consistent with the terms of an approved Plan of Operations. An approved Plan of Operations consistent with the selected alternatives will contain the stipulation that any water right acquired solely for the purposes of mineral development in an approved Plan of Operations will terminate when the Plan of Operations terminates. MMC must request and obtain prior written approval from the KNF for any change in beneficial use or place of use of water allowed under an approved Plan of Operations or the water use allowed under an approved Plan of Operations will terminate.

MMC will create 7.5 acres of new wetlands in the Libby Creek drainage (see section 1.1.6.3, *Isolated Wetlands*). MMC will acquire a permit for the created wetlands if the DNRC determines water use for creating wetlands was a beneficial use. If water use for creating wetlands was not a beneficial use, MMC could use water for wetland creation without a beneficial water use permit protecting its right to do so. Water to create wetlands will come from precipitation on MMC and National Forest System lands and the legal availability of that water will not be at risk of appropriation by another user.

MMC will acquire a parcel along US 2 through which Swamp Creek flows for wetland and stream mitigation (see section 1.1.6.2.1, *Jurisdictional Wetlands*). Rehabilitation of the site to improve its functions as a wetland will not require a water right. The current owner of this parcel has a surface water right to flood irrigate 26 acres of hay meadow between May 1 and October

31, with a maximum diversion rate of 291.72 gpm, and maximum volume of 52 acre-feet per year. MMC will file for a change of use for this water right to an instream flow right. Any water right used for wetland mitigation will be conveyed to the Forest Service when the mitigation sites are conveyed.

Construction and Operations Phases Diversions and Discharges

MMC holds two 1902 surface water rights on Libby Creek, one for mining near the Libby Adit site in Section 15, Township 27N, Range 31W (with a maximum diversion of 44.9 gpm between April 1 and December 19, and maximum volume of 50.97 acre-feet), and one for domestic use in the same section (15 gpm year-round, and a maximum volume of 1.5 acre-feet). MMC also holds a 1989 groundwater right near the Libby Adit site in Section 15, Township 27N, Range 31W with a total diversion of 40 gpm year-round. These rights will likely be sufficient to meet anticipated potable water use and dust control.

The Forest Service has an instream water right for 40 cfs in Libby Creek at the confluence of Bear Creek with a 2007 priority date. Any new water right obtained by MMC associated with its Plan of Operations will be junior to the Forest Service right and will terminate when the Plan of Operations expires. Senior rights have an earlier priority date and claimants who hold them have a higher priority to divert water from a stream or water body than those with later, or junior rights. Consequently, MMC will divert groundwater from Libby Creek during high flows (April through July) and store it in the tailings impoundment, Seepage Collection Pond, or mine water pond at the Libby Plant Site. No appropriation will be made whenever flow at LB-2000 is less than 40 cfs. Storage of diverted water will occur during the late Construction Phase after the Starter Dam is lined and MMC begins storing water for mill startup, during the Operations Phase, and during the Closure Phase until the impoundment is dewatered for reclamation.

MMC will establish a flow gaging station at LB-2000 near the upstream point-of-diversion of the Forest Service's 40-cfs right. The gaging station will consist of a staff gage and pressure transducer. The pressure transducer will be set to collect stream stage data at 1-hour intervals and transmitted electronically to the mine office. MMC will review the transducer data daily at 9 AM and if it indicates a flow below 40 cfs, MMC will cease appropriating Libby Creek water. Site-specific flow measurements will be conducted at the gaging station for a range of low, medium, and high flow measurements to establish a rating curve for the staff gage and pressure transducer data. A specific height on the staff gage will be identified that equates to a flow of 40 cfs in Libby Creek. After initial equipment setup and verification of proper operation, the staff gage will be measured monthly, and the pressure transducer data will be downloaded monthly.

In an average precipitation year, groundwater tributary to Libby Creek will be appropriated from Libby Creek alluvium between April 1 and July 31 at an average flow rate of 765 gpm and a maximum flow rate of 1,125 gpm (410 acre-feet/year maximum volume). Water will be diverted using a subsurface infiltration gallery installed in the gravels along the west side of the Libby Creek channel. The gallery will be connected to a pumping station that will pump water in a single pipe to the Poorman tailings impoundment. Groundwater tributary to Libby Creek also will be appropriated year-round at an average and maximum flow rate of 250 gpm (403 acre-feet/year maximum volume) from the pumpback wells. Precipitation captured by the impoundment will be appropriated year-round at an average flow rate of 625 gpm and a maximum flow rate of 1,950 gpm (1,038 acre-feet/year maximum volume). (The values shown in Table 7 are what MMC requested and may be different from those in any beneficial water use permit issued.) Diverted

water will be stored in the impoundment water pond and will be pumped to the plant/mill for ore-processing make-up water.

Whenever flow in Libby Creek at LB-2000 is less than 40 cfs, stored water will be treated at the Libby Adit Water Treatment Plant, and discharged at a rate equal to all Libby Creek appropriations, including created wetlands in the Libby Creek drainage. The rates will vary, depending on actual precipitation and the total pumping rate of the pumpback wells. As part of the water balance monitoring described in Attachment 3 of the ROD, MMC will measure precipitation and evaporation at the tailings impoundment and total pumping rate of the pumpback wells to determine the appropriate rate of discharges to avoid adversely affecting senior water rights. Any water from the tailings impoundment to be treated and discharged will be mine drainage and precipitation commingled with process water. No process water will be discharged unless one of the two exemptions in the ELGs is met (40 CFR 440.104(b)(2)).

On Ramsey Creek, a senior water right holder has a 1 cfs surface water right on Ramsey Creek between RA-200 and RA-400. When the 3D model is updated after the Evaluation Phase, MMC will re-evaluate baseflow changes in Ramsey Creek. If baseflow changes in Ramsey Creek may adversely affect this right on Ramsey Creek during any mining phase, MMC will develop a plan during final design to convey treated water from the Water Treatment Plant to a location upstream of the senior water right's point of diversion (RA-300). Discharge to Ramsey Creek will equal MMC's Ramsey Creek baseflow changes whenever the flow at RA-300 is less than 1 cfs. Discharge of treated water to Ramsey Creek will require a new outfall in the MPDES permit.

Closure and Post-Closure Phases Diversions and Discharges

During operations and at closure, the three adits will be hydraulically connected to the mine void, and without plugs, water will drain toward the mine void until the void fills to the level of the adits. During the Closure Phase, MMC will place two or more plugs in each adit. The plugs will be site specifically designed both hydraulicly and technically, and will be located to isolate the adits hydraulically from the mine void and to ensure any groundwater tributary to Libby and Ramsey creeks will flow into the adits, and remain within the Libby Creek watershed. The plug locations will be determined by the agencies using the 3D groundwater model maintained and updated throughout the project. MMC will provide a plugging design and the required groundwater modeling as part of the Final Closure Plan.

Following adit plugging, water flowing into the adits will begin to refill the adits. As long as MMC appropriated or diverted water from Libby Creek whenever flow at LB-2000 is less than 40 cfs, MMC will treat, if necessary to meet MPDES permitted effluent limits, stored adit water and discharge it to Libby Creek at a rate equal to all of MMC's Libby Creek appropriations or diversions occurring at that time. Discharges to Ramsey Creek also will be required if the modeling indicated adit inflows during the Closure Phase will adversely affect the senior water right on Ramsey Creek.

After facilities are reclaimed and precipitation is no longer intercepted, appropriations or diversions from the Libby Creek watershed will be limited to adit inflows and pumping from the pumpback well system. Inflow into the adits, during the period when Libby Creek will have a flow of 40 cfs or more at LB-2000, will begin to refill the adits. Whenever flow at LB-2000 is less than 40 cfs, MMC will set a datum at the current water level in each adit. The datum will be the location of the water level in each of the adits at the time water will be required for mitigation. Through discharges, MMC will maintain water levels in each adit at that datum as long as flow in

Libby Creek at LB-2000 is less than 40 cfs. In other words, MMC will discharge from the adits so as not to increase the storage in any adit whenever mitigation is required. Discharges will cease and water levels in the adits will increase whenever flow in Libby Creek at LB-2000 is 40 cfs or more. A new datum will then be established whenever mitigation is again needed.

Before the water level in the adits reached the bedrock-colluvial interface (about 800 feet from the adit portal), MMC will place an additional plug in bedrock at the bedrock-colluvial interface and allow the adits to reach steady state hydrologic conditions. Construction of the second plug will begin when flow at LB-2000 is 40 cfs or more. A third plug will be placed at the opening of each adit. The third plug to be placed at the adit opening will be coarse rock fill intended to prevent access to the tunnel and also to prevent subsidence in the near-surface portion of the tunnel. The adit portals then will be reclaimed.

Water appropriated by the pumpback well system during the Closure and Post-closure phases will be treated and discharged at the Water Treatment Plant. After the second plug is placed in each adit, no further discharges to Libby Creek other than from the pumpback well system will be required to avoid adversely affecting senior water rights.

1.1.3.4.3 Wastewater Discharges and Water Treatment

The existing Water Treatment Plant will be used solely to treat any waters before discharge at the existing MPDES-permitted outfalls. The agencies anticipate that the Water Treatment Plant will be modified to increase capacity and as necessary to treat parameters such as nutrients or metals to meet MPDES permitted effluent limits. In 2015, MMC requested that the general variance for both total nitrogen and total phosphorus be incorporated into the MPDES permit and indicated that the facility design flow is less than 1.0 million gallons per day (mgd). In the draft renewal MPDES permit, the DEQ preliminarily granted a variance for total nitrogen of 15 mg/L, and determined that a variance for total phosphorus was not necessary because the facility did not show reasonable potential to violate this nutrient standard.. MMC will have to comply with the BHES Order limit of 1 mg/L total inorganic nitrogen. The final MPDES permit will contain DEQ’s final determination regarding the variance.

MMC’s analysis of discharges during operations indicated maximum discharges will be 1,024 gpm during an average year, and 1,178 gpm during the estimated wettest year in a 10-year period (36 inches of precipitation). A discharge of 1,178 gpm will exceed the current design capacity of the Water Treatment Plant, estimated to be 500 gpm. During final design, MMC will estimate the maximum discharge rate during the estimated wettest year in a 20-year period using best available precipitation data and modify the Water Treatment Plant such that it will have adequate capacity to treat discharges during such a year. MMC also will evaluate the size of the percolation pond at the Libby Adit, and enlarge it, if necessary, to accommodate higher flow rates. MMC will seek authorization from the DEQ to amend its MPDES permit to discharge at a higher rate than 500 gpm considered in the draft renewal MPDES permit. The increased capacity and treatment modifications will be in place at mill startup.

If MMC’s Ramsey Creek diversions adversely affects a senior right on Ramsey Creek during any mining phase, MMC will develop a plan during final design to convey treated water from the Water Treatment Plant to a location upstream of senior water right’s point of diversion. A discharge of treated water to Ramsey Creek will require a new outfall in the MPDES permit.

MMC evaluated several treatment alternatives for treating nitrogen compounds. The recommended alternative for treating nitrates and ammonia is a moving bed biofilm reactor (MBBR). In a MBBR, microorganisms grow as a biofilm on the surfaces of plastic carriers, called media, in a treatment reactor. Air is forced into the reactor, and as the media circulate through wastewater in the reactor, the microorganisms remove nitrogen compounds through biological processes. The media provide high surface area and protected interior space for growth of the microorganisms, enabling high treatment capacity in a small footprint.

Organic nitrogen treatment will be achieved by removal of the particulate fraction through solids separation via ultrafiltration. Inorganic nitrogen treatment will be a two-step process. Ammonia will be removed from water through the biological process called nitrification, which converts (oxidizes) ammonia to nitrate. Nitrates are removed through another biological process called denitrification. Microorganisms convert nitrate to inert nitrogen gas that vents from the system. With addition of a carbon energy source, the biological processes are optimized and carbon dioxide is also produced and vented with the nitrogen gas.

At the current design flow rate of 500 gpm, the MBBR system for nitrification will consist of a concrete tank about 24 feet long, 24 feet wide and up to 13 feet deep. The nitrification concrete tank will be filled about 50 percent with plastic media and supplied with forced air. An MBBR system for denitrification will be a concrete tank about 20 feet long, 24 feet wide and 10 feet deep (plus 2 to 3 feet of freeboard). The denitrification tank will be filled about 40 percent with plastic media. A carbon energy source will be added to the denitrification tank. Both tanks will be on the south side of the existing water treatment building.

The existing Water Treatment Plant uses ultrafiltration to remove metals sorbed onto particulates suspended in the water, thereby reducing total metal concentrations. The current system has been successful in treating adit discharges to concentrations less than MPDES permitted effluent limits. MMC currently samples untreated water monthly for both total and dissolved metals. MMC will continue the monitoring described in Attachment 3 of the ROD, and make appropriate modifications to the Water Treatment Plant if necessary to remove dissolved metals. Treatment technologies for dissolved metals could include the addition of chemicals to promote chelation (formation of a larger, filterable compounds) followed by the existing ultrafiltration system, or reverse osmosis.

1.1.3.4.4 Stormwater Control and Discharges

MMC will continue to discharge stormwater from all permitted stormwater outfalls unless MMC submitted and the DEQ approved a Notice of Termination. Some stormwater outfalls used during the Construction Phase may be terminated while others remain in place. MMC also will continue to maintain BMPs associated with the outfalls until the DEQ approved a Notice of Termination. MMC will implement the SWPPP until the DEQ approved a Notice of Termination for all stormwater outfalls.

Poorman Impoundment Site

Stormwater from undisturbed lands above the tailings facility will be diverted around the impoundment site toward the Poorman Creek and Little Cherry Creek drainages during mine operations, unless water was needed for mill operations. Stormwater from reclaimed areas that are not fully stabilized will be captured along with runoff from the tailings facility. Undisturbed portions of the facility will either drain into existing drainages or be diverted away from active areas, soil stockpiles, and the stormwater pond. All diversions will be sized to handle a 10-

year/24-hour storm event. The diversions will be reclaimed and permanent drainageways established when mine operations ended when the site is fully reclaimed.

Localized sediment retention structures and BMPs will be used along the downslope perimeter of the impoundment for control, sampling, and recovery of drainage from the impoundment, sediment, and stormwater runoff. These structures and collection ditches will act as stormwater diversions to channel the water and sediment from the tailings thickener facility into stormwater ponds. The EPA considers runoff from tailings dams when constructed of waste rock or tailings to be mine drainage, or, if process water if process fluids are present. MMC will design all ditches and sediment ponds that will contain process water or mine drainage for a 100-year/24-hour storm. All runoff from the tailings impoundment dam will be directed to the Seepage Collection Pond or to lined containment ponds. Water from the ponds will be returned to the impoundment and then mill for reuse. Alternative water management techniques may be identified during final design and the MPDES permitting process. Stormwater discharges from the tailings impoundment will not occur during operations.

Depending on final design, a stormwater outfall may be needed for stormwater from the soil stockpile upgradient of the tailings impoundment. Ditches and the sediment pond containing stormwater will be designed for the 10-year/24-hour storm. Infrequent discharges from the sediment pond will flow and be monitored at a MPDES permitted outfall at a Little Cherry Creek tributary, and will be required to meet applicable effluent limits.

Libby Plant Site

Surface water runoff from the Plant Site area will be directed along ditches to lined sediment ponds sized for the 10-year/24-hour storm. Water from the ponds will be pumped to the plant for makeup needs. An ore stockpile at the Plant Site will be covered so that precipitation water will not contact this material. No waste rock will be placed at the Plant Site. Stormwater discharges from the Libby Plant Site will not occur during operations.

Access Roads

The Libby Creek Road will be reconstructed during the Construction Phase and new disturbances will be revegetated after the road surface was paved. New disturbances will achieve final stabilization during the Operations Phase and permitted stormwater discharges will cease after the DEQ approved a Notice of Termination. Stormwater discharges from Outfalls 005 through 008 will likely continue during the Operation Phase.

To reduce the potential for adversely affecting water quality, MMC will use either a chemical stabilization that does not attract wildlife or groundwater appropriated using its existing water right to control dust on unpaved mine access roads and other work areas.

1.1.3.4.5 Fugitive Dust Control

Measures to control and minimize fugitive dust are provided in MMC’s Application for Air Quality Permit and will include all measures identified by the DEQ in its Supplemental Preliminary Determination on MMC’s air quality permit application. MMC will use BMPs during construction, operation, and closure to control wind and water erosion. All appropriate precautions will be taken to minimize fugitive dust from all construction and operation activities related to the project, including concentrate transfer and loading activities at the Libby Loadout. These measures will include watering or applying dust suppression agents that does not attract wildlife on unpaved roads and work areas on an as-needed basis.

Dust emissions from ore crushing, conveying, and other handling activities will be controlled with water sprays, wet Venturi scrubbers, and enclosures. Such control devices will be included on the primary crusher located underground, coarse ore conveyor transfer points, conveyor from the Libby Adit portal to mill, and the ore stockpile located adjacent to the mill facilities.

All transfer operations and storage areas at the Libby Loadout will be completely enclosed. Concentrate transported by haul truck to the loadout will be dumped in an enclosed storage bin, and then transferred to rail cars. Loaded rail cars waiting for consolidation into a unit train will be covered to prevent wind losses and water pollution. The potential accumulation of concentrate along the haul truck turn-around, at the concentrate storage area, and along the railroad tracks will be limited, and will be managed by regular clean-up with sweepers. Regular visual inspections will be completed by site personnel on reclaimed areas to evaluate where fugitive dust emission control measures are in place and properly functioning.

1.1.3.4.6 Excess Water Management

MMC will monitor flows from the mine and adits, as well as from individual fractures in the vicinity of the Rock Lake Fault and Rock Lake. If mine and adit inflows greater than 500 gpm occur for 10 days, MMC will notify the agencies on the 11th day. MMC will then implement excess water contingency plans, examples of which are described below.

If the mine void encounters substantial groundwater inflows in the vicinity of the Rock Lake Fault or Rock Lake, MMC will notify the agencies within 5 business days. “Substantial groundwater inflows in the vicinity of the Rock Lake Fault or Rock Lake” means a flow from any individual fracture within 1,000 feet of either the Rock Lake Fault or Rock Lake with total flow greater than an average of 50 gpm over a 24-hour period. The agencies will evaluate the inflow data and direct MMC to take appropriate actions. MMC will then evaluate the possible effect to Rock Creek and Rock Lake and provide an evaluation report to the agencies within 30 days after initial agency notification.

Underground Water Management - Grouting

The bedrock encountered by the adits and mine will have low permeability. Several large faults and many smaller fractures, capable of storing and transmitting groundwater, will be encountered during mine development. To reduce the amount of water entering the adits and mining areas, MMC will grout areas where water is flowing into the adits and mine workings. Drilling will occur ahead of drift development to allow identification of potential inflows. Grouting will be used as the primary mechanism to reduce adit and mine inflows.

Tailings Impoundment Storage

An estimated 71 million gallons of water (220 acre-feet) will be required to initiate mill operations, and MMC plans to slowly build this water inventory during construction activities. The lined Starter Dam will be designed to hold the required amount of water for mill startup. During Starter Dam construction, a temporary water retention structure upstream from the Starter Dam will be constructed to hold water temporarily until the Starter Dam is complete. Once the tailings facility is in full operation, MMC expects the impoundment will have ample storage capacity to hold excess water.

Temporary Diversions

Temporary diversion ditches within the tailings impoundment will be used to control water from undisturbed areas. In the event of surplus water, MMC will divert water collected by the

temporary diversion ditches within the tailings impoundment, but above the expanding tailings pond. These ditches will divert surface runoff from undisturbed lands within the tailings impoundment perimeter toward the Poorman Creek and Little Cherry Creek drainages, thereby reducing the amount of water entering the tailings impoundment.

Enhanced Evaporation, Infiltration, and Dust Control

Enhanced evaporation will be accomplished by spraying within the tailings impoundment. Managing water through a sprinkling system will result in substantial evaporation during certain periods of the year. MMC plans to use water to control dust from the tailings beaches. This will consume/evaporate a portion of the water generated from the project.

1.1.3.5 Waste Management

MMC will submit plans and specifications for public water supply wells, as well as plans for construction of a sanitary waste treatment facility to the DEQ for approval. During the Evaluation and Construction Phases, MMC will use an on-site sewage treatment and disposal system at the Libby Adit Site. The system consists of the four components: four 1,000-gallon septic tanks; a two-pod treatment unit and combination recirculation tank/drainfield dosing tank; effluent distribution system; and infiltrator trenches. Expected discharge is 585 gallons per day (Geomatrix 2010a). During operations, MMC will use a similar system consisting of septic tanks for primary treatment, followed by discharge to the tailings impoundment for final disposal. The effluent from the septic tanks will be disinfected before pumping to the impoundment. Disinfection will be by chlorination, ozonation, or ultraviolet light. This step will disinfect the effluent to reduce the number of microorganisms and eliminate potential hazards due to human exposure of the water in the impoundment. Disinfection will be conducted as the effluent water is pumped from the septic tanks to the impoundment. Expected discharge is 6,100 gallons per day; a rate of 7,000 gallons per day is used for design purposes. Sanitary waste management after the impoundment is no longer available for final disposal will be determined in the final closure plan.

Solid waste (excluding domestic/sanitary) will be transported off site to the Lincoln County landfill. MMC anticipates that no hazardous wastes will be generated by the operation. MMC will manage and dispose of any hazardous waste in accordance with applicable federal and state regulations. 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. No wastes other than waste rock will be buried underground in mined-out areas. Reinforced concrete foundation materials may be buried on National Forest System lands under the following conditions:

- The concrete must be free from contaminants, such as petroleum products.
- 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.).
- 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 is cut flush with the individual sections.

- The concrete will be buried with a minimum of 4 feet of glacial borrow material graded in a manner that will not concentrate surface water runoff or allow water to pond.
- If new federal regulations prohibit burying of any materials at time of mine reclamation and closure, all materials will be hauled off-site.
- 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.

1.1.3.6 Communications

Communications for the project will be provided by both a telephone system and a two-radio system. Telephone and data communications will be via new, buried utilities (the 34.5-kV electric line) along the Libby Creek Road and the Libby Plant Access Road from Libby if MMC acquired easements for its construction across State and private land on the Libby Creek Road. Telephone and data communications will parallel the 34.5-kV electric line along the Bear Creek Road if used for the 34.5-kV line. Telephone and data communications will be placed on the 230-kV transmission line structures if easements cannot be acquired on either road. MMC currently has radio communications to the Libby Adit Site and will use this system for secondary emergency communications. MMC is currently allowed to use the local county emergency radio system to communicate with emergency responders. In addition, a fiber optic line will be included on the transmission line and will provide communications between the substations. No additional disturbance will be required for any of the communication systems for the project.

1.1.3.7 Project Employment

Much of the construction work will be equipment and specialty services required for project development. Each vendor or supplier may have a local distributor or hire local construction employees to assist in the installation or construction of their particular piece of the project. MMC expects up to 80 percent of the construction workers will be hired locally. MMC is committed to local hire and will encourage contractors to use local hire where possible, including partnerships with local businesses. MMC will work with local job services and educational institutions to outline the types of jobs and skills necessary for training purposes.

1.1.4 Temporary Cessation of Operations

Although a temporary cessation of operations is not planned, uncontrollable circumstances may cause a short-term stoppage in operations. Temporary cessation of operations refers to the suspension of ore processing and/or mining for an anticipated period of up to 1 year. Major steps to be undertaken will include the following:

- Continuing mine dewatering
- Maintaining water management (including treatment, etc.)
- Maintaining all monitoring activities
- Clearing and repairing site drainage and sedimentation control structures to ensure proper runoff and sedimentation control over a sustained period of time
- Contouring and seeding areas susceptible to erosion

- Securing monitoring wells, pumps, and intake structures to prevent equipment damage
- Maintaining access roads to insure project access
- Inspecting, repairing, or replacing signs and fencing around the property
- Implementing facility inspections
- Controlling noxious weeds
- Continuing dust suppression activities on the tailings beach and dam face

MMC will maintain the operation so that startup may be initiated quickly when the situation causing the temporary closure is eliminated. Staffing levels may be reduced to levels necessary but will provide staffing and coverage properly to maintain the facilities and permit. MMC will notify the lead agencies 30 days before any project startup. If the temporary closures are required for an extended period of time (greater than 1 year), MMC will meet with the lead agencies to discuss the project and issues that should be addressed in a temporary closure plan. MMC will submit the temporary closure plan that will outline the specific activities necessary to provide interim protection of resources.

After 5 years of any cessation of mine development or operation, for reasons other than litigation, KNF will consult with MMC, DEQ, USFWS, Corps, tribal representatives, and other interested agencies on interim or final reclamation plans to be implemented as outlined in the selected mine and transmission line alternatives , and the timeframes for implementation.

1.1.5 Closure and Post-Closure Phases

1.1.5.1 Closure and Reclamation of Project Facilities

MMC will develop final regrading plans for each facility to reduce visual impacts of reclaimed mine facilities. These plans will require the agencies' approval before implementation. At the end of operations, any waste rock not used in construction will be either placed back underground or used in regrading the tailings impoundment. MMC will develop plans to shape slopes of the Libby Plant Site, mine portal areas, and Libby Adit Site to closely resemble the surrounding landscape. Final grading will involve regrading and shaping flat surfaces to blend with the adjacent landscape and have natural dendritic drainages. Additional fill will be used as necessary to create smooth transitions between human-made and natural landforms.

1.1.5.1.1 Underground Mine

No solid wastes other than waste rock will be buried underground in mined-out areas.

1.1.5.1.2 Rock Lake Ventilation Adit

The Rock Lake Ventilation Adit will be plugged with concrete and any surface disturbance regraded. The adit location is steep and is mostly bare rock; salvaging and replacing soil will not be feasible. If the site has salvageable soil and it can be safely removed, it will be salvaged and seeded. At closure, soil will be replaced and the area reseeded.

1.1.5.1.3 Libby Adit Site

The DEQ currently holds a reclamation bond to cover reclamation of 11.6 acres at the Libby Adit Site, including plugging the existing adit, associated with its approval of revision 06-002. Reclamation of the Libby Adit Site will follow procedures described for the Plant Site. All

structures will be removed, and above- and below-grade features will be resloped. The water well will be plugged in accordance with state regulations and all surface piping will be removed to below the ground surface. Internal roads and parking areas will be graded to blend in with the original slope and revegetated using seeding and mulch. Portal openings will be covered with material from the patio and graded to meet adjacent topography. The remaining portal patio area will be regraded to blend with the adjacent topography and promote runoff away from the disturbed area. The slopes will be graded to 2H:1V slope. All portal areas will be soiled and seeded. The sediment control structure located below the portal patio will be regraded so it will not retain runoff once vegetation is established on this area.

Because the Libby Adit Site is on private land, MMC will maintain control of the property with a fence after mining is complete. The agencies will require a bond for long-term monitoring and maintenance, and possible long-term, post-closure water treatment in order to ensure ground and surface waters will be protected from unanticipated impacts.

MMC will place two or more plugs in each of the three mine adits. The plugs will be located to isolate the adits hydraulically from the mine void and to ensure groundwater from Libby and Ramsey creeks will not flow into the mine void. The plugs are described in section 1.1.3.4.2, *Water Rights*. If necessary to minimize post-mining changes to the streamflow in East Fork Rock Creek and East Fork Bull River, MMC will construct concrete bulkheads in access openings in any barrier pillar left within the mine void. Barrier pillars are discussed in section 1.1.3.1, *Mining*.

1.1.5.1.4 Libby Plant Site

The mill building, conveyors, bridges, administration offices, substations, and other facilities associated with this area will be dismantled and removed once they are no longer required to support mine operations or closure activities. Plant Site facilities will be removed, sold, scrapped, or disposed locally off of National Forest System lands. Concrete foundations may be broken up and buried on-site in accordance with the Forest Service policy regarding solid waste disposal discussed in section 1.1.3.5, *Waste Management*.

The Plant Site will be constructed using a cut and fill sequence. Once all the buildings are removed, a portion of the fill material used to construct the mill site will be “pulled” back up the slope and placed into the cut side of the area. If the cut slopes are not stabilized by interim reclamation at plant closure, the slopes will be reduced to a 2H:1V slope, soiled, and seeded. Internal roads and parking areas will be graded to blend in with the final slope and revegetated using seeding and mulch.

1.1.5.1.5 Poorman Tailings Impoundment and Borrow Areas

As part of reclamation, all surface facilities will be removed from the site. Facilities at the impoundment site will be removed, sold, scrapped, or disposed locally off of National Forest System lands. Concrete foundations may be broken up and buried on-site in accordance with the Forest Service policy regarding solid waste disposal discussed in section 1.1.3.5, *Waste Management*.

At closure, the tailings will continue to settle as the tailings consolidate, forcing some of the entrained water in the tailings mass to the surface. Dewatering activities will be implemented to remove this water while incrementally placing the reclamation cover as dewatering activities progress. MMC will survey tailings settlement at closure on a 100-foot by 100-foot grid to document settlement. The area will be surveyed after borrow material used for fill is placed to

create final reclamation gradients, and again after soil placement to ensure runoff gradients are achieved and soil thicknesses are met. Rocky borrow and geotextile will be needed for construction equipment to work on the tailings surface. MMC will use rocky borrow from within the disturbance area to provide erosion protection and to minimize potential gully formation at the tailings dam crest. Borrow material volumes will be determined during final design. An estimated average of 4 feet of fill will be needed to create the final grade needed before soil is placed on the tailings impoundment surface. The fill will either be excavated from within the impoundment footprint during impoundment and dam construction or excavated from borrow areas. It will take up to 20 years for settling and consolidation to stop and to complete the entire cover on the tailings impoundment surface.

MMC will develop a design to recontour faces of the tailings impoundment dams to closely blend with the surrounding landscape. Sand deposition will be varied during final cycloning and placement of sand on the dams. This design will incorporate additional rocky borrow at selected locations on the dam face and use benches in some locations. Islands of trees and shrubs will be planted in the rocky areas. The seed mixture on the dam face will vary to reduce uniformity of the revegetated dam.

Deposition of the tailings at closure will produce a final surface that will drain toward an unnamed tributary of Little Cherry Creek. Once all water from the tailings surface in the northern area of the impoundment had been removed (evaporated, or treated, if necessary, and discharged), and the near surface tailings had stabilized for equipment access, a channel will be excavated through the tailings and Saddle Dam abutment to route runoff from the site toward a tributary of Little Cherry Creek. The channel will be routed at no greater than 1 percent slope and along an alignment requiring the shallowest depth of tailings to be excavated down to the channel grade. The side slopes will be designed to a stable slope and covered with coarse rock to prevent erosion. As part of the final closure plan, MMC will complete a hydraulic and hydrologic (H&H) analysis of the runoff channel during final design, and submit it to the lead agencies and the Corps for approval. The H&H analysis will include a channel stability analysis and a sediment transport assessment. Based on the analysis, modifications to the final channel design will be made and minor modifications to the upper reaches of the tributary of Little Cherry Creek may be needed to minimize effects on channel stability in the tributary of Little Cherry Creek and to avoid allowing water to pond on the surface of the reclaimed tailings. Other drainage alternatives for the surface of the reclaimed tailings impoundment that protect against erosion but also provide aquatic habitat may be developed with agency approval.

Water will not flow toward Little Cherry Creek as long as water was needed for water rights mitigation, described in section 1.1.3.4.2, *Water Rights*. A stormwater/sediment retention pond will be built on the impoundment surface near the Saddle Dam that will be designed to contain the 10-year/24-hour storm, or an estimated 40 million gallons of water.

1.1.5.1.6 Borrow Areas

The borrow areas will remain until the impoundment reclamation plan is completely implemented to ensure no fill material is required. The borrow area slopes will be reduced to at least a 2H:1V slope and graded to ensure stormwater does not leave the borrow area. The bottom of the borrow pit will be ripped to reduce water retention. Once the areas are no longer needed, the areas will be covered with soil and reseeded.

1.1.5.1.7 Post-Closure Water Management

MMC will operate the seepage collection and the pumpback well systems until groundwater adjacent to the reclaimed impoundment meets Board of Health and Environmental Sciences (BHES) Order limits or applicable nondegradation criteria without additional treatment. The Seepage Collection Pond and mill pond at the Libby Plant Site also will remain in place. Long-term treatment through the water treatment plant may be required if BHES Order limits or nonsignificance criteria are not met. The length of time these closure activities will occur is not known, but may be decades or more. Following removal of the Seepage Collection Dam, the disturbed area will be graded to blend with the original slope. After BHES Order limits or applicable nonsignificance criteria are met, seepage from the underdrains and seepage not intercepted by the underdrains will flow to Libby Creek.

Following cessation of mining, the tailings impoundment will be partitioned to provide an area for water storage. The water level within the tailings will be lowered so construction equipment can work on the surface. Dewatering the top few feet of tailings will be accomplished by promoting natural drying and evaporation. MMC anticipates some difficulty in dewatering the tailings in the center portion of the tailings impoundment surface containing the fine tailings. The tailings in this area will have low bearing capacity. Subgrade reinforcement, such as a geotextile, may be needed for construction equipment to work on the tailings surface.

Seepage through the tailings dams will continue following reclamation. The seepage collection system will remain in place. Seepage to the underdrain system is expected to decrease from 930 gpm to 200 gpm 10 years after closure, reaching a steady state rate of 50 to 100 gpm over a longer period. Seepage collected in the pond will be pumped to the tailings impoundment where it will evaporate, be distributed to the Water Treatment Plant, if necessary, or be used to irrigate reclaimed areas. Seepage from the tailings not collected by the underdrain system is estimated to decrease from 25 gpm during operations, and 22 gpm at closure, to 17 gpm in the first 10 years after closure, and stabilizing at 5 gpm over the long term. The seepage will mix with the underlying groundwater and be intercepted by the pumpback well system, if required to comply with applicable standards. MMC will operate the seepage collection and the pumpback well systems until seepage from the underdrain system and groundwater adjacent to the reclaimed impoundment meets BHES Order limits or applicable nondegradation criteria without additional treatment. Long-term treatment may be required if BHES Order limits or nonsignificance criteria are not met. The length of time these closure activities will occur is not known, but may be decades or more.

Following removal, the Seepage Collection Dam and Pond will be graded to blend in with the original slope. After BHES Order limits or applicable nondegradation criteria are met and the Seepage Collection Dam and Pond is removed, seepage from the underdrain system will flow down the former Little Cherry Creek drainage to Libby Creek. Seepage not intercepted by the underdrain system will mix with underlying groundwater and flow to the former Little Cherry Creek or Libby Creek.

1.1.5.1.8 Roads

The general road reclamation approach will be as follows:

- Libby Creek Road – The Libby Creek access road (NFS road #231), from US 2 to south of the tailings impoundment, will not be returned to its pre-mine width and the roadway will remain 26 feet wide. Cut-and-fill slopes associated with widening the Libby Creek access road will be reclaimed immediately following any reconstruction or road improvements.
- New Roads – All new roads constructed for the project will be reclaimed, which includes grading to match the adjacent topography, obliterating the road prism. This will include all roads constructed for the project.
- Open Roads – Reclamation of open roads upgraded for operations previously open to the public use will be completed to allow the road to be retained and used in a manner consistent with the pre-operational conditions. The surface will be bladed and sediment control systems inspected and replaced, as necessary.
- Currently Gated or Barriered Roads – All currently gated or barriered roads will be decommissioned by using a variety of treatment methods to achieve desired conditions for other resources. Mine related roads that will be closed within the Poorman Impoundment disturbance area are NFS roads 5181, 5181A, 5185, 5185A, 5187, 6201, 6201A, 6212, 6212H, 6212L, 6212M, 6212P, and 14404; road 14403 within the Libby Creek Plant site disturbance area; and road 5170, a spur off of the Poorman Creek road #2317 located south of the impoundment.

Available soil will be salvaged from disturbed areas and redistributed on fill and cut slopes where possible. Where soils are not salvaged during road construction, the road surface will be scarified and prepared for seeding. Soil will not be respread on cut slopes in consolidated material. Resoiled slopes will be broadcast seeded or hydroseeded with the planned seed mixture, dozer tracked where possible, and fertilized and mulched as necessary. Planting of trees and bareroot shrubs is not planned for roads not completely obliterated. MMC will inspect sediment control features and repair or replace controls as needed.

1.1.5.1.9 Monitoring and Potable Water Supply Wells

Any monitoring well used by MMC for monitoring during any project phase will be plugged and abandoned according to ARM 36.21.810 when it is no longer needed for monitoring. Any potable water supply well on National Forest System lands will be plugged and abandoned according to ARM 36.21.810. The well casing will be removed to below the ground surface, and the well covers removed and disposed off-site. The area associated with all abandoned wells will be regraded to blend with the natural surroundings. The area will be ripped if appropriate and revegetated with in accordance with the revegetation plan.

1.1.5.2 Revegetation

1.1.5.2.1 Revegetation Success/Bond Release Criteria

MMC and the lead agencies will establish disturbed/reclaimed control sites for the project before operations. These sites will be based on previous disturbances and be close as possible to the mine area. MMC will develop a vegetation monitoring plan from these sites and collect vegetation data during the mine life. This information will be used to validate the release criteria numbers with respect to minimum cover requirements, tree/shrub density, weeds, and other provisions preliminarily set in the EIS. The intent is to provide long-term site-specific data to support the release criteria established for the project. The monitoring plan will be approved by the lead agencies and will require the report be submitted annually or as outlined in the plan or as

approved by the lead agencies. Monitoring will continue for 20 years after planting or seeding to ensure revegetation requirements are met, or less if the reclamation portion of the bond is released by the lead agencies before this period expired.

The following criteria for all reclaimed areas, including the transmission line right-of-way and access roads, will be used to determine revegetation success and bond release. Minimum vegetation cover will be 80 percent of the disturbed/reclaimed control site total cover. If the required minimum cover is not obtained, MMC will implement remedial action such as reseeding with a modified seed mixture, mulching, fertilizer, or other changes to address the issue. If after two remedial attempts the particular site still does not meet the minimum vegetative cover standard but meets 80 percent of the average of selected disturbed/reclaimed control sites, does not exhibit rills or gullies, and meets the weed standard, the portion of the reclamation bond will be released. If the site continues to fail to meet the cover requirement, a third remedial effort, approved by the lead agencies, will be applied. If the standard still is not met but the site has 70 percent of the disturbed/reclaimed control cover and does not exhibit rills and gullies and meets the weed standard, the portion of the reclamation bond attributed to revegetation success will be released.

Category 1, 2, and 3 noxious weed species cover will have less than or equal to the cover of noxious weed species present on agency-approved disturbed/reclaimed control sites in the area. Category 2 and 3 (new invaders and potential invaders) are described in the latest edition of the KNF Noxious Weed Handbook. A minimum of 400 trees and 200 shrubs per acre will be living after 15 years (density may be lower in some areas where no trees or shrubs are planted, such as herbaceous wetlands and meadows).

1.1.5.2.2 Seed Mixture

Al seed mixes will be composed of local native seed from the Forest Service Coeur d'Alene Nursery or the Kootenai Seed Mix. MMC will select seed mixes to be compatible with dry and moist forest conditions. On dry south-facing slopes, a seed mix with more aggressive plant species able to establish under harsh conditions will be used, while in moist areas, the aggressive species will be avoided. Native seed mixes will have the ability to be updated in conjunction with ongoing research and as more information becomes available, or as directed by the lead agencies.

In the selected mine alternative, MMC will not use the species shown in Table 8, and will replace them with native species. In the event native species are not establishing rapidly enough to control invasive plants, MMC will submit an alternative seed mixture to the lead agencies for approval. The alternative mixture may include non-native species meet the overall goals and

Table 8. Introduced Species Not Used in Seed Mixes.

Revegetation Mixture 1	Revegetation Mixture 2
Redtop (*Agrostis gigantea*)	Redtop (*Agrostis gigantea*)
Meadow foxtail (*Alopecurus pratensis*)	Orchardgrass (*Dactylis glomerata*)
Tall fescue (*Festuca arundinacea*)	Canada bluegrass (*Poa compressa*)
Timothy (*Phleum pratense*)	White clover (*Trifolium repens*)
White clover (*Trifolium repens*)	

Introduced species will be replaced with native species to the extent native species are commercially available.

objectives of the reclamation plan. MMC will conduct seeding between September 15 and October 31, or between April 1 and June 15. All areas will be seeded with the permanent seed mix. Any change in the seeding schedule will be approved by the lead agencies.

1.1.5.2.3 Soil Replacement and Handling

MMC will replace soils in all disturbed areas, with the exception of soil stockpiles and cut slopes in consolidated material. Where redistributed soils cover non-native material, the replaced soil depth will average 24 inches using two lifts, including over the entire tailings impoundment. Soils replacement depths at other disturbances where soil is to be replaced, except road disturbances, will be 18 inches and will be applied in two lifts. If MMC demonstrated through test plots that site-specific soils will provide sufficient root zone and revegetation success with thinner soil replacement, the replaced soil thickness may be reduced with the lead agencies' approval.

Soils in the impoundment area will be replaced based on soil erodibility and slope steepness. For example, the least erodible colluvial/glacial soils having the greatest rock fragment content for both first lift and second lift soils, will be used on the impoundment face to minimize erosion potential. The soils with the greatest erodibility, primarily glaciolacustrine soils, will be used on slopes less than 8 percent, such as the relatively flat tailings impoundment surface. Soil salvage and redistribution will occur throughout the life of the mine operation. Soils should be handled and worked at the minimal moisture content to reduce the risk of compaction and tire rutting.

Disturbed areas, such as parking areas, roads, adit portal areas, and building sites will be ripped to 18 inches deep with dozer ripping teeth before soil replacement to reduce any root zone barriers due to compaction and to facilitate stormwater infiltration after reclamation. Any disturbed area to be seeded will be scarified to a depth of 6 to 12 inches before seeding for best seed establishment. All disturbed areas will be seeded, fertilized, and mulched as necessary. Where soil fertility may be low and tilth poor, organic matter (weed-free agencies-approved wood-based compost) will be incorporated into respread soils before planting. All permanent cut and fill slopes on roads will be seeded, fertilized, and stabilized with hydromulch, netting, or by other methods.

Reclamation equipment will be worked along contours where possible to minimize creation of erosion channels. Crawler tracking or dragging will be used when work on slopes must be perpendicular to contours. Windrows of woody debris or logs will be placed parallel to slope contours and the bases of long fills. Reclaimed sites will be inspected periodically throughout the reclamation effort to assess progress toward meeting reclamation objectives. Slopes will be visually inspected for rills, gullies, and slope failures and repaired as needed.

1.1.5.2.4 Planting

Seeding rates are designed to average 90 to 100 live seeds per square foot for drill seeding and roughly twice that for the broadcast seeding. Drill seeding will occur on slopes of 33 percent or less. Rocky slopes, areas where organic debris had been spread, or slopes greater than 33 percent will be broadcast or hydroseeded.

On slopes of 33 percent or less, the seedbed will be disced and harrowed. After seeding, straw mulch will be applied at 0.5 to 1.5 tons per acre and anchored with a straw crimper. Some hydroseeded areas of slopes steeper than 33 percent will be mulched with a cellulose fiber mulch and a tackifier. Fertilizer application rates will be based on soil tests; phosphorus fertilizer will be applied before seeding; and nitrogen fertilizer will be applied in growing seasons after seeding.

Tree and shrub seedlings will be planted in selected areas of the Libby Plant Site, the Libby Adit Site, and the tailings impoundment. Shrubs and trees will not be planted on soil stockpile sites, portal patios, or along road corridors. Seedlings will be planted either continuously in strips on steeper slopes or in highly visible areas, or in randomly placed groupings on level to gently sloping areas. Containerized seedlings will be used when available. When bareroot stock is used, planting densities will be increased by 10 to 15 percent, depending on planting success of containerized stock versus bareroot stock. MMC will plant sufficient trees and shrubs to achieve 400 trees and 200 shrubs per acre 15 years after planting. To help prevent noxious weed establishment, MMC will plant trees and shrubs randomly by hand unless safety issues require machine planting. MMC will mulch around planted trees and shrubs, and control weeds adjacent to trees and shrubs, but apply native seed elsewhere. If noxious weeds colonized planting areas, and weed control with herbicides is necessary, trees will likely be lost. MMC will use an agencies-approved wood-based compost to promote fungi-based communities and tree growth rather than straw or manure based compost that promotes bacteria-based grassland communities.

Mycorrhizae, which are structures in the soil important in maximizing plant establishment and productivity, especially for woody plants, are eliminated in soil stored for prolonged periods. In reclaimed areas where trees will be planted, an agencies-approved wood-based compost will be incorporated into the upper 6 inches of respread soil that had been stored for prolonged periods to promote the rebuilding of mycorrhizae in the soil, and/or inoculated tree-planting stock with the appropriate mycorrhizal fungi will be used, or mycorrhizal fungi will be incorporated into the soil as pellets during seeding. Additional nitrogen fertilizer may be needed to compensate for wood-based mulch.

1.1.5.2.5 Organic Amendments

MMC will amend the top 0 to 4 inches of soil before seeding with an agencies-approved wood-based organic amendment to raise the organic matter level in the soil to a minimum of 1 percent by volume.

1.1.6 Mitigation Plans

1.1.6.1 Grizzly Bear, Lynx, and Bull Trout

The mitigation plans for grizzly bear, lynx and bull trout are presented in Attachment 4 of the ROD. The plans are modified by the terms and conditions of the USFWS Biological Opinions presented in Attachments and 6 of the ROD. MMC will implement the Forest Service’s mitigation plans as modified by the terms and conditions of the USFWS BOs. The grizzly bear mitigation plan includes access road changes shown in Figure 5 of the ROD.

1.1.6.2 Jurisdictional Wetlands and Other Waters of the U.S.

The objective of the compensatory mitigation plan for jurisdictional wetlands and other waters of the U.S. is to offset unavoidable adverse impacts to wetlands, streams and other aquatic resources allowed under a Clean Water Act Section 404 Permit (i.e., discharge of dredged or fill material into a water of the U.S.). For impacts permitted under a 404 Permit, compensatory mitigation is not considered until after all appropriate and practicable steps have been taken to first avoid and then minimize adverse impacts to the aquatic ecosystem pursuant to 40 CFR 230 (the 404(b)(1) Guidelines).

MMC used the mitigation sequencing required by compensatory mitigation regulations (33 CFR 332.3(b), 40 CFR 293(b)) in developing its mitigation plan for the selected alternatives. MMC will use the Swamp Creek site, which is considered an off-site mitigation site, as compensatory mitigation for all unavoidable effects on jurisdictional wetlands. The following sections discuss on-site and off-site mitigation. According to the compensatory mitigation regulations, on-site means an area located on the same parcel of land as the impact site, or on a parcel of land contiguous to the impact site. Off-site means an area that is neither located on the same parcel of land as the impact site, nor on a parcel of land contiguous to the parcel containing the impact site. Most of the wetland effects will occur on National Forest System lands. In the following sections, mitigation is considered on-site if it occurs within a facility permit area and off-site if it occurs outside of a permit area. The Corps is responsible for determining if a mitigation site is considered on-site or off-site.

Mitigation for other waters of the U.S., such as streams, is described below. MMC will be responsible for meeting the Corps' mitigation requirements for jurisdictional wetlands and other waters of the U.S. The monitoring of the mitigation sites is described in section C.4 of Attachment 3 of the ROD.

During plan development, MMC coordinated with the MDT on the plans and MDT's proposed improvements to US 2 adjacent to the Swamp Creek mitigation site. MMC will continue to coordinate with MDT as necessary as final plans are developed.

1.1.6.2.1 Jurisdictional Wetlands

The Swamp Creek wetland mitigation area is about 4 miles east of the project area and encompasses 67 acres along US 2. The meadows cover an area of about 30 acres. In the early 1950s, a new channel of Swamp Creek was excavated across the property, enhancing surface water drainage and lowering the shallow groundwater surface. Other side ditches were excavated to channel water from several natural springs on the property. As a result of the ditching effort, productive hayfields were developed on the property.

MMC completed a wetland delineation in 2011 and the site has 20 acres of degraded wetland. MDT holds an easement on the property for a stabilization berm for reconstruction of US 2. The total area rehabilitated will be 18 acres, with 15 acres attributed to wetland mitigation and 3 acres attributed to stream restoration. Wetland rehabilitation is the manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions of degraded wetland. Rehabilitation results in a gain in wetland function but does not result in a gain in wetland acres (33 CFR 332.2, 40 CFR 230.92). Most of this degraded wetland area will be rehabilitated from the current condition of hayfields to a viable ecological habitat by planting wetland vegetation throughout the site, increasing water availability to the rooting zones of plants, and preventing cattle grazing on the property.

The Swamp Creek wetland mitigation project will be accomplished by completing the following specific activities: (1) prolong valley bottom flooding and near-surface groundwater levels by constructing meanders and raising the channel bottom of Swamp Creek and two spring-fed channels; (2) terminate hay production in the valley bottom; burn the grass (one or more times), followed by plowing the soil and seeding the area with wetland vegetation; 3 acres of this area will be used for riparian corridor planting along the stream channels; (3) plant willow/alder shrubs in separate "pods" throughout the 15-acre mitigation area in the valley bottom and around the springs to increase wetland diversity and habitat; (4) prohibit cattle grazing on the 18-acre

meadow area and the Spring #1 area of the Swamp Creek property and (5) implement a weed control program to prevent invasion of undesirable species into the wetland mitigation areas.

A minimum 50-foot-wide vegetated upland vegetated buffer (3 acres) will be maintained around the wetland rehabilitation area. The east and west sides of the Swamp Creek property are bordered by National Forest System lands; the buffer zone around the wetland mitigation area will help provide some connectivity for the two sides of public land. Construction of the wetland mitigation area on the Swamp Creek property is expected to be conducted over a 2-year period prior to filling of wetlands at the Poorman Impoundment Site. Once wetland rehabilitation and vegetation planting are complete, the residential house and other buildings on the site will be removed, which will improve overall habitat conditions on the entire 67-acre Swamp Creek property.

MMC will coordinate with the KNF Native Seed Coordinator and the Corps on planting plans and seed mixtures and use of local native seed from the Forest Service Coeur d'Alene Nursery or the Kootenai Seed Mix. No introduced species will be used unless unavailability of native seed requires such species and unless the KNF and Corps approve such species.

Reed canarygrass is an "exotic" species that is not native to Montana. Reed canarygrass is not considered a noxious weed but it is also not a desired species for wetland restoration. Based on three sites evaluated, reed canarygrass makes up 25 to 80 percent of the cover of the Swamp Creek mitigation site. Reed canarygrass is difficult to control because it has vigorous, rapidly spreading rhizomes and forms a large seed bank. Control of reed canarygrass is most effective when it includes an integrated approach implemented in a sequential and timely order. MMC will complete a vegetation survey of the entire mitigation site to define distribution of the grass and presence of more desirable species. MMC's initially will burn areas where reed canarygrass is found during late spring. In areas where reed canarygrass is dominant and/or pervasive, herbicides will be applied. Application of herbicide will be limited to areas where reed canary grass is the dominant species and where the vegetative survey did not identify sufficient quantities of desirable wetland species. Burning will be completed for the first 3 years to ensure long-term treatment. Vegetation surveys will be completed to assess the success of burning to reduce reed canarygrass presence. Where mowing of the hayfield could reduce the presence of reed canarygrass, it will be completed in conjunction with burning to reduce the ability of reed canarygrass to produce seed heads. Vegetation monitoring will be conducted to ensure mowing is occurring effectively when combined with burning.

Garrison creeping foxtail is another "exotic" species that is not native to Montana that is increasing its dominance in wetland areas. MMC will develop a plan similar to reed canarygrass to control its dominance in the wetland mitigation area.

The water right associated with this Swamp Creek allows for flood irrigation of 26 acres of hay meadow. Rehabilitation of the site to improve its functions as a wetland will not require a water right. The current owner of this parcel has a surface water right to flood irrigate 26 acres of hay meadow between May 1 and October 31, with a maximum diversion rate of 291.72 gpm, and maximum volume of 52 acre-feet per year. MMC will file for a change of use for this water right to an instream flow right. MMC will convey any water right used for the Swamp Creek site to the Forest Service when the title or a perpetual conservation easement of the Swamp Creek mitigation site is conveyed to the Forest Service.

MMC will convey the title or a perpetual conservation easement of the Swamp Creek mitigation site to the Forest Service after the Corps has determined the sites' performance standards have been met. The requirements for conveyance are described in the grizzly bear mitigation plan (see Attachment 4 of the ROD). If a perpetual conservation easement is conveyed, the easement will allow for public access to the property. Known Native American Traditional Use Areas are on the uplands adjacent to the Swamp Creek wetlands mitigation site and within the private land boundary. The upland areas at the Swamp Creek site protected by a conservation easement or conveyed to the Forest Service will be managed to protect and provide for future traditional cultural uses. Developed recreational use will not be encouraged.

1.1.6.2.2 Jurisdictional Waters (Streams)

Swamp Creek Site

The Swamp Creek stream mitigation will consist of constructing about 6,500 linear feet of new meandering channels, planting a 10-foot wide riparian zone on each side of the channels totaling about 3 acres, and removing cattle on the property to prevent grazing along the channels. Three primary drainage channels located on the Swamp Creek site will be subject to channel restoration: main Swamp Creek channel and two tributary channels from Spring #2 and Spring #3. The Swamp Creek channel flows through the center of the valley bottom on this property. The two spring-fed tributaries of Swamp Creek flow year-round, with Spring #2 having the highest flows (1.0 to 1.5 cfs baseflow).

The three Swamp Creek channels will be subject to reconstruction to natural meandering conditions that will be accomplished by completing the following: (1) reconstruct the channels to a meandering configuration, raise the channel bottom of Swamp Creek and two spring-fed channels, and incorporate small woody debris structures along some stream bank reaches; (2) plant riparian vegetation, including willow/alder shrubs, in a buffer zone along the new meandering channels to create a riparian corridor; and (3) protect the valley bottom area by prohibiting cattle grazing along Swamp Creek and tributary channels. Construction of the stream mitigation project on the Swamp Creek property is expected to be conducted over a 2-year period prior to filling wetlands at the impoundment site or along the access road.

In some reaches of the new channels, specific areas of hedge-brush layering, willow fascines, and/or salvaged wetland sod mats will be constructed on the channel banks as protection from erosion and to improve establishment of riparian vegetation. These features typically will be limited to selected locations along the outside bank of meanders. The abandoned segments of the original straight channels will be filled with soil from the excavated new channels, and planted with wetland vegetation. These fill areas will remain as slight topographic depressions to provide some small areas of open-water near the new stream channels during periods of high groundwater.

A riparian buffer zone 10 feet wide (3 acres) will be developed along each side of the reconstructed channels. Riparian vegetation will be planted in these stream corridors where there is sufficient soil and sod to allow the successful plantings. Shrubs and herbaceous wetland vegetation will be planted in the riparian zone.

Little Cherry Creek Site

Stream mitigation at the Little Cherry Creek site will consist of replacing the culvert at NFS road #6212 with a bridge, bottomless arch pipe, or a new culvert that will comply with Forest Service

stream simulation techniques. The culvert will be replaced before the project affects streams in the impoundment site.

Poorman Creek Sites

Stream mitigation at the Poorman Creek sites will consist of replacing one culvert across the creek at NFS road #278, removing one bridge on a decommissioned NFS road #6212, and stabilizing 400 feet of eroding cut slope adjacent to NFS road #6212. The bridge on NFS road #6212 across Poorman Creek will be removed during construction. MMC will dispose of the bridge structure in accordance with section 1.1.3.5, *Waste Management*. Concrete footers and reinforcement structures will be demolished and removed. Fill material that is placed to provide the proper elevation for the bridge structure and adjacent topography will be excavated and removed. Material removed from the bridge area will be relocated to the Poorman Impoundment Site to be used in construction of the impoundment or placed behind the impoundment. The culvert removal will follow procedures described for the Little Cherry Creek site. MMC will implement the mitigation described for culvert removals on grizzly bear mitigation lands.

Stream Improvements on Lands Acquired for Grizzly Bear Mitigation

MMC will convey the title to or a perpetual conservation easement on between 6,193 and 6,891 acres of land to the Forest Service or private conservation organization independent of MMC for grizzly bear mitigation. All lands will be acquired before the start of the Construction Phase. The Forest Service will ensure that the specified acres of mitigation properties were managed for grizzly bear habitat in perpetuity. The grizzly bear mitigation plan also requires MMC to implement access management improvements, such as road decommissioning and culvert removal, on mitigation lands. MMC will conduct a survey to assess all mitigation lands for opportunities to improve aquatic resources. Some of the types of activities that will be conducted to mitigate streams include: remove culverts and restore the floodplain, restore disturbed riparian buffer areas by removing roads and revegetating, add woody debris to the floodplain, remove riprap and bridge abutments below the ordinary high water mark, remove berms and other impervious fill material, and install instream habitat features to increase the value to aquatic life. MMC will use the Corps' Montana Stream Mitigation Procedure and the Corps' compensatory mitigation regulations (33 CFR 332) in assessing mitigation opportunities. For the purposes of assessing stream mitigation credits, MMC identified 21 culverts that will be removed and adjacent riparian habitat will be restored on 908 linear feet of stream on potential wildlife mitigation lands. MMC will use the following BMPs during instream work, such as culvert replacement or removals, within 0.25 mile of a bull trout occupied stream:

- Conduct all in-stream work between July 15 to September 1; work can be completed outside of that time period if it can be implemented in a dry portion of the stream channel and all other potential impacts are fully mitigated
- Place straw bales in the streams below the culvert where practicable
- Minimize the duration of instream work to the extent practicable

1.1.6.2.3 Performance Standards for Jurisdictional Wetlands and Waters of the U.S.

Performance standards for mitigation sites are discussed in section C.4.2 in Attachment 3 of the ROD. The Corps may modify the performance standards in accordance with any 404 permit issued for the project.

1.1.6.2.4 Monitoring

The Corps will use wetlands monitoring to determine if the compensatory mitigation is meeting the performance standards established in any 404 permit issued for the project. The monitoring described in section C.4 in Attachment 3 of the ROD may be modified in a 404 permit.

1.1.6.3 Isolated Wetlands

Isolated wetlands may be 1) directly affected by facility construction, such as the tailings impoundment and 2) indirectly affect by mine operations, such as operating of a pumpback well system or mine dewatering. The directly-affected wetlands are those affected by a facility, such as the tailings impoundment, and those that are within the disturbance area but outside the footprint of a facility. Federal agencies have responsibilities to avoid, minimize, and mitigate unavoidable impacts on wetlands under Executive Order 11990. Executive Order 11990 requires federal agencies to "consider factors relevant to a proposal's effect on the survival and quality of the 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. The Corps' wetland mitigation requirements will fulfill the Executive Order's requirements to minimize harm to jurisdictional wetland. The following measures are the KNF's practicable measures to minimize harm to isolated wetlands.

The objective of the compensatory mitigation plan for isolated wetlands is to minimize harm to isolated wetlands and to offset unavoidable adverse impacts on isolated wetlands that will occur under a Forest Service approved Plan of Operations. Section 1.1.1.5.3, *Final Tailings Impoundment Design Process*, describes the agencies' requirements for the impoundment design before construction will begin. One mitigation measure requires MMC to avoid or minimize, to the extent practicable, filling wetlands and streams, such as described in Glasgow Engineering Group, Inc. (2010). This mitigation will ensure adverse effects will be minimized before considering compensatory mitigation.

Before issuance of the 2008 regulations regarding compensatory wetland mitigation, the Corps in Montana used ratios for various mitigation types in determining compensation requirements (Corps 2005). In the absence of specific USDA or Forest Service policy or guidance regarding compliance with Executive Order 11990 for isolated wetlands, the KNF will use the Corps' mitigation ratios and performance standards as a guide in determining compensation requirements for isolated wetlands. For the analysis purposes, the KNF used 1:1 ratio for created wetlands established and viable before project impact and a 2:1 ratio for created wetlands not established and viable before project impact. For example, wetlands created concurrent with tailings impoundment construction using wetland soils from the impoundment site will receive a credit at a 2:1 ratio. Preservation of wetlands will receive a 4:1 credit. MMC will develop final facility designs for agency approval as well as update the two 3D groundwater models (mine area and tailings impoundment) (see section 1.1.1.6, *Final Design Process*). The KNF will be responsible for developing and approving final mitigation requirements for isolated wetlands. The KNF will use the Corps' wetland mitigation regulations (33 CFR 332) and applicable regulatory guidance as guidelines for the development of the wetland mitigation and monitoring plan. MMC will submit as part of their amended Plan of Operations a final mitigation plan for isolated wetlands based on KNF's final mitigation requirements, final facility designs, and the updated groundwater models.

The KNF retained three Little Cherry Creek sites and the Gravel Pit site as mitigation for isolated wetlands. The KNF recognizes that the sites are within the drawdown area of the pumpback wells as predicted by the 3D tailings impoundment groundwater model. Section 3.10.4.2 of the Final EIS indicated operation of a pumpback well system may not affect groundwater levels and five of the springs south of Little Cherry Creek because of an apparent subsurface bedrock ridge that separates groundwater flow between the watershed of Little Cherry Creek from those of Drainages 5 and 10 in the Poorman Impoundment Site. The geologic and hydrologic data from the area between the Little Cherry Creek and Poorman drainages are not sufficient to eliminate the possibility of the pumpback well system adversely affecting surface resources, particularly groundwater-supported wetlands. The model will be rerun after MMC collects additional data in the Poorman Impoundment Site during the Evaluation Phase. The KNF also retained the three Little Cherry Creek sites and the Gravel Pit site as mitigation for isolated wetlands because many of the isolated wetlands are supported by surface water and not groundwater. Developing the three Little Cherry Creek sites and the Gravel Pit site as wetland mitigation sites concurrent with impoundment construction will allow soils from wetlands to be filled to be used at the mitigation sites, further enhancing their mitigation success. After the 3D model has been rerun, MMC will reevaluate the feasibility of the three Little Cherry Creek sites and the Gravel Pit site as mitigation for isolated wetlands. Should one or more of the sites be determined to be infeasible, MMC could develop similar sites north of Little Cherry Creek where groundwater drawdown will not occur.

1.1.6.3.1 Little Cherry Creek Sites

The three Little Cherry Creek sites have a total combined area of 9 acres; MMC will create 4.5 acres into new wetlands. The Little Cherry Creek sites will be on land owned by MMC, except for a small area of LCM-2 on National Forest System lands. Wetlands will be developed through excavation of shallow depressions in locations where surface water will collect and be retained. Existing vegetation, primarily coniferous forest, will be removed before excavation. The depressional areas will be excavated 4 to 5 feet below ground surface, with some variations in depth and overall shape configuration to improve habitat diversity. Once the depressions are excavated to within 1 or 2 feet of the spring/early summer water table, hydrologic conditions will likely be present for at least 20 days of the growing season.

Wetland soil, sod, and shrubs will be excavated from existing wetlands at the Poorman Impoundment Site before filling during construction and placed in the wetland mitigation areas. An average of 24 inches of surface soils and 12 inches of subsoils at all wetlands will be excavated and used at wetland mitigation sites. Final design for management of wetland soils will be included in the Soil Salvage and Handling Plan.

A minimum 25-foot-wide vegetated upland buffer will be maintained around the three wetland mitigation areas. Assuming a total upland buffer perimeter of 4,500 feet for the three areas, a 25-foot buffer will create a 2.5-acre buffer. The sites will be constructed concurrently with construction of the Poorman Impoundment so that wetland soil removed from the impoundment disturbance area could be hauled directly to the mitigation sites. MMC expects the three mitigation sites could be constructed and planted during a single non-winter period.

In 2010, MMC installed shallow piezometers (monitoring wells) in the Little Cherry Creek mitigation sites and measured water levels in June and September. Water levels were also measured in May through September in 2011, 2012, and 2013. At the Little Cherry Creek sites, the water table is shallow in the spring and early summer (typically less than 2 feet below ground

surface), declining more than 2 feet during late summer and early fall, and then rising again in late fall. Hydrologic support will be provided by direct precipitation or shallow groundwater. Groundwater from beneath the tailings impoundment will not be used to provide hydrologic support. MMC will acquire a water right for the created wetlands if the DNRC determines water use for creating wetlands was a beneficial use. If water use for creating wetlands is not a beneficial use, MMC could use water for wetland creation without a beneficial water use permit protecting its right to do so. Water to create wetlands will come from precipitation on MMC and National Forest System lands and the legal availability of that water will not be at risk of appropriation by another user. Any water rights used for wetland mitigation will be conveyed to the Forest Service when the mitigation sites are conveyed.

If the title to or a perpetual conservation easement on Little Cherry Creek mitigation sites had not already been conveyed as part of the grizzly bear mitigation plan, MMC will convey the title or a perpetual conservation easement on the Little Cherry Creek mitigation sites to the Forest Service as compensatory mitigation to offset impacts to isolated wetlands when the sites' performance standards have been achieved. Conveyed lands will be the isolated wetland mitigation sites, vegetated upland buffers, and adjacent existing wetlands contiguous to National Forest System lands. The requirements for conveyance are described in the grizzly bear mitigation plan.

1.1.6.3.2 Gravel Pit Site

The 4-acre Poorman gravel pit site is National Forest System land south of the Poorman Impoundment. MMC will create a 3-acre wetland in this area by excavating several small depressions in the former gravel pit, and lining the depressions with low permeability wetland soil removed from the Poorman Impoundment disturbance area. Hydrologic support will be provided by direct precipitation. A minimum 50-foot-wide vegetated upland buffer will be maintained around the site, creating a 2-acre buffer. The site will be developed concurrently with the Little Cherry Creek sites.

1.1.6.3.3 Performance Standards for Isolated Wetlands

The KNF will use the Corps and EPA's compensatory mitigation regulations (33 CFR 332 and 40 CFR 298) as a guide to offset unavoidable impact to wetlands and to ensure performance standards and the effectiveness of isolated wetland mitigation. Performance standards for jurisdictional wetland mitigation sites described in the Corps' 404 permit will be used as a guide in developing performance standards to assess the success of the isolated wetland mitigation sites.

1.1.6.3.4 Monitoring

Water levels in piezometers in four wetlands (LCC-29, LCC-35A, LCC-36, and LCC-39A) will be measured monthly April through September. Vegetation in these four wetlands also will be monitored, following the methods used for the GDE monitoring (see section C.10.4.2, *Groundwater Dependent Ecosystem Monitoring* in Attachment 3). The monitoring will continue through the Closure Phase as long as the pumpback well system operates. Other monitoring for jurisdictional wetland mitigation sites described in the Corps' 404 permit will be used as a guide in developing monitoring requirements.

1.1.6.4 Wildlife

The selected alternatives will include implementation of a wildlife awareness program prepared by MMC. The objectives of the wildlife awareness plan are to: reduce the risk of human-caused mortality of threatened and endangered species, identify other wildlife issues of concern for the

Montanore Project, establish company procedures and protocols that address these issues, and develop employee and contractor awareness of wildlife issues. The wildlife awareness program includes the education of employees about bear awareness and safety, refuse management, company policies regarding wildlife, and other wildlife concerns.

1.1.6.4.1 Gray Wolf

If a wolf den or rendezvous site is located in or near the project facilities by FWP wolf monitoring personnel, MMC will provide funding for FWP personnel to implement adverse conditioning techniques before wolves concentrate their activity around the den site (in early to mid-March) to discourage use of the den. This will occur in the spring before the expected start-up of construction activities. Discouraging use before denning starts will give wolves time to excavate an alternate den site at a safer, more secluded location.

1.1.6.4.2 Key Habitats

Mitigation common to both the mine and transmission line alternatives is discussed in the following sections. Wildlife mitigation specific to the transmission line is discussed in section 1.2.13, *Wildlife Mitigation Measures*.

1.1.6.4.3 Snags (Cavity Habitat)

MMC will leave snags within the disturbance area of the mine, or the clearing width of transmission line, unless required to be removed for safety or operational reasons. This mitigation will be incorporated into the Vegetation Removal and Disposition Plan (section 1.1.1.5.2, *Vegetation Removal and Disposition Plan*).

1.1.6.4.4 Elk Security

Any new, gated, or barriered road used for construction and decommissioning of the transmission line will be restricted from all motorized access with a gate or earthen barrier prior to general hunting season.

1.1.6.4.5 Mountain Goat

MMC will fund surveys to monitor mountain goats to examine response to mine-related impacts. The surveys will be integrated into the current monitoring effort of the FWP. Aerial surveys will be conducted three times annually (winter-late spring-fall) by the FWP along the east front of the Cabinet Mountains from the Bear Creek drainage south to the West Fisher drainage. Surveys will be conducted for 2 consecutive years before construction, and every year during construction activities. Survey results will be analyzed by the KNF, in cooperation with the FWP, at the end of the construction period to determine the appropriate level and type of survey work needed during the Operations Phase. If the agencies determined that construction disturbance is significantly affecting goat populations, MMC will develop, fund, and implement mitigation measures to reduce the impacts of mine disturbance. Surveys will be conducted using the current protocol of the FWP. Currently, the FWP conducts one aerial survey of the east Cabinet Mountains every other year. This additional level of monitoring will provide information on the status of mountain goat use adjacent to the project area, and potential effects of the project.

MMC will not conduct any blasting at the entrance to any adit portals during May 15 to June 15 to avoid disturbance to the potential goat kidding area on Shaw Mountain.

1.1.6.4.6 Migratory Birds

MMC will coordinate with the KNF and Regional bird monitoring partnership group to fund monitoring of landbird populations as part of the Forest Service Regional effort of the "Integrated Monitoring in Bird Conservation Regions" (IMBCR). The KNF is located with the Northern Rockies Bird Conservation Region 10 (BCR 10), which is characterized by high-elevation mountain ranges with mixed conifer forests and intermountain regions dominated by sagebrush steppe and grasslands (Partners in Flight 2000). BCRs approximate an eco-province, and are the scale recommended by Partners in Flight for monitoring. Across the KNF, transects are identified in 2010, with at least 10 transects monitored each year. Two of these 10 annually monitored transects are located within the Crazy and Silverfish PSUs.

Prior to the Evaluation Phase, and continuing for the life of the mine, MMC will coordinate with the KNF and Forest Service Region 1 bird monitoring specialist to fund and initiate annual monitoring of up to 12 ICMBR transects; up to 8 located within a 1 mile influence zone of the mine facilities or transmission lines (MT-BCR10-K078, MT-BCR10-KO271, MT-BCR10-KO102, MT-BCR10-KR53, MT-BCR10-KR229, MT-BCR10-KR133, and MT-BCR10-KR277), and an additional 4 transects located outside of the facilities and transmission line influence zones for comparison with the influence zone transects.

1.1.6.5 Hard Rock Mining Impact Plan

Lincoln County approved an updated Hard Rock Mining Impact Plan for the Montanore Project in 2007. The plan describes how the Montanore Project will affect local government services, facilities, costs, and revenues. The plan specifies the measures MMC will undertake to mitigate adverse fiscal impacts on local governments. MMC will prepay about $180,000 in taxes before construction to offset the net negative fiscal impact on the county budget during the first year. MMC submitted a petition for an amendment for consideration by the Hard Rock Mining Impact Board. The Board approved the petition for amendment in 2008.

1.1.6.6 Cultural Resources

All mine and transmission line alternatives will require additional cultural resource inventory to satisfy requirements of Section 106 under the NHPA and 22-3, MCA. Additional survey will be conducted in all previously undisturbed areas where surface disturbance will occur in the alternative selected in the ROD. Such areas will include any surface disturbance required in mitigation plans, such as culvert replacement and other compensatory wetland mitigation sites. The number of cultural resources that will require mitigation may increase pending the result of these additional inventory efforts. The appropriate type of mitigation will depend on the nature of the cultural resource involved and will ultimately be determined during consultation between MMC, the KNF, and Montana SHPO. Any mitigation plan for cultural resources will be developed by MMC and approved by the KNF in consultation with the Montana SHPO under the project-specific Programmatic Agreement, and will include consulting Confederated Salish and Kootenai Tribes and the Kootenai Tribe of Idaho (Tribes), if affected cultural resources are prehistoric or of recent cultural significance.

Mitigation could include data recovery (excavation) of prehistoric archaeological sites, a Historic American Building Survey (HABS) for standing structures, or Historic American Engineering Record (HAER) for built resources such as mines, roads, and trails. For landscape-level resources such as the Libby Mining District, the USDI National Park Service's (NPS) Cultural Landscapes Program will be implemented. Mitigation also will include monitoring during ground disturbing

activities when the subsurface spatial extent of the resource is unknown or because of the fragility of the resource and its proximity to the activity. Section 3.7.5 of the Final EIS discusses mitigation measures for known resources in the analysis area.

The Tribes will be afforded the opportunity to monitor any ground disturbing activities associated with the selected agency mine and transmission line alternatives. Section C.3, Cultural Resources, of Attachment 3 of the ROD discusses monitoring requirements.

1.1.7 Monitoring Plans

The agencies required monitoring plans are presented in Attachment 3 of the ROD.

1.2 Agencies' Selected Transmission Line Alternative (Miller Creek Transmission Line)

1.2.1 Environmental Specifications

The agencies' Environmental Specifications will be implemented to guide line construction, operation, maintenance, and decommissioning activities in all of the agencies' transmission line alternatives. The agencies' Environmental Specifications also include sensitive areas where special measures will be taken to reduce impacts during construction and reclamation activities. Sensitive areas are wetlands; riparian areas; bull trout critical habitat; old growth habitat; core grizzly bear habitat; bald eagle primary use areas; areas with high risk of bird collisions; big game winter range; visually sensitive and high visibility areas; and cultural and paleontological resources. Additional areas for monitoring may be identified following the preconstruction monitoring trip by the agencies or preconstruction surveys by MMC.

1.2.2 Preconstruction Surveys

MMC will complete, before any ground-disturbing activities, an intensive cultural resources survey and a jurisdictional wetland delineation on all areas where such surveys have not been completed and that will be disturbed by the implementation of the Miller Creek Transmission Line Alternative. Similarly, MMC will complete a survey for threatened, endangered, or Forest sensitive plant species on National Forest System lands for any areas that will be disturbed by a transmission line alternative where such surveys have not been completed or for any species listed since 2005. MMC also will update surveys in suitable habitat for threatened, endangered, and state-listed plant species potentially occurring on non-National Forest System lands. The survey results will be submitted to the agencies for approval. If wetlands, cultural resources or species of concern are identified and adverse effects could not be avoided, MMC will develop appropriate mitigation plans for the agencies' approval. The mitigation will be implemented before any ground-disturbing activities. To the extent feasible, MMC will make adjustments to structure and road locations, and other disturbing activities to reduce impacts.

To the extent possible, MMC will survey all planned ground disturbance areas for noxious weeds before initiating disturbance. Where noxious weeds are found, MMC will treat infestation the season before the activity is planned. For example, if timber clearing is planned to be in the spring or early summer, the survey and control will be implemented the previous fall. Areas surveyed will include all areas designated for timber removal. MMC will describe in final design plans the extent of which surveys and pretreatment will not be feasible. The survey and treatment

approach will be a part of the final Weed Control Plan, to be reviewed and approved by the lead agencies.

1.2.3 Substation Equipment and Location

Two substations will be required. One substation will be used to tap the Noxon-Libby 230-kV transmission line and supply power to the mine site over a new 230-kV transmission line. BPA's Sedlak Park Substation Site at the Noxon-Libby 230-kV transmission line is in an area known locally as Sedlak Park, 30 miles southeast of Libby on US 2. At the Libby Plant Site, a second, 150-foot by 300-foot substation will be built to distribute electricity through lower voltage lines to equipment in various locations at the Libby Plant Site, the Libby Adit Site, the Poorman Tailings Impoundment Site, and within the underground mine.

The Plant Site's electrical service will be 230-kV, 3-phase, 60-cycle, provided by a new, overhead transmission line. The BPA will design, construct, own, operate, and maintain the Sedlak Park Substation and loop line. The BPA is prohibited by law from providing power directly to a user; Flathead Electrical Cooperative will be the retailer of power to the mine project. MMC will be responsible for funding construction of the transmission line, substation, and loop line that will connect the substation to the Noxon-Libby 230-kV transmission line. Sedlak Park Substation construction will require disturbing 2 acres. The substation will be near US 2 and require a short access road from US 2. The access road from US 2 will be designed and constructed to MDT standards.

The substation site will be fenced. The area surrounding the substation will be graveled and kept free of vegetation. No water will be required at the Sedlak Park Substation site, and toilet facilities will be self-contained. The Sedlak Park Substation will be designed to exclusively serve the mine. No additional lines have been proposed to enter or leave the Sedlak Park Substation.

1.2.4 Alignment and Structure Type

From the Sedlak Park Substation, the alignment will traverse an east-facing ridge immediately north northwest of the substation, and will cross Hunter Creek 2 miles north northwest of the substation (Figure 3 of the ROD). After crossing Hunter Creek, the alignment will head west, crossing US 2, the Fisher River, West Fisher Creek, and NFS road #231 (Libby Creek Road). The alignment then will head northwest, up and over the ridge between West Fisher Creek and Miller Creek. After the alignment crosses the ridge between West Fisher Creek and Miller Creek, the alignment will follow NFS road #4724 (South Fork Miller Creek Road) to a ridge separating Miller Creek from the Standard Creek drainage. The alignment will traverse the ridge into the Howard Creek drainage. The centerline will be about 500 feet east of the northeast corner of a private land parcel about 0.5 mile south of Howard Lake. North of the private land, the alignment will generally parallel Howard Creek, then cross Libby Creek and end at a substation at the Libby Plant Site.

The lead agencies selected wooden H-frame structures to reduce structure height. H-frame structures also provide for longer span lengths and consequently fewer structures and access roads. Using H-frame structures will require more right-of-way and tree clearing. To eliminate the need to use or construct roads that may affect core grizzly bear habitat, a helicopter will be used for structure construction at 16 locations in the Miller Creek and Howard Creek drainages.

The centerline of the alignment will be near existing residences at three locations: near the Fisher River and US 2 crossing north of Hunter Creek (Section 32, Township 27 North, R. 29 West), in the Standard Creek drainage (Section 29, Township 27 North, R. 30 West) and southeast of Howard Lake (Section 19, Township 27 North, R. 30 West). Montana regulations allow the final centerline to vary by up to 250 feet of the centerline (ARM 17.20.301 (21)) unless there is a compelling reason to increase or decrease this distance. During final design, MMC will minimize effects on private land by keeping the centerline at least 200 feet from these residences and implementing the measures for sensitive areas described in the Environmental Specifications for the 230-kV transmission line.

After a more detailed topographic survey is completed, MMC will complete a detailed visual assessment of the alignment at these locations, plus at the locations east and southeast of Howard Lake. Based on the assessment, MMC will locate the transmission line through existing open areas in the forest, where feasible, and incorporate into the Vegetation Removal and Disposition Plan measures to minimize vegetation clearing and clearing and transmission line visibility from residences and Howard Lake through modification of pole height, span length, and vegetation growth factor. The quantity and location of poles to be installed by helicopter will be modified as necessary to minimize access roads visible from private property and Howard Lake.

Based on a preliminary design, six structures will be in a RHCA on National Forest System lands and three structures will be in a riparian area on private lands. During final design, MMC will locate these structures outside of riparian areas if the agencies determined alternative locations are technically and economically feasible.

1.2.5 Line and Road Construction Methods

The construction of the transmission line will follow the sequence of: 1) centerline surveyed and staked; 2) right-of way cleared and access roads built; 3) work areas cleared and leveled as needed; 4) foundations installed, and transmission line structures erected and installed; 5) ground wire, conductors, and ground rods installed, and 6) the site will be cleaned up and reclaimed. Construction of the line is expected to take 2 years.

1.2.6 Surveying

Construction survey work will consist of establishing a centerline location, specific pole locations, right of way boundaries, work area boundaries, and access roads to work areas. The specified right-of-way boundaries, work areas, access roads, and other features will be marked with painted laths or flags. Markers will be maintained until final cleanup and/or reclamation is completed, after which they will be removed.

1.2.7 Vegetation Clearing

During final design, MMC will submit a final Vegetation Removal and Disposition Plan for lead agencies' approval (see section 1.1.1.5.2, *Vegetation Removal and Disposition Plan*). The plan will apply to all National Forest System lands covered by the Plan of Operations and all State and private lands covered by the transmission line certificate. It will not apply to private lands affected by the substation and loop line. One of the plan's goals will be to minimize vegetation clearing, particularly in riparian areas. The plan will identify areas where clearing will be avoided, such as deep valleys with high line clearance, and measures that will be implemented to minimize clearing. It will evaluate the use of monopoles to reduce clearing in select areas, such as

old growth. The plan also will evaluate the potential uses of vegetation removed from disturbed areas, and describe disposition and storage plans during life of the line. For example, the growth factor used to assess which trees will require clearing may be reduced in sensitive areas, such as RHCAs, from 15 years to 5 to 8 years. Reducing the growth factor could reduce clearing width, but increase maintenance costs. Heavy equipment use in RHCAs will be minimized. Shrubs in RHCAs and in the line of sight between the line and private land will be left in place unless they had to be removed for safety reasons. Vegetation management in riparian areas on private lands will be decided by MMC and the private landowner. Sediment and runoff from all disturbed areas will be minimized through the use of BMPs developed in accordance with the Forest Service's *National Best Management Practices for Water Quality Management on National Forest System Lands* (USDA Forest Service 2012a).

The BPA will clear all trees at the Sedlak Park Substation Site, which will include the 2-acre substation and short access road from US 2 to the substation. Trees within the up to 300-foot right-of-way of the loop line also will be cleared. The BPA will pre- and post-construction weed surveys at the Sedlak Park Substation and treat weeds caused by substation construction. The BPA will be responsible for weed control at the substation during operations and decommissioning. All herbicide applications will comply with all applicable state and federal regulations. It also will revegetate all disturbed areas outside of the access road prism and substation yard.

Most construction activity will be contained in the 150-foot right-of-way with major exceptions being access road construction. General right-of-way clearing will be governed by safety, reliability, environmental, and cost considerations. A 150-foot right-of-way will be cleared as necessary and additional tree clearing outside the 150-foot right-of-way will be necessary to prevent trees from falling into the line, or fires from flashovers where trees are too close to the conductor. Some areas within the 150-foot clearing area will not require clearing, such as within high spans across valleys. Actual acreage cleared will be less and will depend on tree height, slope and line clearance above the ground. Clearing will produce a "feathered" edge on the right-of-way clearing, with the width of right-of-way clearing varying along the line. Trees within the right-of-way will be removed to provide a minimum of 18 feet clearance between the vegetation and the conductor. Trees that will extend within 18 feet of the conductors within 5 years also will be removed. Other trees on or off the right-of-way that could fall into the line will be removed. In some areas, such as steep drainages, trees beneath the line will not be cleared if sufficient clearance exists between the line and the tree. All merchantable timber will be measured, purchased from the KNF, and then salvaged from the right-of-way; cleared smaller trees and brush will be burned or chipped. Non-merchantable trees and slash will be piled into windrows (using a brush blade to minimize soil accumulation) and burned.

Ground disturbance necessary for some pulling and tensioning sites may extend up to 100 feet beyond the right-of-way boundary where the line makes an angle. These sites usually require an area up to 40 feet by 150 feet. The selected alignment will require 19 of these sites.

Line construction will require up to two construction seasons of helicopter use, but will occur for one season for any particular line segment. The total duration of helicopter use for each line segment will be about 2 months for one construction season. All activities on National Forest System and State trust lands for both construction seasons and decommissioning of the transmission line will occur between June 16 and October 14. Most construction activity will be contained in the 150-foot right-of-way with major exceptions being access road construction. In

areas adjacent to core grizzly bear habitat (2.5 miles), MMC will use a helicopter to clear timber, reducing the need for access roads. A helicopter also may be used to remove timber from steep area, such as north of West Fisher Creek. As described above, helicopters will be used for structure construction in some segments.

Conventional vegetation clearing techniques will be used in other areas. Merchantable timber will be transported to designated landings or staging areas, and branches and tops will be removed and piled. Helicopter landing sites will generally be on roads. The KNF will be responsible for disposing of the piles. Non-merchantable material will be left within the transmission line clearing area, and will be lopped and scattered. Large woody debris will be left as necessary to comply with the wildlife mitigation described below.

The FWP holds a conservation easement on some lands owned by Plum Creek where the transmission line will be located. The easement was partially funded by the Forest Legacy Program for the purpose of preventing the land from being converted to non-forest uses. One of the stated purposes of the conservation easement is to “preserve and protect in perpetuity the right to practice commercial forest and resource management.” MMC will convey title or a conservation easement to FWP to 91 acres of private land adjacent to the FWP conservation easement prior to to the start of the transmission line construction. Final acquisition requirements will be determined during final design of the transmission line. MMC will follow any FWP requirements for conveyance. Acquired lands or easements will be added to the existing conservation easement.

1.2.8 Access Road Construction and Use

A final Road Management Plan described in section 1.1.1.3.1, *Development of Plans* will be developed and implemented. If construction access roads onto US 2 are necessary, an encroachment permit will be required before entering MDT right-of-way. Installation of culverts, bridges, or other structures at perennial stream crossings will be specified by the agencies following on-site inspections with DEQ, Forest Service, FWP, landowners, and local conservation districts. Installation of culverts or other structures in a water of the United States will be in accordance with any U.S. Army Corps of Engineers 404 and DEQ 318 permit conditions. Work in streams within the transmission line corridor will be in accordance with MFSA certificate requirements. All culverts will be sized according to Revised Hydraulic Guide (KNF 1990) and Parrett and Johnson (2004) unless superseded by the Corps’ 404 and DEQ 318 permit conditions. Where new culverts are installed, they will be installed so water velocities or positioning of culverts will not impair fish passage. Stream crossing structures will be able to pass the 100-year flow event without impedance.

Where possible, roads currently open year-round will be used for construction access. Roads currently closed either seasonally or year-round will only be opened for construction and decommissioning access where necessary, and public access will be restricted either through the use of gates or earthen barriers during hunting season.. Where seasonally closed roads will be used, efforts will be made to minimize their use during the periods when these roads will otherwise be closed. Existing roads will be used for construction and decommissioning access where possible and new roads or spurs will be built only where necessary. New roads will be 12 feet wide and cleared of all trees and shrubs. Wood refuse and cleared shrubs will be placed on the downhill edge of the road for erosion control. A road within the right-of-way will be required for line stringing operations across side slopes greater than 10 percent.

Improvement of existing roads will be required in some areas to allow access of construction equipment into the transmission line corridor. Upgrades could include widening, lengthening of culverts, placing fill on or near stream banks, clearing, and regrading. Final design plans detailing the location of work areas and new and existing access roads will be submitted to the lead agencies for approval before construction.

Roads built for the installation of the transmission line will be needed for future reclamation of the line. The KNF will change the status of new transmission line roads on National Forest System lands to intermittent stored service after line installation is completed. Intermittent stored service roads will be closed to motorized traffic and will be treated so they will cause little resource risk if maintenance is not performed on them during the operation period of the mine and before their future need. They will not be used for routine maintenance of the transmission line, but may be used for emergency repairs, such as a damaged insulator. Intermittent stored service roads will require some work to return them to a drivable condition. Intermittent stored service road treatments will include:

- Conducting noxious weed surveys and performing necessary weed treatments before storage activities
- Blocking entrance to road prism
- Removing culverts determined by the KNF to be high-risk for blockage or failure; laying back stream banks at a width and angle to allow flows to pass without scouring or ponding so that revegetation has a strong chance of success
- Installing cross drains so the road surface and inside ditch will not route any intercepted flow to ditch-relief or stream-crossing culverts
- Removing and placing unstable material at a stable location where stored material will not present a future risk to watershed function
- Replacing salvaged soil and revegetating with grasses in treated areas and unstable roadway segments to stabilize reduce erosion potential

New transmission line roads on National Forest System lands will be decommissioned after closure of the mine and removal of the transmission line. Decommissioned roads will be removed from service and will receive a variety of treatments to minimize the effects on other resources. In addition to all the intermittent stored service road treatments, a decommissioned road will be treated by one or more of the following measures:

- Conducting noxious weed surveys and performing necessary weed treatments before decommissioning
- Removing any remaining culverts and removing or bypassing relief pipes as necessary
- Stabilizing fill slopes
- Fully obliterating road prism by restoring natural slope and contour; restoring all watercourses to natural channels and floodplains
- Revegetating road prism
- Installing water bars or outsloping the road prism
- Removing unstable fills

Newly constructed roads on Plum Creek lands will be gated after construction and managed. MMC will be able to use roads on Plum Creek lands for inspections and maintenance. The Selected Alternative will not require roads or structures on any other private land other than Plum Creek. Road management will depend on the easement agreement between the Plum Creek and MMC. Newly constructed roads on State land will be gated after construction and managed in accordance with an easement agreement between the DNRC and MMC. MMC will require the use of roads currently gated or barriered. Table 9 lists those restricted roads used for construction access.

Table 9. Existing Restricted Roads used for Construction Access in Selected Transmission Line Alternative.

Road #	Road Name	Location	Existing Closure Device	Length (miles)
4726	Miller Creek Ridge	South of Miller Creek	Gated	2.3
4726F	Miller Creek Ridge F	South of Miller Creek	Gated	1.3
6210	Libby Ramsey	Libby Creek	Gated	0.9
8770	4W Ranch (Cactus Wade)	East of Fisher River	Gated	0.4
8773	Wade's Back Entry	East of Fisher River	Gated	0.2
99760	Brulee-Hunter 99760	Hunter Creek (Plum Creek land)	Gated	1.1
99806	Wade-Kenelty D 99806	Fisher River (Plum Creek land)	Gated	3.1
99806D	Wade-Kenelty D 99806D	Fisher River (Plum Creek land)	Gated	0.3
99830	West Fisher 99830	West Fisher Creek (Plum Creek land)	Barriered	0.8

1.2.9 Foundation Installation

Excavations for foundations will be made with power auger equipment. Where the soil allows, a vehicle-mounted power auger will be used. The foundation excavation and installation requires equipment access to the foundation sites. If rocky areas are encountered, foundations may require blasting. The foundation excavation and installation will require access to the site by a power auger or drill, a crane, material trucks, and ready-mix trucks. Concrete for use in constructing foundations will be obtained from commercial sources or from a remote batch plant on private land, depending on contractor needs.

Foundation holes left open or unguarded will be covered and/or fenced where practical to protect the public and wildlife. Soil removed from foundation holes will be stockpiled on the work area and used to backfill holes. All remaining soil not needed for backfilling will be spread on the work area. Concrete trucks will wash their chute debris into a depression in the permanent disturbance area at the pole site and soil from the foundation excavation will be used to cover the chute debris.

Where bedrock is encountered while excavating structure holes, a rock drill and compressor will be used to drill the rock. A hole will be blasted using explosives. Blasting will not expand the area needed for operations around the hole, but will increase the amount and duration of associated construction activity. It also will slightly affect the sequence and schedule of operations around those holes, extending the amount of time that the structures remain at the site before they can be set.

1.2.10 Structure Installation

Structure construction activity is expected to occur within 30 feet of the holes where the structures are installed. Activities conducted outside the 30-foot radius will include pole assembly, framing conductor supports and establishing an operating location for the crane. The optimal crane operating conditions require that the crane be as close to the hole as possible but because of uneven terrain at certain sites, cribbing with timbers under the crane outriggers will be necessary to level the crane. The need for the crane to be outside of the 30-foot radius will probably be the exception. Temporary construction yards may be necessary and will be located on existing disturbed areas or other areas on private lands along the line alignment.

1.2.11 Line Stringing

Once structures are in place, a pilot line will be pulled (strung) from structure to structure and threaded through the stringing sheaves on each structure. A larger diameter, stronger line will then be attached to the pilot line. This is called the pulling line, and one pulling line is connected to a conductor or overhead ground wire. Each conductor or ground wire is then pulled through the sheaves in succession and held under tension until connected to the insulators. This process will be repeated until all the ground wires and conductors are pulled through all sheaves. Conductor splicing will be required at the end of a conductor spool or if a conductor are damaged during stringing. The work will occur on work areas for the structures or pulling/tensioning sites. Conductors will be strung using powered pulling equipment at one end and powered braking or tensioning equipment at the other end. For public protection during wire installation, guard structures will be erected over roadways, transmission lines, structures, and other obstacles. Guard structures consist of temporary H-frame structures placed on either side of an obstacle.

A helicopter will be used for line and ground wire stringing. Completed segments of the line will be strung at the end of the construction season. The duration of helicopter use for line stringing will be about 10 days. Ground disturbance associated with the use of helicopter construction will include work areas for each structure site measuring about 15 feet by 15 feet, depending on the topography of the site. All necessary equipment will be lowered from a helicopter to allow foundation installation and structure setting. Vegetation will be removed and the work area will be graded by hand to flatten as needed for the safe operation of equipment and access by work crews.

Three conductors with a horizontal spacing of about 20 feet and a vertical spacing of 6.5 feet will be used. A fiber optic static wire for protection against lightning strikes and communication will be located at the top of each structure 17 feet above the top conductor.

1.2.12 Operation, Maintenance, and Reclamation

The line will be designed and operated to comply with applicable standards. MMC will be governed by the Environmental Specifications for the 230-kV transmission line to guide line construction, operation, maintenance, and decommissioning activities. To minimize the potential for bird collisions or electrocution, the line will be constructed according to recommendations outlined in Reducing Avian Collisions with Power Lines (APLIC 2012) and Suggested Practices for Raptor Protection on Power Lines (APLIC 2006).

Following construction, land within the right-of-way and other disturbed areas outside of the right-of-way, such as tensioning sites, that had been rutted, compacted, or disturbed will be

reclaimed. Access roads will be regraded, scarified, and seeded. All permanent cut-and-fill slopes on maintenance roads will be seeded, fertilized, and stabilized with hydromulch, netting, or other methods. Drive-through dips, open-top box culverts, waterbars, or crossdrains will be installed on maintenance roads to prevent erosion. Unauthorized traffic will be blocked with appropriate structures.

Monitoring at monthly intervals during the growing season will be conducted along the right-of-way and access roads to detect the invasion of spotted knapweed or other noxious weeds. Spotted knapweed plants found on areas disturbed by the project will be treated by spot spraying individual plants. Herbicides will be carried in tanks mounted on vehicles or in backpack tanks. Herbicide spray will be applied only when wind velocity is less than 8 miles per hour to prevent wind drift. No herbicides will be applied within 25 feet of water bodies. All herbicide applications will comply with all applicable state and federal regulations.

Inspection and repair of the line will be conducted by helicopter. Line inspections will be conducted annually to assess structural integrity and to identify maintenance needs; additional inspections may be needed after a fire or ice storm. MMC estimates a line crew will access the line about 5 days per year for maintenance of hardware and removal of trees. Roads placed in intermittent stored service or decommissioned will not be used for routine maintenance of the transmission line, but may be used for emergency repairs, such as a damaged insulator. Increased helicopter use will be required to conduct routine maintenance and line decommissioning. Clearing of danger trees will continue until the line is decommissioned. All vegetation clearing in core grizzly bear habitat will be completed without motorized access.

Hazard trees that will interfere with or fall into the transmission line or associated facilities will be identified during routine maintenance inspections. Targeted trees and tall shrubs will be removed in a non-motorized manner. Clearing of danger trees and tall shrubs will continue until the line is decommissioned. Slash will be lopped and scattered evenly throughout the surrounding terrain. Stumps will be cut to less than 1 foot tall, and lopped slash will be left as close to the ground as possible.

Land use in the right-of-way normally will not be restricted except for those activities that interfere with the line operation and maintenance. Line operation will not require any permanent employees, although MMC will have a trained fire crew and will cooperate with the KNF and local fire departments in controlling forest fires in the area.

MMC expects the transmission line facilities will be the last facilities reclaimed following mine closure. Newly constructed roads needed for construction of the transmission line will be soiled and reseeded immediately after construction is completed. Because the access roads will rarely be used following construction, MMC anticipates these roads will have stabilized naturally or by MMC through interim reclamation. The substation at the plant site will be removed. MMC will remove all other transmission line equipment at closure, such as structures, insulators, line, and other hardware from the right-of-way. All concrete foundations/footers will be broken up and buried in place. Poles and other structures will be dismantled and sold, scraped, and/or disposed of off-site. After the transmission line is removed, all newly constructed roads on National Forest System lands will be bladed and recontoured to match existing topography, obliterating the road prism. Management of newly constructed roads on Plum Creek land after the transmission line is removed will depend on the easement agreement between Plum Creek and MMC. Where culverts

are removed, stream banks will be recontoured and reseeded. Native shrubs, such as alder or willow, will be planted on stream banks to reduce bank erosion during high streamflow.

The BPA will dismantle the substation and remove the loop line following mine closure, assuming it had no need for the facilities. The substation and access road will be revegetated after materials had been removed from the site.

1.2.13 Wildlife Mitigation Measures

Mitigation common to both the mine and transmission line alternatives is discussed in section 1.1.6, *Mitigation Plans*. Some monitoring described for the mine also will apply to transmission line alternatives. Except where noted, all wildlife mitigation measures will be implemented during construction of the transmission line.

1.2.13.1 Down Wood Habitat

MMC will leave large woody material for small mammals and other wildlife species within the cleared transmission line corridor on National Forest System lands. Woody material will be scattered and not concentrated within the clearing area. Piece size should exceed 3 inches in diameter, and preference will be for a down “log” to be at least 8 feet in length with a small-end diameter of 6 inches or more. This material will originate from existing logs on site, unused portions of designated cut trees, broken tops, or similar materials. This mitigation will be incorporated into the Vegetation Removal and Disposition Plan. Monitoring of woody material will be implemented through a timber sale contract. The following amounts of coarse woody debris (CWD) will be left:

- Vegetative Response Unit (VRU) 1: leave 5 to 9 tons (6 to 14 logs) per acre of CWD on site after timber clearing
- Vegetative Response Unit (VRU) 2 and 9: leave 10 to 15 tons (15 to 20 logs) per acre of CWD on site after timber clearing
- Vegetative Response Unit (VRU) 3, 4, and 5: leave 15 to 30 tons (23 to 30 logs) per acre of CWD on site after timber clearing

1.2.13.2 Sensitive Species and Other Species of Interest

1.2.13.2.1 Bald Eagle

MMC will either: 1) not clear vegetation or conduct other construction activities during the breeding season (February 1 to August 15) in potential bald eagle nesting habitat or; 2) fund or conduct field and/or aerial reconnaissance surveys to locate any new bald eagle or osprey nests along specific segments of the transmission line corridor. Surveys will be conducted between March 15 and April 30, one nesting season immediately before transmission line construction. The survey may be integrated into the current monitoring of the Libby Ranger District, or may be contracted by MMC. Transmission line segments to be surveyed will be from Sedlak Park Substation in Section 9 Township 26 North, Range 29 West to the western edge of Section 31 Township 27 North, Range 29 West in West Fisher Creek; and from the northern end of Section 19 Township 27 North, Range 30 West to the northern edge of Section 13 Township 27 North, Range 31 West, which is the area to the east and northeast of Howard Lake.

If an active nest is found, guidelines from the Montana Bald Eagle Management Plan (Montana Bald Eagle Working Group 2010) will be followed to provide management guidance for the immediate nest site area (Zone 1), the primary use area (Zone 2), and the home range area (Zone 3) as long as they are in effect. This will include delineating a 0.25-mile buffer zone for the nest site area, along with a 0.5-mile buffer zone for the primary use area. High intensity activities, such as heavy equipment use, will not be permitted during the nesting season (February 1 to August 15) within these two zones. The USFWS guidelines will be followed if the Montana Bald Eagle Management Plan guidelines are not in effect.

MMC committed to constructing the transmission line according to recommendations outlined in Reducing Avian Collisions with Power Lines (APLIC 2012) and Suggested Practices for Raptor Protection on Power Lines (APLIC 2006). Specific recommendations that will be implemented are described for migratory birds in section 1.2.13.3, *Migratory Birds*.

The agencies' Environmental Specifications include additional monitoring and mitigation not described in MMC's Environmental Specifications. Areas of high risk for bird collisions where line-marking devices may be needed, such as the Fisher River crossing, and recommendations for type of marking device will be identified through a study conducted by a qualified biologist and funded by MMC.

1.2.13.2.2 Western Toad

All shrub habitat will be retained in wetlands and riparian areas crossed by the transmission line. Wetlands avoidance, minimization, and mitigation and avoidance measures also will ensure that impacts on western toad breeding habitat are minimized.

1.2.13.2.3 Elk, White-tailed Deer, and Moose Winter Habitat

MMC will not conduct transmission line construction activities in elk, white-tailed deer, or moose winter range between December 1 and April 30. These timing restrictions may be waived in mild winters if MMC could demonstrate that snow conditions are not limiting the ability of these species to move freely throughout their range. MMC must receive a written waiver of these timing restrictions from the KNF, DEQ, and FWP, before conducting construction activities on elk, white-tailed deer, or moose winter range between December 1 and April 30. Timing restrictions will not apply to substation construction. Grizzly bear mitigations in the agency-mitigated alternatives include restrictions on the timing of transmission line construction and decommissioning. These restrictions will apply to National Forest System and State trust lands. This grizzly bear mitigation will require that MMC be restricted to June 16 to October 14 for conducting these activities. No waiver of winter range timing restrictions will be approved on National Forest System or State trust lands where the grizzly bear mitigations will apply.

1.2.13.3 Migratory Birds

MMC committed to constructing the transmission line according to recommendations outlined in Reducing Avian Collisions with Power Lines (APLIC 2012) and Suggested Practices for Raptor Protection on Power Lines (APLIC 2006). MMC will ensure the following recommendations will be implemented:

During Construction

- Provide 60-inch minimum horizontal separation between energized conductors and/or energized conductors and grounded hardware.

- Provide 36-inch minimum vertical separation between energized conductors and/or energized conductors and grounded hardware.
- Insulate hardware or conductors against simultaneous contact where adequate spacing not possible. If transformers, cutouts, or other energized or grounded equipment are present on the structure, then jumpers, cutouts, and bushings should be covered to decrease the chance of a bird electrocution.
- Covering conductors may be necessary at times if adequate separation of conductors, or conductors and grounded parts, could not be achieved. On three phase structures, the cover should extend a minimum of 3 feet from the pole top pin insulator.
- Discourage birds from perching in unsafe locations by installing bird perch guards (triangles) or triangles with perches.
- Increase the visibility of conductors or shield wires where necessary to prevent avian collisions. This may include installation of marker balls, bird diverters, or other line visibility devices placed in varying configurations, depending on line design and location. Areas of high risk for bird collisions where such devices may be needed, such as major drainage crossings, and recommendations for type of marking device will be identified through a study conducted by a qualified biologist and funded by MMC.

During Operations

- Replace or modify a structure where there has been a documented problem with a nest site or an avian electrocution. This may include the installation of elevated perches (or nesting platforms in the case of osprey).

1.2.14 Other Modifications and Mitigations

Modifications described for the selected mine (e.g., conducting cultural resources, wildlife, plant, and wetland surveys; implementing wildlife mitigation; conveying land or conservation easement on lands adjacent to FWP's conservation easement; affording Native American Tribes the opportunity to monitor any ground disturbing activities, revising seed mixtures (Table 8), modifying revegetation success criteria, implementing measures to protect visual resources, and revising weed control) will be implemented.

1.3 Forest Plan Amendment

The 2015 KFP became effective on February 17, 2015. I have identified the need to amend the 2015 KFP to provide project-specific variances for the following direction in the agencies' preferred alternatives (Mine Alternative 3 and Transmission Line Alternative D-R).

FW-GDL-WL-08 Big Game: Management activities should avoid or minimize disturbance to native ungulates on winter range between December 1 and April 30, with exception of routes identified on MVUM as open to motor vehicle use. Management activities that occur on winter range during the winter period should concentrate activities to reduce impacts to native ungulates. (2015 KFP, page 31-32)

FW-GDL-WL-09 Big Game: Management activities should be avoided on native ungulate winter range areas during the critical mid-winter period (January and February) when snow depths most likely influence movement and availability of forage. (2015 KFP, page 32)

FW-GDL-AR-01: Management activities should be consistent with the mapped scenic integrity objective, see Plan set of documents. The scenic integrity objective is High to Very High for scenic travel routes, including Pacific Northwest National Scenic Trail, designated Scenic Byways, and National Recreation Trails. (2015 KFP, page 35)

MA5a,b,c-GDL-AR-06. Management activities should be consistent with the Scenic Integrity Objective of Moderate to High. (2015 KFP, page 64)

MA6-GDL-AR-05. Management activities should be consistent with the Scenic Integrity Objective of Low to High. (2015 KFP, page 66)

FW-STD-RIP-01: When RHCAs are intact and functioning at desired condition, then management activities shall maintain or improve that condition. Short-term effects from activities in the RHCAs may be acceptable when those activities support long-term benefits to the RHCAs and aquatic resources. (2015 KFP, page 25)

FW-STD-RIP-02: When RHCAs are not intact and not functioning at desired condition, management activities shall include restoration components that compensate for project effects to promote a trend toward desired conditions. Large-scale restoration plans or projects that address other cumulative effects within the same watershed may be considered as compensatory components and shall be described during site-specific project analyses. (2015 KFP, page 25).

FW-GDL-VEG-02: Road construction (permanent or temporary) or other developments should generally be avoided in old growth stands unless access is needed to implement vegetation management activities for the purpose of increasing the resistance and resilience of the stands to disturbances. (2015 KFP, page 19).

The need for the amendments are discussed in four applicable sections of the FEIS:

- FW-GDL-WL-08 and FW-GDL-WL-09—Wildlife
- FW-GDL-AR-01—Scenery
- FW-STD-RIP-01 and FW-STD-RIP-02—Aquatic Life and Fisheries
- FW-GDL-VEG-02—Vegetation

A significance determination of the amendments will be in the ROD and is available in the project record.

Attachment 2 – Approved Stipulations/Mitigation Measures and Other Requirements

Stipulations/Mitigation Measures and Other Requirements

MMC will proceed with the Evaluation, Construction, Operation, and Reclamation Phases of the Montanore Project according to Mine Alternative 3 and Transmission Line Alternative D-R as modified by this ROD and described in Attachment 1 – Selected Mine and Transmission Line Alternatives. The table of approved agency stipulations/mitigations and other requirements (Attachment 2) summarizes the requirements for the Montanore Project, which are listed in full in the following attachments and/or permits:

Requirement	ROD Location
Selected Mine and Transmission Line Alternatives as modified by the ROD	Attachment 1
Agencies' Conceptual Monitoring Plans (Final EIS Appendix C)	Attachment 3
KNF's Terrestrial Threatened and Endangered Species Mitigation Plan	Attachment 4
KNF's Mitigation Plan for Bull Trout and Bull Trout Critical Habitat	Attachment 5
USFWS Terms and Conditions in the Biological Opinion for Grizzly Bear	Attachment 6
USFWS Terms and Conditions in the Biological Opinion for Bull Trout and Bull Trout Critical Habitat	Attachment 7
Environmental Specifications for Montanore 230-kV Transmission Line	Attachment 8
Requirements of other permits (e.g. MPDES permit, air quality permit, 404 permit, 401 certification)	Not attached

The stipulations/mitigations and other requirements table is organized by phase (e.g. Evaluation, Construction, Operations, etc.). Under some phases, the table lists both stipulations/mitigations and other requirements, but they are separated according to type. The phase indicates when a particular stipulation/mitigation or other requirement begins, but does not indicate when each ends. Unless otherwise noted, stipulations, mitigations, and other requirements apply to the phase listed and each subsequent phase thereafter.

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 mine phase (second column), ROD reference (fourth column), and resource affected (fifth 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 the Montanore Project are limited to activities that affect surface resources on National Forest System lands. KNF's approval of the amended Plan of Operations requires that MMC obtain all necessary Clean Water Act permits prior to implementing each phase of mine development.

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
All Phases				
		Stipulation/Mitigation Measures		
1	All Phases	In accordance with 36 CFR 228.9, MMC will maintain the structures, equipment, and other facilities in a safe, neat, and workmanlike manner. Hazardous sites or conditions resulting from operations will be marked by signs, fences, or otherwise identified to protect the public in accordance with federal and state laws and regulations.	Attachment 1, Section 1.1.1.2	All
2	All Phases	In accordance with 36 CFR 228.10, in occurrences of temporary cessation of operations (period up to 1 year, other than seasonally), MMC will file a statement with the District Ranger that includes informational requirements of 36 CFR 228.10.	Attachment 1, Section 1.1.4	All
3	All Phases	*After 5 years of any cessation of mine development or operation, for reasons other than litigation, the Forest Service will consult with MMC, DEQ, USFWS, Corps, tribal representatives, and other interested agencies on interim or final reclamation plans to be implemented as outlined in the selected mine and transmission line alternatives, and the timeframes for implementation.*	Attachment 1, Section 1.1.4	All
4	All Phases	MMC will submit an annual report to the lead agencies. The report will include a discussion of MMC's compliance with all monitoring and mitigation requirements specified in the KNF ROD. Each monitoring and mitigation requirement of the selected mine and transmission line alternatives will be listed in the report.	Attachment 1, Section 1.1.2.7.3	All
5	All Phases	In accordance with 36 CFR 228.11, MMC will 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.	Attachment 1, Section 1.1.1.2	All
6	All Phases	MMC will comply with the agencies' Environmental Specifications for the construction, operation, and reclamation of the transmission line according to the selected transmission line alternative.	Attachment 1 and Attachment 8	All
7	All Phases	During all phases when diesel generators are needed for power, MMC will use Tier 4, if available, or Tier 3 engines that meet EPA's Tier 4 or 3 nitrogen oxides emission standards and comply with the federal engine emission limitations. MMC also will use Tier 4, if available, or Tier 3 engines on underground mobile equipment and emergency generators, if available. MMC will use ultra-low sulfur diesel fuel in those engines.	Attachment 1, Section 1.1.1.2	Air Quality

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
8	All Phases	The Forest Service and MMC, in consultation with the Service (and other stakeholders as determined by Forest Service), will agree to integrate the principles of adaptive management by collecting, disseminating where needed, and reviewing new information on bull trout, the results of implementation of the Core Area Bull Trout Mitigation Guidance Plans (see Stipulation 36) and Fisheries Monitoring Plan (see Stipulation 38) over time, consider the revised numerical groundwater model prepared during the Evaluation Phase and other information related to bull trout near the project area.	Attachment 7, Term and Condition (T&C) for Reasonable and Prudent Measure (RPM) 1, item 8.	Aquatic Life and Fisheries
9	All Phases	MMC will not sidecast road material on road segments within or abutting RHCAs in priority watersheds. MMC will install or fund the installation of signage where sidecasting will be avoided.	Attachment 1, Section 1.1.1.3.1	Aquatic Life and Fisheries
10	All Phases	If previously unrecorded cultural properties, human remains, or funerary objects are discovered during any activity by MMC, MMC will immediately cease the activity in the area of the discovery and secure the area with a 100-foot (30-meter) buffer by attaching temporary fencing to trees. No disturbance will occur in securing the site. MMC also will notify the county coroner if the discovery is human remains or funerary objects and the KNF Forest Archaeologist if the discovery is on National Forest System lands or the SHPO Archaeologist if the discovery is on lands other than National Forest System lands.	Attachment 3, Section C.3	Cultural Resources
11	All Phases (with active drilling)	MMC will not explore or mine for any ore outside of its extralateral rights. MMC will notify the agencies within 48 hours when ore is encountered during either the extension of the Libby Adit, development of any drifts, or exploration drilling. MMC will isolate underground any ore encountered outside of its extralateral rights from waste rock in case a future authority provides for the disposal of those valuable minerals.	Attachment 1, Section 1.1.1.2	Geology

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
12	All Phases (with active drilling)	To ensure MMC stays within its extralateral rights and out of the 1,000-foot Rock Lake and 300-foot Rock Lake Fault buffer zone boundaries, MMC will fund and retain an independent certified mine surveyor to conduct biannual surveys (twice a year) of all underground mine workings. The surveyor will be selected by the agencies through an agreement with MMC. The surveyor will have no financial interest in the Montanore Project. The agencies may also require more frequent surveys should discrepancies arise, and/or routine as-built drawings. The surveyor will be selected by the agencies and will be under the agencies' direction. MMC will provide mine access, support, and all information the surveyor needs to complete identified tasks. This will include all company-conducted mine surveys of the underground workings. After completing the monitoring survey, the independent surveyor will submit maps of the workings to the agencies and will report any that cross the established property boundaries, enter into buffer zones, or deviate from designated pillar spacing and size.	Attachment 1, Section 1.1.3.1.3	Geology
13	All Phases	MMC will check the status of road closures (either due to mine operations or wildlife mitigation) twice a year (spring and fall), and repair any gate or barrier that is allowing access.	Attachment 1, Section 1.1.2.7.3	Recreation Transportation Wildlife
14	All Phases	For roads that will be closed as part of the project, MMC will be responsible for installing and maintaining gates or barriers at each closure. Gates will have dual-locking devices to allow the KNF fire or administrative access.	Attachment 1, Section 1.1.2.6	Transportation
15	All Phases	MMC is responsible for ensuring that any new water right for water use issued pursuant to Montana law for water use in the selected alternatives will be consistent with the terms of an approved Plan of Operations. MMC will ensure that the approved Plan of Operations consistent with the selected alternatives will contain the stipulation that any water right acquired solely for the purposes of mineral development in an approved Plan of Operations will terminate when the Plan of Operations terminates.	Attachment 1, Section 1.1.3.4.2	Water Rights
16	All Phases	MMC must request and obtain prior written approval from the KNF for any change in beneficial use or place of use of water allowed under an approved Plan of Operations or the water use allowed under an approved Plan of Operations will terminate.	Attachment 1, Section 1.1.3.4.2	Water Rights
17	All Phases	MMC will coordinate with the KNF and Regional Bird Monitoring Partnership Group to fund monitoring of landbird populations as part of the Forest Service regional effort of the "Integrated Monitoring in Bird Conservation Regions."	Attachment 1, Section 1.1.6.3.6	Wildlife

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
18	All Phases	MMC will ensure that operating surface and mill equipment will not exceed 55 dBA measured at 250 feet from mill site for periods exceeding one hour. Backup beepers may exceed 55 dBA 250 feet from the mill. MMC would install silencers on intake and exhaust ventilation fans in the three Libby Adits so that they generate sounds less than 85 dBA measured 3 feet downwind of the portal. MMC also would locate all fans a minimum of 500 feet from the portals during operations unless alternative locations would not increase noise levels in the CMW from the Libby Adit Site by 5 decibels or more. If necessary, MMC will install low-noise fan blades or noise suppression equipment to reduce fan noise to about 16 dBA.	Attachment 1, Section 1.1.1.4 and Attachment 4, Item B.2.a	Wildlife
19	All Phases	MMC will maintain the fence surrounding the Libby Adit for the life of the project.	Attachment 1, Section 1.1.1.2 and Attachment 4, Item A.1.a	Wildlife
20	All Phases	MMC will prohibit the use of salt during winter plowing operations.	Attachment 4, Item A.1.d	Wildlife
21	All Phases	MMC will remove road killed animals daily from road rights-of-way within the permit area and along roadways used for access hauling ore (NFS roads #231, #278, #2317, #4781, #6210, and #2316) and new roads built for the project. MMC will move road-killed animals at least 50 feet beyond the right-of-way clearing or as far as necessary to be out of sight of the road.	Attachment 4, Item A.1.e	Wildlife
22	All Phases	MMC will report all grizzly bear, lynx, wolf and black bear mortalities within the permit area and along access roads within 24 hours. If a threatened or endangered (T&E) species mortality occurs, MMC will haul future road-killed animals to a disposal location approved by FWP (thus modifying Stipulation 49), if deemed necessary by the grizzly bear specialists or law enforcement officer to avoid additional grizzly bear or other T&E species mortality.	Attachment 4, Item A.1.g	Wildlife
23	All Phases	In coordination with and as approved by the Forest Service, MMC will plan, fund, and implement habitat enhancement activities on acquired mitigation land parcels consistent with the intent of Attachment 4 to improve core habitat and road densities prior to transfer to the Forest Service.	Attachment 6, T&C for RPM 2, items 2c, ROD Section 1.4.1.3	Wildlife

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
24	All Phases	MMC will include grizzly bear and black bear sanitation incidents that have occurred within the mine permit area and corrective measures taken during the previous year in the report described in A.3.a.viii of Attachment 4. MMC will submit the report each December, beginning in the year in which Evaluation Phase activities start.	Attachment 4, item A.3.a.viii Attachment 6, Reporting Requirement a	Wildlife
25	All Phases	*By April of each year, the Forest Service will prepare and submit to the USFWS an annual report of grizzly bear and black bear sanitation incidents and corrective measures that have occurred within the Cabinet Mountains portion of the Cabinet Yaak Ecosystem and Cabinet Face Bears Outside of the Recovery Zone (BORZ) taken during the previous year.*	Attachment 6, Reporting Requirement a,	Wildlife
26	All Phases	*By April of each year, the Forest Service will prepare and submit to the USFWS an annual report that summarizes actions taken to comply with the terms and conditions implementing RPMs 1 and 2 in Attachment 6 during the previous year.*	Attachment 6, Reporting Requirement b	Wildlife
Other Requirements				
27	All Phases	MMC will implement the limits, emission controls, and mitigations required by its Air Quality Permit (MAQP #3788-00).	Attached to DEQ's ROD	Air Quality
28	All Phases	MMC will comply with the limits, monitoring, and discharge locations of the MPDES Permit MT0030279.	Attached to DEQ's ROD	Water Resources
29	All Phases	MMC will abide by the conditions and requirements of a Corps-approved Section 404 permit for jurisdictional wetlands and other waters of the U.S.	ROD Section 1.6.6	Wetlands
30	All Phases	MMC will apply for and implement the requirements of DEQ's Section 401 certification for jurisdictional wetlands and other waters of the U.S.	Attached to DEQ's ROD	Wetlands
31	All Phases	SWPPP BMPs will be implemented and will be inspected at least monthly (during the snow-free period) until revegetation is successful and 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 will continue until the areas disturbed during construction are finally stabilized (a vegetation cover has been established with a density of at least 70 percent of the pre-disturbance levels, or equivalent permanent, physical erosion control reduction methods have been employed).	Attachment 3, Section C.10	Water Resources Aquatic Life and Fisheries

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
Pre-Evaluation Phase				
		Stipulation/Mitigation Measures		
32	Pre-Evaluation	MMC will submit final mitigation plans consistent with the selected mine and transmission line alternatives, the Biological Assessments, the terms and conditions of the Biological Opinions, and other state and federal permits or approvals.	Attachment 1, Section 1.1.1.5.2, Attachments 4, 5, and 6	All resources
33	Pre-Evaluation	MMC will submit plans for monitoring during the Pre-Evaluation and Evaluation Phases consistent with 1) the revised Appendix C of the Final EIS; 2) the Terms and Conditions in the USFWS Biological Opinions (Attachment 6 and Attachment 7) 3) conditions of any other issued permit or approval, such as the MPDES permit, the 404 permit, the 401 certification, or a beneficial water use permit deemed necessary for the Evaluation Phase.	Attachment 1, Section 1.1.1.5.2 and Attachment 3	All resources
34	Pre-Evaluation	MMC will implement all monitoring for all resources required before initiating the Evaluation Phase, such as water resources, consistent with approved monitoring plans described in Stipulation 33.	Attachment 3	All applicable resources
35	Pre-Evaluation	MMC will develop for KNF approval a final Road Management Plan before the Evaluation Phase that will address roads used during the Evaluation Phase (NFS road #231 and #2316) and roads that will be stabilized or closed for the wildlife mitigation.	Attachment 1. Section 1.1.1.3	Aquatic Life and Fisheries
36	Pre-Evaluation	MMC will prepare for Forest Service approval, in consultation with the USFWS and Montana Fish Wildlife and Parks (FWP), a Bull Trout Mitigation Guidance Plan specific to each bull trout Core Area potentially affected by the Project.	Attachment 7, T&C for RPM 1, item 1.a.	Aquatic Life and Fisheries
37	Pre-Evaluation	MMC will fully consider the “Conceptual Bull Trout Mitigation Plan” described in Attachment 7, T&C for RPM 1 during development of Core Area Bull Trout Mitigation Guidance Plans for the Kootenai River and Lower Clark Fork River Core Areas (see Stipulation 36) and Fisheries Monitoring Plan (see Stipulation 38). The Core Area Bull Trout Mitigation Guidance Plans (Kootenai River and Lower Clark Fork River Core Areas) will identify and quantitatively evaluate potential bull trout population effects, potential habitat effects, and overall bull trout conservation effects of specific mitigation concepts described in the “Conceptual Bull Trout Mitigation Plan” section of Attachment 7.	Attachment 7, T&C for RPM 1, item 9.	Aquatic Life and Fisheries

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
38	Pre-Evaluation	MMC will prepare for Forest Service approval, in consultation with FWP and the USFWS, a final comprehensive Fisheries Monitoring Plan that addresses all fisheries related monitoring needed to document and verify project effects, including: verification of the extent and magnitude of take (see Stipulation 7) associated with project impacts; long-term effects of baseflow depletions, and effectiveness of mitigation measures intended to minimize take of bull trout; effects of "warm water" supplementation to Libby Creek from mine Adit sources; and short-term effects of projected sediment inputs to bull trout in the affected streams. The Fisheries Monitoring Plan will identify the techniques, intensity, duration, and frequency of fisheries population and habitat monitoring needed in all affected streams or other water bodies in the Action Area. The Fisheries Monitoring Plan will specifically address monitoring needs of proposed or anticipated bull trout mitigation projects ("before the action" data collection) and will take into account the amount of time and monitoring effort needed to fully assess the effects of the mitigation projects (for example, two bull trout life cycles or 14 years may be needed to verify short-term and long-term effects of particular actions).	Attachment 7, T&C for RPM 2, item 1	Aquatic Life and Fisheries
39	Pre-Evaluation	MMC will make long-term binding arrangements with FWP (or other entities approved by FWP and Forest Service in consultation with the USFWS) for immediate implementation (beginning with final Forest Service authorization to initiate the Evaluation Phase) of the Fisheries Monitoring Plan, including reporting and approval requirements of annual monitoring efforts to the Forest Service. The Fisheries Monitoring Plan will contain provisions for documenting, collecting data, and annual reporting of the actual extent of "take" documented for particular factors noted in Stipulation 38. *The "Take Statement" will be approved by the Forest Service and submitted by KNF to the USFWS by March 1 of each following calendar year*.	Attachment 7, T&C for RPM 2, item 2	Aquatic Life and Fisheries
40	Pre-Evaluation	*By March l of each year, the Forest Service will prepare and submit to the USFWS an annual report that summarizes actions taken to comply with the bull trout Biological Opinion's Terms and Conditions implementing RPMs 1 and 2 during the previous year.*	Attachment 7, T&C for RPM 2, item 3.a.	Aquatic Life and Fisheries
41	Pre-Evaluation	MMC will conduct Pre-Evaluation Phase water resources monitoring (surface and groundwater monitoring and groundwater dependent ecosystem inventory and monitoring) as described in Section C.10 of Attachment 3.	Attachment 3, Section C.10	Water Resources

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
42	Pre-Evaluation	MMC will develop a Transportation Plan for the life of the mine to be approved by the agencies before the Evaluation Phase. The plan's objectives will be to minimize mine-related vehicular traffic between US 2 and the plant site and minimize parking at the plant site. Busing employees to the plant site, requiring managers to car pool to the extent practicable, and establishing a supply staging area in Libby to consolidate shipments to the mine site will be a part of the plan.	Attachment 1. Section 1.1.1.3 and Attachment 4, Item A.1.b	Wildlife
43	Pre-Evaluation	MMC will conduct wildlife monitoring as described in Section C.5 of Attachment 3.	Attachment 3, Section C.5	Wildlife
44	Pre-Evaluation	MMC will fund or implement, under Forest Service direction, the construction of an earthen barrier on Forest Trail #935 (East Fork Rock Creek) to convert it from a motorized to non-motorized trail.	Attachment 6, T&C for RPM 2.a,ROD Section 1.4.1.3, item 2.a.	Wildlife
45	Pre-Evaluation	MMC will fund or implement, under Forest Service direction, the restriction of public motorized access on existing open NFS roads 231 and 2316 from April 1 to May 15 through installation of gates for as long as MMC uses and snowplows the two roads.	Attachment 4, Item B.1.a; Table 2	Wildlife
46	Pre-Evaluation	MMC will restrict, under Forest Service direction, or fund the restriction of public motorized access on existing open NFS roads 4778, 4778E, 5192 and 5192A from April 1 to June 15 through installation of gates.	Attachment 4, Item B.1.a; Table 2	Wildlife
47	Pre-Evaluation	MMC will fund or implement, under Forest Service direction, the construction of barriers on existing open NFS roads 4776A, 4778C, and 14458, and on currently gated roads 4776C, 4776F, 4778C, 6200, 6200D, 6200E, 6200F, 6214, and 6214F to prevent motorized access. MMC will fund the construction of or construct barriers, under Forest Service direction, on gated NFS road 6745and convert it to a trail.	Attachment 4, Item B.1.a; Table 2	Wildlife
48	Pre-Evaluation	If Rock Creek Mine mitigation has not yet restricted motorized traffic with an earthen barrier on the Upper Bear Creek road #4784, then MMC will implement and fund restriction. MMC will only implement this access change if the Rock Creek Project has not yet done so.	Attachment 4, Item B.1.a; Table 2	Wildlife
49	Pre-Evaluation	Beginning prior to the Evaluation Phase and continuing through construction and the first 3 years of mill operations, MMC will monitor frequency of vehicle killed animals, report findings annually, and review with Forest Service and FWP to determine if additional mitigation measures are necessary.	Attachment 4, Item A.1.f	Wildlife

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
50	Pre-Evaluation	MMC will fund a local FWP Law Enforcement Officer, in 5-year increments for the life of the mine and through the closure and reclamation phase, or as otherwise agreed to by Forest Service in consultation with USFWS. This position will be new and based in Libby. The position description and an initial list of work items will be developed by FWP, the Forest Service, and MMC representatives. *The Forest Service will request review and advice from the USFWS on the position description and list of work items.*	Attachment 4, Item A.1.h	Wildlife
51	Pre-Evaluation	MMC will fund a Habitat Conservation Specialist in 5-year increments for the life of the mine and through the closure and reclamation phase, or until the Oversight Committee determines that the position(s) are no longer needed. The Habitat Conservation Specialist will address grizzly bear/land use issues, coordinate and account for implementation of the mitigation plan, and coordinate all land acquisition and/or conservation easements for required grizzly bear mitigation. This will be a new position stationed in a location that serves Lincoln and Sanders counties. The Habitat Conservation Specialist will work with Lincoln and Sanders counties' planning staff to provide county land use planners with current, accurate and adequate information on grizzly bear and other wildlife to use in their decision making process. The position description and an initial list of work items will be developed jointly by the agencies (including, but not limited to, Forest Service, FWP, and Lincoln and Sanders Counties) and MMC representatives. *The Forest Service will request review and advice from the USFWS on the position description and list of work items.* Funding of the Habitat Conservation Specialist is required only if both the Rock Creek Project and the Montanore Project operate concurrently.	Attachment 4, Item A.1.i	Wildlife
52	Pre-Evaluation	If the Rock Creek Mine is not yet operating, MMC will fund a local FWP Grizzly Bear Specialist in Libby for the life of the mine in 5-year increments. This Grizzly Bear Specialist will aid in grizzly bear conservation, with a focus on public outreach, assistance and education. The position description and an initial list of work items will be developed by FWP, the Forest Service, and MMC representatives. *The Forest Service will request review and advice from the USFWS on the position description and list of work items.* The Montanore Mine Project must have its own grizzly bear specialist, regardless of the status of the Rock Creek Mine Project.	Attachment 4, Item A.1.j	Wildlife

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
53	Pre-Evaluation	MMC will fund and maintain up to 35 bear-resistant refuse containers for employee use and at mine facilities, and fund replacements as needed for life of the mine. The portion of these 35 containers to be placed at the mine facilities will be coordinated with bear specialists, with timely (minimum weekly unless a problem develops or grizzly bear personnel recommend a more frequent schedule) removal of contents. One of these containers will be placed at the Libby Adit, if one is not already in place. As determined in coordination with the bear specialist, if the 35 refuse containers are more than what is needed for employees, the remaining containers could be used for non-mine personnel living in grizzly bear habitat near the project area.	Attachment 4, Item A.1.k	Wildlife
54	Pre-Evaluation	MMC will fund and or maintain electrification of garbage transfer stations adjacent and throughout CYRZ.	Attachment 4, Item A.1.l	Wildlife
55	Pre-Evaluation	MMC will fund an initial 10 electric fencing kits, and 2 more annually, as needed, that can be installed by FWP bear specialists at bear problem sites within grizzly bear habitat adjacent to and throughout the CYRZ.	Attachment 4, Item A.1.m	Wildlife
56	Pre-Evaluation	MMC will implement a wildlife awareness program (See MMC Wildlife Awareness Plan in Appendix C of the BO) for employees and contractors. As part of the wildlife awareness program, MMC will require mine employees (including all management staff) to attend training related to living and working in grizzly bear habitat prior to starting work and at least once a year thereafter for the life of the mine. MMC will prohibit MMC employees, contractors, and subcontractors from the following while on duty: • carrying firearms within the permit area boundary or along the Libby Creek access road, except for security officers and other designated personnel. This will not include controlling Libby Creek Road use by the general public. • feeding wildlife (including dropping food stuffs from lunches, etc.) within the permit area to avoid attracting bears or other wildlife and to discourage habituation • using private vehicles to travel to and from the work site, or for work purposes, except as approved in the Transportation Plan described in Stipulation 42. • hunting within the permit area MMC will identify consequences for violations in an employment contract.	Attachment 4, Item A.1.n	Wildlife

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
57	Pre-Evaluation	MMC will agree that all mortality reduction measures will be subject to modification based on adaptive management, where new information supports changes, for the life of the mine. Modifications will be reviewed and approved by the Oversight Committee.	Attachment 4, Item A.1.o	Wildlife
58	Pre-Evaluation	*The Forest Service will agree to adopt adaptive management actions in response to new information from monitoring.*	Attachment 4, Item F.3.c	Wildlife
59	Pre-Evaluation	The Forest Service, DEQ, FWP, and MMC will develop a MOU to establish roles, responsibilities, and timelines for an Oversight Committee comprised of members of the Forest Service, FWP, and other parties deemed appropriate by the parties named. The USFWS will be an ex-officio, non-voting member of the Oversight Committee, with only advisory responsibilities. Only the Forest Service, DEQ and FWP will be signers on the MOU. The USFWS will be an advisor in the development of the MOU. The Oversight Committee will develop a comprehensive grizzly bear management plan for Cabinet Mountain portion of CYRZ, and will be operational prior to the evaluation phase. Details of the required contents of the MOU and the grizzly bear management plan and roles, responsibilities and timelines of the Oversight Committee are specified in items F1, 2 and 4 of Attachment 4.	Attachment 4, Item F.1, 2, and 4	Wildlife
60	Pre-Evaluation	MMC will post a bond or establish trust fund to cover cost of projected mitigation measures. The amount in the fund or posted in a bond will be commensurate with projected work and associated required mitigation items for each phase. The Oversight Committee will determine the amount of trust fund deposits, to be made in 5-year increments over the life of the mine. If implementation costs prior to or during either evaluation or construction phases exceed the amount deposited in the trust fund/and or bond, MMC will contribute additional funds to fully implement those actions in a timely manner (as determined by the KNF in consultation with the USFWS).	Attachment 4, Item F.3.a	Wildlife
61	Pre-Evaluation	*The Forest Service will establish and lead annual stakeholders informational meeting. Stakeholders may include, but will not be limited to state and federal agencies, county commissioners, mining company, local citizen, and non-governmental organizations representatives. The objectives of the meetings will be to review a) management objectives, b) implementation of mitigation measures, c) monitoring and research results; d) and to hear concerns from the public.*	Attachment 4, Item F.3.b	Wildlife

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
62	Pre-Evaluation	MMC will secure or protect (through conservation easement or acquisition in fee with conveyance of fee or perpetual conservation easement to the Forest Service) from development and use a 5-acre parcel in East Fork Rock Creek owned by MMC and an additional 495 acres to compensate for acres lost by physical alterations or displacement. Costs of processing fee lands or preparing and accepting conservation easement by the Forest Service for these acres will be funded by MMC. Requirements for habitat replacement are specified in Items C.1, C.2.a-e, D.1.a, and Table 4 of Attachment 4.	Attachment 4, Item C.1, C.2.a-e, D.1.a, Table 4	Wildlife
63	Pre-Evaluation	MMC will plan, fund, and implement any habitat enhancement activities needed to improve the mitigation properties acquired during the Pre-evaluation Phase, such as the trail conversion, road access changes or removal of buildings and debris, before the title or a conservation easement is conveyed to the Forest Service.	ROD, Section 1.4.1.3.	Wildlife
Evaluation Phase				
		Stipulation/Mitigation Measures		
64	Evaluation	Within 6 months of MMC receiving final authorization from the Forest Service to initiate the Evaluation Phase, MMC will employ or fund a local Bull Trout Mitigation Coordinator to lead MMC planning, coordination, implementation, and monitoring activities.	Attachment 7, T&C for RPM 1, item 1.b.	Aquatic Life and Fisheries
65	Evaluation	The Bull Trout Mitigation Coordinator will prepare annually, by January 1 of each year, for Forest Service approval, in consultation with USFWS, annual work plans, including: identification of data collection needs; proposed feasibility studies; engineering design needs; and implementation planning documents necessary to accomplish mitigation actions identified in Core Area Bull Trout Mitigation Guidance Plans (see Stipulation 36), and/or other mitigation actions determined appropriate by Forest Service in consultation with USFWS; and MMC funding needed in the calendar year to fully complete these tasks.	Attachment 7, T&C for RPM 1, item 1.b.	Aquatic Life and Fisheries
66	Evaluation	The Bull Trout Mitigation Coordinator will prepare annually, by March 1 of each year for Forest Service approval, in consultation with USFWS, annual completion reports describing activities undertaken in the previous calendar year and the status of those activities and results of any studies conducted.	Attachment 7, T&C for RPM 1, item 1.b.	Aquatic Life and Fisheries

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
67	Evaluation	Within one calendar year of issuance of the Forest Service authorization to implement the Evaluation Phase, MMC will prepare for Forest Service approval, in consultation with FWP and the USFWS (and other stakeholders deemed appropriate by the Forest Service), a feasibility assessment of actions needed (with tasks, costs, scheduling, etc.) to further develop mitigation planning and implementation of the Libby Creek mitigation project	Attachment 7, T&C for RPM 1, item 1.c.	Aquatic Life and Fisheries
68	Evaluation	Prior to submittal to the Forest Service for approval of the Libby Creek mitigation project feasibility assessment, MMC will conduct a meeting to facilitate consultation with the FWP, Forest Service, USFWS, and other appropriate regulatory agencies and stakeholders as determined by the Forest Service.	Attachment 7, T&C for RPM 1, item 1.c.	Aquatic Life and Fisheries
69	Evaluation	Final designs by MMC and construction authorizations by the Forest Service, if the project is deemed feasible by the Forest Service in consultation with the agencies, will be completed within one year of Forest Service approval of the feasibility assessment.	Attachment 7, T&C for RPM 1, item 1.c.	Aquatic Life and Fisheries
70	Evaluation	Within one calendar year of issuance of the Forest Service authorization to implement the Evaluation Phase, MMC will prepare for Forest Service approval, in consultation with the City of Libby, FWP and the USFWS (and other stakeholders deemed appropriate by the Forest Service), a feasibility assessment of actions needed (with tasks, costs, scheduling, etc.) to further develop mitigation planning and implementation of the Flower Creek mitigation project.	Attachment 7, T&C for RPM 1, item 1.d.	Aquatic Life and Fisheries
71	Evaluation	Prior to submittal to the Forest Service for approval of the Flower Creek mitigation project feasibility assessment, MMC will conduct a meeting to facilitate consultation with the City of Libby, FWP, Forest Service, Service, and other appropriate regulatory agencies and stakeholders as determined by the Forest Service.	Attachment 7, T&C for RPM 1, item 1.d.	Aquatic Life and Fisheries
72	Evaluation	Final designs [of the fisheries mitigation plans] by MMC and construction authorizations by Forest Service, if the project (or components thereof) is deemed feasible by the Forest Service in consultation with the agencies, will be completed within one year of Forest Service approval of the feasibility assessment.	Attachment 7, T&C for RPM 1, item 1.d.	Aquatic Life and Fisheries

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
73	Evaluation	Within one calendar year of issuance of the Forest Service authorization to implement the Evaluation Phase, MMC will prepare for Forest Service approval, in consultation with FWP, Avista Corporation (Avista), Revett RC Resources Corporation (Revett), and the USFWS (and other stakeholders deemed appropriate by the Forest Service), a feasibility assessment of actions needed (with tasks, costs, scheduling, etc.) to further develop mitigation planning and implementation of the Rock Creek Invasive Species Eradication Project.	Attachment 7, T&C for RPM 1, item 1.e.	Aquatic Life and Fisheries
74	Evaluation	Prior to submittal to the Forest Service for approval of the Rock Creek mitigation project feasibility assessment, MMC will conduct a meeting to facilitate consultation with Avista, Revett, FWP, Forest Service, USFWS, and other appropriate regulatory agencies and stakeholders (as determined by the Forest Service).	Attachment 7, T&C for RPM 1, item 1.e.	Aquatic Life and Fisheries
75	Evaluation	Final implementation plans (prepared by MMC in consultation with the entities described in Stipulation 74) and permitting authorizations by Forest Service and other agencies, if the project is deemed feasible by the Forest Service in consultation with the agencies, will be completed within one year of Forest Service approval of the feasibility assessment.	Attachment 7, T&C for RPM 1, item 1.e.	Aquatic Life and Fisheries
76	Evaluation	Within one calendar year of issuance of the Forest Service authorization to implement the Evaluation Phase, MMC will prepare for Forest Service approval, in consultation with FWP and the USFWS (and other stakeholders deemed appropriate by the Forest Service), a feasibility assessment of actions needed (with tasks, costs, scheduling, etc.) to further develop mitigation planning and implementation of the Copper Gulch mitigation project.	Attachment 7, T&C for RPM 1, item 1.f.	Aquatic Life and Fisheries
77	Evaluation	Prior to submittal to the Forest Service for approval of the Copper Creek mitigation project feasibility assessment, MMC will conduct a meeting to facilitate consultation with the affected land owners, FWP, Forest Service, Service, and other appropriate regulatory agencies and stakeholders as determined by the Forest Service.	Attachment 7, T&C for RPM 1, item 1.f.	Aquatic Life and Fisheries
78	Evaluation	Final designs by MMC, land owner agreements, and construction authorizations by Forest USFWS Service, if the project is deemed feasible by the Forest Service in consultation with the agencies, will be completed within one year of Forest Service approval of the feasibility assessment.	Attachment 7, T&C for RPM 1, item 1.f.	Aquatic Life and Fisheries

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
79	Evaluation	Within one calendar year of issuance of the Forest Service authorization to implement the Evaluation Phase, MMC will prepare for Forest Service approval, in consultation with FWP and the USFWS (and other stakeholders deemed appropriate by the Forest Service) a feasibility assessment of actions needed (with tasks, costs, scheduling, etc.) to further develop mitigation planning and implementation of the West Fork Rock Creek mitigation project.	Attachment 7, T&C for RPM 1, item 1.g.	Aquatic Life and Fisheries
80	Evaluation	Prior to submittal to the Forest Service for approval of the West Fork Rock Creek mitigation project feasibility assessment, MMC will conduct a meeting to facilitate consultation with the FWP, Forest Service, Service, and other appropriate regulatory agencies and stakeholders as determined by the Forest Service.	Attachment 7, T&C for RPM 1, item 1.g.	Aquatic Life and Fisheries
81	Evaluation	Final designs by MMC and construction authorizations by Forest Service, if the project is deemed feasible by the Forest Service in consultation with the agencies, will be completed within one year of Forest Service approval of the feasibility assessment.	Attachment 7, T&C for RPM 1, item 1.g.	Aquatic Life and Fisheries
82	Evaluation	Prior to development and signing of MOU(s) (see Stipulation 83), MMC will commit to fund the Bull Trout Mitigation Coordinator position (including needed support; see Stipulation 64), development of annual work plans, and annual completion reports, development of two Bull Trout Core Area Mitigation Guidance Plans, a Fisheries Monitoring Plan, preliminary mitigation project feasibility assessments (described in Stipulations 67 through 81), and any supporting studies needed to complete the tasks as deemed appropriate by Forest Service in consultation with FWP and Service.	Attachment 7, T&C for RPM 1, item 1.h.	Aquatic Life and Fisheries
83	Evaluation	*The Forest Service and MMC will develop and sign a Memorandum of Understanding (MOU): The Forest Service will develop a MOU with FWP, MMC, and other cooperating parties deemed appropriate by the Forest Service. The USFWS will be an advisor in the development of the MOU. The MOU must be completed prior to the Forest Service issuing MMC a letter of authorization to proceed with the Construction Phase, and not later than two calendar years from the date of final Forest Service authorization to implement the Evaluation Phase.*	Attachment 7, T&C for RPM 1, item 2.e.	Aquatic Life and Fisheries
84	Evaluation	The waste rock storage areas at the Libby Adit Site will be lined to collect runoff from the area and seepage through the waste rock. A sump will be located at the toe of the pile where runoff and seepage will be collected and pumped up to the Water Treatment Plant for treatment before discharge.	Attachment 1, Section 1.1.1.2	Geochemistry Water Resources

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
85	Evaluation	MMC will drill ahead of the drifts, install and monitor piezometers described in Section C.10.4.4.1 of Attachment 3, and keep all drill stations 300 feet from the Rock Lake Fault and 1,000 feet from Rock Lake until additional data collection and analysis is complete.	Attachment 1, Section 1.1.1.2	Water Resources
86	Evaluation	During the Evaluation and Construction Phases, MMC will use an on-site sewage treatment and disposal system at the Libby Adit Site. The system will consist of four components: four 1,000-gallon septic tanks, a two-pod treatment unit and combination recirculation tank/drainfield dosing tank, effluent distribution system, and infiltrator trenches.	Attachment 1, Section 1.1.3.5	Water Resources Solid Waste
87	Evaluation	Before, during, and after project construction and operation, MMC will conduct aquatic biological monitoring, as described in Section C.11 of Attachment 3. The monitoring will include the monitoring required by the USFWS' Biological Opinion (see Fisheries Monitoring Plan, Stipulation 38).	Attachment 3, Section C.11	Aquatic Life and Fisheries
88	Evaluation	MMC will implement the Geochemistry Sampling and Analysis Plan (SAP). The SAP seeks to prioritize sampling and testing to ensure that data needed to modify waste management plans are available at the start of construction. For a full description of this stipulation, see Section C.9.4 of Attachment 3.	Attachment 3, Section C.9.4 and Table C-8	Geochemistry
89	Evaluation	MMC will complete and provide to the agencies a detailed surficial geologic survey of lands overlying the mine area to identify structures that could affect subsidence potential and implement the Evaluation Phase activities described in the Rock Mechanics Monitoring Plan.	Attachment 1, Section 1.1.1.5.4	Geotechnical Engineering
90	Evaluation	MMC will update the 3D groundwater models for the mine area and the Poorman Impoundment Site, incorporating the hydrologic and geologic information collected during the Evaluation Phase.	Attachment 1, Section 1.1.1.5.5 and Attachment 3, Section C.10	Geotechnical Engineering Water Resources
91	Evaluation	MMC will conduct Evaluation Phase water resources monitoring (surface and groundwater monitoring and groundwater dependent ecosystem inventory and monitoring) as described in Section C.10 of Attachment 3 (also see Stipulation 84).	Attachment 3, Section C.10	Water Resources

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
92	Evaluation	MMC will implement before the Evaluation Phase and maintain during the Evaluation Phase the BMPs shown in Table 19 of the Final EIS, such as installing, replacing, or upgrading culverts, to bring the access roads (NFS roads #231 and #2316) up to INFS standards and guidelines. All ditches on NFS roads #231 and #2316 will be cleaned out to enhance drainage and reduce sedimentation. MMC will implement and maintain BMPs on roads required to be closed or stabilized for wildlife mitigation.	Attachment 1, Section 1.1.1.3.2	Wetlands and Other Waters of the U.S. Water Resources Aquatic Life and Fisheries
93	Evaluation	MMC will use the Swamp Creek Site, which is considered an off-site wetlands mitigation site, as compensatory mitigation for all unavoidable effects on jurisdictional wetlands. MMC will use Swamp Creek, Little Cherry Creek, Poorman Creek, and grizzly bear mitigation sites as compensatory mitigation for all unavoidable effects on streams. MMC will be responsible for meeting the Corps' mitigation requirements for jurisdictional wetlands and other waters of the U.S. The monitoring of the mitigation sites is described in Section C.4 of Attachment 3.	Attachment 1, Section 1.1.6.2 and Attachment 3	Wetlands and Other Waters of the U.S.
94	Evaluation	MMC will file for a change of use for the Swamp Creek water right to an instream flow right.	Attachment 1, Section 1.1.3.4.2	Water Resources Wetlands and Other Waters of the U.S.
95	Evaluation	Maintenance, monitoring, and performance standards for wetland mitigation sites are described in Section C.4 of ROD Attachment 3. The maintenance, monitoring, and performance standards for jurisdictional wetlands and streams may be modified in accordance with any 404 permit issued for the project.	Attachment 1, Section 1.1.6.3 and Attachment 3, Section C.4	Wetlands and Other Waters of the U.S.
96	Evaluation	MMC will create 4.5 acres of new wetlands at the Little Cherry Creek Sites and 3 acres at the Gravel Pit Site for compensatory mitigation of avoidable effects on isolated wetlands. The monitoring of the mitigation sites is described in Section C.4 of Attachment 3.	Attachment 1, Section 1.1.6.3	Wetlands and Other Waters of the U.S.
97	Evaluation	MMC will comply with maintenance, monitoring, and performance standards for isolated wetlands to be developed by the Forest Service.	Attachment 1, Section 1.1.6.3 and Attachment 3, Section C.4	Wetlands and Other Waters of the U.S.

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
98	Evaluation	MMC will use Libby Creek Road (NFS road #231) and Upper Libby Creek Road (NFS road #2316)as the primary year-around access to the surface facilities at the Libby Adit Site during the Evaluation Phase. MMC installed a gate on Libby Creek Road. Unless as directed by the Forest Service or the Oversight Committee discussed in the grizzly bear mitigation plan, MMC will continue to maintain the gate and *the Forest Service will continue to seasonally restrict access on the two roads as long as MMC uses and snowplows the two roads during the Evaluation Phase.*	Attachment 1, Section 1.1.1.3.2	Wildlife
99	Evaluation	MMC will continue to snowplow the Libby Creek Road (NFS road #231) and Upper Libby Creek Road (NFS road #2316) to allow access during winter.	Attachment 1, Section 1.1.1.3.2	Wildlife
100	Evaluation	In the spring before the expected start-up of construction activities, if a wolf den or rendezvous site is located in or near the project facilities by FWP wolf monitoring personnel, MMC will provide funding for FWP personnel to implement adverse conditioning techniques before wolves concentrate their activities around the den site (in early to mid-March) to discourage use of the den.	Attachment 1, Section 1.1.6.3.6	Wildlife
101	Evaluation	MMC will fund FWP's aerial surveys for mountain goats along the east front of the Cabinet Mountains from the Bear Creek drainage south to the West Fisher drainage as described in the selected mine alternative.	Attachment 1, Section 1.1.6.3.6	Wildlife
102	Evaluation	If the full project is not approved after the Evaluation Phase, or if MMC decides not to proceed with the project, MMC will reclaim facilities associated with the evaluation program as outlined in the selected mine alternative.	Attachment 1, Section 1.1.1.3	All
Other Requirements				
103	Evaluation	Prior to the beginning of construction of mine and transmission line facilities, MMC will be required to obtain a MPDES permit for stormwater discharges associated with all construction activities. The permit will require MMC to prepare and implement a Stormwater Pollution Prevention Plan (SWPPP). BMPs will be developed in accordance with the Forest Service's 2012 *National Best Management Practices for Water Quality Management on NFS Lands*.	Attachment 3, Section C.10	Water Resources Aquatic Life and Fisheries
104	Evaluation	MMC will acquire a beneficial permit for the created wetlands if the DNRC determines water use for creating wetlands is a beneficial use.	Attachment 1, Section 1.1.3.4.2	Water Resources Wetlands and Other Waters of the U.S.

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
105	Evaluation	The Libby Adit will be dewatered and water will be treated before discharging to one of three permitted outfalls (MPDES permit MT0030279).	Attachment 1, Section 1.1.1.2	Water Resources
Pre-Construction				
		Stipulation/Mitigation Measures		
106	Pre-Construction	Before any ground-disturbing activities, MMC will complete preconstruction surveys as described in the selected mine and transmission line alternatives.	Attachment 1, Section 1.1.1.5.1 (mine) and Section 1.2.2 (transmission line) and Attachment 3	All resources
107	Pre-Construction	MMC will submit amended monitoring plans for all remaining phases consistent with 1) the revised Appendix C of the Final EIS; 2) the Terms and Conditions in the USFWS Biological Opinions (Attachment 6 and Attachment 7); 3) conditions of any other issued permit or approval, such as the 404 permit, the 401 certification, or a beneficial water use permit.	Attachment 1, Section 1.1.2.7.5 and Attachment 3	All resources
108	Pre-Construction	MMC will implement all monitoring for all resources required before initiating the Construction Phase, such as water resources, consistent with approved monitoring plans described in Stipulation 107.	Attachment 1, Section 1.1.2.7.5 and Attachment 3	All applicable resources
109	Pre-Construction	MMC will establish a trust fund and/or post a bond, to adequately fund implementation costs (planning, development, construction, and monitoring) during the Construction phase of the overall Bull Trout Mitigation Plan, the two Core Area Bull Trout Mitigation Guidance Plans (specifically including projected costs of implementing the mitigation plans described in Stipulations 67 through 81 and the Fisheries Monitoring Plan (see Stipulation 38).	Attachment 7, T&C for RPM 1, item 2.a.	Fisheries
110	Pre-Construction	MMC will make an initial deposit to the trust fund for the projects described in Stipulations 67 through 81.	Attachment 7, T&C for RPM 1, item 2.b.	Fisheries
111	Pre-Construction	MMC will separately commit to fund during the Construction Phase all costs associated with the Bull Trout Mitigation Coordinator and support (if that position is filled by a MMC employee or contractor), and costs of funding activities in Stipulation 82 (if implementation of Stipulation 82 activities occurs during the Construction Phase; see Stipulations 64, 65, 66, and 82).	Attachment 7, T&C for RPM 1, item 2.c.	Fisheries

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
112	Pre-Construction	No later than 2 calendar years from Forest Service issuance of authorization to implement the Evaluation Phase for the Montanore Project, MMC will prepare an overall bull trout mitigation audit report detailing and quantifying progress toward accomplishment of bull trout mitigation objectives. Findings and MMC recommendations will be presented for approval by the KNF, in consultation with the USFWS and FWP.	Attachment 7, T&C for RPM 1, item 2.d.	Fisheries
113	Pre-Construction	MMC will submit a tailing impoundment site exploration plan to the KNF for approval. MMC will complete a preliminary site exploration program to confirm the geotechnical suitability of the Poorman Impoundment Site and the Libby Plant Site.	Attachment 1, Section 1.1.1.5.3	Geotechnical Engineering
114	Pre-Construction	MMC will complete a field exploration program to collect data and material samples necessary for the final design. This program will consist of site reconnaissance and a drilling and sampling program to evaluate site surface and subsurface geology and foundation conditions, groundwater conditions and water quality, borrow material availability and geotechnical characteristics of foundation and borrow materials. Site data to be collected will include an assessment of artesian pressures and their potential influence on impoundment stability, an assessment of a subsurface bedrock ridge between Little Cherry Creek and the effect it may have on pumpback well performance, aquifer pumping tests to refine the impoundment groundwater model and update the pumpback well design, and site surface and subsurface geology to identify conditions such as preferential pathways that may influence the seepage collection system, the pumpback well system, or impoundment stability.	Attachment 1, Section 1.1.1.5.3	Geotechnical Engineering
115	Pre-Construction	MMC will update the seismic stability analysis using the most recent attenuation relationships that are based on instrumental records of attenuation collected in the United States and internationally (e.g., Spudich et al. 1999, Boore and Atkinson 2007, or Petersen et al. 2008).	Attachment 1, Section 1.1.1.5.3	Geotechnical Engineering
116	Pre-Construction	MMC will complete circular failure and block failure assessments through various critical dam sections, and through the foundation.	Attachment 1, Section 1.1.1.5.3	Geotechnical Engineering
117	Pre-Construction	MMC will update the pumpback well design and analysis using geologic and hydrologic data collected as part of the field exploration plan, with a focus on minimizing drawdown north of impoundment.	Attachment 1, Section 1.1.1.5.3	Geotechnical Engineering
118	Pre-Construction	MMC will avoid or minimize, to the extent practicable, filling wetlands and other waters of the U.S., such as described in Glasgow Engineering Group, Inc. (2010).	Attachment 1, Section 1.1.1.5.3	Geotechnical Engineering

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
119	Pre-Construction	Avoid or minimize, to the extent practicable, locating facilities (such as the Seepage Collection Pond and transmission line structures in the selected mine and transmission line alternatives) in a floodplain. If locating mine facilities in a floodplain cannot be avoided, an application for a floodplain permit will be submitted to the DNRC that provides details on the obstruction or use of a floodway floodplain, and a permit will be required before construction begins. If locating mine facilities in a floodplain cannot be avoided, an application for a floodplain permit will be submitted to the DNRC that provides details on the obstruction or use of a floodway floodplain and a permit will be required before construction. DNRC's permit decision and associated conditions on the floodplain permit for these facilities constitute compliance with requirements of Executive Order (EO) 11988 as amended by EO 13690 (See ROD Section 1.6.19).	Attachment 1, Section 1.1.1.5.3	Geotechnical Engineering
120	Pre-Construction	MMC will determine the proper thickener and distribution system and deposition plan for the tailings. MMC will develop an optimum filling plan and operation and monitoring manual that addresses plant operations, tailings thickening parameter tolerances, contingencies for tailings density not meeting specifications, monitoring of the thickening process, and reporting to the KNF.	Attachment 1, Section 1.1.1.5.3	Geotechnical Engineering
121	Pre-Construction	Before commencing operations, MMC will submit to the KNF for approval a general operation plan for the tailings impoundment site including a Fugitive Dust Control Plan as described in the selected mine alternative and its Air Quality Permit (MAQP #3788-00). The plan will include, at a minimum, the embankment and cell (if any) configurations, a general sprinkler arrangement, and a narrative description of the operation, including tonnage rates, initial area, and timing of future enlargement.	Attachment 1, Section 1.1.1.5.3	Geotechnical Engineering
122	Pre-Construction	Technical review of the final tailings facility design will be made by a technical advisory group (TAG) established by the lead agencies. The tailings TAG will be comprised of agency experts in geotechnical, geochemical, and water quality issues related to current practices in the construction, operation, and closure of tailings facilities. The tailings TAG's review will encompass the technical aspects of tailings design including impoundment groundwater model, the pumpback well system, and the short- and long-term stability of the tailings storage facility. MMC will fund an independent technical advisor(s) to assist the TAG if required by the KNF.	Attachment 1, Section 1.1.1.5.3	Geotechnical Engineering
123	Pre-Construction	MMC will submit data regarding the concentrations of potential pollutants in runoff and seepage from waste rock to the DEQ before storing waste rock at the tailings impoundment site.	Attachment 1, Section 1.1.2.4	Water Quality

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
124	Pre-Construction	MMC will submit an Operations, Maintenance and Surveillance Manual for the Libby Plant Site and Poorman Tailings Impoundment Site.	Attachment 1, Section 1.1.1.5.3	Geotechnical Engineering
125	Pre-Construction	MMC will submit a detailed final mine plan for KNF approval. Approval of the final design by the KNF is required before construction begins. Technical review of the final underground mine design will be made by a TAG established by the lead agencies. The tailings TAG will be comprised of agency personnel with a background in geotechnical engineering, underground mine design, and wilderness (to evaluate potential surface impacts in the CMW). MMC will fund an independent technical advisor(s) to assist the TAG if required by the agencies.	Attachment 1, Section 1.1.1.5.4	Geotechnical Engineering
126	Pre-Construction	MMC will design into the mine plan and implement the measures described in the selected mine alternative to reduce the risk of subsidence.	Attachment 1, Section 1.1.1.5.4	Geotechnical Engineering
127	Pre-Construction	MMC will perform pre-mining baseline topographic surveys over the ore body using aerial methods (LiDAR, InSAR, or equivalent) approved by the agencies. Surveys will 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, landslides, etc.), and (b) as a reference point for measuring any suspected mining-related subsidence.	Attachment 1, Section 1.1.1.5.4	Geotechnical Engineering
128	Pre-Construction	MMC will reference the Troy Mine experience in its pillar designs, and highlight how the new designs account for and differ from failed designs at the Troy Mine.	Attachment 1, Section 1.1.1.5.4	Geotechnical Engineering
129	Pre-Construction	MMC will undertake numerical modeling to further evaluate expected underground mine design performance, including the potential for shear failure at the pillar/roof or pillar/floor interface.	Attachment 1, Section 1.1.1.5.4	Geotechnical Engineering
130	Pre-Construction	MMC will obtain data regarding the mine's structural setting through lineament analysis of surface features, joint mapping and statistical analysis of joint frequency and attitude, strain-relief overcoring to measure the horizontal stress field, and further exploratory drilling.	Attachment 1, Section 1.1.1.5.4 and Attachment 3, Section C.7	Geotechnical Engineering
131	Pre-Construction	MMC will submit a final Soil Salvage and Handling Plan consistent with the selected mine alternative to the KNF for approval.	Attachment 1, Section 1.1.1.5.2 (plan) and Sections 1.1.2.2.2-4 (construction)	Soils and Reclamation

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
132	Pre-Construction	MMC will follow the Final Road Design Process (Libby Creek Road Reconstruction and US 2 improvements) described in the selected mine alternative.	Attachment 1, Section 1.1.1.5.6	Transportation
133	Pre-Construction	MMC will update the Road Management Plan for KNF approval to address all new and reconstructed roads used for the mine and transmission line and roads required to be closed or stabilized for wildlife mitigation.	Attachment 1, Section 1.1.1.3.1 and Section 1.1.1.5.2	Transportation Water Resources
134	Pre-Construction	MMC will prepare a Vegetation Removal and Disposition Plan for KNF approval.	Attachment 1, Section 1.1.1.5.2 (mine) and Section 1.2.8 (transmission line)	Vegetation
135	Pre-Construction	MMC will modify its existing Weed Control Plan and submit it for approval to the KNF and the Lincoln County Weed Control District. For vegetation monitoring requirements related to noxious weeds, see Section C.8 of Attachment 3 to the ROD.	Attachment 1, Section 1.1.1.5.2 and Attachment 3, Section C.8 (monitoring)	Vegetation
136	Pre-Construction	*The Forest Service will ensure that MMC complies with mitigation plan requirements concerning the law enforcement officer, grizzly bear specialist, and grizzly bear habitat conservation specialist (see Stipulations 50 through 52).*	Attachment 4, Item A.3.a.	Wildlife
137	Pre-Construction	*The Forest Service will also ensure that MMC provides bear resistant garbage receptacles for all Forest Service campgrounds and sites where garbage facilities are normally provided within the Cabinet portion of the CYRZ.* If RC Resources has already completed most of this work, MMC will replace or maintain receptacles where needed.	Attachment 4, Item A.3.b.	Wildlife
138	Pre-Construction	MMC will use segments of NFS roads #231, #278, and #4781 as the main access between US 2 and the main haul road between the Libby Adit Site and the Poorman Impoundment Site.	Attachment 6, Term and Condition 2b	Wildlife
139	Pre-Construction	MMC will fund or implement, under Forest Service direction, the conversion of gated NFS roads 2317, 4781 and 6701, or portions thereof to a trail and barriered road and the conversion of gated roads 2316 and 6702 to barriered roads.	Attachment 4, Item B.1.b, Table 3	Wildlife
140	Pre-Construction	MMC will fund or implement, under Forest Service direction, the conversion of existing gated NFS road 4725 to a barriered road.	Attachment 4, Item B.1.b, Table 3	Wildlife

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
141	Pre-Construction	MMC will fund or implement, under Forest Service direction, the installation of an earthen barrier on NFS road 14442 to convert it from a seasonally restricted road to a closed road, and on NFS roads 6205D, 6787B, 6209E, 4776B to convert them from currently open roads to closed roads.	Attachment 4, Item E.2, Table 3	Wildlife
142	Pre-Construction	MMC will secure or protect (through conservation easement or acquisition in fee with conveyance of fee or perpetual conservation easement to the Forest Service) from development as described and identified on the priority list and mitigation credit process paper. MMC will coordinate with KNF, FWP and USFWS to modify priorities as needed. Costs of processing fee lands or preparing and accepting conservation easement by the Forest Service for these acres will be funded by MMC. Requirements for habitat replacement are specified in Items C.1, C.2.a-e, and Table 4 of Attachment 4.	Attachment 4, Item C.1, C.2a-e, Table 4	Wildlife
143	Pre-Construction	MMC will secure or protect (through conservation easement or acquisition in fee with conveyance of fee or perpetual conservation easement to the Forest Service) from development as described and identified on the priority list and mitigation credit process paper. MMC will coordinate with KNF, FWP and USFWS to modify priorities as needed. Costs of processing fee lands or preparing and accepting conservation easement by the Forest Service for these acres will be funded by MMC. Requirements for habitat replacement are specified in Items C.1, C.2.a-e, and Table 4 of Attachment 4. Required compensation is less than compensation described in the FEIS due to the change in main access road from the Bear Creek Road to the Libby Creek Road.	Attachment 4, Item C.1, C.2a-e, Table 4	Wildlife
144	Pre-Construction	MMC will plan, fund, and implement access management strategies on acquired mitigation land parcels consistent with the intent of the mitigation plan to improve core and access parameters (road densities) before the parcels are transferred to the Forest Service. MMC will develop the strategies in coordination with the Forest Service and USFWS and *the strategies will be approved by both agencies.*	Attachment 6, T&C for RPM 2, item 2.c.	Wildlife
145	Pre-Construction	MMC will plan, fund, and implement any habitat enhancement activities needed to improve the mitigation properties acquired during the Pre-construction Phase, such as the trail conversion, road access changes or removal of buildings and debris, before the title or a conservation easement is conveyed to the Forest Service.	ROD, Section 1.4.1.3.	Wildlife

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
146	Pre-Construction	MMC will contribute funding through the reclamation phase to support ongoing research and monitoring conducted/directed by USFWS of bear movements and population status in the Cabinet Mountains to confirm the effectiveness of mitigation measures. Specific research activities to be funded and funding conditions are specified in item F.5 of Attachment 4.	Attachment 4, Item F.5	Wildlife
147	Pre-Construction	MMC will fund for 3 years monitoring of grizzly and black bear movement along US Hwy 2 south of Libby conducted or coordinated by the USFWS. Specific research activities and supplies to be funded and funding conditions are specified in Item D.3 of Attachment 4.	Attachment 4, Item D.3	Wildlife
148	Pre-Construction	MMC will develop a public outreach (information and educational) plan in detail for KNF approval before the start of the Construction Phase and continue through life of mine. Details of the activities involved in developing and implementing the program are specified in Appendix I of the grizzly bear Biological Opinion.	Attachment 6, T&C for RPM 1, items 1.a and 1.b. ROD Section 1.4.1.3	Wildlife
149	Pre-Construction	If RC Resources, Inc. has not funded a second grizzly bear specialist position as part of mitigation for the Rock Creek Project, then MMC will continue to fund the additional grizzly bear specialist. Requirements for funding of the second grizzly bear specialist are specified in item A.2.a of Attachment 4. See A.2.a.i for exception if Rock Creek Project is concurrent.	Attachment 4, Item A.2.a	Wildlife
150	Pre-Construction	MMC will fund and implement a long-term public attitude and input survey so the public outreach and information and education program described in Stipulation 148 can be appropriately adapted.	Attachment 4, Item A.2.b	Wildlife
151	Pre-Construction	MMC will fund an additional 100 bear resistant garbage containers plus 20 bear resistant garbage containers per year for distribution, under direction of the grizzly bear specialists, to new mine employees and the general public.	Attachment 4, Item A.2.c	Wildlife
152	Pre-Construction	MMC will 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) first within the Cabinet Mountain portion of the CYRZ, then within the entire CYRZ. If containers are acquired in BMUs 4, 5, 6, 7, and 8 as part of the Rock Creek Project mitigation, then MMC will fund replacement and maintenance of the containers in these BMUs.	Attachment 4, Item A.2.d	Wildlife

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
153	Pre-Construction	MMC will 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 Montanore Mine, except as rehabilitation on closed roads, on mitigation habitat where attracting bears will be encouraged, or for closure activities as it relates to habitat.	Attachment 4, Item A.2.e	Wildlife
154	Pre-Construction	MMC will post a bond to or make payment to a trust fund to cover the cost of construction phase mitigation. MMC will post a bond to adequately fund the mitigation plan implementation costs. The Oversight Committee will determine the amount of trust fund deposits, to be made in 5-year increments over the life of the mine. If implementation costs prior to or during the construction phase exceed the amount deposited in the trust fund/and or bond, MMC will contribute additional funds to fully implement those actions in a timely manner (as determined by the KNF in consultation with the USFWS).	Attachment 4, Item F.3.a	Wildlife
155	Pre-Construction	Continue development and revision of Grizzly bear Management Plan and processes contained within as necessary.	Attachment 4, Item F.4	Wildlife
156	Pre-Construction	MMC will fund habitat enhancement on 526 acres of lynx stem exclusion habitat. Habitat enhancement activities are specified in Lynx, Item A in Attachment 4.	Attachment 4, Lynx, Item A	Wildlife
157	Pre-Construction	*The Forest Service will monitor new snow compaction activities in the Montanore Project area from access roads for life of mine and take appropriate action if compaction monitoring identifies increased lynx predator access to new areas.*	Attachment 4, Lynx Item B	Wildlife
Construction				
		Stipulation/Mitigation Measures		
158	Construction	MMC will establish permit area boundaries around each mine facility. Disturbance area boundaries around the plant site and tailings impoundment site will be marked in the field with fence posts or fenced and signed to limit potential disturbance outside permitted disturbance areas. Fences, if used, will be designed and built to avoid debris jams at stream crossings.	Attachment 1, Section 1.1.2.1	All resources
159	Construction	MMC will mark specified right-of-way boundaries, work areas, access roads, and other features for the transmission line with painted laths or flags. Markers will be maintained until final cleanup and/or reclamation is completed, after which they will be removed.	Attachment 1, Section 1.2.6	All resources

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
160	Construction	MMC will update its closure plan, including a long-term monitoring plan, during the Construction Phase in sufficient detail to allow development of a reclamation bond. MMC will periodically revise its closure plan to incorporate new reclamation techniques, and the bond will be updated accordingly. A final closure and post-closure plan, including a long-term monitoring plan, will be submitted 3 to 4 years before mine closure (see Stipulations 241 and 248).	Attachment 1, Section 1.1.2.7.1	All resources
161	Construction	MMC will begin air resources monitoring at the commencement of mill facilities or the tailings impoundment and will continue air monitoring for at least 1 year after normal production is achieved. For a full description of this stipulation, please see Section C.2 of Attachment 3.	Attachment 3, Section C.2, Air Quality Permit	Air Quality
162	Construction	Once the power is available from a transmission line, the generators at the Libby Adit Site will be moved to the Libby Plant Site and used as a backup power source. The backup generators at the mill after power was available from a transmission line will not be used more than 16 hours during any rolling 12-month period.	Attachment 1, Section 1.1.2.3, Air Quality Permit	Air Quality
163	Construction	The Rock Lake ventilation adit will be used only as an air intake adit and any pollutant emissions from the adit is prohibited.	Attachment 1, Section 1.1.2.3	Air Quality
164	Construction	The conveyor and three transfer points will be fully enclosed to minimize emissions, contact with precipitation, and loss of ore. Any spillage will be promptly cleaned up to avoid contact with precipitation.	Attachment 1, Section 1.1.3	Air Quality Water Resources
165	Construction	MMC will continue to conduct aquatic biological monitoring (see Stipulation 87) as described in Section C.11 of Attachment 3 at stream stations that are within and downstream of disturbance area boundaries and at benchmark stations that are upstream of potential influence from the project.	Attachment 3, Section C.11	Aquatic Life and Fisheries
166	Construction	Within 5 years of MMC receiving Forest Service authorization to commence the Construction Phase, MMC will fully complete, unless otherwise agreed to by Forest Service in consultation with the USFWS, implementation of mitigation measures identified, and approved by Forest Service in consultation with USFWS, in the overall Bull Trout Mitigation Plan (Attachment 5). With this authorization, MMC will also implement the two Core Area Bull Trout Mitigation Guidance Plans (specifically the projects described in Stipulations 67 through 81), and continuation of the Fisheries Monitoring Plan (see Stipulation 38).	Attachment 7, T&C for RPM 1, item 3.a.	Aquatic Life and Fisheries

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
167	Construction	MMC will separately commit to fund and otherwise support all costs and activities associated with the Bull Trout Mitigation Coordinator (see Stipulations 64, 65, 66, 82, and 111) (including administrative support), and to completing activities in Stipulation 82 (if implementation of Stipulation 82 activities occurs during the Construction Phase.	Attachment 7, T&C for RPM 1, item 3.b.	Aquatic Life and Fisheries
168	Construction	Prior to Forest Service authorization to initiate the Operations Phase, MMC will contribute funds to the trust fund and/or post a bond (see Stipulation 109), to fund any remaining implementation costs during the Operations phase of the overall Bull Trout Mitigation Plan (Attachment 5), the two Core Area specific Bull Trout Mitigation Guidance Plans, and continuation of the Fisheries Monitoring Plan. *The amount in the trust fund or posted in a bond will be approved by the Forest Service in consultation with the USFWS (and other stakeholders as determined by the Forest Service), and will be commensurate with projected mitigation planning, coordination, study, monitoring, design, construction, and other conservation activities needed to accomplish the mitigation projects in a timely manner within the Operations Phase of the Montanore Mine Project, as defined in the Core Area Bull Trout Mitigation Guidance Plans (see Stipulations 67 through 81 and the Fisheries Monitoring Plan (see Stipulation 38).*	Attachment 7, T&C for RPM 1, item 4.a.	Aquatic Life and Fisheries
169	Construction	MMC will separately commit to funding costs associated with the Bull Trout Mitigation Coordinator (see Stipulations 64, 65, 66, 82, 111, and 167) and administrative support and to costs of funding activities identified in the Fisheries Monitoring Plan (see Stipulation 38).	Attachment 7, T&C for RPM 1, item 4.b.	Aquatic Life and Fisheries
170	Construction	Prior to authorization of the Operation phase, and not later than two calendar years from Forest Service authorization of the Construction phase for the Montanore Project, MMC will prepare an overall bull trout mitigation audit report detailing and quantifying progress toward accomplishment of bull trout mitigation objectives. Findings and MMC recommendations will be presented for approval by the Forest Service, in consultation with the USFWS and FWP.	Attachment 7, T&C for RPM 1, item 4.c.	Aquatic Life and Fisheries
171	Construction	*The KNF will contact the Confederated Salish and Kootenai Tribes and Kootenai Tribe of Idaho, and the tribes will be afforded the opportunity to monitor construction activities associated with the mine on state and federal lands.* *For a full description of this stipulation, please see Section C.3 of Attachment 3.*	Attachment 3, Section C.3	Cultural Resources

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
172	Construction	The tailings pipeline will be constructed according to the specifications in the selected mine alternative.	Attachment 1, Section 1.1.3.3.1	Geotechnical Engineering Water Resources
173	Construction	MMC will fund a third party technical advisor to assist the agencies with tailings impoundment quality assurance and quality control oversight during construction.	Attachment 1, Section 1.1.1.5.3	Geotechnical Engineering
174	Construction	MMC will fund a third party technical advisor to assist the agencies with underground mine quality assurance and quality control oversight during construction.	Attachment 1, Section 1.1.1.5.4	Geotechnical Engineering
175	Construction	MMC will implement measures to reduce the risk of subsidence according to the selected mine alternative and the agency-approved mine plan.	Attachment 1, Section 1.1.1.5.4 and Attachment 3, Section C.7	Geotechnical Engineering
176	Construction	MMC will develop a new hiking trail between Poorman and Ramsey Creeks to provide nonmotorized access to upper Ramsey Creek.	Attachment 1, Section 1.1.2.6.1	Recreation
177	Construction	MMC will design and construct a scenic overlook with information and interpretive signs on NFS road #231 (Libby Creek Road) downstream of the Midas Creek crossing with views of the tailings impoundment. MMC will develop two interpretative signs – one on the mining operation and another one on the mineral resource and geology of the Cabinet Mountains. Parking will be developed in cooperation with the KNF.	Attachment 1, Section 1.1.2.7.2	Recreation
178	Construction	MMC will pay the reimbursement funding for a volunteer campground host from Memorial Day through Labor Day at Howard Lake Campground during the Construction and Operation Phases of the mine.	Attachment 1, Section 1.1.2.7.2	Recreation
179	Construction	MMC will shield or baffle night lighting at all facilities.	Attachment 1, Section 1.1.2.7.2	Scenery Wildlife
180	Construction	MMC will submit plans and specifications to the KNF to locate aboveground facilities, to the greatest extent practicable, without the facilities being visible above the skyline as viewed from the Key Observation Points.	Attachment 1, Section 1.1.2.7.2	Scenery
181	Construction	MMC will implement the approved Soils Salvage and Handling Plan (see Stipulation 131) during the Construction Phase and continue to implement the plan whenever soil is removed, stockpiled, or replaced. MMC will salvage soils in all disturbed areas, with the exception of slopes exceeding 50 percent and soil stockpiles.	Attachment 1, Section 1.1.2.2.2	Soils and Reclamation

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
182	Construction	For two-lift soil salvages, MMC will segregate soils according to erodibility (i.e., rock fragment content) and first lift versus second lift.	Attachment 1, Section 1.1.2.2.3	Soils and Reclamation
183	Construction	MMC will incrementally stabilize soil stockpiles (rather than waiting until the design capacity is reached) to reduce erosion and maintain soil biological activity in the surface. Seeding should be done as soon after disturbance as possible rather than waiting until the next appropriate season.	Attachment 1, Section 1.1.2.2.3	Soils and Reclamation
184	Construction	MMC will immediately seed road cuts-and-fills to reduce erosion on Forest Service roads regardless of planting time. To the extent possible, MMC will stockpile soils in clearings or recent timber harvest areas that are immediately adjacent to new roads, which will be operational for mine life, rather than stockpiling along the entire road corridor.	Attachment 1, Section 1.1.2.2.3	Soils and Reclamation
185	Construction	Direct haul soil salvage and replacement will be required for use whenever, and as much as possible, to enhance revegetation success of native unseeded species.	Attachment 1, Section 1.1.2.2.4	Soils and Reclamation
186	Construction	Disturbances that will be reclaimed during construction (e.g. road cut-and-fill slopes, and transmission line structure locations,) will be reclaimed as soon as final grades are achieved with direct haul soil or soil that had been stockpiled for less than 1 year.	Attachment 1, Section 1.1.2.2.4	Soils and Reclamation
187	Construction	Before operation activities, MMC will submit a reclamation monitoring plan that will establish the soil testing protocol to determine the appropriate fertilizer mix required for successful reclamation. The final monitoring plan will describe sample locations, frequency, and analysis. In addition, MMC and the lead agencies will establish reclamation monitoring control sites for the project. MMC will develop a vegetation monitoring plan from these sites and collect vegetation data during the mine life. For a full description of this stipulation, please see Section C.8 of Attachment 3.	Attachment 3, Section C.8	Soils and Reclamation
188	Construction	MMC will fund and implement road improvements to US 2 and intersections with US 2 required by MDT.	Attachment 1, Section 1.1.6.2.1	Transportation
189	Construction	MMC will fund and implement improvements to the Main Haul Road (graveled recreation parking area at the gate on the Poorman Creek Road, bridge across Ramsey Creek, etc.) as described in the selected mine alternative.	Attachment 1, Section 1.1.6.2.1	Transportation

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
190	Construction	MMC will make improvements to the following roads as described in the selected mine alternative: 1) the segments of NFS roads #2317, #4781, #6210, and #2316 used as the main haul road between the Libby Adit Site and the Poorman Impoundment Site; 2) the segment of NFS road #2316 west of the Libby Adit Site used for access to the Upper Libby Adit Site; and 3) Libby Creek Road from the junction with Bear Creek Road to the junction with NFS road #2316, just north of the Ramsey Creek bridge, a distance of 2 miles.	Attachment 1, Section 1.1.6.2.1	Transportation
191	Construction	MMC will reconstruct Libby Creek Road within the existing right-of-way, or obtain easements from the existing owner for reconstruction outside of the existing right-of-way, as described in the selected mine alternative.	Attachment 1, Section 1.1.6.2.1	Transportation
192	Construction	During road construction, MMC will maintain access and continue snowplowing as described in the selected mine alternative.	Attachment 1, Section 1.1.6.2.1	Transportation
193	Construction	*The KNF will discuss with Lincoln County if it wants ownership of Bear Creek Road.*	Attachment 1, Section 1.1.6.2.1	Transportation
194	Construction	MMC will restrict any new, gated, or barriered road used for construction and decommissioning of the transmission line from all motorized access with a gate or earthen barrier prior to general hunting season	Attachment 1, Section 1.1.6.3.6	Transportation Wildlife
195	Construction	MMC will complete vegetation clearing according to the selected mine and transmission line alternatives and the agency-approved Vegetation Removal and Disposition Plan (see Stipulation 134).	Attachment 1, Section 1.1.1.5.2 (mine), Section 1.1.2.7.2 (scenery), and Section 1.2.8 (transmission line)	Vegetation Scenery Wildlife
196	Construction	MMC will implement the agency-approved Weed Control Plan (see Stipulation 135) and noxious weed mitigation measures described in the selected mine alternative.	Attachment 1, Section 1.1.2.2.5	Vegetation
197	Construction	MMC will leave snags within the disturbance area of the mine and the clearing width of the transmission line, unless required to be removed for safety or operational reasons. This mitigation will be incorporated into the Vegetation Removal and Disposition Plan (see Stipulation 134).	Attachment 1, Section 1.1.6.3.6	Wildlife

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
198	Construction	MMC will leave large woody material for small mammals and other wildlife species within the cleared transmission line corridor on National Forest System lands as described in the selected transmission line alternative.	Attachment 1, Section 1.2.13.1	Vegetation Wildlife
199	Construction	Before soil removal, merchantable timber will be measured, purchased from the KNF, and then cleared. Non-merchantable trees, coniferous forest debris, and slash from vegetation clearing in the mine disturbance areas and along the transmission line will be managed in accordance with Montana law regarding reduction of slash (76-13-407, MCA) and, on National Forest System lands, KNF objectives regarding fuels reduction. Except where used in wildlife or fisheries mitigation, excess slash will be removed or burned in all timber clearing areas and within 0.5 mile of any residence. Slash management on Plum Creek and other private lands not owned by MMC will be in accordance with Montana law and the landowner/MMC easement agreement. Non-merchantable trees and coniferous forest debris will be removed using a brush blade or excavator to minimize soil accumulation. MMC will comply with DNRC open burning requirements.	Attachment 1, Section 1.1.2.2.1, Attachment 8, Section 2.14	Vegetation
200	Construction	Where possible, slash of non-coniferous forest debris or dead coniferous forest snags will be salvaged and chipped to be sold, used as mulch, or used as an additive to stored soil. All mulching materials will be certified weed-seed free.	Attachment 1, Section 1.1.2.2.1	Vegetation
201	Construction	MMC will install pumpback recovery wells to collect tailings seepage not intercepted by the Seepage Collection System. The pumpback recovery wells will be located beyond the dam toe of the tailings impoundment and will be designed to collect seepage not collected by the drain system. MMC will monitor downgradient wells to detect any groundwater quality changes. If water quality changes at compliance wells due to inadequate capture by the pumpback recovery wells, MMC will be required to increase pumping rates or install additional pumpback wells.	Attachment 1, Section 1.1.2.5.3	Water Resources
202	Construction	MMC will construct a Seepage Collection Pond and return facility 500 feet west of Libby Creek, 500 feet downstream of the impoundment. The facility design will include collection of water from the impoundment seepage collection drains, the groundwater relief drains, and runoff from the downstream slope and toe area of the tailings dam facility.	Attachment 1, Section 1.1.2.5.3	Water Resources

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
203	Construction	A pump station will be located on the west side of the Seepage Collection Pond. The return water pipelines will plumb either into the return water lines in the thickener plant or into the tailings facility where the water will combine with the tailings water and then will be recovered through the tailings impoundment return water system. The pumps will be rated at 125 percent of the estimated maximum flow into the ponds.	Attachment 1, Section 1.1.2.5.3	Water Resources
204	Construction	MMC will conduct Construction Phase water resources monitoring (surface and groundwater monitoring, groundwater dependent ecosystem inventory and monitoring, suspended sediment monitoring, and water balance) as described in Section C.10 of Attachment 3.	Attachment 3, Section C.10	Water Resources
205	Construction	Construction Phase and Operations Phase diversions and discharges will be consistent with the requirements of the selected mine alternative.	Attachment 1, Section 1.1.3.4.2	Water Resources Water Rights
206	Construction	MMC will continue to use an on-site sewage treatment and disposal system at the Libby Adit Site (see Stipulation 86).	Attachment 1, Section 1.1.3.5	Water Resources
207	Construction	MMC will treat and discharge stored water at rate equal to all Libby Creek appropriations whenever flow at LB-2000 is less than 40 cfs.	Attachment 1, Section 1.1.3.4.2	Water Rights
208	Construction	MMC will not conduct any blasting at the entrance to any adit portals during May 15 to June 15 to avoid disturbance to the potential goat kidding area on Shaw Mountain.	Attachment 1, Section 1.1.6.3.6	Wildlife
209	Construction	MMC will either: 1) not clear vegetation or conduct other construction activities during the breeding season (February 1 to August 15) in potential bald eagle nesting habitat; or 2) fund or conduct field and/or aerial reconnaissance surveys to locate any new bald eagle or osprey nests along specific segments of the transmission line corridor. Surveys will be conducted between March 15 and April 30, one nesting season immediately before transmission line construction.	Attachment 1, Section 1.2.13.2.1 Attachement 8, Appendix I	Wildlife
210	Construction	All shrub habitat will be retained in wetlands and riparian areas crossed by the transmission line. Wetlands avoidance, minimization, and mitigation and avoidance measures also will ensure that impacts on western toad breeding habitat are minimized.	Attachment 1, Section 1.2.13.2.2	Wildlife
211	Construction	MMC will not conduct transmission line construction activities in elk, white-tailed deer, or moose winter range between December 1 and April 30.	Attachment 1, Section 1.2.13.2.3 Attachment 8, Appendix I	Wildlife

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
212	Construction	To minimize avian collisions with the transmission line, MMC will ensure the recommendations outlined in the selected transmission line alternative are implemented.	Attachment 1, Section 1.2.13.3	Wildlife
213	Construction	MMC will conduct all transmission line construction activities within on National Forest System and State trust lands in the CYRZ and Cabinet Face BORZ, including use of the helicopters, between June 16 and October 14.	Attachment 4, Item A.4, Attachment 8, Appendix I	Wildlife
214	Construction	MMC will remove temporary roads built for transmission line installation on NFS lands.	Attachment 4, Item E.3.a	Wildlife
Operations				
		Stipulation/Mitigation Measures		
215	Operations	Mining and milling operations will be conducted as described in the selected mine alternative.	Attachment 1, Section 1.1.3.1 and Section 1.1.3.2	All
216	Operations	MMC will manage tailings as described in the selected mine alternative.	Attachment 1, Section 1.1.3.3	All
217	Operations	MMC will continue (see Stipulation 87) to conduct aquatic biological monitoring as described in Section C.11 of Attachment 3 at stream stations that are within and downstream of disturbance area boundaries and at benchmark stations that are upstream of potential influence from the project.	Attachment 3, Section C.11	Aquatic Life and Fisheries
218	Operations	MMC will fully complete, unless otherwise agreed to by Forest Service in consultation with the USFWS, implementation of mitigation measures and activities identified, and approved by Forest Service in consultation with the USFWS, in the overall Bull Trout Mitigation Plan (Attachment 5), the two Core Area specific Bull Trout Mitigation Guidance Plans and the Fisheries Monitoring Plan.	Attachment 7, T&C for RPM 1, item 5.a.	Aquatic Life and Fisheries
219	Operations	Beginning not later than eight calendar years from Forest Service final authorization for MMC to commence the Evaluation Phase for the Montanore Project, MMC will prepare an overall bull trout mitigation audit report detailing and quantifying progress toward accomplishment of bull trout mitigation objectives. A bull trout mitigation audit report will be prepared for Forest Service approval every three years throughout the Operation phase. Findings and MMC recommendations will be presented for approval by the Forest Service, in consultation with the USFWS and FWP.	Attachment 7, T&C for RPM 1, item 5.b.	Aquatic Life and Fisheries

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
220	Operations	MMC will separately commit to fund and otherwise support throughout the Operation phase all costs and activities associated with the Bull Trout Mitigation Coordinator (see Stipulations 64, 65, 66, 82, 111, 167, and 169) and administrative support, and to costs of funding activities identified in the Fisheries Monitoring Plan (see Stipulation 38).	Attachment 7, T&C for RPM 1, item 5.c.	Aquatic Life and Fisheries
221	Operations	Communications (telephone, etc.) for the project will be provided as described in the selected mine alternative.	Attachment 1, Section 1.1.3.6	Communications
222	Operations	Operational geochemical sampling and analysis will be conducted as described in Section C.9.5 of Attachment 3.	Attachment 3, Section C.9.5	Geochemistry
223	Operations	MMC will fund a third party technical advisor to assist the KNF with tailings impoundment quality assurance and quality control oversight during operations.	Attachment 1, Section 1.1.1.5.2	Geotechnical Engineering
224	Operations	MMC will fund a third party technical advisor to assist the KNF with underground mine quality assurance and quality control oversight during operations. The technical advisor will assist the KNF in evaluating underground mine stability and adherence to the approved mine plan. MMC will facilitate underground inspections by the third-party technical advisor that may occur as frequently as quarterly. The technical advisor will compile the results into an annual report and submit it to the KNF.	Attachment 1, Section 1.1.1.5.4 and 1.1.3.1.3	Geotechnical Engineering
225	Operations	MMC will compile the results from its surface and underground monitoring programs as developed during the final design process, and provide the results to the agencies in an annual report.	Attachment 1, Section 1.1.3.1.3	Geotechnical Engineering
226	Operations	Solid waste (excluding domestic/sanitary) will be transported off-site to the Lincoln County landfill.	Attachment 1, Section 1.1.3.5	Solid Waste Management
227	Operations	Reinforced concrete foundation material may be buried on National Forest System lands under certain conditions; all other building materials will be removed and disposed of at an approved off-site waste disposal facility.	Attachment 1, Section 1.1.3.5	Solid Waste Management
228	Operations	MMC will be responsible for maintaining all existing or new roads and stream crossings used by the mine.	Attachment 1, Section 1.1.3.6	Transportation
229	Operations	During operations, MMC will use a supply staging area in Libby where shipments to the mine site will be consolidated to minimize traffic.	Attachment 1, Section 1.1.1.3.1	Transportation

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
230	Operations	MMC will conduct vegetation monitoring, including noxious weed monitoring, every 2 years during operations at sites representative of various types of disturbance as described in Section C.8 of Attachment 3. Disturbed/reclaimed control sites will be established to provide information on site conditions.	Attachment 3, Section C.8	Vegetation
231	Operations	MMC will maintain a detailed water balance that will be used to monitor water use.	Attachment 1, Section 1.1.3.4.1	Water Resources
232	Operations	Water treatment will be conducted as described in the selected mine alternative.	Attachment 1, Section 1.1.3.4.3	Water Resources
233	Operations	Excess water will be managed as described in the selected mine alternative.	Attachment 1, Section 1.1.3.4.5	Water Resources
234	Operations	MMC will conduct Operations Phase water resources monitoring (surface and groundwater monitoring, groundwater dependent ecosystem inventory and monitoring, suspended sediment monitoring, and water balance) as described in Section C.10 of Attachment 3.	Attachment 3, Section C.10	Water Resources
235	Operations	By Year 5 of operations, MMC will assess the need for barrier pillars and/or bulkheads to minimize changes in East Fork Rock Creek and East Fork Bull River streamflow (See Stipulation 267). If needed, MMC will submit a revised mine plan to the agencies for approval. One or more barriers will be maintained underground, if necessary, after the plan's approval.	Attachment 1, Section 1.1.3.1.2	Water Resources
236	Operations	MMC will treat all unpaved portions of the haul roads, access roads, parking lots, or the general plant area with chemical stabilization (no salt, oil, or similar petroleum-derivatives), groundwater, or water with nitrate concentrations of 1 mg/L or less and with concentrations of all other parameters less than the mine drainage ELG. See also Stipulation 20.	Attachment 1, Section 1.1.3.4.4 and Attachment 8, Section 2.8.3	Water Resources Air Quality
237	Operations	Final stabilization using vegetation will be accomplished using the seed mixture approved by the agencies for Alternative 3.	Attachment 3, Section C.10	Water Resources Aquatic Life and Fisheries
238	Operations	MMC will continue (see Stipulation 86) to use an on-site sewage treatment and disposal system, but the effluent will be discharged to the tailings impoundment for final disposal. The effluent from the septic tanks will be disinfected before pumping it to the impoundment, and disinfection will be by chlorination, ozonation, or ultraviolet light.	Attachment 1, Section 1.1.3.5	Water Resources

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
239	Operations	MMC will convey the title or a perpetual conservation easement of the Swamp Creek mitigation site to the Forest Service after the Corps has determined the site's performance standards have been met. The requirements for conveyance are described in the grizzly bear mitigation plan (KNF's Biological Assessment). MMC will convey any water right used for the Swamp Creek site to the Forest Service when the title or a perpetual conservation easement of the Swamp Creek mitigation site is conveyed to the Forest Service.	Attachment 1, Section 1.1.6.2.1 and Attachment 4	Wetlands and Other Waters of the U.S.
240	Operations	If the title to or a perpetual conservation easement on Little Cherry Creek mitigation sites had not already been conveyed as part of the grizzly bear mitigation plan, MMC will convey the title or a perpetual conservation easement on the Little Cherry Creek mitigation sites to the Forest Service when the sites' performance standards have been achieved. Conveyed lands will be contiguous to the isolated wetland mitigation sites, adjacent existing wetlands, and National Forest System lands. The requirements for conveyance are described in the grizzly bear mitigation plan (Attachment 4).	Attachment 1, Section 1.1.6.3	Wetlands and Other Waters of the U.S.
241	Operations	MMC will submit a final closure and post-closure water resources monitoring plan 3 to 4 years before mine closure. The plan will incorporate monitoring information obtained during the mining period in the design of monitoring locations and sampling frequency. The plan will include measuring water levels in the mine void through the Rock Lake Ventilation Adit. Mine water quality and geochemical analysis of rock surrounding the mine void will be made during the Operations Phase. Hydrologic data will be collected in all phases through the Operations Phase and will be integrated into the groundwater model. The need for continued monitoring beyond the Closure Phase will be based on these data.	Attachment 3, Section C.10	Water Resources
242	Operations	*The Forest Service will complete an environmental assessment for potential access management changes on National Forest System lands indirectly affected by habitat enhancement activities on acquired parcels within the CYE Recovery Zone within 5 years from the start of the Construction Phase, and to implement these approved access changes within 2 years of that decision signing.*	Attachment 6, T&C for RPM 2, items 2d and 2.e.	
Other Requirements				
243	Operations	MMC will implement the Fugitive Dust Control Plan at the tailings impoundment throughout operations along with other requirements of its Air Quality Permit (MAQP #3788-00) (see Stipulation 121).	Attachment 1, Section 1.1.3.3.1	Air Quality

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
244	Operations	MMC will implement the emission control requirements of its Air Quality Permit (MAQP #3788-00).	Attachment 1, Section 1.1.3.4.6	Air Quality
End of Operations				
		Stipulation/Mitigation Measures		
245	End of Operations	Prior to authorization of the Closure and Reclamation phase, MMC will prepare an overall bull trout mitigation audit report detailing and quantifying progress toward accomplishment of bull trout mitigation objectives. The audit report will include documentation of the extent and magnitude of take that occurred to bull trout as a result of the Proposed Action. Findings and MMC recommendations will be presented for approval by the Forest Service, in consultation with the USFWS and FWP.	Attachment 7, T&C for RPM 1, 6.a., ROD Section 1.4.1.3	Aquatic Life and Fisheries
246	End of Operations	Prior to authorization of the Closure and Reclamation phase, MMC will contribute adequate funds to the trust fund and/or post a bond, to fund implementation, maintenance, and monitoring costs during the Closure and Reclamation phases (and in perpetuity, if deemed appropriate) of the overall Bull Trout Mitigation Plan (Attachment 5), the two Core Area specific Bull Trout Mitigation Guidance Plans, and continuation of the Fisheries Monitoring Plan. *The amount to be deposited in the trust fund or posted in a bond will be determined by Forest Service in consultation with the USFWS (and other stakeholders as determined by the Forest Service) and will be commensurate with projected mitigation planning, coordination, study, monitoring, design, construction, and other conservation activities needed to accomplish the mitigation projects in a timely manner, as determined by the Forest Service in consultation with the USFWS.*	Attachment 7, T&C for RPM 1, 6.b. ROD 1.4.1.3,	Aquatic Life and Fisheries
247	End of Operations	MMC will separately commit to funding costs associated with the Bull Trout Mitigation Coordinator and support and to costs of funding activities deemed appropriate by Forest Service in consultation with the USFWS (and other stakeholders as determined by Forest Service) that will be necessary to achieve full mitigation during the Closure and Reclamation Phases.	Attachment 7, T&C for RPM 1, 6.c. ROD 1.4.1.3,	Aquatic Life and Fisheries
248	End of Operations	MMC will submit a final closure and post-closure plan, including a long-term monitoring plan, 3 to 4 years before mine closure (see Stipulation 160).	Attachment 1, Section 1.1.2.7.1	All Resources

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
Closure and Post-Closure				
		Stipulation/Mitigation Measures		
249	Closure and Post-Closure	MMC will fully complete, unless otherwise agreed to by Forest Service in consultation with the USFWS, implementation of any remaining mitigation measures identified, and approved by Forest Service in consultation with the USFWS, in the overall Bull Trout Mitigation Plan (Attachment 5), the two Core Area specific Bull Trout Mitigation Guidance Plans and continuation of the Fisheries Monitoring Plan.	Attachment 7, T&C for RPM 1, item 7.a.	Aquatic Life and Fisheries
250	Closure and Post-Closure	MMC will prepare an overall bull trout mitigation audit report detailing and quantifying progress toward accomplishment of bull trout mitigation objectives. *A bull trout mitigation audit report will be prepared for Forest Service approval every three years throughout the Closure and Reclamation phase. Findings and MMC recommendations will be presented for approval by the Forest Service, in consultation with the USFWS and FWP.*	Attachment 7, T&C for RPM 1, item 7.b.	Aquatic Life and Fisheries
251	Closure and Post-Closure	MMC will separately commit to fund and otherwise support throughout the Closure and Reclamation Phases, as needed, all costs and activities associated with the Bull Trout Mitigation Coordinator and support and to costs of funding activities deemed appropriate by Forest Service in consultation with the USFWS (and other stakeholders as determined by Forest Service) that will be necessary to achieve full mitigation during the Closure and Reclamation Phases.	Attachment 7, T&C for RPM 1, item 7.c.	Aquatic Life and Fisheries
252	Closure and Post-Closure	At the end of operations, any waste rock not used in construction will be placed back underground or used in regrading the tailings impoundment. Any waste rock used at the Libby Plant Site will require an MPDES permit modification to include runoff or seepage from the waste rock.	Attachment 1, Section 1.1.5.1	Geochemistry Soils and Reclamation Water Resources
253	Closure and Post-Closure	MMC will develop final regrading plans for each facility to reduce visual impacts of reclaimed mine facilities. These plans will require the agencies' approval before implementation.	Attachment 1, Section 1.1.5.1	Scenery Soils and Reclamation
254	Closure and Post-Closure	MMC will reclaim the Rock Lake Ventilation Adit as described in the selected mine alternative.	Attachment 1, Section 1.1.5.2	Soils and Reclamation
255	Closure and Post-Closure	MMC will reclaim the Libby Adit Site as described in the selected mine alternative.	Attachment 1, Section 1.1.5.3	Soils and Reclamation

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
256	Closure and Post-Closure	MMC will reclaim the Poorman Tailings Impoundment Site and borrow areas as described in the selected mine alternative.	Attachment 1, Section 1.1.5.5	Soils and Reclamation
257	Closure and Post-Closure	Borrow areas will remain until the impoundment reclamation plan is completely implemented to ensure no fill material is required.	Attachment 1, Section 1.1.5.6	Soils and Reclamation
258	Closure and Post-Closure	Once the tailings pipelines are no longer needed, they will be flushed out into the tailings impoundment. The pipelines will be removed from all stream crossings and anywhere they are less than 3 feet below the surface. For other segments of the pipelines, the pipelines will be left in place, cut at 0.5-mile intervals, and capped.	Attachment 1, Section 1.1.3.3.1	Soils and Reclamation Water Resources
259	Closure and Post-Closure	MMC will bury no waste other than waste rock underground in mined-out areas.	Attachment 1, Section 1.1.5.1.1	Solid Waste Management
260	Closure and Post-Closure	MMC will reclaim roads as described in the selected mine alternative and as discussed in MMC's Technical Memo - Project Road Use Description, which will be updated to be consistent with the KNF ROD for the amended Plan of Operations	Attachment 1, Section 1.1.5.1.8	Transportation
261	Closure and Post-Closure	Similar to the Operations Phase (see Stipulation 230), MMC will conduct vegetation monitoring every year at sites representative of various types of disturbance until bond release, as described in Section C.8 of Attachment 3. Vegetation monitoring also will assess noxious weeds (see Stipulation 135). The number and location of representative sites will be approved by the agencies. Monitoring will continue for 20 years after planting or seeding to ensure revegetation requirements are met, or less if the project bond were released by the lead agencies before this period expires.	Attachment 3, Section C.8	Vegetation
262	Closure and Post-Closure	MMC will revise all seed mixes so that mixes will be composed of local native seed from the Forest Service Coeur d'Alene Nursery or the Kootenai Seed Mix. MMC will select seed mixes to be compatible with dry and/or moist forest conditions.	Attachment 1, Section 1.1.5.2.2	Vegetation
263	Closure and Post-Closure	MMC will conduct soil replacement and handling in accordance with the Soils Salvage and Handling Plan (see Stipulation 131) and the selected mine alternative.	Attachment 1, Section 1.1.5.2.3	Vegetation
264	Closure and Post-Closure	MMC will complete seeding and planting as described in the selected mine alternative.	Attachment 1, Section 1.1.5.2.3	Vegetation
265	Closure and Post-Closure	MMC will amend the top 0 to 4 inches of soil before seeding with an agencies-approved wood-based organic amendment to raise the organic matter level in the soil to a minimum of 1 percent by volume.	Attachment 1, Section 1.1.5.2.5	Vegetation

Number	Mine Phase	Stipulation/Mitigation Measure or Other Requirement (MMC is responsible fo implementation of all measures, except those in *italicized* text, which are the responsibility of the Forest Service.)	ROD Reference	Resource
266	Closure and Post-Closure	At Closure, MMC will place two or more plugs in each adit. The plugs will be site specifically designed both hydraulicly and technically, and will be located to isolate the adits hydraulically from the mine void and to ensure any groundwater tributary to Libby and Ramsey creeks will flow into the adits, and remain within the Libby Creek watershed. The plug locations will be determined by the KNF using the 3D groundwater model maintained and updated throughout the project. MMC will provide a plugging design and the required groundwater modeling as part of the Final Closure Plan (See Stipulations 160 and 248).	Attachment 1, Section 1.1.3.4.2 and Section 1.1.5.1.3	Water Resources
267	Closure and Post-Closure	If necessary to minimize post-mining changes to the streamflow in East Fork Rock Creek and East Fork Bull River, MMC will construct concrete bulkheads in access openings in any barrier pillar left within the mine void (See Stipulation 235).	Attachment 1, Section 1.1.1.6.4 and Section 1.1.5.1.3	Evaluation
268	Closure and Post-Closure	MMC will continue surface and groundwater monitoring (as described for construction and operations; see Stipulations 204 and 234).	Attachment 3, Section C.10	Water Resources
269	Closure and Post-Closure	MMC will conduct post-closure water management as described in the selected mine alternative.	Attachment 1, Section 1.1.5.1.7	Water Resources
270	Closure and Post-Closure	MMC will plug and abandon monitoring and potable water supply wells when no longer needed as described in the selected mine alternative.	Attachment 1, Section 1.1.5.1.9	Water Resources
271	Closure and Post-Closure	MMC will manage Closure Phase and Post-Closure Phase water appropriations and discharges as described in the selected mine alternative.	Attachment 1, Section 1.1.3.4.2	Water Rights
272	Closure and Post-Closure	MMC will implement final closure and post-closure monitoring plan completed 3 to 4 years before mine closure (see Stipulation 241).	Attachment 3, Section C.10	Water Resources
273	Closure and Post-Closure	MMC will conduct all transmission line construction activities within on National Forest System and State trust lands in the CYRZ and Cabinet Face BORZ, including use of the helicopters, between June 16 and October. .	Attachment 4, Item A.4 and Appendix I of Attachment 8	Wildlife

Attachment 3 – Conceptual Monitoring Plans

Attachment 3. Conceptual Monitoring Plans

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C.1 Introduction

This appendix contains the agencies' conceptual monitoring plans for Alternative 3. MMC would develop final monitoring plans for the agencies' approval. Final monitoring plans would be incorporated as a component of appropriate permits and plans administered by the various agencies. Identification of these plans and the timing for their submittal and approval is discussed in the following sections of this Appendix. Where applicable, plans would include a section on quality assurance measures that ensure the reliability and accuracy of monitoring information as it was acquired. For example, surface water quality sampling would follow DEQ's *Quality Assurance Project Plan (QAPP), Sampling and Water Quality Assessment of Streams and Rivers in Montana, 2005* (DEQ 2005a). Each plan would describe data quality objectives for sampling, which would include specific methods for analysis and quantification, and criteria for assessment of the data. All plans would identify action levels, which when reached would require MMC to implement a corrective measure. MMC would update the closure plan, including long-term monitoring plan, during the Construction Phase in sufficient detail to allow development of a reclamation bond.

All monitoring would require an annual report unless otherwise specified. Final reporting requirements would be described in applicable permits or approvals or in MMC's final monitoring plans. The format and requirement needs for reporting would be finalized by the agencies. Reports would be submitted to other agencies as identified by the KNF and the DEQ. 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.

MMC would submit as part of its annual report to the lead agencies a discussion of its compliance with all the monitoring and mitigation requirements specified in the DEQ Operating Permit and the KNF's approved Plan of Operations. Each monitoring and mitigation requirement of the selected alternative would be listed in the report.

MMC's monitoring plans would have four overarching objectives: 1) to supplement available information in areas where there is uncertainty; 2) to validate predictions of impacts on each resource; 3) to assess if the alternative selected in the KNF's ROD is adversely affecting the environment; and 4) to monitor the effectiveness of the agencies' mitigation measures described in the EIS and ROD and any additional mitigation measures implemented by MMC to reduce adverse effects of mining. The monitoring plans are expected to be dynamic, and change as new data were collected and analyzed. Monitoring data would be used to assess the potential effects of mining, determine if additional monitoring was needed, update the 3D groundwater models to reassess effects to water resources, and, if needed, require corrective action by MMC to mitigate adverse effects of mining on analysis area resources. Monitoring data would be made available for public review.

C.2 Air Quality

Most of the following air monitoring is based on DEQ's supplemental Preliminary Determination issued in 2011. The DEQ may change the monitoring requirements when it issues a final Montana air quality permit.

C.2.1 Objective

The objectives of air monitoring are to monitor annual production information and emission sources, and to assess effectiveness of wind erosion control measures at the tailings impoundment site.

C.2.2 Locations, Parameters, and Frequency

MMC would submit to the agencies for approval a general operating plan for the tailings impoundment site including a fugitive dust control plan to control wind erosion from the site. The plan would include, at a minimum, the embankment and cell (if any) configurations, a general sprinkler arrangement, and a narrative description of the operation, including tonnage rates, initial area, and timing of future enlargement.

MMC would install, operate, and maintain three air monitoring sites in the vicinity of the mine and facilities. The exact location of the monitoring sites would be approved by the agencies and meet all applicable siting requirements contained in the Montana Ambient Air Monitoring Program Quality Assurance Project Plan (2013a), ARM 17.8.202 and 17.8.204; the EPA Quality Assurance Manual (EPA 2008a, 2008b); and 40 CFR 50, 53, and 58; or any other requirements specified by the DEQ.

MMC would begin air monitoring at the commencement of mill facilities or the tailings impoundment and continue air monitoring for at least 1 year after normal production was achieved. MMC would monitor nitrogen and sulfur emissions at the Libby Adit for a minimum of 2 years. MMC would analyze for metals shown in Table C-1 on the PM_{10} filters once the mill facilities and tailings impoundment were operational. At that time, the DEQ and the KNF would review the air monitoring data and determine if continued monitoring or additional monitoring

Table C-1. Air Monitoring Locations, Parameters, and Frequency.

Location	Site	Parameter	Frequency
Plant Area	Site #1	PM-10[1] As, Cu, Cd, Pb, Zn[2] PM-2.5[3]	Every 3rd day according to EPA monitoring schedule
Tailings Area (Up-drainage)	Site #2	PM-10[1] As, Cu, Cd, Pb, Zn[2] PM-2.5[3]	Every 3rd day according to EPA monitoring schedule
Tailings Area (Down-drainage)	Site #3	PM-10[1] / PM-10[1] Collocated As, Cu, Cd, Pb, Zn[2] PM-2.5[3] / PM-2.5[3]Collocated Wind speed, Wind Direction, Sigma theta[4]	Every 3rd day according to EPA monitoring schedule (Collocated every 6th day) Continuous
Libby Adit	Site #4	NOx and SO_2 Wind speed, Wind Direction, Sigma theta[4]	Daily Continuous

[1] PM-10 = particulate matter less than 10 microns.
[2] As = Arsenic, Cu = Copper, Cd = Cadmium, Pb = Lead, Zn = Zinc.
[3] PM-2.5 = particulate matter less than 2.5 microns.
[4] Sigma Theta = Standard Deviation of Horizontal Wind Direction.

was warranted. The DEQ and the KNF may require continued air monitoring to track long-term impacts of emissions for the project or require additional ambient air monitoring or analyses if any changes took place regarding quality and/or quantity of emissions or the area of impact from the emissions.

C.2.3 Inspections

DEQ's Air Resources Management Bureau personnel would perform on-site inspections of the operation on a random basis on a frequency of at least once per year. The overall effectiveness of the proposed air pollution control measures, with emphasis on the adequacy of wind erosion prevention at the tailings impoundment, would be evaluated on an ongoing basis.

C.2.4 Reporting

MMC would use air monitoring and quality assurance procedures that are equal to or exceed applicable requirements. MMC would provide the DEQ and the KNF with annual production information for all emission points in the annual emission inventory request. The request would include all sources of emissions identified in the emission inventory contained in the permit analysis. The following information would be provided:

- Amount of ore and waste handled
- Amount of diesel used (surface equipment and underground equipment separately)
- Amount of propane used
- Amount of explosives used (RU Emulsion explosive and High Explosive separately)
- An estimate of vehicle miles traveled on on-site access roads
- Amount of disturbed acreage (including tailings impoundment area)
- Other emission-related information the DEQ may request

MMC would submit quarterly data reports within 45 days after the end of the calendar quarter and an annual data report within 90 days after the end of the calendar year. The annual report may be substituted for the fourth quarterly report if all required quarterly information is included in the report. The quarterly report would consist of a narrative data summary and a data submittal of all data points in AIRS format. This data would be submitted electronically. The narrative data summary would include:

- A topographic map of appropriate scale with coordinates and a true north arrow showing the air monitoring site locations in relation to the plant, any nearby residences and/or businesses, and the general area
- A hard copy of the individual data points
- The quarterly and monthly means for PM_{10}, $PM_{2.5}$, and wind speed
- The first and second highest 24-hour PM_{10}, $PM_{2.5}$ concentrations and dates
- A quarterly and monthly wind roses
- A summary of the data collection efficiency
- A summary of the reasons for missing data
- A precision and accuracy (audit) summary
- A summary of any ambient air standard exceedances

- Calibration information

The annual data report would consist of a narrative data summary containing:

- A topographic map of appropriate scale with UTM coordinates and a true north arrow showing the air monitoring site locations in relation to the plant, any nearby residences and/or businesses, and the general area
- A pollution trend analysis
- The annual means for PM_{10}, $PM_{2.5}$, and wind speed
- The first and second highest 24-hour PM_{10}, $PM_{2.5}$ concentrations and dates
- The annual wind rose
- An annual summary of data collection efficiency
- An annual summary of precision and accuracy (audit) data
- An annual summary of any ambient standard exceedance
- Recommendations for future monitoring

Using the nitrogen and sulfur monitoring data, MMC would update the nitrogen and sulfur deposition analysis and compare the updated model results to the current FLM deposition analysis thresholds. MMC would also assess potential effects on lake ANC if appropriate methods were available. If modeled results using the Libby Adit monitoring data were greater than current FLM deposition analysis thresholds, MMC would develop a plan for agencies' review that evaluated all available control technologies to reduce pollutant emissions.

C.3 Cultural Resources

C.3.1 Objective

Cultural resources would be monitored to ensure protection for cultural resources or human remains not identified during initial surveys from adverse effects during construction, and that all cultural resources that were to be avoided were not adversely affected during construction.

C.3.2 Locations, Parameters, and Frequency

In Alternatives 3 and 4 before any ground-disturbing activities, MMC would complete an intensive cultural resources survey on all areas proposed for disturbance for any areas where such surveys have not been completed and that would be disturbed by the alternative. Surveys would meet the requirements of the 36 CFR 800 regulations, following the guidelines in the 2011 KNF Site Inventory Strategy. Eligibility assessments for historic properties within the selected alternatives, as outlined in the KNF's ROD, would be completed and formally resolved through the SHPO and/or the Keeper of the National Register pursuant to 36 CFR 800, before project impacts to properties occurred. MMC would prepare a mitigation plan for all NRHP-eligible properties determined through a formal determination of effect to be adversely affected by the project. The mitigation plan would be submitted for approval by the KNF if on National Forest System lands in consultation with the SHPO and the Advisory Council on Historic Preservation. The survey, eligibility assessment, and mitigation planning would be completed by a qualified archaeologist meeting the Secretary's Standards and Guidelines for Archeology and Historic Preservation (48 FR 44716).

In 2010, the KNF and Montana SHPO entered into a Programmatic Agreement that described certain requirements of the parties to mitigate the unavoidable adverse effects on historic properties and to manage inadvertent discovery of historic properties. Monitoring would be required during any land disturbing activity that has potential to adversely affect unidentified sites. Monitoring would be completed by a qualified archaeologist meeting the Secretary's Standards and Guidelines for Archeology and Historic Preservation (48 FR 44716). The KNF would contact the Confederated Salish & Kootenai Tribes and the Kootenai Tribe of Idaho (collectively the Tribes) to determine if they were interested in monitoring mine construction activities on National Forest System lands and transmission line construction on National Forest System, State or private lands. If either or both tribes expressed an interest, MMC would develop a Tribal Monitoring Plan in cooperation with the KNF, DEQ, and the Tribes. This plan would facilitate the presence of tribal monitors from the Tribes during construction. The plan would outline the tribal monitor's qualifications, responsibilities, and capabilities as well as establish funding, which would be MMC's responsibility. The plan would be submitted to the KNF and DEQ for review at least 90 days prior to the beginning of construction. The KNF and DEQ would have 30 days to review the plan. The KNF and DEQ would invite the SHPO and the DNRC to comment on the draft plan. The approved plan would be incorporated into the Environmental Specifications (Appendix D).

If previously unrecorded cultural properties, human remains, or funerary objects are discovered during any activity by MMC, MMC would immediately:

- Cease the activity in the area of the discovery and secure the area with a 100-foot (30-meter) buffer by attaching temporary fencing to trees. No disturbance would occur in securing the site.
- Notify the KNF Forest Archaeologist if the discovery was on National Forest System lands or the SHPO Archaeologist if the discovery was on lands other than National Forest System lands.
- If the discovery was human remains or funerary objects, notify the county coroner and the KNF Forest Archaeologist if the discovery was on National Forest System lands or the county coroner and the SHPO Archaeologist if the discovery was on lands other than National Forest System lands.

Following notification, the KNF would:

- Determine appropriate mitigation measures for the discovery of cultural properties following Native American Graves Protection and Repatriation Act procedures outlined in 43 CFR 10, if on National Forest System lands, or the Montana Human Skeletal Remains and Burial Site Protection Act procedures outlined in 22-3-801, MCA, if on lands other than National Forest System lands.
- Consult with Montana SHPO on the proposed mitigation measures, and the Tribes on the proposed mitigation measures if the properties were prehistoric.
- Follow procedures for submitting mitigation measures outlined in the Montana Human Skeletal Remains and Burial Site Protection Act in the event that the Native American remains or funerary objects were discovered on state or private lands.
- Oversee the implementation of any agreed upon mitigation measures.

C.3.3 Reporting

As part of the report submitted annually to the agencies, MMC would provide information on the mitigation implemented during the prior year pursuant to the Agreement. The report also would discuss any previously unidentified cultural resources encountered during construction.

C.4 Wetlands and Other Waters of the U.S.

C.4.1 Objective

The Corps would use monitoring to determine if the compensatory mitigation for jurisdictional wetlands and other waters of the U.S. was meeting the performance standards established in any 404 permit issued for the project. The monitoring described in this section may be modified in a Corps 404 permit. Monitoring would follow the Corps' Regulatory Guidance Letter (RGL 06-3) (Corps 2008a) that addresses monitoring requirements for compensatory mitigation projects. Final performance standards for the jurisdictional mitigation sites would be established in the 404 permit. Similarly, the KNF would use monitoring to determine if the compensatory mitigation for isolated wetlands was meeting the performance standards established in the approved Plan of Operations.

The objective of the wetlands monitoring also would be to evaluate the possible indirect effects of the project. Because the possible indirect effects on wetlands would be associated with the pumpback well system, wetland monitoring is discussed in section C.10.5.5.2, Pumpback Well System Monitoring. Wetland monitoring overlying the mine area is discussed in section C.10.3.2, Groundwater Dependent Ecosystem Inventory and Monitoring.

C.4.2 Locations, Parameters, Frequency, and Performance Standards

This section discusses monitoring of sites used for mitigation of impacts to waters of the U.S. Inventory and monitoring of groundwater dependent ecosystems, including wetlands, is described in section C.10.3.2.2, Continued GDE Monitoring. Monitoring of wetlands and springs in the impoundment area is described in section C.10.5.5.2, Pumpback Well System Monitoring.

C.4.2.1 Swamp Creek Wetland Mitigation Site

MMC's mitigation for impacts to wetlands is wetland rehabilitation at the Swamp Creek site. The following sections describe MMC's proposed maintenance, monitoring and performance standards for the site. The proposed maintenance, monitoring, and performance standards may be modified in accordance with any 404 permit issued for the project.

C.4.2.1.1 Maintenance and Monitoring

Maintenance would consist of inspecting the site on an at least monthly schedule to identify any maintenance control problems, such as erosion, sedimentation, instability, weeds, wetland vegetation degradation, and structure/fence damage. If any such problems were identified, corrective action would be initiated promptly. Inspection results would be described in the annual monitoring report. A weed monitoring and control program would be implemented to minimize invasive species. The following tasks would be performed and photo-documented during the non-winter period (May-October) for the wetland mitigation site:

- ***Vegetation:*** Determine boundaries of dominant, species-based vegetation communities once per year during the last half of the growing season. Characterize plant type and density in quadrats established along one or more transects (depending on wetland size) through the center of representative new wetlands in each of the three mitigation areas. Locations and types of noxious weeds would be identified and noted on a site map.
- ***Hydrology:*** Monitor groundwater levels monthly during the growing season in piezometers installed within the mitigation areas and in nearby wetland and upland areas. Delineate presence or evidence of moving and/or standing surface water within the wetland areas. This information would be compared to the existing dewatered state to assure water is present for an extended period of time to support rehabilitation of the degraded wetlands.
- ***Soil:*** Characterize shallow soil conditions at representative locations in the new wetland area using soil cores/samples obtained from a hand-auger or sharpshooter shovel.
- ***Wildlife:*** Record direct and indirect observations of site use by mammals, reptiles, amphibians, and bird species. Indirect use indicators include tracks, scat, burrow, eggshells, skins, and bones.
- ***Functional Assessment:*** Evaluate functions and services once per year during the last half of the growing season using established lists of site-specific functions and services to be achieved at the new wetland site.

Photo-points would be established at each wetland mitigation site to document site-specific conditions and changes from year to year. Field information obtained for each of the above-listed six monitoring categories would be recorded on monitoring forms. The monitoring period would be sufficient to demonstrate that the mitigation met the performance standards, but not less than 5 years. Some aspects of compensatory mitigation may require inspections or monitoring more frequently than annually during the early stages of development to identify and address problems that may develop. Annually, the Corps would review all monitoring results to determine if changes to the monitoring program were warranted, and whether other mitigation measures were necessary. The Corps would also determine when monitoring could be terminated after successful self-sustaining mitigation sites were established.

C.4.2.1.2 Performance Standards

The performance standards for the Swamp Creek wetland mitigation site proposed by MMC for Alternative 3 (MMC 2014a) could be modified by the Corps in accordance with any 404 permit issued for the project. MMC would request that monitoring cease and the site be transferred to the KNF when the follow performance standards were met for two consecutive years a minimum of 2 years after active management ceased:

Wetlands

- Water saturation levels are within 12 inches of the surface, and/or standing water
- Water is present for at least 12.5 percent of the growing season (20 consecutive days) at the far edges of the hayfield where conditions currently were dewatered for agricultural use
- Aerial cover of facultative or wetter species cover meets or exceeds 60 percent of combined cover

- State listed noxious weeds do not exceed 10% after 5 years and for at least 2 consecutive years without maintenance to demonstrate sustainability of the site
- More than three wetland species are present, one species does not exceed 30% of the total cover, and reed canarygrass was not a dominant species for the vegetation community
- Planted and volunteer native woody species (alder, willow and other wetland species) are at least 174 stems per acre in the planted areas

Upland Buffer

- Maintain a predominance of native vegetation communities (including trees and shrubs) in the upland buffer areas. Native vegetation is at least 80% of the plant communities compared to surrounding upland areas
- MT state listed noxious weeds do not exceed 10% after five years and for at least two consecutive years without maintenance to demonstrate sustainability of the site
- Buffers remain undisturbed to the maximum extent practicable allowing for sound management practices

C.4.2.2 Swamp Creek Stream Mitigation Site

C.4.2.2.1 Maintenance and Monitoring

Maintenance would consist of inspecting the site on an at least monthly schedule to identify any maintenance control problems, such as erosion, sedimentation, instability, weeds, wetland vegetation degradation, and structure/fence damage. If any such problems were identified, corrective action would be initiated promptly. Inspection results would be described in the annual monitoring report. A weed monitoring and control program would be implemented to minimize invasive species. The following monitoring would be performed and photo-documented during the non-winter period (May-October) for the stream mitigation project sites:

- ***Riparian Corridor:*** Characterize plant type and density, including locations and types of noxious weeds.
- ***Stream Channels:*** Assess stream cross-sections to monitor channel form and function, natural channel migration, vertical stability (down-cutting), sediment deposition, and stream bank vegetation development.
- ***Aquatic Life and Habitat:*** Characterize aquatic life and fisheries, where applicable, following accepted protocols.
- ***Functional Assessment:*** Evaluate functions and services based on site-specific goals.

C.4.2.2.2 Performance Standards

The performance standards for the Swamp Creek stream mitigation site proposed by MMC for Alternative 3 (MMC 2014a) could be modified by the Corps in accordance with any 404 permit issued for the project. The Montana NRCS Riparian Assessment Method (MT RAM) would be used to evaluate performance of stream and riparian buffer areas. The MT RAM incorporates geomorphological features and processes (pattern, dimension, profile, incisement, and bank stability) with ecological features (riparian vegetation composition and condition) to quantitatively establish the system as Unsustainable, At Risk, or Sustainable. The stream bank and riparian buffer would meet the following performance standards before release of all credits:

1) Attain a cumulative rating score on the MT RAM of "Sustainable" for two consecutive years, including the final year of monitoring. Since component criteria in Questions 1 – 3 and Question 10 can be somewhat qualitative, the following would be used as a refinement:
    - One cross-section per 1,000 feet of assessed reach, beginning at the edge of the designated floodplain, and extending perpendicular across the stream to the opposite floodplain edge. Evidence of active headcuts or low vertical edge (scarp) at the toe of the stream bank, particularly on the inside of a meander, as determined by this cross-section would affect scoring negatively.
    - The project must experience at least one observed bank-full event during the monitoring period to successfully complete this rating; should the project not experience a bank-full event during the initial five-year monitoring period, the USACE may require additional monitoring until a bank-full event occurs. In the situation where a bank-full event has not occurred but all other performance standards have been met, a partial bond release would occur. Regarding scoring the scrub-shrub component of the riparian buffer where this is a component of the climax community, a calculation must be made to determine eventual coverage class of the buffer at maturity.
    - Using the Cowardin et al. classification for scrub-shrub areas of 30% cover at maturity, the standard would be 174 stems per acre of native shrub species (alder and willow). Should other species be proposed for the community, a separate calculation would be required for this performance standard based on the estimated canopy cover at maturity of the proposed species assemblage.
2) Less than 10% cover of exotic/noxious species as listed by the Montana Department of Agriculture, state noxious weeds list; and
3) Buffers remain undisturbed to the maximum extent practicable allowing for sound management practices.

C.4.2.3 Culvert Removal and Replacement and Bridge Removal

Monitoring and performance standards described for the Swamp Creek wetland and stream mitigation site would be used for culvert removal and replacement and bridge removal sites.

C.4.2.4 Isolated Wetland Mitigation Sites

Wetland monitoring and performance standards for the compensatory mitigation for the isolated wetlands would be a component of the approved Plan of Operations for the Forest Service. MMC would be responsible for developing mitigation requirements for submittal to the KNF. Standards would be approved by the agencies prior to the Construction Phase of the project. The Forest Service would use the Corps and EPA's compensatory mitigation regulations (33 CFR 332 and 40 CFR 298) and the Corps' Regulatory Guidance Letter (RGL 06-3) as a guide for establishing monitoring and reporting requirements and performance standards. MMC would be responsible for the isolated wetland mitigation sites and the proper management of those sites until performance standards were met.

C.4.3 Reporting

MMC would submit monitoring reports to the Corps, KNF, and DEQ that follow the requirements described the Corps' RGL 06-3. The Corps would review the reports annually to assess the status

of the compensatory mitigation and to evaluate the likelihood of the mitigation to meet the performance standards. Monitoring would continue until all performance standards were met.

C.5 Wildlife

C.5.1 Objective

The objective of the wildlife monitoring would be to evaluate the effects of the mine and the effectiveness of mitigation measures during all mine phases. In addition, as described below, MMC would contribute to efforts to monitor grizzly bear movements between the Cabinet-Yaak Ecosystem and Northern Continental Divide Ecosystem. If appropriate, mitigation measures may be modified based on results of monitoring.

C.5.2 Locations, Parameters, and Frequency

C.5.2.1 Grizzly Bear

MMC would remove big game animals killed by any vehicles daily from road rights-of-way within the permit area and along roadways used for access or hauling ore (NFS roads #231, #278, #4781, and #2316 and new roads built for the project) for life of mine. Road-killed animals 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. Beginning prior to the Evaluation Phase and continuing through construction and the first 3 years of mill operations, MMC would monitor the number of big game animals killed by vehicle collisions on these roads and report findings annually. The numbers of animals killed by vehicle collisions would be reviewed by the KNF, in cooperation with the FWP, and if necessary, mitigation measures would be developed and implemented to reduce mortality risks.

MMC would also monitor and report (within 24 hours) all grizzly bear, lynx, wolf, and black bear mortalities within the permit area and along the access roads for life of the mine. If a T&E species mortality occurred, MMC would be required to haul future road-killed animals to a disposal location approved by FWP (thus modifying the disposal requirement described in the previous paragraph), if deemed necessary by the grizzly bear specialists or law enforcement officer to avoid additional grizzly bear or other T&E species mortality.

Under the direction of the KNF, MMC would implement or fund access changes on numerous roads before either the Evaluation Phase or the Construction Phase for grizzly bear mitigation. For the life of the project, MMC would implement or fund monitoring of the effectiveness of the closure devices at least twice annually, and complete any necessary repairs immediately.

Prior to Forest Service approval to initiate the Construction Phase, MMC would provide funding for bear monitoring in the area along U.S. 2 between the Cabinets and the Yaak River and/or the area between the Cabinet-Yaak Ecosystem and Northern Continental Divide Ecosystem as identified by FWP. The linkage identification work along U.S. 2 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 aerial flights for 2 hours per week, 30 weeks per year for 3 years, salary for one seasonal worker for 6 months per year for 3 years, salary for one GIS technician for 6 months per year for 3 years, and 10 GPS collars and collar rebuilds each year for 3 years. Other monitoring methods may be considered if approved by the Oversight Committee. Should a permitted project be implemented or a future project be proposed that has adverse effects on the grizzly bear in the Cabinet-Yaak Ecosystem, funding for this

monitoring could be required of those projects, potentially changing the funding required by MMC.

MMC would contribute funding to support monitoring of bear movements and population status in the Cabinet Mountains to confirm the effectiveness of mitigation measures implemented to provide a secure north to south movement corridor. The Forest Service would ensure that adequate funding, provided by MMC, is available to monitor bear movements and use of the Cabinet Mountains to confirm the effective implementation of mitigation measures. Information gained would be useful in determining whether the mitigation plan was working as intended. If not, the information would help in developing new management strategies that would be incorporated in the Biological Opinion through appropriate amendments. Funding would supplement ongoing research and monitoring activities in the Cabinet-Yaak Ecosystem, would be conducted or coordinated by the USFWS' grizzly bear researcher in Libby or the 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 Service would ensure that funding, provided by MMC, is available on an annual basis, 2 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 starting the Construction Phase and would continue throughout the life of the mine through the Closure Phase.

C.5.2.2 Lynx

The KNF would monitor new snow compaction activities (such as snowmobiling) in the project area and take appropriate action if compaction monitoring identified increased predator access to new areas.

C.5.2.3 Mountain Goat

MMC would fund surveys to monitor mountain goats to examine response to mine-related impacts. The surveys would be integrated into the current monitoring effort of the FWP. Aerial surveys would be conducted three times annually (winter-late spring-fall) by the FWP along the east front of the Cabinet Mountains from the Bear Creek drainage south to the West Fisher drainage. Surveys would be conducted for 2 consecutive years prior to construction, and every year during construction activities. Survey results would be analyzed by the KNF, in cooperation with the FWP, at the end of the construction period to determine the appropriate level and type of survey work needed during the Operations Phase. If the agencies determined that construction disturbance was significantly affecting goat populations, mitigation measures would be developed and implemented to reduce the impacts of mine disturbance. Surveys would be conducted using the current protocol of the FWP. Currently, the FWP conducts one aerial survey of the east Cabinet Mountains every other year. This additional level of monitoring would provide information on the status of mountain goat use adjacent to the project area, and potential effects of the project.

C.5.2.4 Migratory Birds

MMC would coordinate with the KNF and Regional bird monitoring partnership group to fund monitoring of landbird populations as part of the Forest Service Regional effort of the "Integrated

Monitoring in Bird Conservation Regions" (IMBCR). The KNF is located with the Northern Rockies Bird Conservation Region 10 (BCR 10), which is characterized by high-elevation mountain ranges with mixed conifer forests and intermountain regions dominated by sagebrush steppe and grasslands (Partners in Flight 2000). BCRs approximate an eco-province, and are the scale recommended by Partners in Flight for monitoring. Across the KNF, transects were identified in 2010, with at least 10 transects monitored each year. Two of these 10 annually monitored transects are located within the Crazy and Silverfish PSUs.

Prior to the Evaluation Phase, and continuing for the life of the mine, MMC would coordinate with the KNF and Forest Service Region 1 bird monitoring specialist to fund and initiate annual monitoring of up to 12 ICMBR transects; up to eight within a 1 mile influence zone of the proposed facilities or transmission lines (MT-BCR10-K078; MT-BCR10-KO271; MT-BCR10-KO102; MT-BCR10-KR53; MT-BCR10-KR229; MT-BCR10-KR133; MT-BCR10-KR277; MT-BCR10-KO138 if transmission line Alternative C-R was selected), and an additional four transects outside of the facilities and transmission line influence zones for comparison with the influence zone transects.

The monitoring effort would continue to provide data to the IMBCR project that would allow inferences to avian species occurrence and population trend from both the local level, such as the PSUs where project activities are proposed to Bird Conservation Regions (BCR) scales, facilitating conservation at local and national levels.

C.5.3 Reporting

Reporting requirements would be described in a Comprehensive Grizzly Bear Management Plan. This plan is discussed in greater detail in the agencies' wildlife mitigation plans for Alternatives 3 and 4 in Chapter 2.

C.6 Geotechnical

C.6.1 Objective

Prior to commencement of mine construction, MMC would prepare and present to the agencies a tailings impoundment (i.e., geotechnical) monitoring plan. 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 impoundment (See section 2.5.2.5.2, Final Design Process in Chapter 2). 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 approving the Construction Phase and incorporated into a monitoring plan approved by the agencies and incorporated into an amended plan of operations or updated operating permit prior to project initiation.

The objectives of the geotechnical monitoring program as it pertains to the tailings impoundment, and appurtenances, and other facilities as appropriate, would be to:

- Collect additional analytical data for use in ongoing impoundment design and operations
- Identify previous unknown site conditions

- Confirm critical design assumptions
- Monitor site conditions during construction and operations
- Monitor impoundment performance during construction and operations
- Assist in assessing material used in dam construction
- Estimate tailings quantities and physical characteristics of impounded tailings
- Establish requirements and a schedule for annual reporting

C.6.2 Locations, Parameters, and Frequency

The monitoring program would emphasize the following tailings impoundment related components: foundation conditions, dam construction, operational stability, material balance, impoundment capacity, and water balance. Because the coarse (sand) fraction of the tailings would be used in the construction of the tailings embankment, a material mass balance would be carried out on an annual basis to assess embankment material needs and whether sufficient building materials would be available to meet the construction requirements. Quantities of tailings from the mill, waste rock from mine development, and borrow materials from on-site sources would be recorded to document material type and quantities used in embankment construction as well as the fine grained tailings material sent directly to the impoundment.

A geotechnical monitoring plan adopted for all action alternatives would incorporate many if not all of the monitoring elements listed in Table C-2. 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 impoundment design process and incorporated into a monitoring plan presented to the agencies prior to project initiation. The monitoring plan would require MMC to submit an annual tailings impoundment 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 Montanore, piezometers would be installed in the dam foundation to measure pore pressures during construction, with particular attention given to areas where the glaciolacustrine clay may be present in the foundation. 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 be installed in the cycloned sand dam as it is constructed in order to monitor the pore pressure build-up and to assess “drawdown” of cyclone water within the dam embankment. The piezometer cables would be buried and lead to a common readout station at the toe of each dam where continuous data reading equipment would be installed out of the way of the embankment construction operation.

Inclinometers would be used to monitor potential deformation of the tailings embankment which could be an indication of foundation failure. The inclinometers would be extended up through the embankment as it was constructed. It is highly likely some inclinometers would be damaged during the embankment raising process and would have to be abandoned. They would be replaced as needed over the course of the impoundment life.

Table C-2. Geotechnical Monitoring.

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
Impoundment Embankment	Piezometers - Main dam - Saddle dam - Beach area	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 tailings; visual inspections by Professional Engineer
	Inclinometers - Main dam	Deformation (inches)	Monthly	
	Material quantities: Cycloned sand, borrow, and mine waste rock	Tons, and cubic yards per year	Annually	Annual reconciliation of fill materials; visual inspections by Professional Engineer
	Material properties	Density and gradation	Weekly	A QA/QC program would be implemented to measure and monitor density and gradation; visual inspections by Professional Engineer
Impoundment Area	Pressure transducer Pond elevation	Tailings density Tailings water volume	Annually	Estimate of in situ tailings density; remaining impoundment capacity Tailings water volume

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, freeboard adequacy, beach width, cracks in the embankment, evidence of slope failure, erosion features along the dam and abutments, and changing trends in seepage quantities, piping, and wet spots, are representative of the kinds of observational features which could be indicative of potential problems with the tailings impoundment and the kinds of features which would be noted and documented during a visual inspection.

During the construction phase of the impoundment, QA/QC of dam 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 quality control tests.

During the operation phase of the tailings impoundment, 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 impoundment embankment and foundation as the embankment was constructed. In situ tailings consolidation within the impoundment would also be monitored to assist with closure planning. The monitoring program would continue into the closure stage, although the frequency of monitoring would likely be reduced as steady state conditions within the impoundment and embankment were approached. The following type of monitoring could be incorporated into a closure monitoring program:

- Installation of piezometers within the tailings impoundment pond area to monitor the progressive “drawdown” of the phreatic surface
- Installation of settlement plates and in situ pressure transducers within the tailings to monitor the consolidation and settlement of the tailings to help confirm the predicted consolidation behavior of the tailings at closure.

C.6.2.1 Reporting and Third-Party Review

During the final tailings impoundment design, and during operations and closure, MMC would fund an independent technical advisor to assist the agencies in ongoing oversight and review of the tailings impoundment. The duties of the third-party technical advisor would be similar to those of consultants retained by the Technical Advisory Group as part of the review of the final tailings design. The technical advisor would be selected, directed by, and report to the agencies through an agreement with MMC. MMC would provide site access, logistical support, and all information required by the technical advisor to complete ongoing reviews of the tailings impoundment. MMC would submit an annual tailings impoundment construction and performance report to the agencies, which would detail tailings impoundment construction, monitoring, and performance.

C.7 Rock Mechanics

C.7.1 Subsidence

A subsidence (underground geotechnical) monitoring plan would be implemented as part of all action alternatives. A final subsidence monitoring plan would be developed during final design, and approved by the agencies and implemented before any underground development began during the Construction Phase. The subsidence monitoring would incorporate the geotechnical monitoring procedures and methods specified in DEQ’s Operating Permit #00150 and the 1993 ROD. MMC would submit a final subsidence monitoring plan for agency approval following completion of the Libby Adit evaluation program (Evaluation Phase). Subsidence monitoring would incorporate both a surface and underground monitoring with objectives to 1) identify pre-subsidence indicators in advance of their developing into surface subsidence so mitigations can be implemented to prevent subsidence, and 2) to collect data that will be used in refining mine design elements such as room and pillar size, pillar orientation, and buffer zone dimensions,

during the course of operations to ensure underground mine stability is maintained and subsidence prevented.

C.7.1.1 Surface Monitoring

MMC would complete a pre-mining baseline topographic survey during the Evaluation Phase over the ore body using aerial methods (LiDAR, InSAR, or equivalent) approved by the agencies. 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 1) identify limitations with the survey technique and to make adjustments in its use to ensure accuracy, and 2) establish a pre-mine reference surface for comparing to the ground surface once mining has commenced. During operations, these surveys would be required to monitor for any surface movement that may be induced by the mining operation. 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.

MMC would also complete and provide to the agencies a detailed surficial geologic survey of lands overlying the mine area during the Evaluation Phase to map faults, rock joint patterns, and other geologic structures that may affect mine design.

C.7.1.2 Underground Monitoring

The specific details of a subsidence monitoring plan would be developed during final mine design, and would be subject to approval by the agencies prior to the agencies approving the Construction Phase. Should mining be approved, monitoring information would be evaluated in conjunction with data collected from a rock mechanics testing program and from underground and surface mapping of geologic structures and discontinuities (e.g., faults, joint sets) collected during the Evaluation Phase. Collectively, over time the data from these various sources would help develop a model of rock behavior in response to underground mining which could be used to 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, horizontal stress regime, would improve the Montanore 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 monitors would be located near or on faults, barrier pillars, sill pillars, and other important geologic structures. Data would be compiled, assessed, and reported to the lead agencies in an annual report.

MMC has completed some initial numerical modeling to examine the issue of 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 part of the ongoing mine development during operations, and would be applicable to all areas of the mine and not just where the ore horizon is thick or where there are rooms stacked on one another.

During final design, the agencies would provide MMC with data from the Troy Mine, which has experienced pillar stability problems resulting in surface subsidence. The data collected and analyzed from the Troy Mine will aid the agencies in their evaluation of MMC's proposed design and monitoring plan. For example, data from the Troy Mine indicates 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 encroaching too close to known faults. This information would be used to aid in the development of MMC's underground mine design.

The monitoring plan would be in a continual process of modification throughout the course of mining as new data was 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.

C.7.1.3 Reporting and Third-Party Review

During the Evaluation, Construction, and Operations phases, MMC would fund an independent technical advisor to assist the agencies in review of MMC's subsidence monitoring plan, underground rock mechanics data collection program, and MMC's mine plan. The technical advisor would be selected and directed by the agencies through an agreement with MMC. MMC would provide the agencies and their representatives access to the underground workings to observe data collection and mine development. MMC would provide mine access, logistical support, and all information required by the technical advisor to complete a review of underground rock mechanics data and MMC's mine plan. The technical advisor would have no financial interest in the project.

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 MMC.

C.7.2 Underground Mining Boundary Monitoring

To ensure MMC only mined ore within its valid existing rights and that the underground mine development adhered to required buffer zone boundaries, the Plan of Operations and DEQ operating permit would include requirements for underground monitoring. MMC would fund and facilitate biannual surveys of the underground workings that would be completed by an independent certified mine surveyor. The surveyor would be selected and directed by the agencies through an agreement with MMC. The surveyor would have no financial interest in the Montanore Project. The agencies may also require more frequent surveys and/or as-built drawings if discrepancies arose. MMC 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 crossed the established extralateral rights boundary, entered into designated buffer zones, or deviated from agency approved mine design.

C.8 Reclamation

C.8.1 Objective

The objectives of reclamation monitoring would be to:

- Assess the success of reestablishing a viable vegetation community following reclamation
- Determine the appropriate fertilizer mix and organic amendments required for successful reclamation
- Assess the effectiveness of weed control measures
- Determine if the criteria for revegetation success and for bond release are met

C.8.2 Locations, Parameters, and Frequency

MMC would submit a reclamation monitoring plan that would establish the soil testing protocol to determine the appropriate fertilizer mix required for successful reclamation. The final monitoring plan would describe sample locations, frequency, and analysis. The fertilizer type, mix, and rate would be approved by the agencies before being used. Interim reclamation activities would provide opportunities to monitor and evaluate the most effective use of fertilizers for final reclamation.

The vegetation cover, species composition, and tree planting success would be evaluated during the first year following reseeding or replanting. In addition to a general evaluation, MMC would conduct vegetation monitoring every 2 years during operations at sites representative of various types of disturbance. Control sites in areas unaffected by the project would be established to provide information on site conditions. At the end of mine operations, MMC would conduct similar vegetation monitoring every year at sites representative of various types of disturbance until bond release. The number and location of representative sites would be approved by the agencies. The following characteristics would be evaluated:

- Plant species responses (germination, growth, competition)
- Total and vegetation cover
- Plant species and plant diversity (including weeds)
- Procedures to reclaim steep rocky slopes
- Soil redistribution depth
- Soil rock fragment content
- Effects of fertilizer rates
- Tree planting techniques
- Tree stocking rates
- Viability of bare-root versus containerized stock

Vegetation monitoring also would assess noxious weeds. MMC has a Weed Control Plan approved by Lincoln County Weed Control District. The plan would be modified as described in this section and submitted to the lead agencies during final design for their approval. Following KNF's and DEQ's approval of the final Weed Control Plan, MMC would submit it to the Lincoln County Weed Control District. These measures would be applied to all permit areas, and all currently unopened roads used for transmission line access. Measures outlined in MMC's Weed Control Plan approved by the Lincoln County Weed Control District and the KNF would be followed during operations and reclamation to minimize the spread of weeds to reclaimed areas. If weed content were above 10 percent, MMC would implement additional weed control methods and apply weed control treatment for 2 years.

C.8.3 Reporting

MMC would submit an annual report to the lead agencies describing weed control efforts. The report would provide a map showing areas of weed infestation that were treated in the preceding year. It also would provide a qualitative evaluation of the weed control efforts.

A report summarizing survey data would be submitted annually to the agencies. MMC would develop reclamation bond release criteria as part of the overall reclamation plan approved by the agencies. Part of the release criteria would involve specific, qualitative measurement of revegetation success.

MMC would report soil stockpile volumes and disturbance acres in each annual report to the lead agencies. MMC would prepare an annual soil reconciliation report to document that the soils in stockpiles were sufficient to reclaim the current disturbed acres. If a shortfall existed, MMC would submit a plan to make up for the soil shortfall in the following year (see next section regarding replaced soil thickness).

C.8.4 Reclamation Bond Release

The following criteria for all reclaimed areas, including the transmission line right-of-way and access roads, would be used to determine revegetation success and bond release for that component of the reclamation bond. Minimum vegetation cover would be 80 percent of the control site total cover. If the required minimum cover were not obtained, MMC would implement remedial action such as reseeding with a modified seed mixture, mulching, fertilizer, or other changes to address the issue. If after two remedial attempts the particular site still did not meet the minimum vegetation cover standard but met 80 percent of the average of selected control sites, did not exhibit rills or gullies, and met the weed standard, the bond would be released. If the site continued to fall short of meeting the cover requirement, a third remedial effort, approved by the lead agencies, would be applied. If the standard still were not met but the site had 70 percent of the control cover and did not exhibit rills and gullies and met the weed standard, the bond would be released.

MMC and the lead agencies would establish control sites for the project before operation activities. These sites should be similar to the reclaimed areas and be in close proximity to the mine area. MMC would develop a vegetation monitoring plan from these sites and collect vegetation data during the mine life. This information would be used to validate the release criteria numbers with respect to minimum cover requirements, tree/shrub density, weeds, and other provisions preliminarily set in the EIS. The intent is to provide long-term site-specific data to support the release criteria established for the project. The monitoring plan would be approved

by the lead agencies and would require the report be submitted annually or as outlined in the plan or as approved by the lead agencies. Monitoring would continue for 20 years after planting or seeding to ensure revegetation requirements were met, or less if the project bond were released by the lead agencies before this period expired.

Category 1, 2, and 3 noxious weed species cover would have less than or equal to the cover of noxious weed species present on agency-approved disturbed/reclaimed control sites in the area. Category 2 and 3 (new invaders and potential invaders) are described in the latest edition of the KNF Noxious Weed Handbook. A minimum of 400 trees and 200 shrubs per acre would be living after 15 years (density may be lower in some areas where no trees or shrubs were planted, such as herbaceous wetlands and meadows).

C.9 Geochemistry

C.9.1 Introduction

Although the risk of acid generation and trace metal release from the project is generally low, some rock to be mined has the potential to affect surface water and groundwater resources. For this reason, the agencies' alternatives (3 and 4) would require additional geochemical characterization and monitoring of water flow and quality in the Libby Adit, to address uncertainty and validate predictions of future water quality provided in the EIS. Until such data became available, the agencies' alternatives require that rock be placed on a liner and managed to control potential impacts to water quality. This mitigation strategy recognizes that additional material needed for testing would be accessible during the Evaluation Phase. It also recognizes the value of historical Libby Adit and active Troy Mine workings as full-scale, real-time geochemical analogs for the proposed Montanore facilities. Waste rock management would be adapted as additional monitoring data become available to inform the mitigation strategy for various facilities under changing water balance conditions throughout mine life.

MMC presented a comprehensive summary of the available static geochemistry data characterizing rock for the proposed Montanore and Rock Creek mines by test method in tables appended to their waste rock management plan (Geomatrix 2007), as well in their review of waste rock characterization (MMC 2009). It also provided a general plan for additional geochemical characterization work including:

- Collection of representative waste rock samples from the adits, ore zones, barren zones, and above and below ore zones, at least every 500 feet in adits and for every 100,000 tons of waste rock produced in mine workings.
- Analysis of samples using static test methods (acid base accounting, total sulfur, and pH measurements).
- Kinetic or metal mobility testing of select samples, based on static test results.
- Characterization of residual water-soluble nitrate on waste rock mined during the Evaluation Phase, for use in predicting nitrate concentrations in meteoric water from waste rock placed outside the mine.
- Designation of fixed sampling points for in situ characterization of pH changes over mine life, based on rock sampling.
- Correlation of sample and analytical geochemistry data with water quality data.

- Re-evaluation of sampling and waste rock management plans based on cumulative data.
- Annual reporting of sampling, analysis, and results.

Review of the Draft EIS raised concern about perceived uncertainty in the data, and requested additional detail about the specific timing, intensity, and methods of proposed sampling and analysis. In particular, concern was raised about the coordinating the collection and interpretation of Evaluation Phase data with management of mined rock during operations, and a plan for integrating new information with baseline data was requested.

In response to these concerns, a hydrogeochemistry working group comprising agency and interdisciplinary team members reviewed all available hydrogeochemical data, discussed apparent uncertainties, and reconsidered sampling and analysis needs. A portion of that committee focused specifically on geochemistry issues. This Sampling and Analysis Plan (SAP) presents the recommendations of the geochemistry working sub-group and expands upon the approach described by Geomatrix (2007), with a goal of informing the development of risk-based mitigation strategy. MMC would develop a final SAP for the agencies' approval before the Evaluation Phase. The SAP would comply with the selected alternative as outlined in the KNF's Montanore Project ROD.

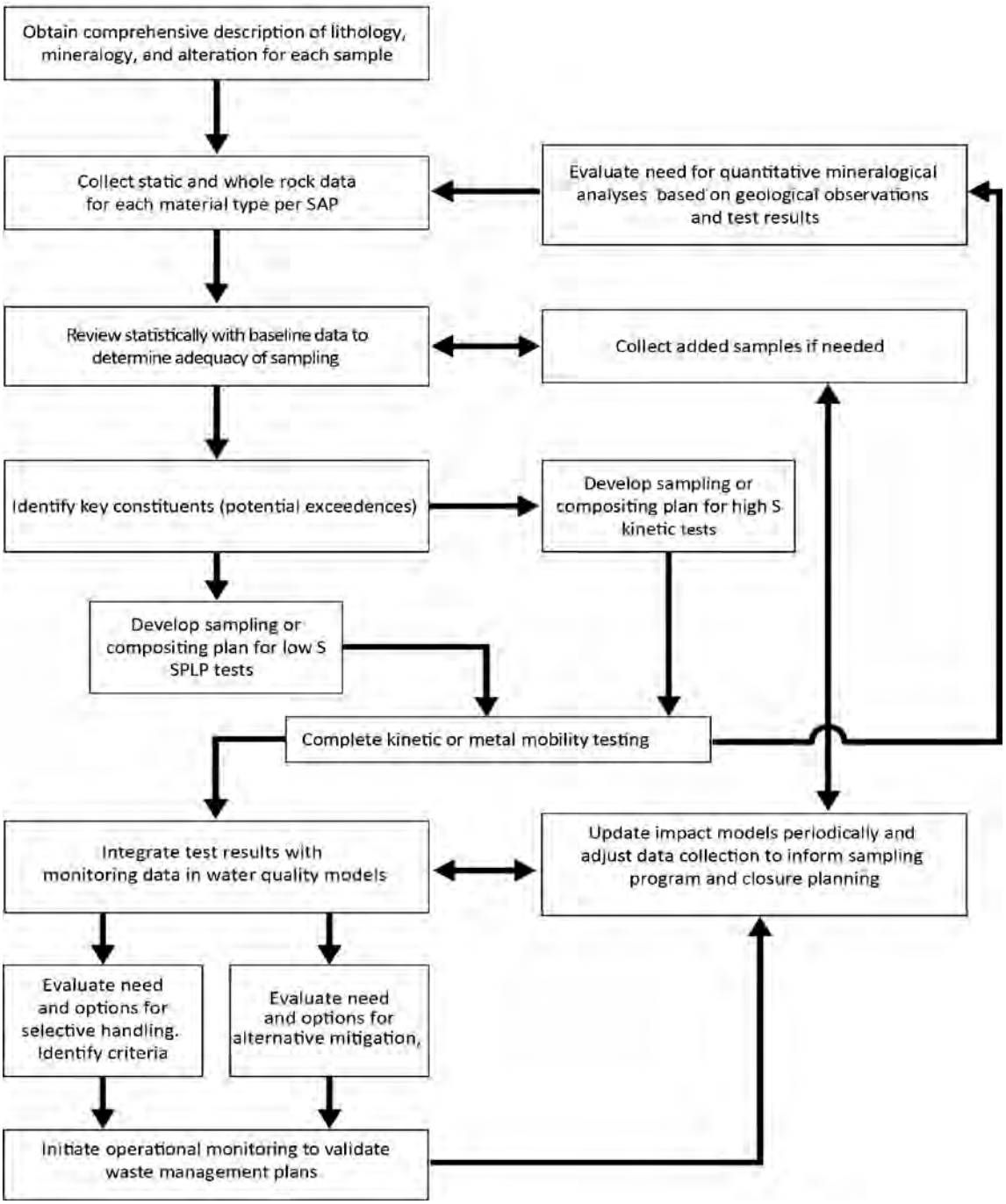
The goal of the SAP is to ensure adequate characterization of acid generation and metal release potential for each of the proposed mine facilities throughout the mine life cycle. The general approach to the sampling and analysis program is summarized in Figure C-1. Two distinct phases of data collection, during the Evaluation/Construction and Operations phases of mine life, are identified in this SAP. Data from both phases would be evaluated statistically to determine overall sampling adequacy and to update mass balance analysis periodically, thus ensuring appropriate mitigation and closure planning.

Data addressing perceived gaps that may influence water quality predictions and waste management practices would be collected during the Evaluation Phase, prior to initiation of construction and operations. During the Evaluation Phase, additional rock would be exposed for sampling and analysis of its potential to release metals, allowing the mine plan to be revised for any needed mitigation. This SAP also provides guidance for integration of Evaluation Phase with EIS analysis and waste rock management plans, prior to initiation of construction, as well as establishment of selective handling criteria as appropriate. This would ensure proper management of mined materials in protecting water resources. As the agencies' mitigation would require that all mined material be managed as though there is potential impact to water quality, until additional testing or monitoring data demonstrate otherwise, there is little risk to the environment using this approach.

An ore production-based strategy for operational verification of the EIS assessment is also provided, which mirrors the approach suggested by Geomatrix (2007) and described in the Draft EIS. Data collected during mine construction and operations would be used to update water quality predictions for comparison with water flow and quality monitoring data and reported for agency review, as suggested by Geomatrix (2007).

Data produced under the Operations Phase SAP would be integrated with the EIS and Evaluation Phase data going forward, to evaluate rock management effectiveness and provide data for facility closure.

Figure C-1. Decision Matrix for Geochemical Sampling and Analysis.



C.9.2 Mine Plan and Material Balance

Waste rock would be produced from the Prichard and Burke Formations during development of access, ventilation, and conveyor adits. Waste rock would also be produced from a barren lead zone that separates two copper-silver ore zones within the upper portion of the lower member of the Revett Formation, and from mineralized (non-ore) zones that lie between the ore zone and the underlying Prichard and Burke Formations. MMC's estimate of tonnage for waste rock, ore, and tailings production during each phase of mine life is summarized in Table C-3.

During the Evaluation Phase, MMC would sample the ore zone to revise resource models and facilitate metallurgical testing as needed. Rock would be exposed in all waste zones during the Evaluation Phase and can be sampled for characterization as appropriate. Metallurgical testing of bulk samples obtained during the Evaluation Phase could provide samples of tailings for additional environmental characterization.

Upon completion of the Evaluation Phase and receipt of the agencies' approval to proceed with the Construction Phase of the mine, MMC would proceed with construction of additional adits that would expose (similar to the Libby Adit) more of the Prichard and Burke Formations. Development would also begin in the lower Revett Formation during construction, which would continue and expand during mining operations. The volume of rock produced from each formation would vary over mine life (Table C-3).

C.9.3 Baseline Geochemistry and Water Quality Data

Geochemical and in situ monitoring data for Montanore available for inclusion in the impact analysis are summarized in Table C-4. Together with geochemical data from other Revett-type copper-silver deposits at Troy and Rock Creek, and monitoring data from the Libby Adit and Troy Mine, these data indicate low overall potential for acid generation, with low to moderate associated potential for metal release. Use of differing approaches to sampling and analysis over time has produced a data set that is inconsistent in terms of detection limits, suites of analytes, and frequency of sampling. Uncertainty that arises from these issues can be resolved through sampling of rock as it becomes available during the Evaluation Phase of development.

The specific type, quality, and adequacy of data available for incorporation into the EIS is discussed in detail in reports by Geomatrix (2007), Enviromin (2013), ERO Resources Corp. (2011), and discussions of the Montanore hydrogeochemistry workgroup (see minutes of meetings from 2009 and 2010 on file with the agencies). In-depth review of these data is not repeated in this plan.

In situ monitoring data collected within and adjacent to the Libby Adit, and water quality data from the Troy Mine, provide further information that can also be used to inform decisions about relative need for additional geochemical characterization and rock management. The Libby Adit provides a real-time, full-scale geochemical analog for Prichard and Burke Formation waste that is currently exposed in underground workings, and the Troy mine data describe a comparable analog for the Revett Formation where it is exposed underground. Available water quality data collected in and around the Libby and Troy adits were discussed in the Draft EIS, as well as in Geomatrix 2007. More recent data were integrated with pre-2007 data in a comprehensive water quality report (ERO Resources Corp. 2011). A statistical summary of these data, together the number of detected values and data reduction methods necessary to analyze baseline conditions, are provided in the report.

Table C-3. Estimated Material Balance, by Phase of Mine Life, Alternative 3.

Rock Type	Current	Evaluation	Construction	Operations Year 1-5	Operations Year 6+	Closure and Post-closure	Total	Proposed Placement Pending Analysis
Prichard waste rock	377,700	0	1,163,700	0	0	0	1,541,400	Tailings impoundment/ construction
Burke waste rock	42,500	0	151,200	0	0	0	193,700	Tailings impoundment/ construction
Revett waste rock (non-lead)	4,200	0	801,000	85,000	121,400	0	1,011,600	Tailings impoundment/ construction
Revett barren lead waste rock		0	134,900	245,000	231,300	0	611,200	Underground
Revett combined waste rock		545,300	0	0	0	0	545,300	Lined Libby Adit pad
Total waste rock	424,400	545,300	2,250,800	330,000	352,700	0	3,903,200	
Revett ore		Core	148,000	22,852,000	97,000,000	0	120,000,000	Mill
Tailings		Pilot	0	23,000,000	97,000,000	0	120,000,000	Tailings impoundment

All units are tons; conversion from bank cubic yards presented in MMC 2009 based on a density of 12.18 cubic feet/ton
Prichard includes Prichard-Burke transition rock
Revett waste reported as combined when data do not distinguish barren lead from other altered zones
Operational rock type defined by formation and mineralization
Source: MMC 2009.

Table C-4. Summary of Geochemical Analyses and In Situ Water Quality Data.

Test	Prichard	Burke	Revett Waste (non-lead)	Revett Barren Lead	Revett Combined	Revett Ore	Tailings
Static	70	19	41	25		35	1
Kinetic	2	0	1	1	1	1	ND
Metals	2	0	0	13	14	12	ND
Mineralogy	ND	ND			10	17	13
Intended location of rock	Adit, then tailings dam construction		Underground workings				Tailings
Source of *in situ* Monitoring	Libby Adit and Waste Rock Sump (WRS)				Troy Mine		
In situ Parameters	pH, metals, nutrients				pH, metals, nutrients		

ND = No data

C.9.4 Evaluation Phase Sampling and Analysis

This section describes sampling and analyses needed to address uncertainties in existing geochemical data and to delineate a plan for applying those data, together with water quality data, to rock management in a timely manner. Following review of available data by lithology and waste type throughout the mine life cycle, and review of chemistry data for geochemical analogs at Rock Creek, the Libby Adit and the Troy Mine, the geochemistry workgroup agreed that available in situ data reduce the need for further pre-construction characterization of the Revett ore, Prichard waste rock, and Burke waste rock zones that are already exposed. Confirmation sampling in zones that have not yet been mined is needed for these lithologies. The lower Revett altered waste and barren lead zones are also not addressed by these analogs and require further evaluation. The fundamental approach relies on a combination of available in situ water quality and geochemical data from all Revett copper-silver deposits, together with Evaluation Phase data, to reduce risk through adaptive waste rock management. The SAP seeks to prioritize sampling and testing to ensure that data needed to modify waste management plans are available at the start of construction. A decision matrix to be used in refining the SAP, based on data as they become available, is provided as Figure C-1. The following explanations are provided to guide sampling and analysis efforts.

Sample Type: The purpose of geochemical characterization is to describe the acid generation potential (using static and kinetic methods), metal/metalloid release potential, and nitrate release potential for mined ore, waste rock, and impounded tailings. Waste rock would be exposed in underground workings or used in surface construction at the proposed mine. There are multiple waste lithologies, which include the Prichard, Burke, and several altered waste zones within the Revett Formation. These materials would be exposed to changing weathering conditions throughout mine life; during active mining, or where placed above ground, rock would be exposed to oxygen; following closure, when underground workings would be flooded, oxygen exposure and related oxidation would be greatly reduced. Materials requiring geochemical characterization are summarized based on lithology, grade, geochemical conditions, and placement in Table C-5.

Table C-5. Summary of Material Types.

Location	Weathering Condition	Material Type	Lithology
Underground Rock left in back and rib, or backfilled within mined out workings. Rock exposed in adits	Partially saturated, aerobic, during dewatering and active mining	Ore	Revett – ore
		Waste	Revett – barren lead
			Revett – chalcopyrite
			Revett – pyrite
			Revett – sphalerite
			Burke
			Prichard
	Saturated, anaerobic, post-dewatering and following groundwater rebound	Ore	Revett – ore
		Waste	Revett – barren lead
			Revett – chalcopyrite
			Revett – pyrite
			Revett – sphalerite
			Burke
			Prichard
Surface Rock stockpiled at adit on liner Rock stockpiled within tailings impoundment footprint on liner Rock used in construction of tailings dam	Variably saturated, aerobic	Waste	Burke
			Prichard
Tailings impoundment	Saturated, anaerobic under active placement conditions Unsaturated tailings post-dewatering	Tailings	Processed Revett ore

Number: Number of samples to be collected is based on minimum requirements for a simple, normally-distributed data set, and would be modified in the context of observed lithological and mineralogical variability. Sampling density would also consider results of preliminary geochemistry analyses and in situ monitoring data. During baseline characterization, sampling would focus on covering the range of variability in mineralization, rather than on spatial or volumetric coverage which would be the focus during operational validation. Tonnage-based guidelines, such as those provided by the Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials (Price 2009), are more appropriate for operational monitoring programs. Determination of adequate sampling would be an iterative process, involving review of known information with new data to determine whether the number of samples is sufficient to describe the observed variability, such as suggested in the Global Acid Rock Drainage Guide (International Network for Acid Prevention 2008). Appropriate statistical tests of initial data, such as T-test/ANOVA or Keyser-Meyer-Olkin tests, would be used to determine sampling adequacy.

The sufficiency of characterization would also be considered in context of the capacity of the mitigation strategy to address uncertainty as well as the potential cost of failed mitigation. For example, collection of more samples of a single rock type to identify variations in metal concentration that lie within the capacity of a planned water treatment plant may be less important than collecting samples from distinct rock types which may identify different metals that would need to be incorporated into the design of that treatment plant. Likewise, extensive characterization of a rock type that represents a small percentage of total mined material (like the lower Revett altered waste zones) is less likely to reduce future costs of water treatment than thorough characterization of rock (like the Prichard) that represents a large portion of the waste.

The number and type of geochemical tests are shown in Table C-6. The specific available geochemical and monitoring data, identified risk, uncertainty about existing information, conclusions of the geochemistry sub-group, requirements for additional geochemical sampling and analysis, and requirements for water quality monitoring for geochemistry during the Evaluation Phase are described below for each rock type.

The sampling and analysis plans would be reviewed, and if appropriate, modified by the geochemist charged with implementing this program, in consultation with the agencies. The intensity of future sampling and method of analyses would be determined by geological observation and review of available data. A thorough geological description by a qualified person, to obtain data describing lithology, mineralogy, and alteration data as a foundation for all subsequent sample collection and analysis, would be required. The need for more comprehensive

Table C-6. Evaluation Phase Geochemical Testing.

Test	Prichard	Burke	Revett Waste (non-lead)	Revett Barren Lead	Revett Ore	Simulated Bench-Scale Tailings	Total Samples
ABA	8[1]	8[1]	24[1]	8	8	5	61
Whole Rock	8[1]	8[1]	24[1]	8	8	5	61
Kinetic (acid)	1[2,3,4]		3[1,2,3,4]	2[2,3,4]			6[3,4]
Particle size	1[2]		3[1,2,3]	2[2,3,4]			6
SPLP (non-acid)	8[1]	1[1]			2	5	16
Mineralogy	4[5]	1[5]	3[5]	2[5]	2	5	17
In situ Monitoring	Libby Adit inflow quality; waste rock stockpile				Review of Troy Mine data		
In situ Parameters	pH, metals, nutrients						
Use of rock	Adit, construction, tailings impoundment		Underground workings			Tailings impound-ment	

[1]Or more as appropriate, per geological description
[2]Composite
[3]Unsaturated kinetic columns
[4]Saturated kinetic columns
[5]As appropriate

analytical mineralogy would be determined based on initial geological description as well as results of geochemical test work (Figure C-1).

C.9.4.1 Prichard Formation

C.9.4.1.1 Available Geochemical and Monitoring Data

Adequate static testing has been completed (n=70). Limited laboratory kinetic tests were completed, which included analysis of arsenic, cadmium, copper, iron, lead, manganese, silver and zinc (Geomatrix, 2007, Appendix B-2). Metal mobility tests and mineralogical analyses have not been completed. A better geological delineation of operational distinction between Burke and Prichard Formations, along with revised tonnage estimates, is needed. There is also a need to clarify factors influencing nitrate release from Prichard waste after blasting. Long-term in situ monitoring of pH, nutrients, and metal release from the Prichard has been conducted at the Libby Adit (sample IDs: RAW and RAW-1), and more recently for the waste rock stockpile on the pad outside of the Libby Adit (sample IDs: WRS and WRS-1). Monitoring has been conducted upgradient of the Libby Adit at LB-200 and downgradient, in monitoring wells MW-07-01 and MW-07-02 and at surface water station LB-300. These data are summarized statistically in the Surface Water Quality Technical Report (ERO Resources Corp. 2011).

C.9.4.1.2 Risk

The risk of acid generation by the Prichard Formation is low. The more important risk associated with waste mined from the Prichard is metal and nitrate release via adit water or seepage from surface facilities constructed with Prichard waste rock. Of particular concern is the tailings impoundment, which is planned to be constructed partly with Burke and Prichard waste rock. A secondary risk of metal and nitrate release from Prichard exposed within the adits also exists.

C.9.4.1.3 Uncertainty

Key issues include:

- Range of ABA values in Prichard Formation yielding NP/AP ratios that suggest a potential for acid generation that is inconsistent with results of in situ monitoring data, which show consistently neutral pH. This suggests mineralogical encapsulation of reactive minerals in non-reactive silica, similar to that observed in the Revett Formation, which has not been verified through mineralogical testing of the Prichard Formation.
- Limited humidity cell testing confirms the overall non-acid generating results of the more comprehensive in situ monitoring record.
- An incomplete list of metal analytes, which were measured in prior kinetic tests at relatively high detection limits (above concentrations currently needed to evaluate compliance), does not fully address metal release questions.
- Possible differences in metal release potential between expansion areas within the Prichard (*e.g.*, areas that have not yet been exposed) and areas that have already been characterized. This would be addressed using SPLP tests with analysis of a complete list of metals at appropriate detection limits. These data would support development of a composite for a humidity cell test to confirm previous findings and collect a complete metal analysis.

- The relatively massive and consistent character of the Prichard waste rock suggests that sub-handling of portions of this unit (based on selective handling criteria) may be problematic if future tests indicate that mitigation to meet water quality standards would be needed. This would be considered in light of any potential for long-term metal release.

C.9.4.1.4 Conclusions

- The available results of metal and nutrient release testing on the Prichard Formation as waste rock, particularly for antimony, arsenic, copper, lead, and nitrate, confirm the fact that additional monitoring is required.
- Historical, ongoing, and continued monitoring of water quality within and downgradient of the Libby Adit is more valuable in predictions of water quality than additional kinetic testing.
- As the mine expanded into undisturbed portions of the Prichard Formation, limited geological, mineralogical, and geochemical analyses would be conducted to test for geochemical variability within the formation and validate baseline analysis as mining proceeds.

C.9.4.1.5 Future Geochemical Analyses

- Additional characterization of metal release potential, either through SPLP, kinetic testing or monitoring work, is needed to validate the conclusions of existing mass balance analysis of potential impacts associated with water quality in adits and downgradient of facilities constructed with Prichard waste rock (such as the tailings impoundment). Analyses of effluent from short and long term leach testing (*e.g.*, SPLP, humidity cells, and *in situ* monitoring) would be reviewed to identify constituents of concern at appropriate levels of detection.
- Geological description and hand specimen mineralogy would be used to describe new exposures of Prichard and link those exposures to historically monitored Prichard exposed in the Libby Adit and on the waste rock pad outside the adit.
- QEMSCAN (quantitative evaluation of minerals by scanning electron microscopy) or petrography (XRD/SEM-EDS) of a small number of representative samples (here estimated as 4, which would be adjusted to fit geological observations) would be used to compare new and historically mined Prichard, and to explain observed differences between static and kinetic tests of ARD potential.
- Acid base account (Modified Sobek), whole rock (*e.g.* 55 element ICP using Chemex method MEMS41, aqua regia digestion) and SPLP (EPA Method 1312 as modified) testing of 8 to 10 representative samples collected from any portions of Prichard not currently exposed or previously sampled. One kinetic test of composited Prichard, with compositing based on ABA, whole rock, and SPLP results, to confirm non-acid characteristics and measure metal release potential.
- Nitrate and trace metal release would be monitored using data from mine and adit water before treatment (*e.g.*, RAW-1) and from waste rock stockpiles (*e.g.*, WRS-1).
- Particle size analysis of run-of-mine Prichard rock using standard ASTM methods would be needed to scale laboratory results to prediction of field scale processes.
- Compare laboratory test results with water quality sample results.

C.9.4.2 Burke Formation

C.9.4.2.1 Available Geochemical and Monitoring Data

There have been enough static tests completed (n=19) to describe the underlying range of acid generation characteristics, but no kinetic, metal release potential, or analytical mineralogy tests of the Burke Formation have been completed. Better geological delineation of operational distinction between Burke and Prichard Formations, with revised tonnage estimates is needed, along with clarification of potential for nitrate release. Burke rock mined from the Libby Adit is monitored in situ, as discussed above for the Prichard Formation.

C.9.4.2.2 Risk

The risks associated with the Burke Formation are negligible.

C.9.4.2.3 Uncertainty

A small quantity of Burke rock would be disturbed during adit development. Acid risk is low, and potential for nutrient and metal release is as described above for the Prichard Formation. Specific issues include:

- Range of ABA values in Burke Formation yield NP/AP ratios that suggest little potential for acid generation, consistent with results of in situ monitoring which show neutral pH.
- Potential metal release by Burke Formation rock where exposed underground or in constructed surface facilities requires evaluation. These data need to be sufficient to support mass balance analysis of adit water quality and predictions of water quality downgradient of facilities constructed with Burke Formation rock.

C.9.4.2.4 Conclusions

- No humidity cell testing is warranted for Burke rock due to consistently high ABA values. Historical, ongoing, and continued monitoring of water quality within and downgradient of the Libby Adit is more important to predictions of water quality than kinetic testing of the Burke Formation.
- Metal and nutrient issues, and sampling and analysis, are the same as those described for the Prichard Formation.
- As the mine expanded into undisturbed portions of the Burke Formation within the new adits, limited geological, mineralogical, and geochemical data would be collected to verify consistency within the formation as mining proceeds.

C.9.4.2.5 Future Geochemical Analyses

- Geological description and hand specimen mineralogy.
- Acid base and whole rock “fingerprint” analysis of 8 to 10 samples.
- SPLP testing of at least one composited sample that represent the range of mineralogy and chemistry observed in the Burke formation, based on geological mapping and the range of metal content observed in the whole rock analyses. Analyses of effluent from short and long term leach testing (*e.g.*, SPLP, humidity cells, and *in situ* monitoring) would be reviewed to identify constituents of concern at appropriate levels of detection.
- Use acid base, whole rock, and SPLP results to determine if kinetic tests also need to be performed.

- More detailed mineralogy, and additional SPLP tests, if elevated metal levels were to be noted in these tests, to understand metal mineral residence and mobility.
- Nitrate release would be predicted using in situ monitoring data from RAW-1, WRS-1, and runoff from any future waste rock stockpiles.
- Particle size analysis of run-of-mine Burke rock using standards ASTM methods would be conducted following kinetic tests to scale laboratory results to prediction of field scale processes.
- Water quality monitoring as described for the Prichard Formation.

C.9.4.3 Revett Formation – Waste Rock

Mineral zonation within the lower Revett was mapped in detail at Troy by Hayes (1983) and Hayes and Einaudi (1986), who identified multiple sulfide-carbonate facies surrounding the copper-sulfide mineralization of the ore body. These pyrite-calcite, chalcopyrite-calcite, and sphalerite-calcite sulfide altered waste zones, are likely to be intercepted by the Montanore adits below the ore zone. Zones of galena-calcite are also recognized, which occur as interbeds in immediate proximity to the ore zone, and are referred to as the “barren lead zone.” During exploration, the barren lead zone was sampled and characterized as potentially acid generating based on humidity cell tests. The other altered zones that are likely to exist below the ore zone have not yet been drill tested and their extent, character, and probable production volume are not well known, although preliminary data suggest that they are thin at Montanore. For this reason, testing of the “barren lead” zone are distinguished from the “non-barren lead” zones in the following discussion.

C.9.4.3.1 Revett Barren Lead Waste Zone (Galena)

Available Geochemical and Monitoring Data

Static (n=25) and kinetic (n=1) tests of acid drainage potential have been completed. Metal concentrations were measured in humidity cell effluent (n=1) for an incomplete list of analytes at relatively high detection limits and there is no analytical mineralogical characterization of this zone at Montanore, making comparison with geological analogs exposed at the Troy Mine less robust. Water quality data collected in the underground workings at Troy represent the cumulative effect of water interacting with all of the Revett waste and ore zones. It is not possible to assign water quality to individual altered waste zones.

Risk

Kinetic testing in a humidity cell indicates potential for acid generation and associated metal release from the lead zone. MMC has designated this material for special handling and would design underground facilities to minimize its disturbance. Barren zone (non-ore) containing galena that is mined and removed to surface would be placed on a lined pad, until it can be replaced underground. While on the pad and stored underground, this material would be exposed to partially saturated, aerobic conditions until dewatering ends and the backfilled mine void is saturated with groundwater. The extent of groundwater rebound may vary, and groundwater modeling results suggest that the entire void would not fill for 490 years. For the purposes of this SAP, it is assumed that barren lead waste would be exposed to weathering under both aerobic and anaerobic conditions. The potential for oxidation, with associated acid production and metal release, would change depending upon oxygen availability and encapsulation.

Uncertainty

It is likely that barren zone leachate would be acidic, with elevated metal concentrations. The principle uncertainty is about the magnitude of metal release, and its response to variable oxygen exposure.

Conclusions

- Although this material is designated for selective handling, further characterization under unsaturated, aerobic conditions is needed to understand its metal release potential within the underground workings during mining and the following refilling period.
- Further, as its geochemical behavior is expected to change as a result of saturation when groundwater rebounds at closure, additional characterization of acid generation and trace metal release potential under saturated conditions is also warranted.
- As the mine expands into undisturbed portions of the barren lead zone, limited geological, mineralogical, and conformational geochemical analysis would be conducted to verify mineralogical and geochemical consistency with the tested zones as mining proceeds.

Future Geochemical Analyses

- Geological description and hand specimen mineralogy.
- Acid base account and whole rock testing of 8 to 10 representative samples collected from the barren lead zone during Evaluation Phase. Number of samples would be adjusted to represent range of mineralization.
- Two kinetic tests (ASTM humidity cell test method, run until steady state chemistry is observed) of representative rock composited based on static tests to confirm magnitude of potential acid generation and analyze for a complete suite of metals at appropriate detection limits. One test would be run under unsaturated conditions and one would be saturated, to represent variable weathering conditions. Analyses of effluent from short and long term leach testing (*e.g.*, SPLP, humidity cells, and *in situ* monitoring) would be reviewed to identify constituents of concern at appropriate levels of detection.
- QEMS or petrography (XRD/SEM-EDS) of two samples, weathered under both aerobic and anaerobic test conditions (or more, based on geologic observations) would be used to establish baseline within barren lead zone for future mineralogical assessment of variability.
- Particle size analysis of run-of-mine Revett barren lead waste rock using standard ASTM methods is needed to scale laboratory results to prediction of field scale processes.

Water Quality Monitoring

- Continued evaluation of available monitoring data from Troy Mine.
- Water quality samples would be collected downgradient of barren lead zone material following underground placement.
- Chemistry of water in saturated zones would be monitored as they are developed to predict long-term chemistry for closure work.

- Changes in nutrient concentrations would be monitored in situ to predict underground nutrient loading from the barren lead waste.

C.9.4.3.2 Revett Formation–Non-Lead Barren Waste Zone

Available Geochemical and Monitoring Data

Limited geological description of volume and mineralogy is available. Static tests have been completed for lower Revett waste (n=41), but the relationship of these samples to the individual altered waste zones is unclear. Limited (n=1) kinetic tests of acid drainage potential for a composite of lower Revett waste has been completed, with analysis of a limited suite of metals at relatively elevated detection limits. No analytical mineralogy has been completed. Water quality data collected in the underground workings at Troy represent the cumulative effect of water interacting with all of the Revett waste and ore zones. It is therefore not possible to assign water quality to individual altered waste zones using Troy monitoring data.

Risk

Detailed mapping of the individual altered waste zones present at Montanore has not been completed and production volumes have not been calculated. It is possible that small (inconsequential) amounts of this rock would be intercepted, yet presence of divalent (iron) sulfide minerals in the altered waste zones as mapped at Troy suggests risk for sulfide oxidation and acid generation. Results of the available kinetic test data do not support acid risk or release of elevated metal concentrations.

Uncertainty

The risk associated with this material may be minimal due to anticipated small volumes of rock from each altered waste zone. Uncertainty exists about potential for acid, metal, and nutrient release.

Conclusions

- Characterization of Revett altered waste zone behavior under unsaturated, aerobic conditions is needed to understand its chemical behavior as a source term in the underground workings, as well as its behavior if used as construction material.
- As the geochemical behavior of this zone would be expected to change as a result of saturation when groundwater rebounds at closure, additional characterization of acid generation and trace metal release potential under saturated conditions could be useful if material is shown to be acid generating.
- The relative volume and extent of altered waste zone exposure, as well as static test results, would dictate whether saturated and unsaturated kinetic testing is warranted for the individual altered waste zones. The need for testing is contingent upon the volume identified during the Evaluation Phase.

Future Geochemical Analyses

- Detailed, well-documented geological description and hand specimen mineralogy, to map altered waste zones.
- Revise calculated production volumes for altered waste zones
- Acid base account and whole rock “fingerprint” analysis of 8 to 10 samples to characterize geochemical variability of rock for development of a composite for kinetic testing.

- Test a composited sample from each mapped altered waste zone in a kinetic test (including a complete suite of metals at appropriate detection limits). As this rock is likely to report to surface facilities, use standard unsaturated kinetic test methods. Analyses of effluent from short and long term leach testing (*e.g.*, SPLP, humidity cells, and *in situ* monitoring) would be reviewed to identify constituents of concern at appropriate levels of detection.
- If >1% of waste by volume were produced from an altered waste zone with static test results that suggest strong potential to generate acid, which would then trigger selective handling with subsequent underground placement, conduct additional column test work under saturated conditions to produce data representing underground long-term behavior of this material.
- As the mine expanded into undisturbed portions of the barren lead zone, limited geological, mineralogical, and conformational geochemical analysis would be conducted to verify consistency within the formation as mining proceeded.
- Particle size analysis of run-of-mine non-lead Revett waste rock using standard ASTM methods would be needed to scale laboratory results to prediction of field scale processes.

Water Quality Monitoring

- Evaluation of ongoing, publicly available monitoring data from Troy Mine.
- When possible, collect water quality samples downgradient of any reactive altered waste zone material following underground placement.
- Monitor chemistry of water from saturated zones as they were developed to predict long-term chemistry for closure work.
- Changes in nutrient concentrations in situ would be monitored to predict nutrient loading from the blasted portions of the non-ore altered waste zones.

C.9.4.4 Revett Formation – Ore

C.9.4.4.1 Available Geochemical and Monitoring Data

Static tests of ore have been completed (n=25). Kinetic testing (n=1) with characterization of metal release potential for an incomplete suite of metals at elevated detection limits has also been completed. More comprehensive characterization of metal release potential, together with analytical mineralogy, has been completed for ore within the Rock Creek portion of the Rock Creek-Montanore deposit (Enviromin 2013; Maxim Technologies, Inc. 2003). Water quality data collected in the underground workings at Troy represent the cumulative effect of water interacting with all of the Revett waste and ore zones. It is not possible to assign water quality specifically to ore zones.

C.9.4.4.2 Risk

Long-term monitoring of the mined underground workings at Troy, where ore left underground is exposed to groundwater, indicates neutral pH with low but increased concentrations of metals common in the ore zone, such as copper, silver, and lead.

C.9.4.4.3 Uncertainty

Uncertainty about the environmental geochemistry of ore left underground is primarily related to the prediction of metal concentrations post-mining.

C.9.4.4.4 Conclusions

- Static test results suggest that a portion of the ore zone has potential to generate acid, yet the kinetic test and in situ monitoring results do not support the potential for acid generation. This has been shown to be the result of non-acidic sulfide minerals and silica encapsulation of sulfide minerals within the Revett ore zone (Maxim Technologies, Inc. 2003).
- Characterization of ore behavior under unsaturated, aerobic conditions is needed to understand its chemical behavior as a source of metals in the underground workings.
- As its geochemical behavior would be expected to change as a result of saturation when groundwater rebounds, additional in situ monitoring of acid generation and trace metal release from backfilled waste under saturated conditions is needed to predict chemistry of the mine pool post closure.

C.9.4.4.5 Future Geochemical Analyses

- Acid base account and whole rock "fingerprint" analysis of 8 samples to characterize geochemical variability of samples for use in composite for kinetic testing.
- Metal mobility tests for one or more composited samples with a complete suite of metals at appropriate detection limits. Static test results would be used to develop composites. Analyses of effluent from short and long term leach testing (*e.g.*, SPLP, humidity cells, and *in situ* monitoring) would be reviewed to identify constituents of concern at appropriate levels of detection.
- Analytical mineralogy quantifying sulfide mineralogy and silica encapsulation would be completed for Montanore and Troy, to compare with that completed by Maxim (2003) for Rock Creek. This would support the use of the Troy and Rock Creek ore deposits as geochemical analogs for Montanore, and confirm the predicted lack of acid generating sulfides and low reactivity of encapsulated sulfides in the ore zone.

C.9.4.4.6 Water Quality Monitoring

- Evaluation of available monitoring data from Troy Mine.
- Monitor chemistry of water from saturated zones as they were developed
- Changes in nutrient concentrations in situ would be monitored to predict nutrient loading from the blasted portions of the ore zone.

C.9.4.5 Tailings

C.9.4.5.1 Available Geochemical and Monitoring Data

Static tests of tailings reject from the process proposed for Montanore (n=1) have been completed with no kinetic tests of acid drainage potential or characterization of metal release potential. Analytical mineralogy and whole rock analyses were completed for tailings that was produced using a similar process to float ore samples from the Rock Creek portion of the Montanore-Rock Creek deposit (n=13). Due to limited access to bulk samples for metallurgical testing, no tailings would be available for further environmental testing until the exploration adit was completed. Water quality data collected from the Troy tailings impoundment, and from downgradient water resources at Troy, are believed to represent conditions anticipated for Montanore, which would use a similar process to concentrate ore by flotation (Enviromin 2013).

C.9.4.5.2 Risk

Total sulfur analyses of tailings generated through bench-scale testing of ore from Rock Creek shows low concentrations of sulfur with little potential for acid generation. The relatively high surface area of the ground tailings does increase metal release in tailings effluent. Long-term monitoring of the impoundment at Troy indicates neutral pH with elevated concentrations of metals common in the ore zone, such as copper, silver and lead. The primary risk associated with tailings is metal release, with secondary risk of elevated nitrate concentrations.

C.9.4.5.3 Uncertainty

The potential for acid generation by Montanore tailings would likely be low based on negligible levels of post-flotation sulfur content in samples from Rock Creek, but would be confirmed through testing of Montanore tailings when samples were available. The geochemical behavior of tailings would be expected to change as a result of desaturation when dewatering occurred at closure, but no kinetic test data are available to represent this process.

C.9.4.5.4 Conclusions

- Tailings are highly homogeneous and therefore can be represented with a composite sample from the metallurgical testing reject sample.
- Characterization of its behavior under saturated, anaerobic conditions is needed to understand its chemical behavior as a source term in the operational impoundment.
- Additional characterization of acid generation and trace metal release potential under unsaturated conditions is also warranted.

C.9.4.5.5 Future Geochemical Analyses

- Acid base accounting and whole rock “fingerprint” analysis of a composited sample to characterize geochemical variability of tailings.
- Evaluate whether routine quality control measurements in mill could provide a measure of geochemical variability, thereby reducing the magnitude of this testing.
- Kinetic tests may not be necessary, due to low sulfide content, but metal release potential tests using SPLP methods would be conducted on a representative suite of samples. As metallurgical testing proceeds, tailings characteristics may vary. Possible classes of material to be studied using SPLP would include whole tailings, and coarse and fine tailings fractions. This would to a certain extent be defined by the metallurgical test work. As tailings are expected to be highly homogeneous, no compositing strategy would be required. Analyses of effluent from short and long term leach testing (*e.g.*, SPLP, humidity cells, and *in situ* monitoring) would be reviewed to identify constituents of concern at appropriate levels of detection.
- A particle size analysis of tailings, using standard ASTM sieving protocols, would be needed for evaluation of silica encapsulation influence on metal and sulfur reactivity in ground tailings.

C.9.4.5.6 Water Quality Monitoring

- Evaluation of ongoing, publicly available surface water and groundwater monitoring data from the Troy Mine impoundment.
- Monitoring of chemistry of water from the impoundment would continue as the impoundment water balance changes through mine life.
- Monitoring of changes in nutrient concentrations would facilitate prediction of tailings seepage chemistry.

C.9.5 Operations Phase Sampling and Analysis

Operational sampling and analysis would focus on validation of baseline conclusions, through periodic collection of Burke, Prichard, and Revett waste rock samples. Samples would be collected based on tonnage, at a rate that provides coverage of the mineralogical variability observed in mined rock. Geomatrix recommended sampling at least every 500 feet in adits and for every 100,000 tons of waste rock (Geomatrix 2007). This level is approximately consistent with guidelines provided by the Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials (Price 2009), which suggest 50 samples per 4 million tons of waste. Likewise, a sample of tailings can be collected periodically at the tailings line drop box, although collection of sampling can be less frequent than waste rock due to the relative homogeneity and characterization that is done for metallurgical processing. Ultimately, the relative frequency of sampling would be based on "variability within the analysis results for critical parameters, prediction objectives, and required accuracy" (Price 2009).

If test work conducted during the Evaluation Phase allowed rock mined during Construction and Operations phases to be classified for management (*e.g.*, there are no inconclusive kinetic tests, and rock requiring management is clearly delineated), static testing of volumetrically representative rock samples using mineralogical description, whole rock analysis, acid base accounting, with occasional metal mobility testing of composites, would provide an adequate basis for evaluating the consistency of mined rock with baseline samples. Water quality monitoring would be as described in section C.10, Water Resources. Following the Evaluation and Construction phases, and the first 5 years of Operations Phase, the agencies would review the data to determine adequacy of sampling and analysis, and management practices.

Of particular interest for operational sampling are locations where waste rock was exposed to oxidation, in surface stockpiles, constructed facilities, or as backfill in underground workings. Periodic collection of water quality samples downgradient of such facilities would allow long-term behavior to be evaluated in support of closure planning.

C.9.6 Sample Collection and Analysis

C.9.6.1 Collection

Sampling during the Evaluation Phase is focused on addressing specific gaps in existing knowledge, or on comparison of newly mined rock from a given lithology with rock that was mined and sampled historically. Sampling would specifically follow the guidelines provided in the SAP, as approved by the agencies, and would be focused on collection of samples across the range of observed mineralization and geological conditions observed. Sampling would proceed as follows:

- Sites would be located on a map and photographed
- Geological description, including lithology, structure, mineralogy, evidence of sulfide, carbonate, and iron oxide, would be completed at each site.
- A representative sample of at least 2 kilograms, allowing sufficient mass for preparation of splits suitable for completion of baseline static ABA, whole rock, and metal mobility tests with enough material archived for composite development and/or mineralogy would be collected.

- The number of samples would follow the guidelines provided in Table C-6, but may vary to accommodate the range of observed mineralogical variation.
- Material would be dried, bagged in plastic to prevent oxidation for shipment to a lab.
- Sample would be crushed to passing 3/8” sieve, and then randomly split using established protocol to obtain subsamples for relevant analyses.
- Care would be taken to document elements of sampling and analytical uncertainty.

C.9.6.2 Analytical Methods

Samples would be analyzed using the following methods, or by comparable methods approved in advance by the agencies:

- Whole rock metal content – EPA method 3050B http://www.epa.gov/wastes/hazard/testmethods/sw846/pdfs/3050b.pdf, or ALS Chemex method MEMS41 aqua regia digestion followed by ICP, contact www.alsglobal.com
- Acid Base Accounting (ABA) – modified Sobek Method, after Lawrence and Wang, 1997 http://technology.infomine.com/enviromine/ard/Acid-Base%20Accounting/acidbase.htm#Lawrence Sobek
- Synthetic Precipitation Leachability Procedure – EPA Method 1312, http://www.epa.gov/osw/hazard/testmethods/sw846/pdfs/1312.pdf
- Analyses of effluent from short and long term leach testing (*e.g.*, SPLP, humidity cells, and *in situ* monitoring) would be reviewed to identify constituents of concern at appropriate levels of detection.

C.9.7 Data Analysis

As operational data were collected, they would be summarized in an accessible spreadsheet or database format, and evaluated statistically to evaluate sampling adequacy and modify sampling goals as appropriate. Specifically, the distribution of values would be plotted and standard descriptive statistics would be calculated. The relative adequacy of sampling would be calculated, so that the need for additional sampling could be considered. As a general rule, greater characterization would be needed for material posing more risk to water quality.

Criteria to be used for evaluation of individual sample results include comparison of whole rock analyses with standard crustal abundance for elements of concern and comparison of metal mobility results with water quality standards. Metal concentrations in whole rock cannot be directly correlated with metal mobility due to solubility constraints imposed by the minerals that host the metals.

Acid base account results would be evaluating using the following criteria. Rock that is potentially acid generating has an NNP (calculated as NP minus AP, in units $TCaCO_3$/kTon) less than 20, or an NP/AP ratio of less than 1. Rock that is non-acid generating has an NNP greater than 20 or and NP/AP ratio greater than 3. Values that lie between these values are uncertain and require kinetic testing.

Kinetic tests using ASTM standard method D5744-96 would be conducted for a minimum of 20 weeks testing and terminated only with regulatory approval. For interpretation of the results, guidance is provided in the Global Acid Rock Drainage Guide (International Network for Acid

Prevention 2008) or Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials (Price 2009) for prediction of acid generation and metals mobility potential.

The mass loading analysis (Appendix G) used to predict future water quality would periodically be revised to incorporate new data. Results of this analysis would identify the need to adopt or modify selective handling criteria, if appropriate, to mitigate impact based on consultation between agencies and mine site geology staff. The analysis would be updated prior to start of construction, and every 5 years through mine life, if water quality standards change or if unanticipated changes in water quality were observed.

Data would be reviewed in the context of waste management and risk mitigation strategies, and used to evaluate the most relevant closure strategies (*e.g.*, bulkheads, flooding, etc.). Following completion of the Evaluation Phase, the need to handle material selectively would be reevaluated and criteria for material placement would be established. Where possible, trigger values that would enable mining personnel to identify rock for selective handling or to determine the need for mitigation would be identified. A routine reporting schedule would be developed in consultation with the agencies.

C.10 Water Resources

C.10.1 Introduction and Objectives

MMC and its predecessors have collected and reported ambient surface water and groundwater quantity and quality data as well as aquatic biology data (see Chapter 3). Additional monitoring would be required to supplement this original data collection and provide long-term monitoring for the project. The objective of the monitoring is to provide a long-term assessment of the water resources and groundwater dependent ecosystems that could be affected by the mine. Monitoring would be maintained during the life of the project. Post-mining surface water and groundwater monitoring would be continued for a period of time to be specified by the agencies during review of MMC's Final Closure Plan.

The following monitoring would be implemented in one or more of six phases of the project: Pre-Evaluation, Evaluation, Construction, Operations, Closure, and Post-Closure. The first phase would be a Pre-Evaluation Phase of data collection and monitoring to collect additional data before additional dewatering and extension of the Libby Adit started. Monitoring during the next phase, Evaluation Phase, would be designed to monitor the potential effects of the dewatering of the Libby Adit, and the storage of waste rock at the Libby Adit Site. The activities associated with the Evaluation Phase are described in section 2.5.2 in Chapter 2. Monitoring during the next two phases, Construction and Operations, would generally be the same, except for the addition of sediment monitoring, as discussed during those phases. The Closure Phase would cover the period when mill operations ceased, and site reclamation and closure were implemented. The last phase, Post-Closure, would be the monitoring conducted after the adits were plugged, and reclamation of mine facilities was completed. The objectives described in the following sections apply to facilities proposed in Alternative 3. Objectives would be similar for other alternatives and would reflect the facility location of each alternative. An overview of the hydrology and aquatic biology monitoring locations for Alternative 3 is shown in Figure C-2.

C.10.2 Funding

The Montana Board of Health and Environmental Sciences (the Board of Environmental Review's predecessor) approved a "Petition for Change in Quality of Ambient Waters" to increase the concentration of select constituents in surface water and groundwater above ambient water quality (Appendix A). The Order remains in effect and MMC would be responsible for ensuring compliance with the Order's provisions. One provision of the Order was the requirement that Noranda (now MMC) provide funding to the DHES (now DEQ) so that the DEQ could perform sufficient independent monitoring to verify monitoring performed by Noranda (now MMC). The funding would not exceed the actual cost of the agencies' independent monitoring, and or $35,000 annually, whichever was less (in 1992 dollars).

The monitoring may include independent collection or analysis of surface water, groundwater, or aquatic life samples, independent interpretation of monitoring data, or other activities the agencies deemed necessary to verify MMC's monitoring. Beginning in the year in which additional dewatering and extension of the Libby Adit began, MMC would provide $59,300 annually to the DEQ; $35,000 in 1992 dollars is $59,300 (2014 $), using the Consumer Price Index as the inflation factor. Any funding exceeding the agencies' actual cost would be returned to MMC annually or rolled over for the following year. The funding would increase annually in accordance with the Consumer Price Index. The funding would continue throughout the project until the Post-Closure Phase and final bond release, or the agencies' approval to cease monitoring.

C.10.3 Pre-Evaluation Phase

C.10.3.1 Objective

MMC is maintaining groundwater levels in the Libby Adit at 7,200 feet from the adit portal. Water from the adit is pumped to the surface, treated at the Water Treatment Plant, and then discharged at a MPDES-permitted outfall at the site. The Pre-Evaluation Phase covers monitoring up to when MMC would begin additional dewatering of the Libby Adit. The objectives of data collection and monitoring during this phase are to:

- Characterize groundwater conditions overlying portions of the Libby Adit
- Characterize groundwater quality flowing into the Libby Adit
- Identify and characterize groundwater dependent ecosystems (GDEs) in the upper Libby Creek, upper East Fork Rock Creek, and East Fork Bull River drainages
- Characterize water levels, water supply, and water quality of Rock Lake
- Characterize streamflow and water quality in upper East Fork Rock Creek, and East Fork Bull River
- Characterize flows and water quality of benchmark streams near, but outside of the range of influence of expected mine or adit inflows (such as Bear Creek east of the divide, and Swamp Creek west of the divide)
- Characterize changes in water levels and water quality in benchmark lakes near, but outside of the range of influence of expected mine or adit inflows (such as Wanless Lake)
- Assess effects of discharge of treated water on surface water and groundwater adjacent to the Libby Adit

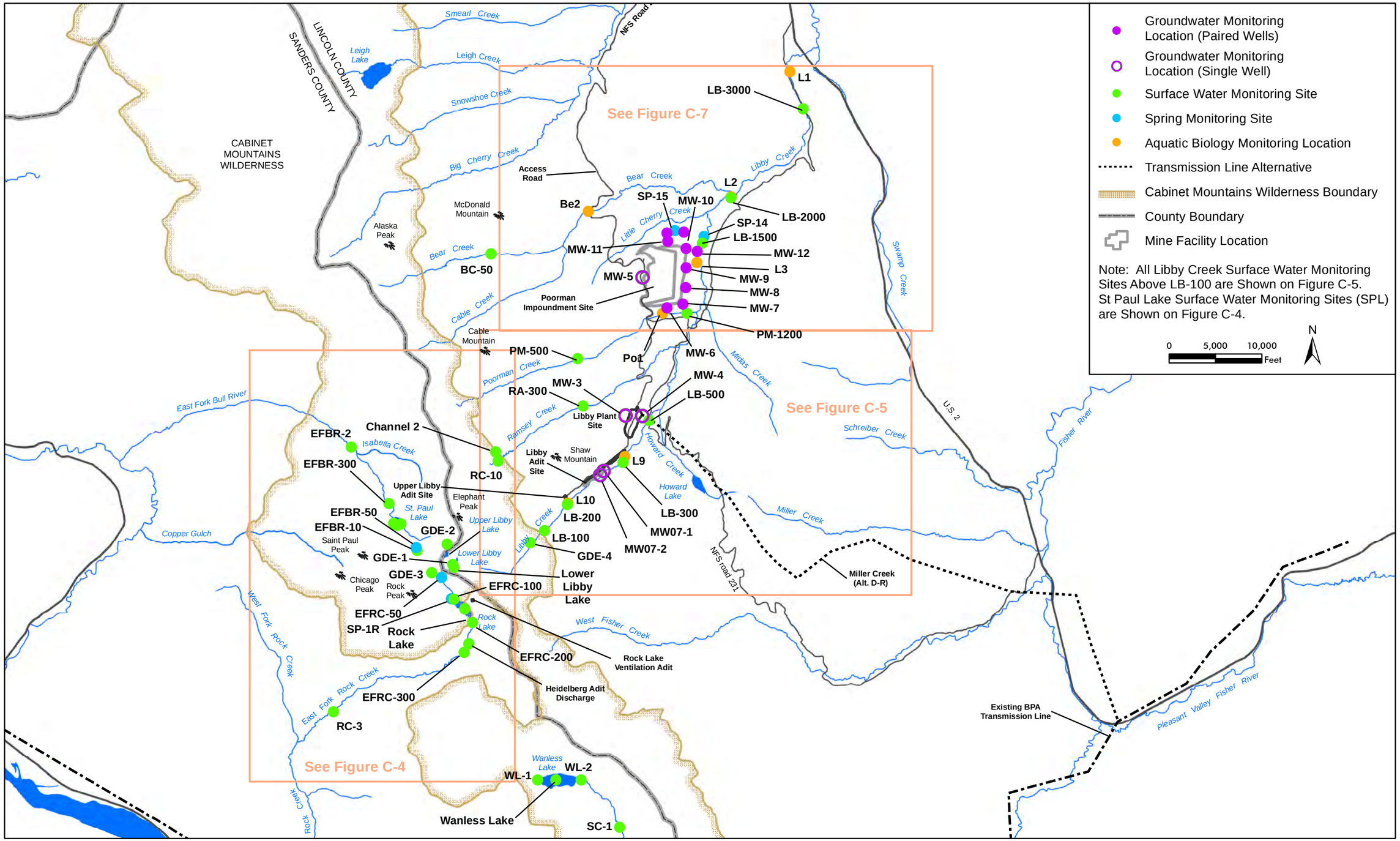


Figure C-2. Current and Proposed Hydrology and Aquatic Biology Monitoring Locations

C.10.3.2 Groundwater Dependent Ecosystem Inventory and Monitoring

C.10.3.2.1 Previous Inventory and Current GDE Monitoring

In 2009, MMC completed a groundwater dependent ecosystem (GDE) inventory focusing on areas at or below about 5,600 feet on the north side of the Libby Creek watershed (Geomatrix 2009a). Additional inventory in the Libby Creek drainage was conducted in 2010. The additional inventory consisted of inventorying GDEs identified in 2009 and the threatened, endangered, and Region 1 sensitive species lists (Geomatrix 2010b). An inventory of other mine areas, such as the Ramsey Creek, East Fork Rock Creek, and East Fork Bull River drainages, was conducted in 2012. Additional areas were inventoried by MMC in 2013, including upper Libby Creek, upper Ramsey Creek and Ramsey Lake, upper East Fork Bull River at and above St. Paul Lake, upper East Fork Rock Creek at and above Rock Lake, and the Libby Lakes basin (MMC 2014b). MMC provided data collected in 2013 and 2014 from GDE sites in the CMW (Klepfer Mining Services 2015a). GDE monitoring completed through 2014 in the CMW is summarized in Table C-7.

MMC completed surveys for wetlands, springs, and perennial and ephemeral streams in the Impoundment Sites in 2005 and 2007 and the Corps issued a preliminary jurisdictional determination for waters of the U.S. at both sites. Surveys for sensitive plants, amphibians, and reptiles also were completed at both sites. No additional GDE inventory of the impoundment sites is needed. In 2011 and 2012, MMC installed and measured water levels in shallow piezometers in wetlands in the Poorman Impoundment Site and the Little Cherry Creek Impoundment Site. Water samples and a snow sample also were collected and analyzed for isotopes.

East Fork Rock Creek

MMC is currently monitoring GDEs in the East Fork Rock Creek and Rock Lake areas (Figure C-4). GDE monitoring activities are:

- Measuring water levels in Rock Lake continuously using a pressure transducer data-logger in the lake and a nearby barometric pressure datalogger (minimum of one data point every hour) and downloading data twice per year (early summer and early fall)
- Measuring water levels using a permanent datum in Rock Lake in early summer and early fall
- Measuring flow and field parameters (pH, specific conductance, dissolved oxygen, and temperature) in Heidelberg Adit discharges in early summer and early fall

Upper Libby Creek

MMC and the KNF currently monitor GDEs and water quality in Libby Creek and Lower Libby Lake (Figure C-5). Monitoring activities are:

- Measuring water levels in Lower Libby Lake using a pressure transducer datalogger in the lake continuously (minimum of one data point every hour) and downloading data twice per year (early summer and early fall)
- Measuring flows and field parameters at seeps side of Lower Libby Lake (GDE-1)
- At the spring/seep complex in upper Libby Creek (located at GDE 4), measuring groundwater levels at two nested piezometer sites and collecting vegetation information annually at transects and quadrants using the Forest Service Level 2 monitoring protocol as a basis for a project specific protocol

Current surface water monitoring is discussed in section C.10.3.3, *Surface Water Monitoring*.

Table C-7. Summary of GDE Monitoring in the CMW.

Site	Dates	Data Collected	Report
Upper Libby Creek			
LB-50 and LB-100	2009-2014 (32x) 2009-2014 (27x)	Flow Field parameters	Geomatrix 2009a, 2010b, 2011d; NewFields 2013a; MMC 2014d; Klepfer Mining Services 2015a
LB-20, LB-30, LB-40, LB-70, and LB-80	2012-2014 (16x) 2012-2014 (14x)	Flow Field parameters	NewFields 2013a; MMC 2014d; Klepfer Mining Services 2015a
GDE-4 (formerly named Spring 8)	2010-2013 2010 and 2012 2010-2014 (7x) 2009-2013 (4x)	Flow and field parameters Isotopes Water levels Wetland indicator species transects	Geomatrix 2009a, 2010b, 2011d; NewFields 2013a; MMC 2014d; Klepfer Mining Services 2015a
Lower Libby Lake	2010-2014 (continuous)	Lake level	
GDE-1	2013	Partial GDE Level 2 inventory	MMC 2014d
Upper Ramsey Creek			
RC-10	2012 2013 (3x)	Flow and field parameters	NewFields 2013a; MMC 2014d
Channel #2	2013	Observation of flow	MMC 2014d
Ramsey Lake	2012 2013 (3x)	Flow and field parameters	NewFields 2013a; MMC 2014d
Upper East Fork Bull River and St. Paul Lake Area			
GDE-2	2013	Partial GDE Level 2 inventory	MMC 2014d
EFBR-10	2013 (1x)	Field parameters	MMC 2014d
EFBR-50	2013 (4x) 2013-2014 (continuous)	Field parameters Stage	MMC 2014d
EFBR-2 and EFBR-300	2013-2014	Flow and field parameters	Klepfer Mining Services 2015a
SPL-1 SPL-4 SPL-9 SPL-11	2012 (1x) 2013 (2x) 2013 (2x) 2013 (1x) 2013 (2x)	Flow and field parameters Flow and field parameters Isotopes (one time excluding SPL-9)	Kline Environmental Research and NewFields 2012 MMC 2014d
Upper East Fork Rock Creek and Rock Lake Area			
EFRC-50	2012 (2x) 2013 (1x)	Flow and field parameters Isotopes	NewFields 2013a; MMC 2014d
SP-1R	2012 (2x) 1999	Flow and field parameters Isotopes	NewFields 2013a; MMC 2014d
EFRC-100 and EFRC-200 (Rock Lake inlet and outlet)	2010-2012 (2x/year) 2009-2014 (4x/year) 2013	Flow and field parameters Water quality parameters Isotope	Geomatrix 2009a, 2010b, 2011d; NewFields 2013a; MMC 2014d; Klepfer Mining Services 2015a

GDE-3	2013 2013 (1x)	Partial GDE Level 2 inventory Isotope	MMC 2014d
Rock Lake	2009-2014 (continuous)	Lake level	Geomatrix 2009a, 2010b, 2011d; NewFields 2013a; MMC 2014d; Klepfer Mining Services 2015a
Benchmark Sites			
BC-50 (Bear Creek)	2013-2014 (6x) 2013 (4x) 2013-2014 (continuous)	Flow and field parameters Water quality parameters Stage	Klepfer Mining Services 2015a
Wanless Lake	2013-2014 (continuous)	Lake level	Klepfer Mining Services 2015a
WL-2 (Wanless Lake)	2013 (3x)	Water quality parameters	Klepfer Mining Services 2015a
SC-1 (Swamp Creek)	2013 (4x) 2013 (1x)	Flow and field parameters Water quality parameters	Klepfer Mining Services 2015a

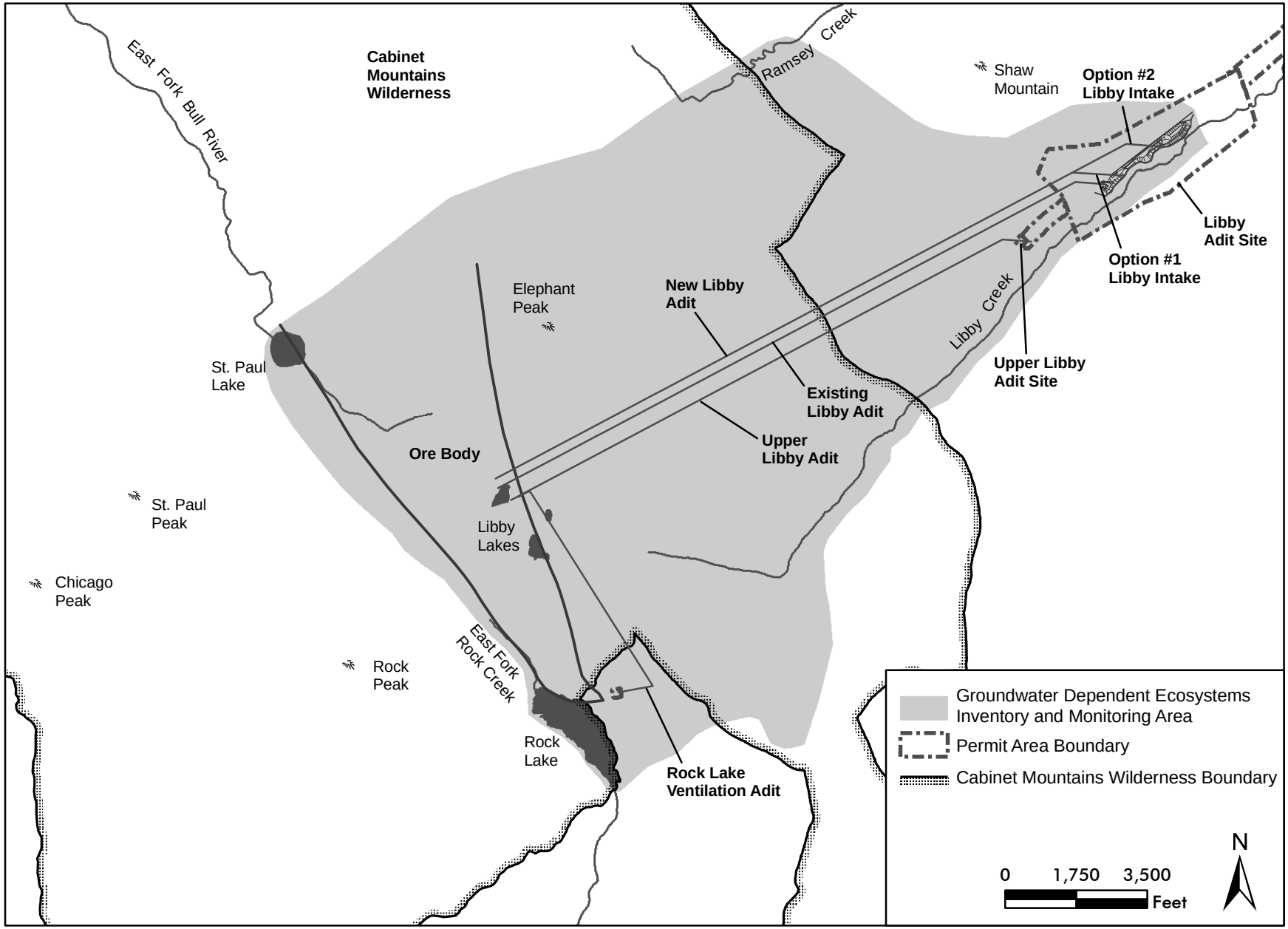


Figure C-3. Groundwater Dependent Ecosystems Inventory and Monitoring Area

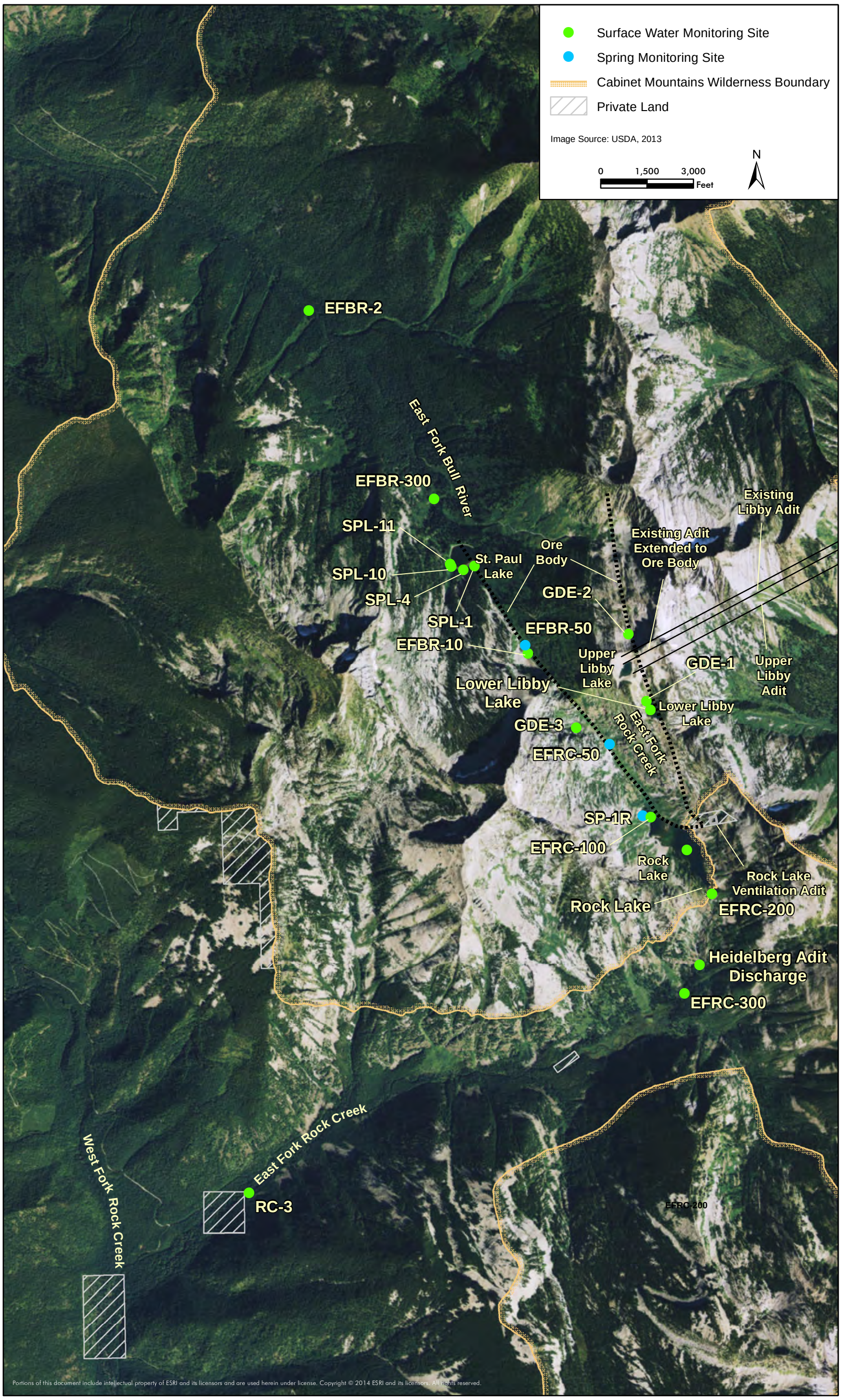


Figure C-4. Current and Proposed Hydrology and Aquatic Biology Monitoring Locations in Mine Area

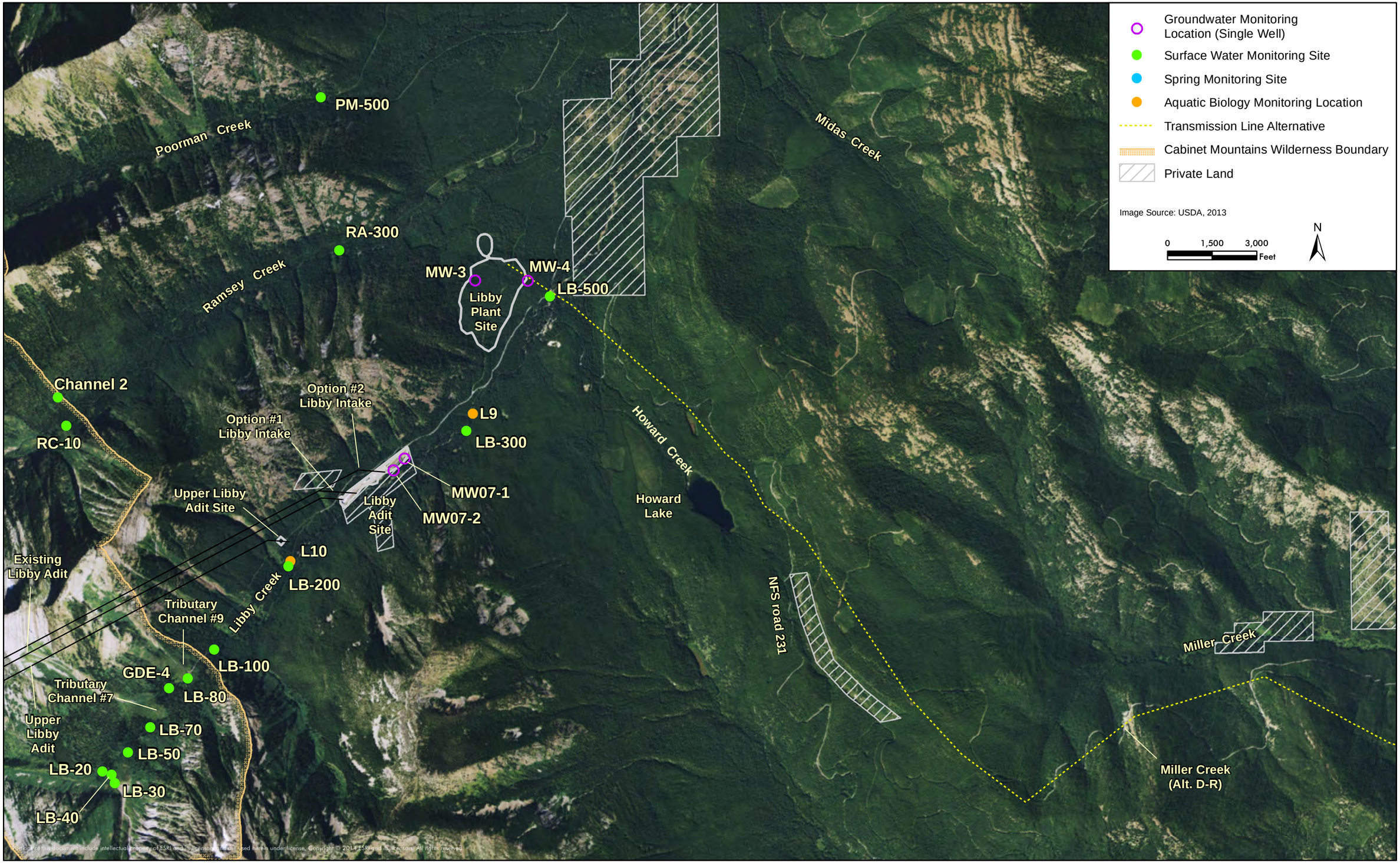


Figure C-5. Current and Proposed Hydrology and Aquatic Biology Monitoring Locations in Upper Libby Creek

C.10.3.2.2 Continued GDE Monitoring

GDE monitoring currently being conducted would continue. Additional GDE monitoring would have locations and frequency specified based on inventory data and on the local hydrogeology and proximity to the mine or adit void. MMC would submit to the agencies for approval a GDE Monitoring Plan for important GDEs found during the inventory. The plan would be incorporated into an overall Water Resources Monitoring Plan. The plan's objective is to effectively detect stress to flora and fauna from effects on surface water or groundwater due to mine dewatering so that mitigation could be implemented to minimize such stress. The plan would be submitted to the agencies for approval after the GDE inventory was completed and early enough for at least 1 year of data to be collected before additional dewatering and extension of the Libby Adit started. The plan would include piezometers in critical locations. The plan would include a monitoring schedule, potential mitigation measures, and identification of possible mitigation implementation triggers if stress to flora and fauna is detected and determined to be a result of mine dewatering. The results of the initial inventory, subsequent inventories, and monitoring would be reported in annual reports to the agencies.

Springs

The most accurate site-specific method for measuring spring flow would be used. Any spring with a measurable flow 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, and the hydrogeologic setting (associated geology such as the occurrence or absence of colluvium or alluvium).

In addition to identifying springs in the GDE inventory area, MMC would locate and monitor springs outside of the area potentially affected by mine dewatering or other activities for use as benchmark springs. The number of springs to be monitored would be determined following completion of the initial GDE inventory. Springs would be categorized and benchmark springs chosen based on location (west side of the Cabinets and east side of Cabinets), altitude, and hydrogeologic setting. The flow of each spring would be measured between mid-August and mid-September during a time of little or no precipitation. The springs would be used for evaluating compliance with action levels.

Wetland and Riparian Vegetation

At each critical GDE wetland, fen and riparian area habitat identified from the inventory, a vegetation survey using the Forest Service Level 2 Sampling Protocol for GDEs (USDA Forest Service 2012b) would be completed. Initial survey data would include site photos and points, 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).

Streamflow

The most accurate site-specific method for measuring stream flow 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 time 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.

C.10.3.3 Surface Water Monitoring

C.10.3.3.1 On-going Discharge Monitoring

MMC is currently pumping water from the Libby Adit to the surface, treating it at the Water Treatment Plant, and then discharging it at a MPDES-permitted outfall at the site. MMC is collecting monthly or quarterly samples from Outfall 001 and LB-300 for flow rate, temperature, nutrients, metals, and other parameters. The on-going monitoring would continue during subsequent phases as long as there was a discharge of any mine drainage or process water to any MPDES-permitted outfall. Monitoring requirements described in any permit revision would be incorporated into the monitoring.

C.10.3.3.2 Benchmark Stream, Lake, and Spring Sites

It may be difficult to separate the effects of mine dewatering and other activities that could affect streamflow, spring flow, or the volume and water level of Rock Lake from natural variability and the effects of climate change. For this reason, benchmark sites located outside of the area potentially affected by the Montanore mine (Figure C-2) would also be monitored beginning during the Pre-Evaluation Phase and continuing through all phases or until agreed upon by the agencies that it was no longer necessary. Monitoring would begin at least 1 year before extending the Libby Adit to beneath the ore zone. MMC would locate and monitor springs outside of the area potentially affected by mine dewatering or other activities during the GDE inventory. Springs would be categorized and benchmark springs chosen based on location, elevation, and hydrogeologic setting.

Benchmark springs would be chosen based on location, elevation, water quality, and hydrogeologic setting. Benchmark streams would be chosen based on physiography (size, shape, slope, and aspect), gradient, stream type, climate, vegetation, geology, water quality, and land use. Benchmark sites would be monitored for flow and water quality as soon as they are chosen to determine if they are comparable to surface water sites affected by the mine, and then for at least 1 year prior to expansion of the Libby Adit. The agencies chose two streams for monitoring as benchmark streams, one in the Libby Creek watershed (Bear Creek), and one on the west side of the mountain divide (Swamp Creek), as examples of possible benchmark streams. Different sites and additional sites near the project area may be chosen for monitoring that would be benchmark locations for other stream types and hydrologic regimes. Benchmark sites would represent different stream types within the project area. The Bear Creek location, BC-50, is in upper Bear Creek at an elevation similar to LB-200 on Libby Creek and RA-200 on Ramsey Creek. The Bear Creek watershed above BC-50 is similar to the nearby watersheds of Poorman, Ramsey, and Libby creeks in physiography (size, shape, slope, and aspect), gradient, stream type, climate, vegetation, geology, and land use. The Swamp Creek location, SC-1, located in upper Swamp Creek below Wanless Lake, is near the East Fork Rock Creek, and is at an elevation similar to EFRC-300 below Rock Lake. The Swamp Creek watershed above SC-1 is similar to the nearby East Fork Rock Creek watershed above EFRC-300 in physiography (except for aspect), gradient, stream type, climate, vegetation, geology, and land use, and both have lakes (Rock Lake and Wanless Lake) above them. Swamp Creek drains Wanless Lake, which would be used as a benchmark lake for Rock Lake. Wanless Lake is slightly larger and has a slightly larger watershed than Rock Lake, but it is at a similar elevation, has similar topography, is located within the Revett formation, is bisected by the Rock Lake fault, and is within the 3D groundwater model

domain. Monitoring at the benchmark sites would be the same and would occur at the same time and frequency as monitoring at the comparable sites with the area influenced by the mine. Bear Creek, Swamp Creek, and Wanless Lake would also be used for evaluating compliance with action levels.

C.10.3.3.3 Other Surface Water Monitoring

Past Monitoring

MMC completed a synoptic flow event along upper Libby Creek in September 2010. MMC also completed synoptic flow measurements in this same area on September 13, 2012. In 2010, streamflow was measured at LB-50, LB-100, and LB-200), as well as immediately upstream and downstream of the tributary channels entering Libby Creek. Flow also was measured in the tributary channels, if present. Additional measurements of Libby Creek also were completed between LB-50 and LB-100, and upstream of LB-50. Field parameters of pH, specific conductance, dissolved oxygen, and temperature were measured at selected sites. MMC also surveyed tributary channels #7 and #9 up to about 5,600 feet to determine if any springs were in the upper channel areas (Figure C-5).

Future Monitoring

In addition to monitoring required by the MPDES permit, MMC is conducting the following monitoring (Figure C-5). This monitoring would continue during the Pre-Evaluation Phase or would begin at that time:

- In the Pre-Evaluation Phase and all subsequent phases, collecting flow measurements using the most accurate site-specific method available at EFRC-50, EFRC-100, EFRC-200, RC-3, EFBR-300, EFBR-2 and the Swamp Creek site at the same time every year for the purpose of establishing long-term trends (on or about July 10, August 10, September 10 and October 10)
- In the Pre-Evaluation Phase and all subsequent phases, collecting water quality samples at EFRC-100 and EFRC-200 at the same time every year for the purpose of establishing long-term trends (on or about July 10, August 10, September 10 and October 10) of parameters listed in Table C-10 and Table C-11; complete the same sampling at the inlet and outlet of Wanless Lake
- Sampling Rock Lake and Wanless Lake as described in the following paragraph
- Measuring flow at spring SP-1R site in early summer and late fall
- Measuring streamflow synoptically and analyzing field parameters (Table C-10) at LB-20, LB-30, LB-40, LB-50, LB-70, LB-80, LB-100, LB-200, LB-300, LB-500 on Libby Creek and at frequent intervals on the East Fork Rock Creek from the headwaters to the confluence with the West Fork Rock Creek, and at frequent intervals on the East Fork Bull River from the headwaters to just below the confluence with the North Fork of the East Fork Bull River every two weeks from July 1 to October 15
- Measuring water stage in Libby Creek at LB-200 and continuous flow using a pressure transducer datalogger (minimum of one data point every hour) and downloading data twice per year (early summer and early fall)

- Collecting samples from LB-100, LB-200, LB-300, and LB-500 for field parameters (Table C-10) and analysis of major cations, nutrients, and metals (Table C-11), on a routine basis; complete the same sampling in the Pre-Evaluation Phase and all subsequent phases at the benchmark stream sites.

During the Pre-Evaluation Phase and during all subsequent phases, MMC would sample Rock Lake water quality monthly during July through October by vertical profile sampling, with an optimum of three sampling periods per season. A temperature/dissolved oxygen profile would be collected before any water quality samples were collected. Samples would be collected at the center of the lake from the epilimnion (upper, warmest layer of a stratified lake) and the hypolimnion (cooler, bottom layer of a lake). Samples would be analyzed for all parameters in Table C-11 except metals. A sample from a 5-foot depth would be analyzed for chlorophyll-a, or if bottom of the epilimnion was less than 5 feet based on the temperature/dissolved oxygen profile, would be collected at a shallower depth within the epilimnion. A secchi disk would be used to measure water clarity. USDA Forest Service field sampling and data analysis protocols would be followed (USDA Forest Service 2012c). Wanless Lake, the possible benchmark lake for Rock Lake, or any other possible benchmark lakes would be sampled in the same way during the same sample event. MMC would install pressure transducer dataloggers at the inlet to Wanless Lake and in Wanless Lake or any other possible benchmark lakes during the Pre-Evaluation Phase to monitor inflow and lake levels continuously (minimum of one data point every hour), and would measure outflows from Wanless Lake or any other possible benchmark lakes during the same period such measurements were collected at Rock Lake.

During the Pre-evaluation Phase, MMC would collect sufficient streamflow measures at LB-200 and benchmark site BC-50 on Bear Creek or other corresponding benchmark site (a minimum of 8 times per year during the increasing, peak and decreasing limb of the hydrograph and during low flows) to establish a stage/discharge relationship. After sufficient streamflow measures had been obtained, MMC would continuously record stage.

C.10.3.4 Groundwater Monitoring

MMC collected 1 year of monitoring data beginning in September 2010 and initiated monitoring in 2013 with significantly reduced monitoring frequency to limit the amount of redundant data collected and managed. In 2010, MMC collected representative samples from inside the Libby Adit (*e.g.* at 5,200-foot level) and from the spring at site 8 along upper Libby Creek and analyzed them for oxygen-18, deuterium, and tritium.

For water quality, samples are collected monthly at the raw water holding tank (sample ID: RAW-1) at the Libby Water Treatment Plant and at wells MW07-1 and MW07-2, and analyzed for the parameters shown in Table C-12. Monitoring at wells MW07-1 and MW07-2 would continue during subsequent phases whenever discharges from the Water Treatment Plant occurred. Water quality monitoring associated with the Libby Adit discharge would continue during the Pre-Evaluation Phase.

C.10.4 Evaluation Phase

C.10.4.1 Objectives

During the Evaluation Phase, MMC would dewater the existing Libby Adit to its full length and extend it to beneath the ore body. MMC would collect additional information about the deposit,

as well as geotechnical, geochemical, and hydrological data to support a bankable feasibility study. Building on the inventory and monitoring completed during the Pre-Evaluation Phase, the objectives of monitoring during the Evaluation Phase are to:

- Monitor and characterize groundwater overlying the Libby Adit between the current dewatered location and the ore body
- Monitor and characterize the quality of groundwater entering the Libby Adit
- Characterize groundwater adjacent to the Rock Lake and Snowshoe faults
- Establish a relationship between establish a relationship between streamflow and wetted perimeter at one site each in the East Fork Rock Creek and East Fork Bull River drainages
- Assess potential effects on surface resources of additional dewatering of the Libby Adit
- Assess potential effects on GDEs in the upper Libby Creek, East Fork Rock Creek, and East Fork Bull River drainages
- Assess potential effects on Rock Lake, and upper East Fork Rock Creek, and East Fork Bull River drainages
- Assess potential effects of treated water discharge on surface water and groundwater adjacent to the effluent discharge points
- Characterize groundwater quality at the Libby Plant Site, Poorman Impoundment Site, and the Libby Loadout

C.10.4.2 Groundwater Dependent Ecosystem Monitoring

GDE monitoring currently being conducted and any additional GDE monitoring implemented during the Pre-Evaluation Phase would continue. The monitoring required as a result of the Pre-Evaluation Phase GDE inventory would be implemented. Criteria required to decide which 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 lagtime 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), as they provide advanced warning of significant stress or degradation on the system, as well as providing 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 (*e.g.* hydrophytic vegetation community composition).

Table C-8 identifies the specific monitoring options for GDEs in the inventoried 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 C-8. Groundwater Dependent Ecosystem Monitoring Options.

Surface Resource Component	Look For:	Using:
Springs, Lakes, and Streams	Flow changes	Flow monitoring – continuous stage recording station and/or stream flow measurements
	Wetted perimeter/stage changes	Channel cross-section measurements
	Lake level changes	Continuous level recorder
	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

Springs

In addition to the spring at site 8 along upper Libby Creek, the flow in any spring within the GDE monitoring area (Figure C-3) determined by the agencies to be supported by the regional groundwater system or whose connection to the deep bedrock groundwater might be uncertain would be measured annually between mid-August and mid-September during a period of little or no precipitation. Parameters shown in Table C-10 would be collected. During flow measurements, observations regarding possible short-term sources of water supply, such as nearby late-season snowfields, would be made. A spring that was determined by the agencies, after repeated flow measurements, not to be connected to the deep bedrock groundwater may be eliminated from additional monitoring.

Wetland or Riparian Areas

Monitoring of wetland and riparian areas would depend on the nature and location of the wetland or riparian area, and generally would include vegetation cover (woody, herbaceous, and bryophtyes), and groundwater level measurements. Level 2 GDE vegetation protocols would be used at GDEs.

Streamflow

Streamflow measurements are discussed in the following section on Surface Water Monitoring. For streams within the GDE monitoring areas determined to be supported by the regional groundwater system or whose connection to the regional groundwater system might be uncertain, such stream segments would be measured every two weeks between July 10 and October 10 each year using the most accurate site-specific method available. If the agencies determine, after repeated flow measurements, that a stream segment is not connected to the regional groundwater

system, such locations may be given a reduced measurement cycle or eliminated from additional monitoring.

At EFBR-2 and RC-3, which are important aquatic life sites, MMC would collect streamflow and cross-section measurements during low flow periods to calculate wetted perimeters at these sites and establish a relationship between streamflow and wetted perimeter. At least 4 sets of measurements one or more weeks apart would be collected for 2 years during low flows (mid-August to mid-October). The data would be submitted for agency approval prior to the agencies approving the Construction Phase. The method for the field measurements and establishing this relationship used by the Forest Service is provided by Montana FWP (Nelson 1989). If the channels at either location were altered by large flow events after the initial relationship was established, MMC would collect new data to re-establish the wetted perimeter-discharge relationships at the affected location.

C.10.4.3 Surface Water Monitoring

Surface water monitoring would be required for the purpose of detecting water quality impacts from mine facilities and detecting flow changes due to mine dewatering. Locations, frequency, and the purpose of surface water monitoring locations are listed in Table C-9. New monitoring locations would be developed in collaboration with the agencies. Flow and field parameters shown in Table C-10 would be measured at monitoring locations in the upper part of various drainages. For locations where water stage would be measured with continuous electronic recording, the measuring device would also measure temperature continuously, and be capable of measuring low stages, and remain in place during high stage events. For continuously recorded sites, MMC would collect sufficient streamflow measurements (a minimum of 8 times per year during the increasing, peak and decreasing limb of the hydrograph and during low flows) to establish a stage/discharge relationship. It is from the established stage/discharge relationship that the 10% accuracy for flow measurements would be determined. Continuous temperature recording would follow DEQ’s temperature data logger protocols (DEQ 2005b).

Parameters to be sampled for and analyzed at each surface monitoring location where quality was the focus are provided in Table C-11. Dissolved metal analyses (except for aluminum) are not needed because sufficient dissolved metals data have been collected at monitoring sites in Libby Creek during baseline monitoring. Laboratory analytical methods would conform to those listed in 40 CFR 136. Laboratory reporting limits would comply with the Required Reporting Values found in the most current Montana water quality standards (Circular DEQ-7; DEQ 2012a). The Required Reporting Value is DEQ’s selection of a laboratory reporting limit that is sufficiently sensitive to meet the most stringent numeric water quality standard (DEQ 2012a). For parameters without a Circular DEQ-7 required reporting value, the achievable reporting limits from USDA Forest Service. 2012c, Table 3-1 would be used. If data collected under this plan were to be used for compliance purposes for the MPDES permit, minimum limits specified in the MPDES permit must be achieved. Flow measurements would be made using the most accurate site-specific method available and appropriate for the site.

Table C-9. Surface Water Monitoring Locations—Evaluation Phase.

Station	Location	Parameters	Frequency	Purpose
East Fork Rock Creek Drainage				
EFRC-50	Just below SP-41	Stage/flow; field parameters (Table C-10)	Continuous electronic recording for stage/flow; field parameters on or about 7/10, 8/10, 9/10, 10/10	Monitor mine dewatering
EFRC-100	Inflow to Rock Lake	Stage/flow (Table C-10)	Continuous electronic recording	Monitor mine dewatering
		Quality (Table C-11)	On or about 7/10, 8/10, 9/10, 10/10	
Rock Lake	Near south end of lake Vertical profile sampling at center of lake	Lake stage	Continuous electronic recording	Monitor mine dewatering
		Quality (Table C-11 except metals)	On or about 7/10, 8/10, 9/10, 10/10	
EFRC-200	Below Rock Lake where measurable, such as at exposed bedrock slightly downstream from lake	Flow (Table C-10)	On or about 7/10, 8/10, 9/10, 10/10	Monitor mine dewatering
		Quality (Table C-11)	On or about 7/10, 8/10, 9/10, 10/10	
EFRC-300	Upstream of Rock Creek Meadows	Flow, field parameters (Table C-10)	On or about 7/10, 8/10, 9/10, 10/10	Monitor mine dewatering
RC-3	Upstream of confluence with West Fork Rock Creek	Flow (Table C-10), channel cross-section measurements	Flow on or about 7/10, 8/10, 9/10, 10/10, and flow/cross-section measurements at least 4 times/yr during mid-August to mid-October	Monitor mine dewatering
Heidelberg Adit	Below Rock Lake	Flow (Table C-10)	On or about 7/10, 9/10	Monitor mine dewatering
	Additional GDE sites	To be determined	To be determined	Monitor mine dewatering
East Fork Bull River Drainage				
EFBR-50	Just below SP-42	Stage/flow; field parameters (Table C-10)	Continuous electronic recording for stage/flow; field parameters on or about 7/10, 8/10, 9/10, 10/10	Monitor mine dewatering
EFBR-300	At base of steep slope below St. Paul Lake where measurable	Flow, field parameters (Table C-10)	On or about 7/10, 8/10, 9/10, 10/10	Monitor mine dewatering
EFBR-2	Just downstream Isabella Creek confluence	Flow (Table C-10), channel cross-section measurements Quality (Table C-11)	Flow on or about 7/10, 8/10, 9/10, 10/10, and flow/cross-section measurements at least 4 times/yr during mid-August to mid-October On or about 9/10	Monitor mine dewatering
	Additional GDE sites	To be determined	To be determined	Monitor mine dewatering

Station	Location	Parameters	Frequency	Purpose
Libby Creek Drainage				
Lower Libby Lake	Near outlet	Lake stage	Continuous electronic recording	Monitor mine dewatering
LB-20, LB-30, LB-40, LB-50, LB-70 LB-80, LB-100	Upstream of Wilderness boundary	Flow (Table C-10)	Every two weeks 7/1-10/15	Monitor mine dewatering
GDE 4	Upstream of Wilderness boundary	Level 2 GDE vegetation protocol	Annual	Monitor mine dewatering
		Water levels	Monthly 7/15-10/15	
LB-200	Upstream of Libby Adit	Stage/flow/ temperature	Continuous electronic recording	Monitor mine dewatering
		Quality (Table C-11) or as specified by MPDES permit	On or about 7/10, 8/10, 9/10, 10/10 or as specified by MPDES permit	
LB-300	Upstream of Howard Creek confluence	Stage/flow/ temperature	Continuous electronic recording	Monitor Libby Adit Site and Water Treatment Plant discharges
		Quality (Table C-11) or as specified by MPDES permit	On or about 7/10, 8/10, 9/10, 10/10, or as specified by MPDES permit	
LB-500	Near Libby Plant Site	Quality (Table C-11)	On or about 7/10, 8/10, 9/10, 10/10	Monitor Libby Adit Site and Libby Plant Site
Possible Benchmark Sites (Outside of Mining Influence)				
SC-1	Swamp Creek downstream of Wanless Lake	Flow (Table C-10)	On or about 7/10, 8/10, 9/10, 10/10	Monitor natural variability and climate change
		Quality ((Table C-11)	On or about 9/10	
BC-50	Bear Creek downstream of Wilderness boundary	Stage/flow Quality (Table C-11)	Continuous electronic recording On or about 7/10, 8/10, 9/10, 10/10	Monitor natural variability and climate change
Wanless Lake	To be determined Vertical profile sampling at center of lake	Lake stage	Continuous electronic recording	Monitor natural variability and climate change effects
		Quality (Table C-11 except metals)	On or about 7/10, 8/10, 9/10, 10/10	
WL-1	Inlet to Wanless Lake	Stage/flow	Continuous electronic recording	Comparison to EFRC-100
		Quality (Table C-11)	On or about 7/10, 8/10, 9/10, 10/10	
WL-2	Outlet from Wanless Lake	Stage/flow	Continuous electronic recording	Comparison to EFRC-200
		Quality (Table C-11)	On or about 7/10, 8/10, 9/10, 10/10	

Whole Effluent Toxicity (WET) testing would also be required quarterly for Outfalls 001 to 003. In the draft renewal MPDES permit, the DEQ preliminarily determined that the discharge from the Water Treatment Plant has a reasonable potential to violate numeric or narrative criteria prohibiting toxicity to humans or aquatic life. The WET test uses the most sensitive local or economically important species to implement aquatic life prohibition of toxicity in state waters. In the draft renewal MPDES permit, the effluent limitations for chronic toxicity were for *Ceriodaphnia dubia* and *Pimephales promelas.* If toxicity occurred in a routine WET test, an additional test would be conducted within 14 days of the first test, and if toxicity again occurred, WET testing would increase to monthly and additional testing would be required to determine the cause of the toxicity of the tested organisms. The final MPDES permit will contain final WET testing requirements.

Table C-10. Flow and Field Parameters for Surface Water Samples and Required Reporting Values.

Parameter	Current Required Reporting Value
Flow (cfs or gpm)	Within 10% accuracy
pH (s.u.)	0.1
Dissolved Oxygen (mg/L)	0.3
Specific Conductivity (µS/cm)	1.0
Turbidity (NTU)	1.0
Temperature (° F)	0.1

See note to Table C-11.

Table C-11. 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 Parameters			
Flow (cfs or gpm)	Within 10% accuracy	Temperature	0.1
pH (s.u.)	0.1	Total alkalinity (as $CaCO_3$)	0.26
Dissolved oxygen	0.3	Total hardness (as $CaCO_3$)	1.0
Specific conductivity (µS/cm)	1.0	Turbidity (NTU)	1.0
Oil and grease	1.0		
Inorganic Parameters			
Total dissolved solids	1.0	Total Kjeldahl nitrogen	0.15
Total suspended solids	0.4	Nitrate, as N	0.02
Sodium	0.03	Nitrite, as N	0.01
Calcium	0.08	Nitrate+nitrite, as N	0.02
Magnesium	0.02	Ammonia, as N	0.07
Potassium	0.05	Total inorganic nitrogen	0.01
Bicarbonate	1.0	Total nitrogen	0.15
Chloride	0.1	Total phosphorus, as P	0.004
Sulfate	0.2	Ortho-phosphate	0.001
Silica	0.4		
Metals			
Aluminum, dissolved (0.45 µm filter)	0.009	Lead	0.0003
Antimony	0.0005	Manganese	0.005
Arsenic	0.001	Mercury	0.000005
Beryllium	0.0001	Nickel	0.001
Cadmium	0.00003	Silver	0.0002
Chromium	0.01	Thallium	0.0002
Copper	0.002	Zinc	0.008
Iron	0.02		

Note: Metals are total recoverable unless otherwise specified. For parameters without a Circular DEQ-7 (DEQ 2012a) required reporting value, the achievable reporting limits shown are from USDA Forest Service (2012c, Table 3-1). Required reporting values may differ from MPDES permit reporting levels. Any reporting values in Table C-10 or Table C-11 lower than MPDES permit Reporting Levels would meet USDA Forest Service requirements.

C.10.4.4 Groundwater

Groundwater monitoring would be required for the purpose of detecting potential water quality impacts from mine facilities and for detecting potential groundwater level changes from the underground mine and adits. A summary of all groundwater monitoring requirements are shown on Table C-12.

C.10.4.4.1 Mine Area Locations and Frequency

Piezometers

Because the mine workings (mine void and adits) would be located over a large area mostly beneath the CMW, the most efficient means for obtaining groundwater level data would be from within the mine voids. Numerous piezometers would be required. MMC would submit a plan for the installation of piezometers to be approved by the agencies.

During the dewatering of the Libby Adit, an array of small diameter boreholes would be installed from within the Libby Adit, and instrumented with continuous recording pressure transducers. In general, the boreholes would be drilled in a radial or fan pattern from the mine workings so that the degree of heterogeneity could be assessed as heads change in the fractures surrounding the mine. Each drill station would consist of two boreholes, drilled about 30 degrees from the horizontal from drift, 180 degrees apart, and a third borehole drilled vertically upward from the drift (Figure C-6). Boreholes to be drilled vertically upward from the drift are indicated in Figure C-6 with a “v” symbol. Because the intent of the underground piezometers is to obtain pre-mining pressure data and to track drawdown as MMC dewatered the mine void, the piezometers would be drilled out in front of the existing working face. At each station, the two inclined piezometers would be drilled from a cutout as close to the working face as possible without causing risk to the piezometers during subsequent blasting. The piezometers would be equipped with pressure recording devices before the drift or adit would be advanced. The locations shown on Figure C-6 or a similar approved pattern would be required to assess the variability in fracture spacing; additional piezometers would be installed when fractures transmitting higher flow rates are encountered (>25 gpm).

The first station would be located at the current terminus of the partially dewatered Libby Adit (about 14,000 feet from the portal). The purpose of these piezometers is to start recording water levels as soon as possible after dewatering the existing adit. Water levels in the fractures in the surrounding rock would begin responding as soon as dewatering began, and would be monitored at that time, rather than waiting until the extension of the adit. These piezometers would record hydraulic response as the adit was extended with the associated dewatering. A second station in the Libby Adit would be about 1,500 feet from the current terminus. All subsequent monitoring stations, as shown in Figure C-6, could use planned exploration boreholes so no additional boreholes would be required for piezometer installation.

The groundwater pressure would be continuously recorded using either a transducer with a built in datalogger or with separate transducers and dataloggers. The data would be recorded at least hourly and would be downloaded at least quarterly to ensure proper operation of the equipment, status of battery power for the dataloggers, and to establish groundwater pressure trends.

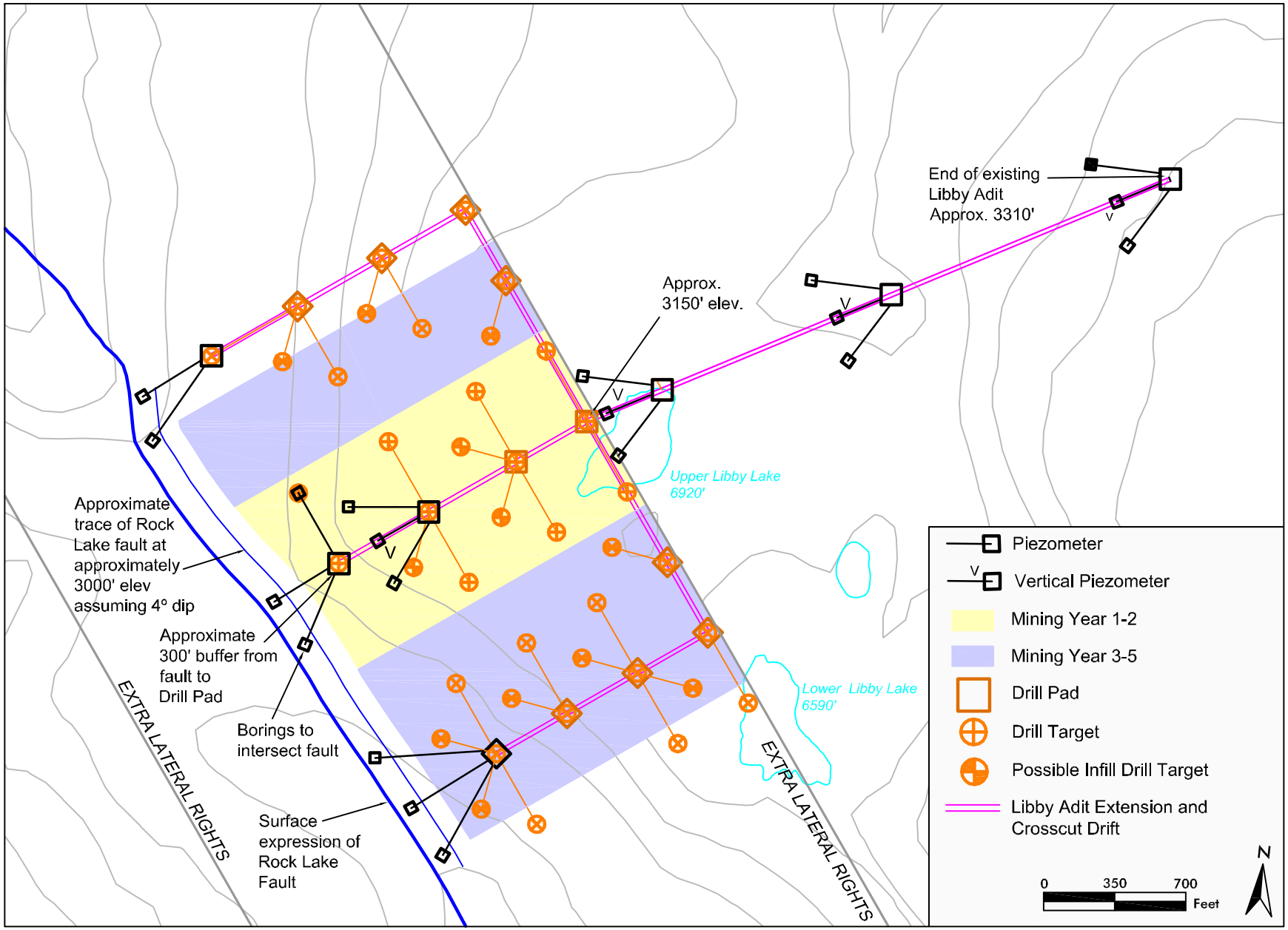


Figure C-6. Proposed Underground Piezometers

The location and number of sites would be determined after reviewing water level data collected during the first 2 years to evaluate any response of the groundwater system to dewatering and to determine whether the existing monitoring network density was sufficient. A plan would be developed for the additional piezometers to be installed in the remainder of the underground mine production area based on information gathered from the Evaluation Phase. This plan would be approved by the agencies.

Groundwater Isotope Analysis

During the late-summer/early-fall baseflow period, MMC would use stable isotope chemistry to compare seepages into Libby Adit or mine void to samples from GDEs and stream baseflow. Sample sites and frequency would be determined after the GDE inventory was completed. Isotopes analyzed would include oxygen-18 and deuterium. In addition, analytes such as tritium or chlorofluorocarbons would be used to establish approximate age of the water. Seepages into the Libby Adit or mine void would be used as benchmark chemistry for the deep aquifer. Major constituents (major anions and cations) would be used to determine relative residence time and travel distance in the aquifer when compared with other groundwater discharges from the same aquifer. The evolution of water chemistry would be graphically determined on trilinear plots. MMC would use age dating of groundwater to separate older groundwater from younger groundwater. Springs discharging older water would be assumed to be supplied by a deeper regional source.

C.10.4.4.2 Libby Adit Site, Libby Plant Site, Poorman Impoundment Site, and Libby Loadout

Location, Frequency, and Parameters

The monitoring of the two wells at the Libby Adit Site, MW07-01 and MW07-02, currently being conducted would continue during subsequent phases as long as there was a discharge to the MPDES-permitted outfalls to groundwater. MMC would submit a plan for the installation of new monitoring wells to be approved by the agencies. Two new wells would be established at the Libby Plant Site, one upgradient of the site and one downgradient (Figure C-5). Four new wells would be established at the Libby Loadout (see Figure 12 in the Final EIS). The monitoring wells at the plant site and Libby Loadout would be installed and sampled quarterly for parameters listed in Table C-12 for 1 year before the Construction Phase began in order to establish pre-operation conditions. Table C-13 lists monitoring requirements after initial characterization was completed.

Table C-12. Monitoring Parameters and Required Reporting Values for Groundwater and Mine and Tailings Water.

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 (μS/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	Silver	0.0002
Nitrate+Nitrite, as N	0.02	Thallium	0.0002
Ammonia, as N	0.07	Zinc	0.008
Total Kjeldahl Nitrogen	0.15		
Total Phosphorus as P	0.004		
Ortho-phosphate	0.001		
Field Temperature	—		
Total Alkalinity (as $CaCO_3$)	0.026		
Total Hardness (as $CaCO_3$)	1.0		
Acrylamide†	0.01 or lowest possible		

†In tailings impoundment water and groundwater downgradient of the tailings impoundment during operations.

For parameters without a Circular DEQ-7 (DEQ 2012a) required reporting value, the achievable reporting limits shown are from USDA Forest Service (2012c, Table 3-1.)

Table C-13. Groundwater Monitoring Requirements.

Well Number	Location	Depth/Screen Interval	Required Data	Monitoring Frequency and Phase	Purpose
Libby Creek Drainage					
MW07-1 and MW07-2	Downgradient of adit facilities	Existing wells at Libby Adit	Water Levels, Water Quality	Quarterly during discharges	Assess potential impacts from Water Treatment Plant discharge
3	Upgradient Plant Site	Water table plus 20 feet or to bedrock, whichever is shallower	Water Levels, Water Quality	Quarterly Construction through Closure	Background data
4	Downgradient Plant Site	Water table plus 20 feet or to bedrock, whichever is shallower	Water Levels, Water Quality	Quarterly Construction through Closure	Assess potential impacts from Plant Site
Poorman Impoundment Site					
5	Upgradient of tailings impoundment	Water table plus 50 feet	Water Levels, Water Quality	Monthly Construction through Closure	Background data
6 – 12	Downgradient of tailings impoundment	Nested pairs – screened in surficial (if saturated) material and bedrock	Water Levels, Water Quality	Monthly Construction through Closure	Assess potential impacts from impoundment seepage and effectiveness of pumpback well system
Wetlands LCC-29, LCC-35A, LCC-36, and LCC-39A	Between Little Cherry Creek and Poorman Impoundment	Nested pairs – screened adequately to assess gradient	Water Levels	Monthly April through September Construction through Closure	Assess potential impacts from pumpback well system
Libby Loadout					
13 – 16	Around loadout facility	Water table plus 20 feet or bedrock, whichever is shallower	Water Levels, Water Quality	Quarterly Construction through Closure	Assess potential impacts from loadout activities
Mine and Adits					
Numerous (see Figure C-6)	From within adit(s) and mine void; drilled radially in all major directions	100's to 1,000 feet from the adit/mine	Water pressure above transducer	Continuously (at least one measurement per hour)	Monitor changes in groundwater pressure as adits/mine advance

A seepage collection system beneath the tailings impoundment and dam would be built to minimize seepage to groundwater from the tailings impoundment. Pumpback wells would be installed to capture seepage not collected by the seepage collection system. During the Evaluation Phase, MMC would complete aquifer testing at the Poorman Impoundment Site and finalize the design of the pumpback well system. After the system was designed, at least seven groundwater monitoring wells would be installed downgradient of the pumpback wells before construction of any of the impoundment facilities (Figure C-7). At least four of these wells would be constructed as nested pairs to monitor both shallow and deeper flow paths from the impoundment. The wells would be located so that the cross-sectional area below the impoundment was adequately covered by the monitoring wells. If any preferential flow paths were encountered during the construction of the impoundment or installation of monitoring wells, they would be monitored independently. The installation of pairs of nested wells is intended to monitor a reasonable vertical thickness of the saturated zone. To obtain a statistically valid set of existing water quality data, the monitoring wells at the impoundment site would be installed and sampled monthly for parameters listed in Table C-12 for 1 year before the initiation of the Construction Phase in order to establish pre-operation conditions. MMC may choose to sample quarterly for 3 years instead. Table C-13 lists monitoring requirements after initial characterization was completed.

Laboratory analytical methods would conform to those listed 40 CFR 136. Laboratory reporting limits would comply with the Required Reporting Values found in the most current Montana's water quality standards (Circular DEQ-7). For parameters without a Circular DEQ-7 required reporting value, the achievable reporting limits from USDA Forest Service. 2012c, Table 3-1 would be used. If data collected under this plan were to be used for compliance purposes for the MPDES permit, minimum limits specified in the MPDES permit must be achieved.

C.10.4.5 3D Groundwater Models Update

MMC developed separate 3D groundwater models for the mine area and the Poorman Impoundment Site. Before the Construction Phase started, MMC would update both models, incorporating the hydrologic and geologic information collected during the Evaluation Phase. MMC anticipates the mine area model's uncertainty for predicting inflows and water resource impacts would be reduced based on the empirical data obtained from underground testing. Effects on surface resources would be re-evaluated based on the revised modeling. The agencies would modify the monitoring requirements described in the following section for the Construction and Operations phases if necessary to incorporate the revised model results.

C.10.5 Construction and Operations Phases

C.10.5.1 Objectives

During the Construction and Operations phases, MMC would build and operate two new adits, an underground mine, the Libby Plant, the Poorman Impoundment, the Miller Creek transmission line alignment, access roads, and the Libby Loadout. Monitoring during the Construction and Operations phases would be the same as during the Evaluation Phase; suspended sediment monitoring (see section C.10.5.4, Stormwater, Suspended Sediment, and Best Management Practices Monitoring) would also be required. The objectives of monitoring during the Construction and Operations phases are to:

- Assess potential effects of continued dewatering of the Libby Adit and the dewatering of the mine void

- Assess potential effects on GDEs in the upper Libby Creek, East Fork Rock Creek, and East Fork Bull River drainages
- Assess potential effects on wilderness lakes, and upper East Fork Rock Creek, East Fork Bull River, Libby Creek, and Poorman Creek drainages
- Assess potential effects of discharge of treated water on surface water and groundwater adjacent to the Libby Adit
- Assess the effectiveness of the pumpback well system at the tailings impoundment
- Assess effects on groundwater quality at the Plant Site, Impoundment Site, and the Libby Loadout
- Assess compliance with the MPDES permit requirements.

C.10.5.2 Groundwater Dependent Ecosystem Monitoring

GDE monitoring would continue during the Construction and Operations phases. Any additional GDE monitoring implemented during the Evaluation Phase would continue.

C.10.5.3 Surface Water Monitoring

The monitoring of sites established during the Pre-Evaluation and Evaluation phases would continue, and additional sites on Poorman and Libby creeks would be monitored (Table C-15).

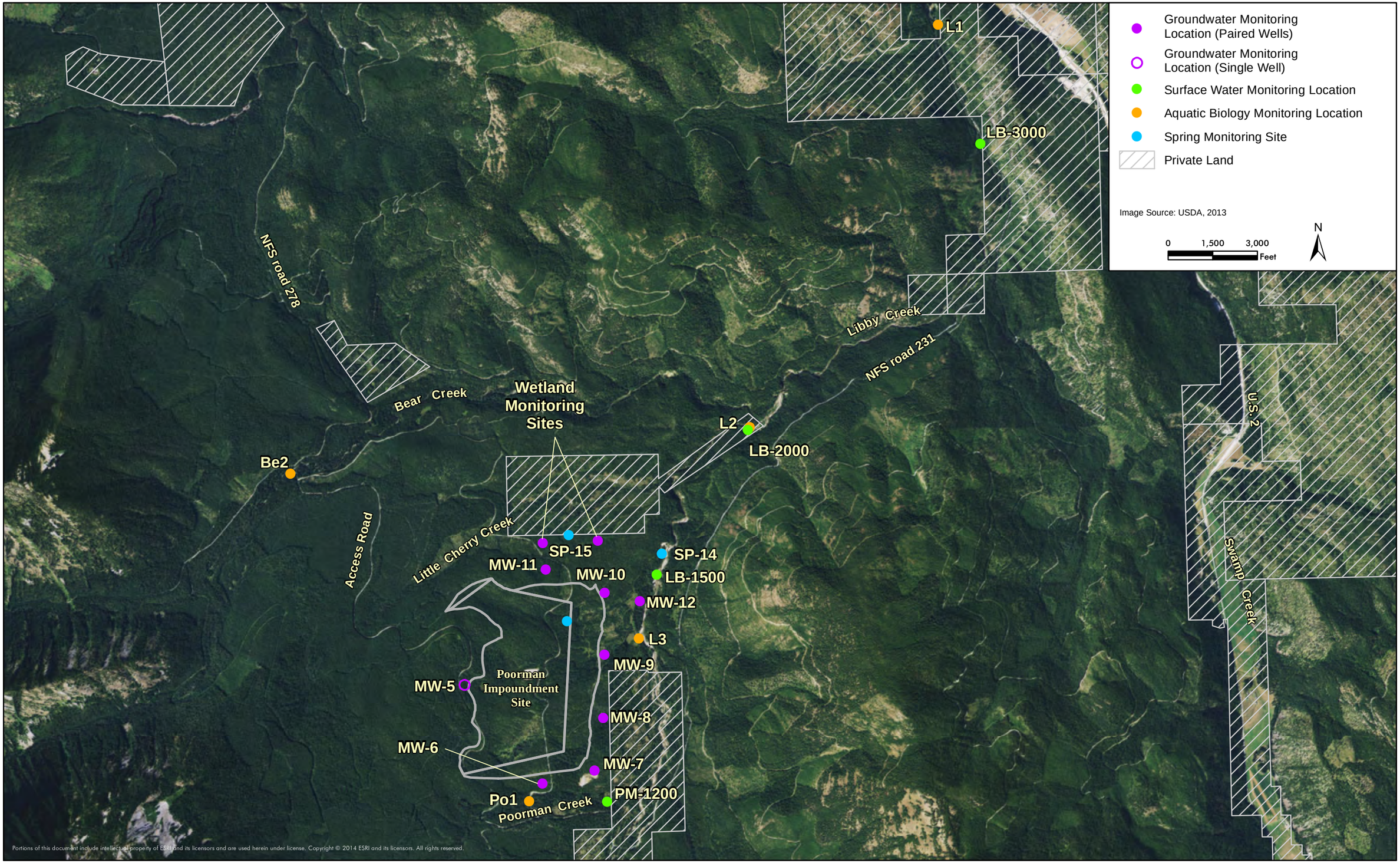


Figure C-7. Current and Proposed Hydrology and Aquatic Biology Monitoring Locations in Impoundment Area

Table C-14. Surface Water Monitoring Locations (Excluding Stormwater Monitoring)—Construction and Operations Phases.

Station	Location	Parameters	Frequency	Purpose
East Fork Rock Creek Drainage				
EFRC-50	Just below SP-41	Stage/flow; field parameters (Table C-10)	Continuous electronic recording for stage/flow; field parameters on or about 7/10, 8/10, 9/10, 10/10	Monitor mine dewatering
EFRC-100	Inflow to Rock Lake	Stage/flow (Table C-10)	Continuous electronic recording	Monitor mine dewatering
		Quality (Table C-11)	On or about 7/10, 8/10, 9/10, 10/10	
Rock Lake	Near south end of lake Vertical profile sampling at center of lake	Lake stage	Continuous electronic recording	Monitor mine dewatering
		Quality (Table C-11)	On or about 7/10, 8/10, 9/10, 10/10	
EFRC-200	Downstream of Rock Lake where measurable, such as at exposed bedrock slightly downstream from lake	Flow (Table C-10)	On or about 7/10, 8/10, 9/10, 10/10	Monitor mine dewatering
		Quality (Table C-11)	On or about 7/10, 8/10, 9/10, 10/10	
EFRC-300	Upstream of Rock Creek Meadows	Flow, field parameters (Table C-10)	On or about 7/10, 8/10, 9/10, 10/10	Monitor mine dewatering
RC-3	Upstream of confluence with West Fork Rock Creek	Flow (Table C-10)	On or about 7/10, 8/10, 9/10, 10/10	Monitor mine dewatering
Heidelberg Adit	Downstream of Rock Lake	Flow (Table C-10)	On or about 7/10, 9/10	Monitor mine dewatering
	Additional GDE sites	To be determined	To be determined	Monitor mine dewatering
East Fork Bull River Drainage				
EFBR-50	Just downstream of SP-42	Stage/flow; field parameters (Table C-10)	Continuous electronic recording for stage/flow; field parameters on or about 7/10, 8/10, 9/10, 10/10	Monitor mine dewatering
EFBR-300	At base of steep slope below St. Paul Lake where measurable	Flow, field parameters (Table C-10)	On or about 7/10, 8/10, 9/10, 10/10	Monitor mine dewatering
EFBR-2	Just downstream of Isabella Creek confluence	Flow (Table C-10)	On or about 7/10, 9/10	Monitor mine dewatering
		Quality (Table C-11)	On or about 9/10	
	Additional GDE sites	To be determined	To be determined	Monitor mine dewatering

Station	Location	Parameters	Frequency	Purpose
Libby Creek Drainage				
Lower Libby Lake	Near outlet	Lake stage	Continuous electronic recording	Monitor mine dewatering
LB-20, LB-30, LB-40, LB-50, LB-70 LB-80, LB-100	Upstream of Wilderness boundary	Flow (Table C-10)	Every two weeks 7/10-10/10	Monitor mine dewatering
GDE 4	Upstream of Wilderness boundary	Level 2 GDE vegetation protocol	Annual	Monitor mine dewatering
		Water levels	Monthly 7/10-10/10	
LB-200	Upstream of Libby Adit	Stage/flow/temperature	Continuous electronic recording	Monitor mine dewatering
		Quality (Table C-11) or as specified by MPDES permit	On or about 7/10, 8/10, 9/10, 10/10 or as specified by MPDES permit	
LB-300	Upstream of Howard Creek confluence	Stage/flow/temperature	Continuous electronic recording	Monitor Libby Adit Site and Water Treatment Plant discharges
		Quality (Table C-11) or as specified by MPDES permit	On or about 7/10, 8/10, 9/10, 10/10 or as specified by MPDES permit	
LB-500	Near Libby Plant Site	Quality (Table C-11)	On or about 7/10, 8/10, 9/10, 10/10	Monitor Libby Plant Site
LB-1500	Downstream of Poorman Creek	Quality (Table C-11)	On or about 7/10, 8/10, 9/10, 10/10	Monitor Poorman Impoundment Site and pumpback well system
LB-2000	Downstream of Little Cherry Creek confluence	Stage/flow (Table C-10)	Continuous electronic recording	Monitor below Poorman Impoundment Site and pumpback well system
		Quality (Table C-11)	On or about 7/10, 8/10, 9/10, 10/10	
LB-3000	Upstream of Crazyman Creek confluence	Quality (Table C-11)	On or about 7/10, 8/10, 9/10, 10/10	Integrated effect site
Ramsey Creek Drainage				
RA-200	Upstream on Ramsey Creek	Flow (Table C-10)	On or about 7/10, 8/10, 9/10, 10/10	Monitor mine dewatering
		Quality (Table C-11)	On or about 7/10, 8/10, 9/10, 10/10	
RA-300	Mid-Ramsey Creek upstream of an existing point-of-diversion	Stage/flow ((Table C-10)	Continuous electronic recording	Monitor mine dewatering

Station	Location	Parameters	Frequency	Purpose
Poorman Creek Drainage				
PM-500	Upstream on Poorman Creek	Quality (Table C-11)	On or about 7/10, 8/10, 9/10, 10/10	Benchmark site; ambient quality
PM-1200	Upstream of Libby Creek confluence	Flow (Table C-10)	Every two weeks 7/1-10/15	Monitor mine dewatering Monitor Poorman Impoundment Site and pumpback well system
		Quality (Table C-11)	On or about 7/10, 8/10, 9/10, 10/10	
Possible Benchmark Sites (Outside of Mining Influence)				
SC-1	Swamp Creek downstream of Wanless Lake	Flow (Table C-10)	On or about 7/10, 8/10, 9/10, 10/10	Monitor natural variability and climate change
		Quality ((Table C-11)	On or about 9/10	
BC-50	Bear Creek downstream of Wilderness boundary	Stage/flow Quality (Table C-11)	Continuous electronic recording On or about 7/10, 8/10, 9/10, 10/10	Monitor natural variability and climate change
Wanless Lake	To be determined Vertical profile sampling at center of lake	Lake stage	Continuous electronic recording	Monitor natural variability and climate change effects
		Quality (Table C-11 except metals)	On or about 7/10, 8/10, 9/10, 10/10	
WL-1	Inlet to Wanless Lake	Stage/flow	Continuous electronic recording	Comparison to EFRC-100
		Quality (Table C-11)	On or about 7/10, 8/10, 9/10, 10/10	
WL-2	Outlet from Wanless Lake	Stage/flow	Continuous electronic recording	Comparison to EFRC-200
		Quality (Table C-11)	On or about 7/10, 8/10, 9/10, 10/10	

C.10.5.4 Stormwater, Suspended Sediment, and Best Management Practices Monitoring

The KNF conducts continuous suspended sediment monitoring during the ice-free period with an automated sampler near LB-3000 on Libby Creek (Figure C-2). The continuous suspended sediment monitoring would continue during construction and post-construction of the mine and transmission line facilities. MMC would either fund the existing KNF monitoring or they would implement their own monitoring efforts in Libby Creek. In lieu of collecting water samples for analysis of total suspended sediments (TSS), MMC may use a turbidity meter in concert with the TSS sampling to establish a relationship between turbidity and TSS. Once a statistically valid relationship between the turbidity meter results and the TSS results was established and approved by the agencies, MMC may use a turbidity meter.

This paragraph describes stormwater monitoring of Outfalls 004 through 008 required in the draft renewal MPDES permit. MMC would seek authorization to discharge stormwater from other disturbances associated with construction activity. Stormwater monitoring requirements for any new outfalls may differ from that described for Outfalls 004 through 008. Stormwater monitoring would be required at all stormwater outfalls whenever a measurable discharge occurred. Both grab and flow-weighted composite samples would be collected. Grab samples would be collected within the first 30 minutes of the stormwater discharge. Unless a grab sample was specified, a flow weighted composite sample would be taken for either the entire discharge or for the first 3 hours of the discharge. The flow-weighted composite sample for a stormwater discharge may be taken with a continuous sampler or as a combination of a minimum of three aliquots (with each aliquot separated by a minimum period of 15 minutes) taken in each hour of the discharge over the course of either the entire discharge or over the first 3 hours of the discharge. Aliquots may be collected manually or automatically. For a flow weighted composite sample, only one analysis of the composite of the aliquots is required. Flow weighted composite samples would not be allowed for pH, total phenols, and oil and grease. MMC may substitute a grab sample for a flow weighted composite sample provided that the grab sample is collected within the first 30 minutes of the discharge. Sample type and parameters to be analyzed for each stormwater outfall are provided in Table C-15.

Table C-15. Monitoring Parameters and Required Reporting Values for Stormwater Samples from Outfalls 004 through 008.

Parameter	Current Required Reporting Value (mg/L unless otherwise specified)	Parameter	Current Required Reporting Value (mg/L)
Physical and Biological Parameters			
Precipitation (storm event (inches) and duration)	0.01	Oil and grease	1.0
Maximum flow (gpm) and total volume (gals) of storm event	Within 10% accuracy	Chemical Oxygen Demand	1
pH (s.u.)	0.1		
Inorganic Parameters			
Total dissolved solids	1.0	Total Kjeldahl nitrogen	0.15
Total suspended solids	0.4	Total inorganic nitrogen	0.01
Ammonia, as N	0.07	Total nitrogen	0.01
Nitrate+nitrite, as N	0.02	Total phosphorus, as P	0.001
Metals			
Aluminum, dissolved (0.45 μm filter)	0.009	Lead	0.0003
Antimony	0.0005	Manganese	0.005
Arsenic	0.001	Mercury	0.000005
Beryllium	0.0001	Nickel	0.001
Cadmium	0.00003	Silver	0.0002
Chromium	0.01	Thallium	0.0002
Copper	0.002	Zinc	0.008
Iron	0.02		

Note: Metals are total recoverable unless otherwise specified.
For parameters without a Circular DEQ-7 (DEQ 2012a) required reporting value, the achievable reporting limits shown are from USDA Forest Service (2012c, Table 3-1). Required reporting values may be different from project MPDES permit reporting levels. Any reporting values in Table C-15 lower than MPDES permit Reporting Levels meet USDA Forest Service requirements.

In addition to the collection and analysis of a stormwater sample for an event, MMC would provide flow information for the storm event sampled and precipitation data for the event that generated the discharge. MMC would collect and report the total volume of the discharge and maximum flow rate (in gallons per minute) for the discharge event sampled. These parameters may be measured or estimated. If these values are estimated, the estimated values must follow those methods given in *Guidance Manual for the Preparation of NPDES Permit Application for Storm Water Discharges Associated with Industrial Activity* (EPA 1991) unless otherwise specified.

MMC would record the data and duration (in hours) of the storm event sampled, rainfall measurements or estimates, and the duration between the storm event sampled and the previous measurable storm event. A measurable storm event is any rainfall event that is greater than 0.1 inch. This information would not be required to be reported monthly but would subject to the record keeping and retention requirements of the MPDES permit.

MMC would maintain the BMPs so they remained effective. Drainage and conveyance systems would be inspected periodically for blockages and erosion. Fueling areas would be inspected to prevent problems before they occurred. MMC would conduct a facility inspection once every 14 days and within 24 hours of a significant precipitation event of 0.5 inches or greater. At a minimum, the documentation of each routine facility inspection would include: the inspection date and time; the name(s) and signature(s) of the inspector(s); weather information; a description of any discharges occurring at the time of the inspection; any previously unidentified discharges of pollutants from the site; any observations of obvious indicators of stormwater pollution; any control measures needing maintenance or repairs; any failed control measures that need replacement; any incidents of noncompliance observed; and any additional control measures needed to comply with MPDES permit requirements. An inspection for a significant storm event may also be used and credited toward one of the monthly inspections. If an inspection or other observation identified stormwater pollution or control measures needing repair or replacement, then MMC would document these conditions within 24 hours of making such discovery. Subsequently, within 14 days of such discovery, MMC would document any corrective action(s) taken or needed, any further investigation of the deficiency, or the basis for determining that no further action is needed. If it was determined that changes were necessary following the review, MMC would make any modifications to the control measures before the next storm event if possible, or as soon as practicable following that storm event. The final MPDES permit will contain final stormwater monitoring and BMP inspection requirements.

Disturbed areas such as access and haul roads, sedimentation ponds and other BMPs would be recontoured and revegetation would be performed to stabilize soils and prevent erosion. Inspection and monitoring of stormwater BMPs would continue until disturbed areas achieved final stabilization. Final stabilization is defined as when a vegetation cover has been established with a density of at least 70 percent of the pre-disturbance levels, or equivalent permanent, physical erosion control reduction methods have been employed. Final stabilization using vegetation would be accomplished using the seed mixture approved by the agencies for Alternative 3. The agencies expect that final stabilization would occur within 2 years of the completed activities.

C.10.5.5 Groundwater Monitoring

C.10.5.5.1 All Facilities

Groundwater monitoring conducted during the Evaluation Phase would continue through the Construction and Operations phases (Table C-13). At the Poorman Impoundment Site, flow measurement weirs would be installed downstream of the Seepage Collection Dam and, during operations, in any areas of observed flows. Any groundwater seeps adjacent to the impoundment would be sampled quarterly for parameters listed in Table C-12. Reclaim water in the tailings impoundment would be sampled monthly at the reclaim pond within the impoundment and analyzed for the parameters shown in Table C-12.

C.10.5.5.2 Pumpback Well System Monitoring

The intent of a pumpback well monitoring system would be to confirm that complete groundwater capture downgradient of the tailings impoundment had been established and that capture was maintained for as long as necessary to meet BHES Order limits or applicable nondegradation criteria of all receiving waters. The water level data from pumpback monitoring wells would be used to adjust pumping rates of the pumpback wells and/or add additional pumping capacity. Selected monitoring wells would be equipped with continuous water level

measuring/recording devices to provide at least four measurements per day. The water levels in wells not equipped with recording devices would be measured by hand at least once per month. The measured water level data would be compared with predicted drawdown at these locations to determine whether full capture had been established. The pumpback well system would be modified, as necessary, to maintain capture, based on the water level data.

In 2012, MMC installed shallow piezometers in each of four wetlands (LLC-29, LCC-35A, LCC-36, and LCC-39) south of Little Cherry Creek. One piezometer was installed in wetlands LLC-29 and LLC-36, two piezometers were installed in wetland LLC-35A, and three piezometers were installed in wetland LLC-39. Wetland LLC-39 was divided in the delineation into three wetlands and labeled LLC-39A, LLC-39B, and LLC-39C. One year before mill operation started, MMC would measure water levels in the piezometers in wetlands LCC-29, LCC-35A, LCC-36, and LCC-39 (Figure C-7) four times over the annual hydrograph. The purpose of the monitoring would be to assess the potential effects of the pumpback well system. Vegetation in these two wetlands also would be monitored, following the methods used for the GDE monitoring (section C.10.4.2, Groundwater Dependent Ecosystem Monitoring. The monitoring would continue through the Closure Phase as long as the pumpback well system operated or until agreed upon by the agencies that it was no longer necessary.

Springs SP-14 and SP-15 adjacent to the impoundment site would be monitored for flow (Figure C-7). The flow of each spring would be measured twice, once in early June or when the area was initially accessible, and once between mid-August and mid-September during a time of little or no precipitation. The purpose of the monitoring would be to assess the potential effects of the pumpback well system. The monitoring would begin at least 1 year before construction and continue through the Closure Phase as long as the pumpback well system operated or until agreed upon by the agencies that it was no longer necessary. The most accurate site-specific method for measuring spring flow would be used.

C.10.6 Closure and Post-Closure Phases

Surface water and groundwater monitoring conducted during the Construction and Operational phases would continue into the Closure Phase or until agreed upon by the agencies that it was no longer necessary. Stormwater BMPs still in use would continue to be inspected and maintained. MMC would update the closure plan, including the long-term monitoring plan, during the Construction Phase in sufficient detail to allow development of a reclamation bond. A final closure and post-closure plan, including long-term monitoring plan, would be submitted 3 to 4 years before mine closure. The plan would incorporate monitoring information obtained during the mining period in the design of monitoring locations and sampling frequency. The objectives of monitoring during the Closure and Post-Closure are to:

- Assess potential effects of refilling of the mine void and adits on surface water and groundwater resources in upper Libby Creek, East Fork Rock Creek, and East Fork Bull River drainages
- Assess potential effects of discharge of treated water on surface water and groundwater adjacent to the Libby Adit until all direct discharges ceased
- Assess potential effects of stormwater discharges at outfalls 004 to 008 until DEQ issued a stormwater Notice of Termination.

- Assess potential effects on groundwater quality at the Plant Site, Impoundment Site, and the Libby Loadout until these facilities were reclaimed.

The plan would include measuring water levels in the mine void through the Rock Lake Ventilation Adit. Mine water quality and geochemical analysis of rock surrounding the mine void would be made during the Operations Phase. Hydrologic data would be collected in all phases through the Operations Phase, and would be integrated into the groundwater model. The need for continued monitoring beyond the Closure Phase would be based on these data. The Financial Assurance section of Chapter 1 describes the mechanisms available to the agencies for ensuring funds would be available should continued monitoring beyond the Closure Phase be required.

C.10.7 Water Balance

MMC would maintain an operational water balance throughout all phases of the project, including the Evaluation Phase. The detailed water balance would include inflows and outflows to the project facilities. The 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, MMC would measure and report the items listed in Table C-16.

MMC would install a DNRC-approved water use measuring device at one or more point of diversion locations approved by the DNRC. Water must not be diverted until the required measuring device is in place and operation. On a form provided by the DNRC, MMC would keep a written monthly record of the flow rate and volume of all water diverted including the period of time. Records would be submitted to the KNF, DEQ, and DNRC by January 31 of each year and upon request at other times during the year. MMC would maintain the measuring device so it always operated properly and measured flow rate and volume accurately.

During operations, annual surveys of the impoundment, including water stored in the pond, would be carried out to assist in the reconciliation of mass balance. The water balance would be reconciled on an annual basis, in conjunction with the mass balance. Records of all flows would be reconciled and the water balance also would use the measured precipitation and evaporation rates on site and observations of areas of beaches and water ponds. These measurements would be provided as monthly (or more frequently if requested by the agencies) and annual averages and totals in a quarterly hydrology report.

C.10.8 Action Levels

This section discusses the agencies' preliminary action levels, or some measurable change in a monitoring parameter that would require MMC action. Final action levels would be described in the final monitoring plan.

Table C-16. Water Balance Monitoring Requirements.

Item	Monitoring Parameters	Frequency	Comments
Thickener underflow feed line to tailings impoundment	Tons and Gallons	Daily	Compiled monthly and reconciled on an annual basis with the water balance; Reconcile mass balance with density of tailings (dam and impoundment)
Secondary cyclone feed line to dam.	Tons and Gallons	Daily	
Secondary cyclone - underflow and overflow	Tons and Gallons	Daily	
Approximate water storage in impoundment	Gallons	Semi-annually	
Precipitation and evaporation at impoundment site	Inches	Daily	Compiled monthly and reconciled on an annual basis
Treated sanitary waste discharged at impoundment	Gallons	Daily	
Approximate pond areas	Acres	Monthly	
Approximate wet and dry beach and dam areas	Acres	Monthly	
Mine and adit inflows	Gallons	Daily	
Libby Creek groundwater diversion	Gallons	Daily	
Potable water use	Gallons	Daily	
Dust suppression at the impoundment	Gallons	Daily	
Dust suppression at other facilities	Gallons	Daily	
Pumpback well groundwater/seepage collection	Gallons	Daily	
Seepage collection pond pumping rate	Gallons/day	Daily	
Seepage collection from any waste rock stockpile	Gallons	Daily	
Reclaim pumping rate	Gallons/day	Daily	
Discharge at any MPDES-permitted outfall	Gallons	Daily	

C.10.8.1 Surface Water Quality and Quantity

MMC would monitor discharges permitted under the MPDES permit and report any incidents of noncompliance in accordance with the permit. MMC would report any incidents of noncompliance as soon as possible, but no later than 24 hours from the time MMC first became aware of the circumstances. This would include any noncompliance which may endanger health or the environment, any unanticipated bypass which exceeds any effluent limitation in the permit, or any upset which exceeds any effluent limitation in the permit. MMC would provide a written report with 5 days of the time that MMC became aware of the circumstances. The written submission would contain a description of the noncompliance and its cause, the period of noncompliance, including exact dates and times, the estimated time noncompliance is expected to continue if it has not been corrected, and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. The MPDES permit also contains action levels for reporting of the discharge of toxic substances for which effluent limits were not established in the permit.

MMC would monitor flows and water quality in benchmark springs and streams outside of the area potentially affected by mine dewatering, as well as changes in the level and water quality of the benchmark lake. Based on the monitoring, MMC would establish a relationship between flows and/or water quality in benchmark springs and streams (described in the previous section on lakes and streams) and flows in any monitored spring or stream, as well as changes in the lake level and water quality of Rock Lake. Flows, lake level changes, and water quality in all monitored springs, lakes, and streams would also be evaluated using simple linear regression or other appropriate statistical analyses. MMC would provide the analysis in the annual report. The trend analysis would follow Forest Service protocols (USDA Forest Service 2012c), regarding trend analysis or another method approved by the agencies. If the relationship in quantity and quality between benchmark and monitored springs, lakes and streams after adit dewatering began was statistically significantly different compared to pre-mining or if the concentration of monitored parameters showed an increasing significantly trend, MMC would flag the flow change, lake level change or water quality parameter for agency review. If the agencies decided that some action were necessary, it would provide written notification to MMC, requesting submittal of a work plan within 30 days. The work plan would contain a detailed assessment of the changes, recommendations for additional monitoring (spatial and/or temporal), development of conceptual mitigation, or other actions to address the situation. The work plan would contain a schedule for implementing the proposed measures. Within 30 days, the agencies would: (i) approve, in whole or part, the plan; (ii) approve the plan with conditions; (iii) request clarifying information for the plan or additional review time or, (iv) disapprove, in whole or in part, directing that a revised work plan be submitted. If the agencies were to disapprove the plan, an explanation would accompany the disapproval.

C.10.8.2 Groundwater Quality

Action levels for groundwater compliance wells downgradient of the tailings impoundment pumpback well system are listed in Table C-17. Action levels for selected parameters are included to provide an early detection of adverse groundwater conditions and to verify the effectiveness of the tailings impoundment pumpback well system. Parameters selected for development of action levels are based on their presence at low concentrations in the downgradient aquifers, but at elevated concentrations in process water. Exceedance of these levels would require additional action by MMC, but would not be considered a violation of the MPDES permit, Hard Rock Operating Permit, or Montana groundwater standards. The action level would be increased accordingly if the pre-mining baseline concentration in any individual monitoring well

consistently exceeded 50 percent of an action level. Action levels for the tailings impoundment monitoring wells would not be changed after construction of the tailings impoundment began.

In addition to assessing relationship of detected concentrations to action levels, MMC would present a trend analysis of all data for the parameters listed in Table C-17 in its annual report. A statistically significant increasing trend in concentration of any parameter would be discussed. Because arsenic is a carcinogen and changes in ambient concentrations are not allowed under Montana's nondegradation rules, MMC would assess if the arsenic concentration of each well was statistically significantly greater than the well's ambient concentration using an appropriate statistical test. For manganese, where ambient concentrations already sometimes exceed the BHES Order limit, if concentrations measured during mining exceeded the BHES Order limit and showed an increasing trend using an appropriate statistical test, this would be considered an exceedance of the action level.

If monitoring indicated that these action levels had been exceeded in any compliance well, MMC would notify the agencies of the exceedance within 5 working days. If the agencies decided that additional actions were necessary, the procedures regarding a work plan described for surface water quality would be implemented.

Table C-17. Action Levels for Groundwater Compliance Wells downgradient of the Tailings Impoundment Pumpback Well System.

Parameter	BHES Order Limit (mg/L)	Groundwater Standard (mg/L)	Ambient Concentration (mg/L)[†]	Action Level (mg/L)[§]
Nitrate + nitrite, as N	10	10	0.07	5
Total dissolved solids	200	—	60	150
Sulfate	—	—	<4.5	20
Potassium	—	—	<0.78	10
Antimony	—	0.0056	<0.003	0.0025
Arsenic	—	0.01	<0.003	See text
Chromium	0.02	0.1	<0.00074	0.01
Copper	0.1	1.3	<0.0012	0.05
Iron	0.2	—	<0.01	0.1
Manganese	0.05	—	<0.077	trend analysis showed increasing concentration trend exceeding 0.05 mg/L
Zinc	0.1	2	<0.0064	0.05

"—" = No applicable concentration.
mg/L = milligrams per liter.
[†]Ambient concentrations are from data collected in LCTM-8 through 2012 (Appendix K). Concentrations presented with a < symbol had at least one sample with a reported concentration less than the detection limit used in calculating representative values; detection limit used in calculating representative value when reported concentration was below the detection limit. For dissolved antimony, all sample results were below detection limits; detection limit for antimony is now lower (0.0005 mg/L).
[§]If the pre-mining baseline concentration in any individual monitoring well consistently exceeded 50 percent of an action level, the action level would be increased accordingly. Action levels in the tailings impoundment monitoring wells would not be changed after construction of the tailings impoundment began.

C.10.8.3 Groundwater Flow

C.10.8.3.1 Mine Area

MMC would monitor flows from the mine and adits, as well as from individual fractures in the vicinity of the Rock Lake Fault and Rock Lake. If mine and adit inflows greater than 500 gpm occurred for 10 days, MMC would notify the agencies on the 11th day. MMC would then implement excess water contingency plans described in Chapter 2, such as grouting or treatment and discharge at the Water Treatment Plant.

If the mine void encountered substantial groundwater inflows in the vicinity of the Rock Lake Fault or Rock Lake, MMC would notify the agencies within 5 business days. “Substantial groundwater inflows in the vicinity of the Rock Lake Fault or Rock Lake” means a flow from any individual fracture within 1,000 feet of either the Rock Lake Fault or Rock Lake with total flow greater than an average of 50 gpm over a 24-hour period. The agencies would evaluate the inflow data and direct MMC to take appropriate actions. MMC would then evaluate the possible effect to Rock Creek and Rock Lake and provide an evaluation report to the agencies within 30 days after initial agency notification.

MMC would monitor the flow in benchmark springs outside of the area potentially affected by mine dewatering, and establish a relationship between flows in benchmark springs (described in the previous section on springs) and flows in any monitored springs. Flow in all monitored springs would also be evaluated using simple linear regression or other appropriate statistical analyses. If the relationship in flow between benchmark springs and monitored springs after adit dewatering began was statistically significantly less than pre-mining, MMC would provide the analysis in the annual report. If the agencies decided that additional actions were necessary, the procedures regarding a work plan described for surface water quality would be implemented.

C.10.8.3.2 Tailings Impoundment Area

MMC would establish a pumpback well monitoring system adjacent to the pumpback wells in the impoundment area (see section C.10.5.5.2, Pumpback Well System Monitoring). Water levels would be measured continuously in some wells using electronic data recorders and monthly by hand in other wells. Within 30 days of the end of each month, MMC would analyze the performance of the pumpback well system and assess the extent of capture of any seepage entering the groundwater beneath the tailings impoundment. If monitoring indicated that full capture of the seepage was not being achieved, MMC would notify the agencies within 5 working days. If the agencies decided that additional actions were necessary, the procedures regarding a work plan described for surface water quality would be implemented.

C.10.8.4 Wetland or Riparian Areas

The initial GDE inventory information (see section C.10.3.2, Groundwater Dependent Ecosystem Inventory and Monitoring) would be used to develop a prevalence index (Corps 2008b) for monitored wetlands overlying the mine. Monitored wetlands north of the impoundment area also would use a prevalence index to assess effects. 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 USDI Fish and Wildlife Service compiled a list of plants and their wetland indicator status (USDI Fish Wildlife Service 1993). 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 wetlands species to a

higher percentage of facultative wetland and facultative upland species. For example, sphagnum moss, an obligate wetlands species found at site 8, 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 2008b). A prevalence index would be identified for each wetland and riparian site monitored.

If the prevalence index of any monitored wetlands is 50 percent greater than its baseline index (such as 1.5 to 2.3) or is above 3 for 2 consecutive years, MMC would provide the analysis in the annual report. If the agencies decided that additional actions were necessary, the procedures regarding a work plan described for surface water quality would be implemented.

Other monitoring options such as piezometers would be used to facilitate or strengthen monitoring effectiveness. If a change in seep or spring flow, water level, or water quality were noted outside the baseline data for an individual site or set of sites, or a trend was observed that was not observed during pre-mining monitoring, then a re-evaluation of those potentially affected habitats would be conducted and documented for comparison against initial 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.

C.10.9 Plan Management

C.10.9.1 Quality Assurance/Quality Control

As part of each plan for environmental monitoring, MMC would develop Sampling and Analysis Plan (SAP) and a Quality Assurance Project Plan (QAPP) and submit them 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.

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.

C.10.9.2 Sample Collection and Data Handling

Field procedures would follow DEQ procedures (DEQ 2012b) 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 using low flow sampling techniques. 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 be

by procedures described in 40 CFR 136, EPA-600/4-79-020, or methods shown to be equivalent. All field procedures would follow standard sampling protocols as demonstrated through the quality assurance and quality control documentation.

MMC would use a sample control plan, which includes sample identification protocol, the use of standardized field forms to record all field data and activities, protocol for collecting field water quality parameters, and the use of chain-of-custody, sample tracking, and analysis request forms. MMC would develop a master file of all field forms and laboratory correspondence. MMC would meet the laboratory method-required holding time for each constituent being analyzed.

MMC would ensure representativeness of samples collected by locating sampling stations in representative areas and by providing quality control samples and analyses. Quality control samples would include blind field standards, field cross-contamination blanks, and replicate samples. Quality control samples would be at a minimum frequency of 1 in 10. In addition, MMC would use EPA-approved laboratories. If revised sampling methods or QA/QC protocols change, MMC would incorporate those as directed by the agencies.

C.10.9.3 Data Reporting

Any reporting required in the MPDES permit would continue as long as there was discharge of any mine drainage or process water to a MPDES-permitted outfall. MMC would submit water quality and flow measurement data to the KNF and DEQ in an electronic format acceptable to the agencies within 10 working days after receipt of final laboratory results. All submitted analytical data would comply with DEQ's minimum reporting requirements for analytical data (DEQ 2009). MMC would develop and maintain an agency-accessible, password-protected website that hosted electronic data. MMC would prepare a report briefly summarizing hydrologic information, sample analysis, and quality assurance/quality control procedures following each sample interval. The report would be posted on MMC's website within 4 weeks after receipt of final laboratory results.

The annual report, summarizing data over the year, would include data tabulations, maps, cross-sections, and diagrams needed to describe hydrological conditions. Raw lab reports and field and lab quality results also would be reported. In the annual report, MMC would present a detailed evaluation of the data. Data would be analyzed using routine statistical analysis, such as analysis of variance, to determine if differences exist:

- Between sampling stations
- Between an upstream benchmark station and the corresponding downstream station
- Between sampling time (monthly, growing season/non-growing season)
- Between stream flow at the time of sampling (for example, low flow during the fall compared to low flow during the winter)
- Between sampling years
- Trend analyses would be included where applicable and/or quantifiable

The annual report would be posted on MMC's website within 90 days after receipt of the final laboratory results for the final quarter of the year. A formal review meeting would be arranged within 2 weeks of MMC submitting the monitoring report to the agencies. The formal review

meeting would involve representatives from the reviewing agencies and MMC. The review could result in various outcomes:

- Determine that no change in the monitoring programs or mine operation plans was needed
- Require modifications to the monitoring programs
- Require new treatment or mitigation measures to be implemented as part of the mine project
- Require MMC to implement necessary measures to ensure compliance with applicable laws and regulations

At the end of the first monitoring year and following submittal of the annual report, MMC would meet with the agencies to discuss the monitoring results. Following the annual review, the agencies would decide whether a change in monitoring or operations would be required.

C.11 Aquatic Biology

C.11.1 General Requirements

MMC would conduct aquatic biological monitoring before, during, and after project construction and operation at stream stations that are within and downstream of project disturbance boundaries and at benchmark stations that are upstream of potential influence from the project. At replicate sample locations within each station, multiple parameters that are likely to display small-scale variability and likely to be correlated would be assessed. Replicated sample locations would be selected to be as similar as possible across stations. This sampling design would allow analysis of data using a before-after/control-impact approach, and would allow use of univariate and multivariate statistical methods. This sampling design is intended to identify natural variability and isolate the influence of water quality and fine sediment deposition on stream biota and habitat.

MMC would collect surface water quality samples at each aquatic biological monitoring station during each monitoring period to assist in interpretation of the data. MMC would also conduct salmonid population surveys and salmonid tissue chemistry surveys to provide additional information to assess the influence of the project on stream biota.

C.11.2 Bull Trout Mitigation Monitoring

MMC would develop Bull Trout Core Area Mitigation Plans in accordance with the USFWS' Biological Opinion for aquatic species. MMC would develop the plans and submit them to the KNF and USFWS within six months of the KNF's approval to start the Evaluation Phase. Mitigation monitoring would include assessment of fish populations and stream habitat in mitigation streams. The Mitigation Plans would describe the monitoring locations, frequency, parameters, and reporting consistent with the requirements of the Biological Opinion.

C.11.3 Monitoring Locations and Times

MMC would conduct aquatic biological monitoring at seven stations (Table C-18 at the end of this section); Figure C-2; Figure C-4 through Figure C-7). Five stations are within or downstream of the proposed disturbance boundaries. Two stations are upstream of potential project impacts

and would serve as benchmark stations. Stream reach length would vary depending on the monitoring task and station.

Monitoring frequency would vary, depending on the monitoring task and station (Table C-19). Some tasks would be conducted three times annually: prior to runoff from the higher elevations in the spring (typically April or May), during summer (typically early August to September), and prior to ice formation (typically October). Other tasks would be conducted annually during the summer period, or less frequently as described below.

C.11.4 Substrate and Fine Sediments

During the summer monitoring period, percent surface fines would be quantified using a grid sampling device as described in the R1/R4 methodology (Overton et al. 1997) at each quantitative macroinvertebrate sample (Surber sample) location. Embeddedness would be also quantified at each Surber sample location by tallying each stone within the Surber sampler frame that is <50% embedded. Substrate size would be quantified by measuring the narrow dimension of these same stones. By conducting these tasks at the Surber sample locations, the data would provide quantitative measures of substrate at all stations in similar habitat and under similar depth and flow conditions, and would improve the ability to isolate the influence of water quality and fine sediments on benthic macroinvertebrates (see below). Samples would be collected within the shortest reach available that meets the macroinvertebrate sample location criteria (see below).

Also during the summer period, in the fish monitoring reaches (L1, L3, L9, and Be2 see below), the substrate monitoring methods described above would be supplemented with the McNeil Core substrate sampling method. Ten representative core samples would be collected from potential spawning locations in scour pool tail crests and low-gradient riffles within the salmonid population survey reach at each of the four stations. Fewer core samples would be collected if 10 suitable locations are not located within the survey reach.

During all three monitoring periods, DEQ methods for assessing sediment impairment (DEQ 2013b) would be followed at all monitoring stations. These methods would include Wolman pebble counts, grid tosses, measurement of residual pool depth, and pool counts (Wolman 1954, DEQ 2013b). Reach lengths for this monitoring component would be 20 times the bankfull width in the sampling area.

C.11.5 Habitat

Habitat surveys would be conducted annually in the summer in the fish monitoring reaches (L1, L3, L9, and Be2 see below). Fish structures developed as mitigation also would be monitored. Instream habitat data collection would generally follow the R1/R4 methods developed by the FS (Overton et al. 1997). Habitat types within the stream reaches would be identified and measured individually. Measurements at recognized units within each habitat type would include length, wetted width, bank width, average depth, maximum depth, substrate type, type of bank vegetation, percent undercut bank, and percent eroded bank. These habitat measurements are consistent with the Inland Native Fish Strategy (INFS) goals. Additionally, other measurements, such as pool frequency, number of pieces of large woody debris, and lower bank angle, would be recorded to document further attainment of the riparian management objectives set by INFS (USDA Forest Service 1995).

C.11.6 Routine Physical/Chemical Features

MMC would measure the following routine physical and chemical parameters at all aquatic biological monitoring stations during all monitoring periods: stream discharge, air and water temperature, pH, total alkalinity, specific conductance, sulfate, and the metals listed in Table C-11. EPA approved methods or other acceptable methods specified in the monitoring plan would be used.

C.11.7 Benthic Macroinvertebrates

MMC would collect five quantitative samples and one qualitative sample of benthic macroinvertebrates from all aquatic biological monitoring stations during the summer period. Methods used would generally follow the guidelines described in the DEQ's macroinvertebrate sampling protocol (2012c) for the collection of quantitative Hess samples and semi-quantitative jab samples. Quantitative samples would be collected using a 500-micrometer mesh Surber sampler rather than a Hess net because Surber samplers have been used by the FWP in Libby Creek beginning in 2000 (Dunnigan et al. 2004). The continued use of the Surber sampler thus would allow for better comparisons with past data. Quantitative samples would be collected from the riffle/run habitats in the stream. Specific sampling locations at each station would be standardized, to the extent possible, for depths between 0.5 and 1.0 feet and flow velocities of less than 1.5 feet per second. MMC would collect the qualitative jab sample with a 500-micrometer mesh net in all micro-habitats not sampled during the collection of the quantitative samples, such as aquatic vegetation, snags, and bank margins. Benthic macroinvertebrates collected with the net would be used to provide supplemental information on species composition at the sites and to determine the relative abundance of the taxa inhabiting aquatic habitats at the sampling station.

Parameters analyzed would include density, number of taxa, number of *Ephemeroptera*, *Plecoptera*, and *Trichoptera* (EPT) taxa, number of Ephemeroptera taxa, number of Plecoptera taxa, percent non-insects, percent predators, percent burrower taxa, the EPT index, percent EPT individuals, Shannon-Weaver diversity index, Simpson diversity index, the Hilsenhoff Biotic Index (HBI) and the biotic condition index (BCI). Several of these parameters are among the metrics calculated by the DEQ as part of its data analysis (DEQ 2012c) and also allow for the calculation of the Montana multi-metric index for mountain stream (Jessup et al. 2006). The use of other metrics such as evenness, Simpson's diversity index, and the BCI have been recommended by FS personnel to allow for comparisons with previously collected data within this region (Steve Wegner, personal communication, 2006). Additionally, these data would be analyzed using the Observed/Expected (O/E) Model developed for Montana (Jessup et al. 2006). To summarize these data, four common statistical measures would be used (mean, standard deviation, coefficient of variation, and standard error of the mean), plus other appropriate measures (EPA 1990).

Quality assurance for macroinvertebrate data would follow DEQ guidelines (DEQ 2005a; 2012c) and would be conducted randomly on 10 percent of the samples, with 95 percent agreement for taxonomic and count precision required. MMC also would maintain a permanent taxonomic reference collection that contains all benthic species collected from project area streams. Taxa identification in this collection would be documented and confirmed by a qualified, independent macroinvertebrate taxonomist (DEQ 2012c). This reference collection would be maintained by MMC through the period of post-operational monitoring. Following this period, the collection would be transferred to a depository selected by the agencies for permanent scientific reference.

C.11.8 Periphyton and Benthic Chlorophyll-a

MMC would sample periphyton and benthic chlorophyll-a at all aquatic biological monitoring stations concurrent with the proposed benthic macroinvertebrate population sampling during the summer period. Qualitative periphyton would be collected following DEQ's standard operation procedure using the appropriate method for the stream type to be sampled (2011a). At stream locations with flowing water present at the time of sampling, the modified PERI-1 method would be used, which designates a specific longitudinal length of stream to be sampled at each site. The sampled stream length would be either 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 eleven 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 procedure (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 was 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/m^2) 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 procedure (2011b) rather than taking chlorophyll-a samples.

Based on these methods, one composite periphyton sample and eleven chlorophyll-a samples would be collected at each site from the reach that included the Surber sample locations prior to collecting macroinvertebrates (see section C.11.7; Table C-19). In addition, L9 (LB-300) and L3 (LB-1000) would be sampled 3 times per year in the summer period to assess if nuisance algal was present. These sampling events would be scheduled approximately a month apart and within the first two weeks of July, August, and September. The summer sampling of all sites may suffice for one of the three sampling events at L9 and L3. As stated in the DEQ's procedures (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 the use of appropriate methods and detection limits. The number of additional delimited areas scrubbed at each transect would be recorded.

C.11.9 Salmonid Populations

To determine possible changes in salmonid populations associated with development of the Montanore Project, MMC would monitor salmonid populations in Libby Creek and Bear Creek

annually during the summer period. The FWP would complete the monitoring if they were conducting surveys at the approximate locations described below during summer. MMC would conduct the monitoring if the FWP was not already doing so and if the required permits were granted to MMC. If the required permits were not granted for some or all of the salmonid population monitoring, relative fish abundance by species and size class would be determined using the direct enumeration snorkeling technique (Thurow 1994 cited in Overton et al. 1997). Day and night snorkel surveys would be conducted in an upstream direction, using a dive light at night. Fish species and lengths would be documented to the extent practical without capturing fish. Fish counts, species identifications, and length determinations would be tallied for each macrohabitat type in each reach. If portions of reaches were too shallow for snorkeling, they would be surveyed from the banks. Bank surveys would also be conducted to tally young of the year fish.

MMC would monitor salmonid populations in Libby Creek in three stream reaches (L1, L3, L9), and in Bear Creek (Be2) using the following procedures. The stream reach would be blocked by netting at its upstream and downstream limits to prevent fish movement into or out of the sample reach during the sampling. Sampling procedures would include multiple-pass depletion electroshocking to collect salmonids from a 300-yard (or 300-meter) reach of stream. All salmonids would be identified, measured for length, and released. Population densities of each salmonid species captured during the study would be estimated, where adequate sample sizes permit, using a maximum-likelihood model (*e.g.*, Seber and Le Cren 1967, MicroFish 3.0). The condition of all captured salmonids would be recorded following an examination for overt signs of disease, parasites, or other indications of surface damage. Length-frequency data would be analyzed to determine whether species were naturally reproducing in or near the stream reaches. These methods may be modified if FWP conducted the monitoring. A monitoring report would be submitted annually to the KNF, the FWP, and the DEQ.

The same salmonid monitoring procedures would be used to monitor salmonid response to fish mitigation projects implemented by MMC. Beginning in the year prior to a fish mitigation project, salmonids would be monitored using the approved methods. In subsequent years (yearly), the mitigation monitoring at each site would be repeated. The salmonid population data from stations L1 and Be2 would be used as controls to assess if observed changes were a natural event.

C.11.10 Bioaccumulation of Metals in Fish Tissue

MMC would conduct monitoring studies that measure background concentrations of copper, cadmium, mercury, lead, and zinc in the fish in Libby Creek to provide a basis for comparison in order to document any potential changes in the concentrations of these metals due to construction and operation of the Montanore mine. Fish tissue monitoring would be conducted if the required permits were granted to MMC. If the required permits were not granted for some or all of the fish tissue monitoring, MMC would report the most relevant data that are available for the project area.

Prior to construction and once construction has begun, the FWP or MMC would collect five rainbow trout or rainbow trout hybrids (*Oncorhynchus* sp.) annually from Sites L1, L3, and Be2 for a period of 5 years, with each trout collected being greater than 4 inches in size. Collections would be completed during the summer period, concurrent with the fish population surveys.

Homogenized whole-fish tissue samples would be analyzed to determine copper, cadmium, mercury, zinc and lead concentrations. Thereafter, if no increasing trends in metal concentrations have been identified after the initial 5-year period, MMC would resample each site at a 3-year interval to document any trends in bioaccumulation of these metals. Test procedures would be the same as those used for baseline testing, unless changed by the agencies.

C.11.11 Sampling Trip and Annual Reporting

Within one week of completing biological sampling, MMC would submit a brief report to appropriate review personnel in the DEQ, the KNF, and the FWP. This report would include brief statements about stream conditions observed at each monitoring station and would alert the review personnel to any marked changes in monitoring data relative to the cumulative monitoring record.

On or before March 1 of each year, MMC would submit an annual aquatic monitoring report that contains summaries of all aquatic monitoring data collected during the previous year. Each report also would discuss trends in population patterns and evaluate changes in stream habitat quality, based on all data collected to date for the project. Reference to appropriate scientific literature would be included. Recommendations in these reports can include modifications to increase monitoring efficiency or to provide additional data needs.

C.11.12 Annual Review and Possible Revision of the Monitoring Plan

Within one month after MMC submits the annual report, an annual meeting would be held to review the aquatics monitoring plan and results, and to evaluate possible modifications to the plan. This meeting would include personnel from the DEQ, KNF, FWP, MMC, and other interested parties.

Table C-18. Aquatic Biology Monitoring Stations.

Reach	Nearest Upstream Activities	Station ID (surface water ID)	Station Comments	All Non-fish Monitoring	Fish Population and Habitat	Fish Tissue Metals
Bear Creek						
1	none	Be2 (BC-500)	Upstream benchmark	X	X	X
Poorman Creek						
2	Impoundment	Po1 (PM-1000)	Impact assessment	X		
Libby Creek						
1	Mine dewatering	L10 (LB-200)	Upstream of Upper Libby Adit	X		
2	Libby Adit	L9 (LB-300)	Impact assessment	X	X	
4	Impoundment	L3 (LB-1000)	Integrated impact assessment	X	X	X
5	Impoundment	L2 (LB-2000)	Integrated impact assessment	X		
6	All	L1 (LB-3000)	Integrated impact assessment	X	X	X

Additional monitoring stations would be developed in other streams, such as the East Fork Bull River and East Fork Rock Creek, in accordance with the Bull Trout Core Area Mitigation Plans discussed in section C.11.2, *Bull Trout Mitigation Monitoring*.

Table C-19. Aquatic Biology Monitoring.

Task category	Task	Timing			Number of Stations	Method	Replication per Station and Within-Station Locations
		Spring	Summer	Fall			
Benthic Biota	Macroinvertebrates, quantitative		X		all	Surber samples for lab taxonomy	5 sites with most similar microhabitat near station
	Macroinvertebrates, qualitative		X		all	kicknet sample for lab taxonomy	1 sample from all habitats in 100 ft reach that includes Surber sample locations
	Periphyton, quantitative		3X/season X		L9 and L3 all	samples from rock surface for chlorophyll-a determination (DEQ SOP 2011b)	11 samples from each transect location within stream reach that includes Surber sample locations
	Periphyton, qualitative		3X/season X		L9 and L3 all	picking and scraping all varieties for lab taxonomy (DEQ SOP 2011a)	1 sample comprised of a composite of 11 transect samples from each site within stream reach that includes Surber sample locations
Habitat	Canopy cover		X		all	densiometer	at each of the 5 Surber sites
	Water velocity		X		all	flow meter at 0.6 m depth	at each of the 5 Surber sites
	Stream discharge	X	X	X	all	velocity-area principle / 0.6 m depth	1 transect at station
	Fish habitat survey		X		4	R1/R4	same 100 yd reach as salmonid survey
Substrate	Embeddedness		X		all	Tally <50% embedded stones	at each of the 5 Surber sites
	Substrate size distribution		X		all	Measure <50% embedded stones	at each of the 5 Surber sites
	Surface fines		X		all	49 point grid	at each of the 5 Surber sites
	Spawning gravel		X		4	McNeil cores for lab analysis and field settling cone	maximum obtainable up to 10 samples within 100 yd salmonid survey reach
	Sediment impairment	X	X	X	all	DEQ 2010 SOP	20 bankfull widths
Water Quality	Conductivity	X	X	X	all	meter	1 measurement at station
	pH	X	X	X	all	meter	1 measurement at station
	Water temperature	X	X	X	all	meter	1 measurement at station
	Water chemistry sample	X	X	X	all	grab sample for comprehensive lab analysis	1 sample at station
Fish	Salmonid population survey		X		4	multiple-pass electrofishing or snorkel	extending from station to 100 yd upstream
	Salmonid tissue metals samples		X		3	*Oncorhynchus* sp. whole-fish Cu, Cd, Hg, Pb, Zn	5 fish per survey reach

C.12 Wilderness

All surface disturbances for the Montanore Project would be outside of the CMW boundary; some activities such as monitoring would occur within the CMW boundary. A summary of the types of monitoring activities that would occur in the wilderness is located in section 3.24.1.4.3 of the Final EIS. A description of monitoring of wilderness character is below.

C.12.1 Objective

The objective of monitoring for Wilderness is to determine if activities approved within the CMW boundary, such as the agencies' required monitoring described in this appendix (see sections C.5 *Wildlife*, C.7 *Rock Mechanics*, and C.10 *Water Resources*), are in conformance with mitigation and special provisions and if management is minimizing impacts to wilderness values.

C.12.2 Locations, Parameters, and Frequency

C.12.2.1 MRDG Process and Approval of Final Monitoring Plans

A Minimum Requirements Analysis (MRA) is required when prohibited use(s) are being considered in an administrative action (Wilderness Act, section 4.c). Prohibited uses in the CWM include motorized equipment and motorized or mechanized transportation. Motorized equipment is defined as any machine activated by a nonliving power source except small battery-powered hand carried devices such as flashlights, GPS, cameras, or cell phones (36 CFR 261.2). Small battery-powered equipment left on site for a period of time would be considered motorized equipment.

The Minimum Requirements Decision Guide (MRDG) is a tool to complete a minimum requirement analysis (Arthur Carhart National Wilderness Training Center 2014). The MDRG has two parts: 1) determine if administrative action is necessary, and if necessary, 2) determine the minimum activity necessary. As part of the project record, a 2015 Montanore Project MRDG has been completed for the conceptual monitoring plan through Step 1 (determination of an administrative action is necessary in the CMW). The determination made was that administrative action is necessary in the CWM due to existing rights, special provisions, and as a requirement of other statutes or regulations. Step 2, which is the determination of the minimum activity necessary, would be used to evaluate Final Plans as they are submitted to the agencies by MMC.

MMC would clearly identify any activities (monitoring, equipment, transport) that would occur within the CMW boundary in submitted plans (maps, tables, monitoring locations) as described under Section C.12.3). The KNF would complete MRDG Step 2, determination of the minimum tool necessary, prior to approving any monitoring activities. The MRDG would be completed for final plans and updated as the project progresses.

C.12.2.2 Wilderness Stewardship Performance

The Forest Service issued the National Wilderness Stewardship Performance Guidebook in 2015. (USDA Forest Service 2015). Two elements that apply to the Montanore Project are described below.

Other Special Provisions—includes 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 Montanore Final Monitoring Plan would be used as a basis for the KNF Special Provision Monitoring Plan. The Special Provisions Monitoring Plan would be interactive and collaborative with MCC 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—establish a baseline and provide foundation for evaluating trends in wilderness character. These trends indicate the outcome of our 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 was 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 (USDA 2014). The KNF would implement solitude monitoring in 2016 to establish pre-operation baseline information for the Montanore Project. The 2016 monitoring would focus on areas identified with possible '*increased visibility of mine disturbances as well as increased noise from mining facilities*' from specific locations including the following: viewpoint at Elephant Peak; between Elephant Peak and Bald Eagle Peak; CMW locations west of the facilities; and Rock Lake Ventilation Adit.

C.12.3 Reporting Requirements

MMC would submit the Final Monitoring Plan with activities (monitoring, equipment, transport) within the CMW boundary clearly identified. The KNF would complete Step 2 of the MRDG, and determination of minimal activity.

MCC would submit all activities (monitoring, equipment, transport) occurring within the CWM annually to the KNF using the Administrative and Special Provisions Authorization form 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 (NRM), a system of database tools used by the Forest Service for managing agency data.

The KNF would complete a Special Provisions Monitoring Plan report annually (starting year Final Monitoring Plan was approved) by October 1 of every year.

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Attachment 4 – KNF's December 2015 Terrestrial Threatened and Endangered Species Mitigation Plan

Attachment 4, the Revised Terrestrial Threatened and Endangered Species Mitigation Plan, includes the corrected acres for displacement and required habitat replacement as identified in KNF letter to USFWS dated March 19, 2015. The revised Mitigation Plan also includes clarifications as a result of the Forest Service's pre-decisional objection process to Table 2 (KNF's Proposed Access Changes for Grizzly Bear Mitigation Prior to the Evaluation Phase) and Table 3 (KNF's Proposed Road Access Changes Prior to the Construction Phase which Benefit Grizzly Bears), and to Items A.4.a, B.1.a, and E.2.a. These corrections and clarifications do not change the effects analysis described in the 2013 Biological Assessment.

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United States Department of Agriculture
Forest Service
Kootenai National Forest
Forest Supervisor's Office
31374 US Highway 2
Libby, MT 59923-3022
406-293-6211

File Code: 2670; 2810; 1950
Date: January 12, 2016

Ms. Jodi Bush
Field Supervisor
US Fish and Wildlife Service
585 Shepard Way
Helena, MT 59601

Dear Ms. Bush,

This letter is a follow-up to my March 19, 2015 letter that updated you on the Montanore Project Final EIS. The March 19, 2015 letter corrected errors in the future traffic volume calculations and in the grizzly bear displacement analysis used to determine the required habitat compensation for long-term displacement effects. This letter documents, as requested by FWS, the corrected displacement numbers, and the associated change in mitigation acres in a final revised Terrestrial Threatened and Endangered Mitigation Plan.

After my March 19, 2015 letter, the Kootenai National Forest (KNF) issued a Final Environmental Impact Statement (EIS), Errata, and Draft Record of Decision for the Montanore Project on April 1, 2015. These documents were issued pursuant to the Forest Service's pre-decisional objection process described in 36 CFR 218. Following a review of the written objections, the Objection Reviewing Officer sent the objectors a letter responding to the objections and containing instructions that described steps the KNF must undertake before issuing a Final EIS and Final Record of Decision. The KNF has taken the required steps to respond to all objection instructions. This follow-up letter addresses three instructions that affect the analysis in the KNF's two Biological Assessments prepared for the project in 2013. These three instructions are as follows:

1. Update the sediment analysis and the discrepancies between the Biological Assessment/ Biological Opinion and the FEIS regarding estimated sediment production over the life of the project.
2. Update the analysis associated with temperature, incorporating the best available science.
3. Ensure that changes in the proposed closure periods for the roads listed in Tables 28 and 29 and in Tables 2 and 3 in the grizzly bear mitigation plan in the 2013 Biological Assessment accurately reflect over-the-snow closure orders currently in effect, and display any changes in closure orders that are proposed by the project.

The KNF issued a Final EIS in December 2015. The four attachments to this letter provide an updated analysis of sediment and temperature, as well as revisions to the Montanore Mine Project Terrestrial Threatened and Endangered Species Mitigation Plan and Implementation Tables which were included as Appendix C in the USFWS Biological Opinion, 2014. Detailed descriptions precede each attachment. The attachments are listed below:

- **Attachment 1** - Updated Sediment and Temperature Requirements in the Selected Mine and Transmission Line Alternatives
- **Attachment 2** - FEIS and ROD Analysis of Temperature and Sediment
- **Attachment 3** - Montanore Project Roads WEPP: Road Batch Modeling and Analysis of

Sediment Loading to Upper Libby Creek and Big Cherry Creek Watershed from Point and Non-point Sources

- **Attachment 4** – Revised Montanore Mine Project Terrestrial Threatened and Endangered Species Mitigation Plan and Implementation Tables

The updated analyses should not affect the determination of the FWS Biological Opinions that the Montanore Project as proposed is not likely to jeopardize the continued existence of the grizzly bear or the bull trout. This updated analysis does not indicate an increase in the amount or extent of anticipated incidental take disclosed in either Biological Opinion. The determination has not been exceeded, so the FWS Opinion should not change. Based on this information, I have determined that re-initiation of formal consultation is not required under 50 CFR 402.16 as described in section *X Reinitiation Notice* of the Biological Opinions for the project. If you agree, I request your written concurrence.

Sincerely,

CHRISTOPHER S. SAVAGE
Forest Supervisor

cc: Craig Jones, Montana DEQ

Attachments: (4)

United States Department of the Interior

Fish and Wildlife Service

Ecological Services
Montana Field Office
585 Shepard Way, Suite 1
Helena, Montana 59601-6287
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In Reply Refer To:
File: M19 Kootenai National Forest: Montanore Mine Project; 06E11000-2013-F-319; 06E11000-2016-TA-0129

January 27, 2016

Christopher Savage, Supervisor
Kootenai National Forest
31374 U.S. Highway 2
Libby, Montana 59923-3022

Dear Mr. Savage:

On January 12, 2016, the U.S. Fish and Wildlife Service (Service) received a letter from the Kootenai National Forest (KNF) regarding the Montanore Mine proposed by Montanore Minerals Corporation (MMC; hereafter referred to as the Montanore Project). In that letter, KNF notified the Service of the following:

A previous letter submitted to the Service on March 19, 2015 corrected errors in the future traffic volume calculations and in the grizzly bear displacement analysis used to determine the required habitat compensation for long-term displacement effects. Those corrections were included (along with the associated change in mitigation acres) in a final revised Terrestrial Threatened and Endangered Mitigation Plan (Attachment 4), attached to the January 12, 2016 letter.

In addition, KNF included attachments that provide updated information regarding the following:

- Updated the sediment analysis and addressed the discrepancies between the Biological Assessment/Biological Opinion and the Final Environmental Impact Statement (FEIS) for the Montanore Project regarding estimated sediment production over the life of the Project (Attachments 1, 2 and 3)

- Updated the analysis associated with temperature, incorporating the best available science (from the FEIS and Record of Decision; Attachment 2)

- Ensured that changes in the proposed closure periods for the roads listed in Tables 28 and 29 and in Tables 2 and 3 in the grizzly bear mitigation plan in the 2013 Biological Assessment accurately reflect over-the-snow closure orders currently in effect, and display any changes in closure orders that are proposed by the Montanore Project.

KNF's review found that the after correction of the errors and updated information discussed above, the effects identified in the Montanore Mine Project Biological Assessments for Terrestrial Species (May 2013) and Aquatic Species (February 2013) are less than previously disclosed.

Finally, KNF requested our agreement with their determination that the updated analyses did not affect the determination of the Service Biological Opinions (BOs: dated April 7, 2014) and the Montanore Project as proposed is not likely to jeopardize the continued existence of the grizzly bear or the bull trout or destroy or adversely modify designated critical habitat for bull trout. And, that the updated analysis did not indicate an increase in the amount or extent of anticipated incidental take disclosed in either Biological Opinion (BO) or an effect to a listed species or critical habitat that was not considered in the Service BOs.

Based on our review of these updated analyses, our determinations made in the Service's April 7, 2014 BOs that the Montanore Project as proposed is not likely to jeopardize the continued existence of the grizzly bear or the bull trout, and is not likely to destroy or adversely modify designated critical habitat for bull trout have not changed. In addition, an increase in the amount or extent of anticipated incidental take disclosed in either BO is not indicated by the updated analyses.

Through the review of updated information that was not previously available (see bulleted list above), the Service agrees that there were no effects of the action that may affect listed or proposed species or designated or proposed critical habitat in a manner or to an extent that were not considered in the original consultation. In addition, these clarifications of data did not show an effect to a listed species or designated critical habitat that was not previously considered in this consultation. In response to the KNF's request and considering the January 12, 2016 letter and it's attachments, the Service agrees with the KNF that re-initiation of formal consultation is not required under 50 CFR 402.16.

Reinitiation of formal consultation is required and shall be requested by the Federal agency or by the Service, where discretionary Federal involvement or control over the action has been retained or is authorized by law and: (a) If the amount or extent of taking specified in the incidental take statement is exceeded; (b) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (c) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the BO; or (d) If a new species is listed or critical habitat designated that may be affected by the identified action.

We value the dialogue and staff cooperation between our offices that seeks to minimize impacts to listed and proposed species and aid their recovery. If you have further questions about this letter or your responsibilities under the BO, please contact me at the address above.

Sincerely,

Jodi L. Bush

Jodi L. Bush
Field Supervisor

Attachment

Clarification of the changes to Grizzly Bear Mitigation from the Revised Terrestrial Mitigation Plan by updating the original "Summary of Impacts" from the April 7, 2014 Service Transmittal Letter

Summary of Impacts to Listed Species of the Proposed Montanore Project (as Described in the Biological Opinion-dated April 7, 2014)

Grizzly Bear. The main impacts of the proposed project to grizzly bear are (1) narrowing of the north-south movement corridor in the Cabinet Mountains; (2) an increase in risk from potential human-caused mortality; and (3) displacement from suitable habitat areas due to human activity or physical loss of habitat to construction of mine features.

Each of these impacts is addressed through project design elements, such as controlling the time when an activity may occur, and appropriate conservation items. Collectively, the conservation measures are reasonably expected to prevent the loss of multiple grizzly bears over the 30-year life of the mine, thus more than offsetting the loss we anticipate from the project (one grizzly bear).

In cooperation with MMC and the Service, the KNF developed a Grizzly Bear Mitigation Plan as part of the Montanore Project proposed action (Appendices C and D). The Service's BO provided KNF with "reasonable and prudent measures" (page 137) and "terms and conditions" (page 138) to minimize the impacts of incidental take to grizzly bear because the Service determined (BO cover letter to KNF, dated March 31, 2014) that the Mitigation Plan, as proposed, was necessary to minimize the effects (including incidental take) of the action to the grizzly bear. This Mitigation Plan has now been replaced with a revised Montanore Mine Project Terrestrial Threatened and Endangered Species Mitigation Plan and Implementation Tables (Attachment 4, January 12, 2016 letter).

To mitigate for habitat physically lost (1,567 acres), replacement habitat required (3,134 acres) will be within the disturbed BMUs (5, 6 or 2) with emphasis on lands within the north-south corridor. In addition, acquisition of an additional 2,293 acres will be required for displacement effects. Displacement of grizzly bear from suitable habitat areas is minimized by (1) acquisition of a total of 5,427 acres of grizzly bear habitat that is at risk of development in or near the CYE and requiring all acquired lands to be managed to benefit grizzly bear in perpetuity, and (2) controlling the time when power line work may be conducted (outside the spring grizzly bear use period).
To mitigate for the narrowing of the north-south corridor, 1,276 acres of the 2,293 acres required for displacement effects would be lands that are at risk of development within this corridor. In addition, motorized trail #935 (East Fork Rock Creek) will be converted to non-motorized, thus creating over 1,000 acres of new grizzly bear core habitat and expanding the distance (east-west) across the north-south corridor between project disturbance sites from 0.9 miles to 3.4 miles. See Appendix C of the BO for details.

In addition, mitigation designed to offset cumulative effects by changing access conditions to create grizzly bear core habitat will also (a) contribute to reducing risk of human-caused bear mortality; (b) provide undisturbed habitat area for displaced bears; (c) improve habitat conditions in the north-

south movement corridor; and (d) help meet Forest Plan standards for grizzly bear habitat conditions. A total of 7,030 acres (includes acres from Trail #935) of new core habitat will be created.

The potential increase in risk from human-caused grizzly bear mortality is minimized by efforts that will inform and educate mine employees and the public about living in grizzly bear country. They will also improve public support for grizzly bear recovery. The major items include: (1) development of a detailed and enhanced information and education program; (2) hiring a grizzly bear specialist to work specifically in the CYE; (3) hiring a law enforcement officer to work specifically in the CYE; (4) making all garbage collection sites and Forest campgrounds in the CYE bear resistant through fencing and new bear resistant garbage containers; and (5) providing the public with temporary electric fencing kits as needed to deter grizzly bear activity near residences. Details of these measures, along with several other items can be found in the project mitigation plan (Appendix C of the BO).

Implementation of the entire mitigation plan will result in an improved condition over the baseline. This improved condition is anticipated to offset and minimize the impacts of the incidental take anticipated as a result of mine development.

In our BO, after reviewing the current status of the grizzly bear, the environmental baseline for the action area, the effects of the proposed Montanore Mine Project and the cumulative effects, the Service determined that the Montanore Project as proposed, is not likely to jeopardize the continued existence of the listed entity of grizzly bears.

Although updated analysis of the information used in the May 2013 BA found errors in traffic volume calculations and the displacement analysis related to effects to grizzly bear for the Montanore Mine Project (Project), these errors are expected to result in effects less than previously disclosed. An increase in the amount or extent of anticipated incidental take disclosed in the BO is ***not*** indicated by the updated analyses. Through the review of updated information that was not previously available, the Service agrees that there were no effects of the action that may affect the grizzly bear in a manner or to an extent that were not considered in the original consultation. In addition, these clarifications of data did not cause an effect to grizzly bear that was not previously considered in this consultation.

Bull Trout and its Designated Critical Habitat. Predicted adverse effects of the proposed Montanore mine project (hereafter referred to as the Montanore Project) to bull trout (Salvelinus confluentus) and designated bull trout critical habitat include permanent reductions in stream flow in important bull trout streams and increased water temperature and sediment delivery. Disruption of groundwater inflow to streams that would occur due to development of the underground mine workings have been modeled to cause baseflow reductions in Libby Creek, Poorman Creek, and Ramsey Creek on the east side of the Cabinet Mountains, and East Fork Rock Creek, mainstem Rock Creek, and East Fork Bull River on the west side of the Cabinet Mountains. Rock Creek, East Fork Bull River, and Libby Creek are predicted to sustain permanent stream flow depletions. Adverse effects to bull trout and designated bull trout critical habitat are predicted to occur as water temperatures are increased by the discharge of mine and adit water into Libby Creek. Initial development of the mine and its access roads will cause

temporary increases in sediment delivery to many streams in the project area; this in turn will cause adverse impacts to bull trout and designated bull trout critical habitat. Additionally, based on the modeled predictions of decreased stream flow, increased water temperatures (Libby Creek), and increased sediment delivery to various streams, it is probable there will be indirect adverse impacts to bull trout from increased numbers of non-native fishes that result from degraded habitat conditions for native bull trout and conversely improved habitat conditions for non-native fish.

As part of the proposed action, KNF developed a Bull Trout Mitigation Plan (KNF biological assessment, Appendix A, 2013) which includes a number of minimization and mitigation actions that are proposed to offset adverse effects to bull trout caused by development of the mine. Based on discussions with the KNF, the Service is uncertain that the Plan's minimization and mitigation measures would be fully implemented and well-timed due to the qualifying statements in the BA and the Plan that condition implementation of certain elements of the Plan on completion of a further hydrologic assessment that will determine the extent of predicted streamflow depletions. As a result of the uncertainty of timely implementation of the Plan in its entirety, the Service conducted its effects analysis only on those actions and associated minimization and mitigation measures of the proposed action that are reasonably certain to occur.

In the Service's BO (April 7, 2014), we determined that the proposed action of construction and operation of the Montanore Project is not likely to jeopardize the continued existence of bull trout. The Service's opinion is based on the conclusions that implementation of the Montanore Project is not likely to appreciably reduce the reproduction, numbers, or distribution of bull trout at the scale of either the Lower Clark Fork River or Kootenai River core areas, and by extension not at the Clark Fork River Management Unit or Kootenai River Management Unit levels and larger scale of the Columbia River Interim Recovery Unit. Therefore, the Service concluded that the proposed Montanore Project will not jeopardize the bull trout at the scale of the coterminous U.S. population of bull trout.

As proposed, implementation of the Montanore Project is anticipated to negatively impact designated bull trout critical habitat in Libby Creek, Bear Creek, West Fisher Creek, Rock Creek and East Fork Bull River. Bull trout habitat (without the designation of "critical habitat") in a number of less significant bull trout streams will also be negatively impacted. Negative impacts to both critical and non-critical habitat will be caused by diminishing the function of important bull trout habitat characteristics due to baseflow depletions, increases in sedimentation, augmentation (addition) of warm water (Libby Creek), and degradation of habitat conditions that favors enhancement of nonnative fish populations. Based on the small extent of the Montanore Project effects in relation to the size of designated critical habitat for bull trout at the Columbia River Basin scale, it is the Service's BO that the adverse effects of the Montanore Project are not likely to destroy or adversely modify bull trout critical habitat.

As previously stated, the Service determined in their BO (April 7, 2014) that the proposed action will not jeopardize bull trout, and is not likely to destroy or adversely modify bull trout critical habitat because KNF has committed to implementation of Best Management Practices (BMPs) to control erosion and sediment delivery from road construction on all affected bull trout streams within the project area. The Service anticipated take of bull trout will occur as a result of the

previously outlined adverse effects. In the BO (USFWS, April 7, 2014), the Service provided KNF with reasonable and prudent measures and terms and conditions that will minimize the impact of incidental take to bull trout and minimize adverse effects to primary constituent elements (PCEs) associated with bull trout critical habitat. KNF must comply with the terms and conditions in order to be exempt from section 9 prohibitions in the Endangered Species Act (Act).

As part of the Forest Service Objection Process the Kootenai NF remodeled sediment loading to project area streams. The remodeled sediment load was less than that originally used to support the analysis in the Service's BO (April 7, 2014) for bull trout and designated critical habitat indicating that effects from sediment to both bull trout and its designated critical habitat were less than analyzed in the KNF aquatic species biological assessment and the Service's BO. In addition, Montana Department of Environmental Quality provided updated temperature modeling data for the upper section of Libby Creek which shows the anticipated increased temperature effects would be negligible and therefore impacts to bull trout and its designated critical habitat would be less than analyzed in the KNF aquatic species biological assessment and Service's BO (April 7, 2014).

KNF explained in their January 12, 2016 letter, that updated analysis of the information used in the February 2013 Aquatic Species BA determined that effects for the Montanore Mine Project (Project), related to bull trout and its designated critical habitat from sediment loading and increased temperature were less than previously disclosed in the KNF Aquatic Species BA and the Service's BO. An increase in the amount or extent of anticipated incidental take disclosed in the Aquatic Species BO for bull trout is ***not*** indicated by the updated analyses. Through the review of updated information (provided in KNFs January 12, 2016 letter), that was not previously available, the Service agrees that there were no effects of the action that may affect the bull trout or its designated critical habitat in a manner or to an extent that were not considered in the original consultation. In addition, these updated analyses did not show an effect to bull trout or its designated critical habitat that was not previously considered in this consultation.

Terrestrial Threatened and Endangered Species Final Revised Mitigation Plan for the Proposed Montanore Minerals Corporation Montanore Mine Project

This December 2015 Final Revised Terrestrial T&E Mitigation Plan replaces the plans included in the KNF Terrestial BA (USFS 2013) and the 2014 Montanore BO (FWS 2014). It incorporates the following changes:

1. Land acqusition acres required for displacement effects in this Final Mitigation Plan have been revised due to a correction in the grizzly bear Cumulative Effects Model calculations (ERO March 2015). The previous Displacement Analysis (ERO Resources Group 2013, Ibid 2014a) applied a compensation level to the Bear Creek Road influence zone which included displacement effects from both existing high use road impacts and the impacts of increased levels of disturbance associated with 24-hour road use. However, MMC is required to offset the impacts of increased levels of disturbance associated with the higher road use, not the impacts of existing use. Using the appropriate CEM analysis compensation levels, items C, Table 4, C.2, and C.2a have been revised.
2. Additional changes resulting from the Forest Service's pre-decisional objection process to clarify the original intent were also made to items A.4.a, B.1.a, E.2.a., and in Tables 2 and 3.

Project Overview

Mines Management, Inc. (MMI) proposes evaluation drilling at the Libby Adit and to construct a copper and silver underground mine consisting of an ore processing plant, a tailings impoundment, a transmission line, and other associated facilities. Montanore Minerals Corporation (MMC), a wholly owned subsidiary of MMI, will be the project operator. MMI has requested the Kootenai National Forest (KNF) to approve a Plan of Operations for the Montanore Project.

Two "lead" agencies have been designated for this project: the U.S. Forest Service (hereafter FS) and the DEQ, with other cooperating agencies consisting of the Bonneville Power Administration, Army Corps of Engineers, and Lincoln County, Montana. The majority of the Montanore Mine Project will occur on National Forest System (NFS) lands, but MMC owned lands and other corporate and private lands will also be affected.

The FS preferred mine alternative is Alternative 3, Agency Mitigated Poorman Impoundment alternative and the KNF and DEQ preferred transmission line alternative is Alternative D-R, Miller Creek Transmission Line Alternative (FEIS 2015). The Terrestrial Biological Assessment and this Terrestrial Threatened and Endangered Species Mitigation Plan address the combined mine and transmission line effects of Alternative 3D-R.

Beginning with issuance of a Forest Service Record of Decision, the project will occur in four phases: Resource Evaluation (estimated at two years), Construction (three to four years), Operations (from

16 to 20 years), and mine Closure and Reclamation phases (up to 20 years or longer) (FS and DEQ 2011).

The FS and MMC are proposing this Terrestrial Threatened and Endangered Species Mitigation Plan (Plan) as an integral part of the proposed action under consideration in the "Biological Assessment (BA) for Threatened, Endangered, and Proposed Terrestrial Species on the Montanore Minerals Corp. Montanore Project" (September 6 2013).

Potential Impacts to Grizzly Bears and Lynx

Effects of the Proposed Action on grizzly bears and lynx are described in detail in the Biological Assessment which is incorporated by reference, and will not be repeated here.

Proposed Grizzly Bear and Lynx Mitigation

The objectives of mitigation measures are to establish conservation actions that in the long-term will fully offset projected impacts from the mine project to grizzly bear or lynx populations and their habitat. This mitigation plan (Plan) displays the specific items identified that will be required to reduce, eliminate, or compensate for environmental consequences to grizzly bear and Canada lynx federally listed as threatened or endangered or proposed for listing. It applies to the implementation of Alternative 3 D-R as displayed in the final environmental impact statement for the Montanore Mine Project. This Plan will be implemented by MMC, or equivalent and appropriate federal and state agencies (FS, FWS, and Montana Fish, Wildlife and Parks (hereafter FWP). This Plan requires MMC to provide funding for planning, coordination, implementation, monitoring, and evaluation of mitigation measure effects of a number of mitigations that are required to offset projected potential adverse effects to grizzly bear and lynx. The Plan provides administrative review/approval mechanisms to assure timely implementation and compliance, and accommodates adaptive management changes to the Plan, if necessary. Should a permitted project be implemented or a project proposed that will have adverse effects on the grizzly bear in the Cabinet-Yaak Ecosystem, funding for some of these measures could be required of those projects, potentially changing the funding required by MMC. The measures that may be jointly funded are marked with an asterisk (*).

Timing of completion of this Plan is tied to four phases of mine activity; evaluation adit (estimated at two years), construction (estimated at 3 to 4 years), operations (estimated at 16 to 20 years), and mine closure and reclamation phases (up to 20 years or longer)**.** The Record of Decision will select an alternative for the combined mine and transmission line for the entire mine project. The Record of Decision will require that prior to FS authorizing MMC to proceed with certain phases of activities, MMC must implement the applicable terms and conditions required by the BO, and all applicable mitigation, monitoring and modifications as outlined for that particular phase in the selected alternative. The FS will issue a letter to proceed to MMC for the implementation of various activities when all requirements, as stipulated in Record of the Decision, have been met.

The following sections describe Alternative 3D-R threatened, endangered and proposed terrestrial species mitigation measures in detail. Mitigation measures are summarized by phase in the Implementation Schedule (see Part 2 attached).

Grizzly Bear Mitigation Plan

The FS grizzly bear mitigation plan includes measures to reduce mortality risks to grizzly bears, maintain and enhance core habitat, reduce fragmentation, increase the distance between existing and proposed activities across the Cabinet Divide and decreasing an area of habitat constriction within the north south movement corridor, reducing displacement effects, and reducing potential for mortality and displacement from occupied grizzly bear habitat outside of the Recovery Zone within the Cabinet Face BORZ.

A. Measures to Reduce Mortality Risks of Grizzly Bears

A. 1. Prior to FS authorization to initiate the Libby Adit Evaluation Phase, to reduce mortality risk to the grizzly bear, **MMC**, <u>under direction of the FS,</u> **will commit to and implement the following**:

A.1. a) Install and maintain fencing surrounding the Libby adit site for the life of the mine.

A.1. b) Develop a transportation plan for life of the mine to be approved by the Forest Service prior to operations and designed to minimize mine-related vehicular traffic traveling between U.S. 2 and the plant site, and minimize parking availability at the plant site. Busing employees to the plant site, requiring managers to car pool to the extent practicable, and establishing a supply staging area in Libby to consolidate shipments to the mine site will be a part of the plan. The transportation plan will specify that exceptions to staging and consolidation of supplies will include full load shipments, expedited shipments to repair equipment and other emergencies as specified in the transportation plan. .

A.1. c) In coordination with the FS,FWP, and FWS MMC will fund, develop, and implement an enhanced public outreach information & education (I&E) program to build support and understanding for the conservation of the Cabinet-Yaak grizzly population that will increase to full funding and implementation prior to the construction phase, for life of the mine. This public outreach plan will be developed and managed by information specialists within the agencies or a professional outreach firm. This will involve preparing educational materials, public service announcements, newspaper ads, and billboards supporting grizzly conservation and will include close coordination and cooperation with both programs employed by the FS, FWP and FWP grizzly bear personnel. Examples include installing signs at all entrance roads in grizzly habitats on the KNF, providing 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. (*)

A.1. d) Prohibit use of salt during winter plowing operations for life of the mine. Salt can attract big game, which may result in mortality from vehicles. The presence of carcasses in turn could attract grizzly bears (or lynx) to the road corridor and increase mortality risk.

A.1. e) Remove big game animals killed by any vehicles daily from road rights-of-way within the permit area and along roadways used for access or hauling ore (NFS roads #231, #278, #4781, and #2316 and new roads built for the project) for life of mine. Road-killed animals will 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.

A.1. f) Beginning prior to the evaluation phase and continuing through construction and the first 3 years of mill operations, MMC will monitor the number of big game animals killed by vehicle collisions on these roads and report findings annually. The numbers of animals killed by vehicle collisions will be reviewed by the FS, in cooperation with the FWP, and if necessary, mitigation measures will be developed and implemented to reduce mortality risks.

A.1. g) Monitor and report (within 24 hours) all grizzly bear, lynx, wolf, and black bear mortalities within the permit area and along the access roads for life of the mine. If a T&E species mortality occurred, MMC will be required to haul future road-killed animals to a disposal location approved by FWP (thus modifying A.1.e), if deemed necessary by the grizzly bear specialists or law enforcement officer to avoid additional grizzly bear or other T&E species mortality,.

A.1. h) Fund a local FWP Law Enforcement Officer in 5-year increments for the life of the mine and through the closure and reclamation phase, or as otherwise agreed by FS in consultation with FWS. This position will be new and based in Libby. Funding will be in five year increments, beginning prior to FS authorization to begin the evaluation phase. The position description and an initial list of work items will be developed by FWP, the FS, and MMC representatives. The Forest Service will request review and advice from the FWS on the position description and list of work items.

A.1. i.) IF both Montanore and Rock Creek are concurrent, fund a local FWP Habitat Conservation Specialist, to address grizzly bear/land use issues, coordinate and account for implementation of the mitigation plan, and coordinate all land acquisition and/or conservation easements for required grizzly bear mitigation (see mitigation items B, C, and D). The position will identify, evaluate, prioritize, and coordinate conservation of grizzly bear and other wildlife habitats for species affected by development and operation of large-scale mining projects in the Cabinet portion of the Cabinet-Yaak Ecosystem, with a primary emphasis on grizzly bears. This will be a new position stationed in a location that serves Lincoln and Sanders counties. Funding will be provided prior to initiation of the evaluation phase and implementation of MMC's land acquisition program described in item C, and then 5-year increments for the life of the mine through the reclamation phase, including shut-down periods, or until the Oversight Committee (see item F(2)) determines that the position(s) are no longer needed. The Habitat Conservation Specialist will work with Lincoln and Sanders counties' planning staff to provide county land use planners with current, accurate and adequate information on grizzly bear and other wildlife to use in their decision making process. The position description and an initial list of work items will be developed jointly by the agencies (including, but not limited to, FS, FWP, and Lincoln and Sanders Counties) and MMC representatives. The FS will request review and advice from the FWS on the position description and list of work items. This habitat conservation specialist position is required only if both Rock Creek and MMC are concurrent.

A.1.j) Fund a local FWP Grizzly Bear Specialist in Libby for the life of the mine in five year increments, beginning prior to FS authorization to initiate the evaluation phase. This Grizzly Bear Specialist will aid in grizzly bear conservation, with a focus on public outreach, assistance and education. Funding will be in five year increments, beginning prior to FS authorization to begin the evaluation phase. The position description and an initial list of work items will be developed by FWP, the FS, and MMC representatives. The Forest Service will request review and advice from the FWS on the position description and list of work items. The Montanore Mine Project must have its own grizzly bear specialist, regardless of the status of the Rock Creek Mine Project.

In summary, <u>prior to the evaluation phase</u> for items A.1.h, A.1.i., and A.1.j,

a. MMC (Montanore Mine project) is required to hire 1 law enforcement officer and 1 grizzly bear specialist regardless of the status of the Rock Creek Project.

b. If MMC (Montanore Mine Project) is concurrent with the Rock Creek Project, MMC is required to hire/fund 1 law enforcement office (A.1.h), 1 grizzly bear specialist (A.1.j), and 1 habitat conservation specialist A.1.i).

A. 1.k) Provide funding for purchase and maintenance of up to 35 bear-resistant refuse containers for use at Montanore Project mine facilities and for personal use by mine employees that live in or near grizzly bear habitat, and fund replacements as needed for life of the mine. The portion of these 35 containers to be placed at the mine facilities will be coordinated with bear specialists, with timely (minimum weekly unless a problem develops or grizzly bear personnel recommend a more frequent schedule) removal of contents. One of these containers will be placed at the Libby Adit, if one is not already in place. Bear-resistant containers to hold attractants will be in place at each mine facility site prior to starting any work. In coordination with the bear specialist, if the 35 refuse containers were more than what was needed for employees, the remaining containers could be used for non-mine personnel living in grizzly habitat near the project area. Providing bear-resistant containers to the community at large is specified under Part A.2. (c).

A.1. l) Provide funding for fencing and electrification and maintenance of garbage transfer stations within grizzly bear habitat adjacent to and throughout the Cabinet-Yaak Recovery Zone. Coordinate with bear specialists, FWS, and Lincoln County to prioritize sites (*)

A.1. m) Provide funding for an initial 10 electric fencing kits that can be installed by FWP bear specialists at additional bear problem sites within grizzly bear habitat adjacent to and throughout the Cabinet-Yaak Recovery Zone. In addition, MMC will fund 2 replacements electric fencing kits per year that can be installed by FWP bear specialists at bear problem sites.

A.1. n) Implement a wildlife awareness program for employees and contractors prepared by MMC. The objectives of the wildlife awareness plan are to: reduce the risk of human-caused mortality of threatened and endangered species, identify other wildlife issues of concern for the Montanore Mine Project, establish company procedures and protocols that address these issues, and develop employee and contractor awareness of wildlife issues. The wildlife awareness program includes the education of employees about bear awareness and safety, refuse management, company policies regarding wildlife, and other wildlife concerns. The MMC Wildlife Awareness Plan for Employees and Contractors is attached as a

separate document. As part of the wildlife awareness program, MMC will require mine employees (including all management staff) to attend training related to living and working in grizzly bear habitat prior to starting work and at least once a year hereafter for the life of the mine. MMC will prohibit MMC employees, contractors, and subcontractors from the following while on duty:

- carrying firearms within the permit area boundary or along the Libby Creek access road, except for security officers and other designated personnel. This will not include controlling Libby Creek Road use by the general public.
- feeding wildlife (including dropping food stuffs from lunches, etc.) within the permit area to avoid attracting bears or other wildlife and to discourage habituation
- from using private vehicles to travel to and from the work site, or for work purposes, except as approved in the transportation plan described in section 1a above.
- hunting within the permit area

MMC will identify consequences for violations in an employment contract so employees will be aware of consequences prior to beginning their employment.

A.1.o) Agree that all mortality reduction measures will be subject to modification based on adaptive management, where new information supports changes. Modifications will be reviewed and approved by the Oversight Committee which will be established prior to the evaluation phase (See item F.1 and F.2).

A. 2. Prior to FS authorization to initiate the construction phase, to reduce mortality risk to the grizzly bear, **MMC**, under the direction of the FS, **will implement** the following:

A.2. a) MMC is required to fund a second local FWP Grizzly Bear Specialist in Libby for the life of the mine in five year increments, beginning prior to FS authorization to initiate the evaluation phase. This Grizzly Bear Specialist will aid in grizzly bear conservation, with a focus on public outreach, assistance and education. Initial funding to cover the first 5 years of the position will be provided by MMC prior to the construction phase (*). However if Rock Creek has already hired a second specialist, then a third or fourth is not necessary and costs can be shared (see A.2.a.i below).

A.2.a. i) EXCEPTION If the Rock Creek Project is operating prior to or concurrent with the Montanore Mine Project, two grizzly bear specialists will be adequate for the Cabinet Mountains portion of the CYE. Therefore, MMC will assume funding for a second Grizzly Bear Specialist position, and the Rock Creek Project will be relieved of that funding. In the event that the Rock Creek Project has already funded a second grizzly bear specialist as required in the in the Rock Creek Mine mitigation plan, then MMC will assume responsibility for funding the second position. The second position may be new or existing (**the goal is two grizzly bear specialists, whether there is one mine or two mines operating, with one in Libby and one in Sanders County**). Conversely, if Rock Creek Mine became active after the Montanore Mine Project Rock Creek will assume funding of one of the grizzly bear specialist positions.

A.2.b. MMC will provide funding to implement a long-term public attitude and input survey so public outreach and information and education program described in item A.1.c, can

respond to current public perceptions and attitudes and adapt I&E program appropriately.

A.2. 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 new mine employees and the community at large under the direction of grizzly bear management specialists.

A.2. d) 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) first within the Cabinet Mountain portion of the Cabinet-Yaak Recovery Zone, then within the entire Cabinet-Yaak Recovery Zone but all prior to the construction phase. This measure applies more broadly to the recovery zone to reduce the potential for grizzly bear conflict and mortality to off-set any potential of mortality associated with the mine, and over time contribute to an improved population status. If Rock Creek Project has already acquired containers in BMUs 4, 5, 6, 7 and 8 then MMC will be required to fund replacement and maintenance of the containers in these BMUs.

A.2. e) 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 Montanore Mine, except as rehabilitation on closed roads, on mitigation habitat where attracting bears will be encouraged, or for closure activities as it relates to habitat.

A. 3. **Prior to FS authorization to MMC to initiate the construction phase**, to reduce mortality risk to the grizzly bear, the **Forest Service** will implement the following:

A.3 a) Ensure that the law enforcement and grizzly bear specialists and the grizzly bear habitat conservation specialist (hereafter grizzly bear personnel) (See item A.1.j, A.2.a for description of when 2 grizzly bear specialists and the grizzly bear habitat conservation specialist position are required) required in the mitigation plan comply with the following:

i. Location of the grizzly bear habitat conservation specialist position (A.1.i.) within the ecosystem will be determined in coordination with the Oversight Committee (see item F.2), while the locations of the grizzly bear specialists are specified in A.1.j and A.2.a, and A.2.a.i).

ii. Grizzly bear personnel will be existing or new positions with FWP as determined by FWP and FWS. And explained as in A.1.h, A.1.i, A.1.j, and A.2.a, A.2.a.i.

iii. Funding intended for the grizzly bear specialist positions will not be used to support already existing positions with FWP that are not performing duties of a grizzly bear specialist in the CYE.

iv. Duties for the law enforcement position will be designed at a State pay band determined by FWP (recommend at least a pay band 05) and will be primarily directed at wildlife issues in the Cabinet Mountains portion of the Cabinet-Yaak Ecosystem.

v. Duties for the bear specialist and habitat conservation specialist positions will be designed as a grizzly bear management specialist at a State pay band determined by FWP (recommend at least a pay band 06) and will be specifically tied to bear activities in the Cabinet Mountains portion of the Cabinet-Yaak Ecosystem.

vi. Grizzly bear personnel will be fully funded for the life of the mine in 5-year increments through the reclamation period, including shut-down periods, or until the Oversight Committee determines that the position(s) are no longer needed. This provision is needed 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 if the mine is temporarily shut-down.

vii. Grizzly bear personnel will be employed, with all supportive equipment, vehicles and gear, prior to the evaluation phase or prior to the construction phase, depending on when hiring is specified within the Plan.

viii. A mandatory reporting system will be established and maintained , (through coordination with the grizzly bear personnel described in items A.1.h, A.1.i,A.j.j and A.2.a above) to ensure that MMC and Forest Service 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 will occur to avoid risks of habituation, mortality or displacement of grizzly bears. The reporting system will be coordinated with the FWP grizzly bear specialists and will provide a mechanism to collect reliable information from the public on such incidents, although such reporting could not be required.

A.3. b) The Forest Service will ensure that MMC provides bear resistant garbage receptacles (see item A.2.d above) for all Forest Service campgrounds and sites where garbage facilities are normally provided within the Cabinet portion of the Cabinet-Yaak Ecosystem recovery zone (in BMUs 1-9). This includes those in MS-3 habitat, which often are most likely to contribute to habituation of bears and increase the risk of bear removal through defense of life or property incidents or management action. (*) If Rock Creek already completed most of this work, MMC will replace or maintain receptacles where needed. See also item A.2.d above. Measure A.2.d applies more broadly to the CYRZ while A.3.b specifies Forest Service sites within the Cabinet Mountain portion of the CYE.

A. 4. During the construction phase and reclamation phase activities, to reduce mortality risk to grizzly bears, **MMC** will implement the following:

a) All activities for both transmission line construction seasons and during reclamation and removal of the transmission line located within the Cabinet-Yaak Recovery Zone and Cabinet Face BORZ will occur between June 16 and October 14. This timing restriction minimizes disturbance associated with transmission line construction or reclamation activities, including helicopter disturbance within the 1 mile zone of influence from either side of the transmission line during grizzly bear early spring emergence and use of spring range within the CYRZ and Cabinet Face BORZ on federal land. This activity timing also minimizes transmission line construction related activity during the fall hunting season and during the denning period. The

activity timing will also be applied to transmission line construction and reclamation activities on Montana school trust lands located within the transmission line influence zone.

B. Measures to Maintain and enhance Grizzly Bear Core Habitat, mitigate for cumulative effects, reduce displacement and mortality risk.

The analysis of impacts to core grizzly bear habitat within BMU 2, 5, and 6 and impacts to the north south movement corridor are described in greater detail in the Biological Assessment. Figure 7 within the BA displays which road access changes specified in Table 2 and Table 3 of this Mitigation Plan create core habitat. Core habitat effects and required habitat compensation are shown in Table 1. To maintain core habitat and reduce mortality risk and the likelihood of adverse effects on the grizzly bear due to cumulative effects the following mitigation measures will be implemented:

B. 1.a. Prior to FS authorization to initiate the Evaluation Phase, MMC, <u>under direction of the FS,</u> **will commit to and implement the following**:

B. 1.a. Under the direction of the FS, MMC will implement or fund access changes on roads **specified in Table 2**. All roads specified in Table 2 are displayed in Figure C-1. In addition MMC will implement or fund monitoring of the effectiveness of closure devices at least twice annually; and complete any necessary repairs immediately. Roads shown in Table 2 that will be seasonally gated will improve conditions on an estimated 808 acres of spring grizzly bear habitat but because these roads will not be gated for the entire active bear season, habitat improved through these seasonal road access changes will not contribute to core or for habitat compensation for core.

As noted in Table 2, if the Rock Creek Mine mitigation restricting the Upper Bear Creek road #4784 with a barrier has not been implemented prior to FS authorization to initiate the Montanore Evaluation phase, then MMC will implement or fund this mitigation. MMC will <u>only implement this mitigation if Rock Creek has not yet done so</u>. MMC will convert the road to a trail and restrict motorized vehicles year-long, including over-snow vehicles. This will modify the current Kootenai National Forest access for over-snow vehicles on road #4784, which currently allows over-snow vehicles from December 1 through April 30. The removal of over-snow vehicle access during this time period minimizes potential for disturbance of females with cubs by snowmobiles shortly before or after den emergence at the beginning of the spring use period[1] Monitoring the effectiveness of the closure device at least twice annually and completing any necessary repairs immediately will also be required of MMC until the Rock Creek Mine initiated activity (*for Upper Bear Creek Road only).

[1]The Rock Creek Project access mitigation on road 4784 was considered in the environmental baseline for the Montanore Mine Project 06 September 2013 Biological Assessment due to the USFWS Rock Creek BO. The FWS Rock Creek Mine BO term and condition 1.c specified a barrier or berm on road 4784 to create core for the life of the Rock Creek Mine. Changing the existing KNF over-snow access y by the Montanore Project does not change or affect the creation of 518 acres core created by this access change as analyzed in the Montanore BA or FEIS.

B.1.b. Prior to FS authorization to initiate the Construction Phase, to create core habitat and additional security for grizzly bears, MMC, <u>under direction of the FS,</u> **will commit to and implement the following** :

B.1.b Under the direction of the FS, MMC will implement or fund access changes on roads **specified in Table 3**. All roads specified in Table 3 are displayed in Figure C-1. MMC will

implement or fund monitoring of the effectiveness of closure devices at least twice annually; and complete any necessary repairs immediately. Responsibilities of MMC remain the same as described under B.1.a.

Summary of B.1.a., and B.1.b. The requirement for MMC to maintain effective closures as described under B.1.a and B.1.b, including barriers which are creating core, will remain in effect thru the reclamation phase of the mine. This will maintain core habitat created and reduce mortality risk and the likelihood of adverse effects on the grizzly bear. The acres of core created provided by road access changes described above will be effective due to installation of barriers, road decommissioning, or long-term storage. Please see the Biological Assessment, Figure 7 for which road access changes specifically create core.

B. 2. Prior to KNF authorization to initiate the Operations Phase, to reduce grizzly bear habitat displacement, unless monitoring or new information demonstrated need for additional mitigation, **MMC** will ensure sounds emitted from facilities and adits during the estimated 16 to 20 year operations phase will comply with the following:

B.2. a. Surface and mill equipment operated will not exceed 55 dBA measured at 250 feet from the mill site for periods exceeding one hour. Intake and exhaust fans will generate less than 83 dBA measured at 50 feet down wind of portals, or ventilation adits. If necessary low-noise fan blades or noise suppression equipment will be installed to reduce fan noise to about 16 dBA, which will not be audible over ambient noise levels.

Table 1. Impacts to core habitat and acres of core habitat created by phase.

Proposed Action Alternative 3D-R	Reduction In Core Acres		Core Acres created due to Access changes prior to Evaluation Phase (Item B.1)			Core Acres created due to Access changes prior to Construction Phase (Item B.2)			Total Core Acre
	BMU 5	BMU 6	BMU 2	BMU 5	BMU 6	BMU 2	BMU 5	BMU 6	
Core habitat lost during construction phase	248	18							266
Within north south movement corridor A. Core habitat created to reduce constriction Access change trail #935 (1,065 acres created) Rock lake meadows (about 5 acres created)							1,070		1,070
B. Core habitat created for loss of core and cumulative effects				849	1,092		1,882		3,823
Outside North South Movement Corridor A. Core habitat created in BMU 2, 5, or 6 outside of the north south corridor for loss of core or mitigation for cumulative effects			274	769				1,094	2,137
Total core created			274	1,618	1,092		2,952	1,094	**7,030**
Summary									
Total core created for loss of core [1]									**532**
Total core created to reduce constriction in north south corridor[2]									**1,070**
Total core created for mitigation of remaining effects									**5,428**

[1]Core habitat lost (acres) mitigation required at 2:1 ratio, so with 266 acres lost there will be 532 acres created as mitigation

[2]See mitigation items D.1 and D.2 below for planned measures to address constriction within the north south corridor.

Core acres created by the Rock Creek Mine mitigation on the Upper Bear Creek Road #4784 considered in baseline condition for the Montanore Mine Project analysis, and is not reflected in Table 1 displaying Montanore Mine Project core created by access changes prior to evaluation phase. If Rock Creek has not yet implemented this mitigation prior to the Montanore Mine Project evaluation phase, then Montanore will implement the Road #4784 access change. Please see the Biological Assessment, Figure 7 core created, and Figure 8, Core reduced.

Table 2. KNF's Proposed Road Access Changes Prior to the Evaluation Phase which benefit Grizzly Bears.

NFS Road Number	Road Name	Length in BMU/BORZ (Miles)	Total Miles	Current Closure Device and Access Status for Motorized Vehicles	Proposed Closure Device and Proposed Access Status for Motorized Vehicles	Notes
231 2316	Libby Creek Road Upper Libby Creek	2.0 / 0.0 1.5 / 0.0	2.0 1.5	Open[1]	Gated seasonally[2] – Restricted to all motor vehicles except mine traffic April 1 to May 15	Gate is located on road 231 below existing Libby Adit Site. Implemented in 2007, with restriction expected to continue through 2-year Evaluation Phase and the 1st year of Construction Phase for reconstruction of roads 6210, 4781, and a portion of road 278.
4778 4778E 5192 5192A	Midas-Howard Creek Midas-Howard Creek E Midas Bowl Midas Bowl A	5.8 / 0.9 0.8 / 0.0 1.6 / 0.0 0.2 / 0.0	6.7 0.8 1.6 0.2	Open[1]	Gated seasonally[2] – Restricted to all motor vehicles, including over-snow April 1 to June 15	Restricted to all motorized vehicles, including over-snow vehicles, during the closure period.
4776A 4778C	Horse Mtn Lookout A Midas Howard Creek C	1.5 / 1.2 1.8 / 0.1	2.7 1.9	Open	Barriered – Restricted yearlong to motor vehicles, Open to over-snow December 1 to March 31	The proposed over-snow access change would minimize disturbance during the grizzly bear spring use period.
14458	Midasize	0.6 / 0.0	0.6	Open	Barriered – Restricted yearlong to all motor vehicles, including over-snow	Proposed change consistent with existing yearlong closure on remaining portion of the road.
4778C	Midas Howard Creek C	1.6/0.0	1.6	Barriered – Restricted yearlong to motor vehicles, including over-snow vehicles	Barriered – Restricted yearlong to motor vehicles, open to over-snow December 1 to March 31	The proposed access change on the 1.9-mile open segment of Road 4778C would result in over-snow-vehicle use being allowed on 1.6 miles.
4776C 4776F 6200 6200D 6200E 6200F 6214 6214F	Horse Mtn Lookout C Horse Mtn Lookout F Granite-Bear Creek Granite-Bear Creek D Granite-Bear Creek E Granite-Bear Creek F Cable-Poorman Creek Cable-Poorman Creek F	0.0 / 0.9 0.7 / 0.4 1.8 / 0.0 0.9 / 0.0 0.3 / 0.0 0.4 / 0.0 3.6 / 0.0 0.6 / 0.0	0.9 1.1 1.8 0.9 0.3 0.4 3.6 0.6	Gated – Restricted yearlong to motor vehicles, open to over-snow vehicles December 1 to April 30	Barriered – Restricted yearlong to motor vehicles, Open to over-snow December 1 to March 31	The proposed over-snow access change would minimize disturbance during the grizzly bear spring use period.
6745	Standard Creek	3.9 / 0.0	3.9	Gated – restricted yearlong to motor vehicles, including over-snow	Barriered – Convert to trail. Restricted yearlong to motor vehicles, including over-snow	No change is proposed to the existing public motorized status.
4784[3]	Upper Bear Creek	2.7 / 0.0	2.7	Gated – restricted to motor vehicles Oct. 15 - June 30, open to over-snow Dec 1 - April 30	Barriered – Convert to trail; restrict all motor vehicles yearlong, including over-snow, over life of project	Montanore would only implement if Rock Creek Mine has not yet done so. Convert to trail; Restrict all motorized vehicles year-long, including over-snow to minimize disturbance during grizzly bear spring use period. This differs from the Rock Creek mine mitigation, which restricted motor vehicles yearlong, but did not restrict over-snow vehicles.

NFS Road Number	Road Name	Length in BMU/BORZ (Miles)	Total Miles	Current Closure Device and Access Status for Motorized Vehicles	Proposed Closure Device and Proposed Access Status for Motorized Vehicles	Notes
	Total access change	**32.3 / 3.4**				**Without the #4784 access change, miles 29.6/3.4**

[1]Seasonal closures implemented with the KNF's approval in 2007 to MMC for snow plowing portions of NFS roads #231 and #2316; Road 4778E is impassible with a closure implemented in 2006.
[2]The seasonal access changes, which minimize potential for displacement and reduce mortality risk for grizzly bears on spring range, do not change the status of these existing open roads during the active bear year, and thus do not change OMRD or TMRD within the BMU or open or total linear miles within the BORZ.
[3]Road 4784 is open July 1 to October 14 to motorized vehicles in existing condition. MMC would only implement if Rock Creek Mine has not yet done so.

Please see the Biological Assessment, Figure 7 for which road access changes create core.

Table 3. KNF's Proposed Road Access Changes Prior to the Construction Phase which benefit Grizzly Bears.

NFS Road Number	Road Name	Length in BMU/BORZ (Miles)	Total Miles	Current Closure Device and Access Status for Motorized Vehicles	Proposed Closure Device and Proposed Access Status for Motorized Vehicles	Notes
2316 2317 4781 6701 6702	Upper Libby Creek Poorman Creek Ramsey Creek South Ramsey Creek South Libby Creek	0.7/0.0 1.8/0.0 2.8/0.0 0.4/0.0 0.4/0.0	0.7 1.8 2.8 0.4 0.4	Gated – Restricted yearlong to motor vehicles, open to over-snow Dec 1 – April 30	Barriered – Restricted yearlong to motor vehicles, including over-snow	Gate is on segment of road 2316 above existing Libby Adit site. On roads 2316, 2317, and 4781, convert to a trail where necessary.
150A	Rock Lake Trail #935	2.9/0.0	2.9	Gated – Restricted yearlong to motor vehicles, including over-snow.	Barriered – restricted yearlong to motor vehicles, including over-snow	Convert to a trail where necessary.
4725	North Fork Miller Creek	4.2/0.0	4.2	Gated – Restricted yearlong to motor vehicles, including over-snow	Barriered – Restricted yearlong to motor vehicles, including over-snow	No change to current public motorized access
14442	Lampton Pond/Cherry Cr	0.0/0.6	0.6	Gated – Restricted to motor vehicles Oct. 15 - June 30 open to over-snow Dec 1 - April 30	Barriered – Restricted yearlong to motor vehicles, including over-snow	Road access change to offset impacts of the transmission line alternative on linear open and total road density within the Cabinet Face BORZ
6205D 6787B 6209E 4776B	Big Hoodoo/Getner Cr Big Hoodoo/Bear/Crazy Crazyman Creek Horse Mtn/Libby Creek	0.0/4.0 0.0/1.6 0.0/1.1 0.0/2.9	4.0 1.6 1.1 2.9	Open Open Open Open	Barriered – Restricted yearlong to motor vehicles, including over-snow	Road access changes to offset impacts of the transmission line alternative on linear open and total road density within the Cabinet Face BORZ
	Total	13.0/10.2				

Please see the Biological Assessment, Figure 7 for which road access changes create core.

C. Measures to compensate for displacement effects and the loss of grizzly bear habitat and reduce mortality risk of the grizzly bear

The analysis of impacts and displacement effects on grizzly bears are described in detail in the Biological Assessment. Methods used to evaluate displacement effects from the Montanore Project and corresponding habitat compensation are described in the *Revised Analysis of Grizzly Bear Displacement Effects* (ERO Resources Corp, 2014). Required habitat replacement for displacement effects and habitat physically lost are shown in Table 4.

To mitigate for both displacement effects and physical loss of grizzly bear habitat**, MMC will, under the direction of the Forest Service, commit to and implement the following**:

C. 1. **MMC will** secure or protect (through conservation easement or acquisition in fee with conveyance of fee or perpetual conservation easement to the Forest Service) from development (including but not limited to housing and motorized access) and use (timber harvest, grazing, and mining) replacement habitat to compensate for acres lost by physical alterations or displacement (Table 4). **All replacement habitats for either displacement or habitat physically lost will be committed by MMC prior to the associated phase of the mine and accepted by the UFSF (i.e. mitigation habitat review, acquisition, conservation easements, recordation, and transfer to USFS complete prior to the evaluation phase or construction phase as required for the phase specific mitigation (Table 4).** FS, in coordination with FWP and review by FWS, will establish and maintain priorities for potential mitigation lands within and outside the recovery zone. Following the priority list is required **(**The priority list process requires the operator to try and purchase the 1st priority and then try to purchase the 2nd, 3rd parcel's etcetera, as outlined in Kasworm et al 2013a parcel description, rank and priority list and associated Figures C-2 and C-3) which replaces **USDA, FS 2008 and Kasworm and Johnson 2012b) (see references). A fair market offer must be made on the higher priority parcel first.** If necessary, MMC will coordinate with KNF, FWP and FWS to modify replacement habitat lands priorities as needed.

C.2. The **Forest Service will** ensure that the specified acres of mitigation properties were managed for grizzly bear habitat in perpetuity. It is anticipated that the following mechanisms could be used to manage properties to include transfer of fee title or Conservation Easements: to the USFS; to another public entity, or to a conservation organization totally separate from and not dependent on MMC. Properties not transferred to the USFS must be protected through appropriate and permanent conservation easements. Costs of processing fee lands or preparing and accepting conservation easement by the Forest Service for these acres will be funded by MMC. First choice for replacement habitat required for habitat physically lost (3,134 acres) will be within the disturbed BMUs (5,6, or 2 in order of priority)) and within the north south movement corridor. If adequate replacement acres were not available in those BMUs or north south movement corridor, then lands may be located in other BMUs (4, 7, and 8) within the Cabinet Yaak Recovery Zone. The first 500 acres of replacement habitat required for displacement (out of the total 2,293 acres) will be within the north south corridor within impacted BMUs (5, 6 or 2) due to evaluation adit displacement. The remaining 1,793 acres required for displacement could be in or outside the north south corridor within the CYRZ (see Table 4, priority for 776 acres to be located in north south corridor) with up to one-half of this 1,793 acres (897 acres) may be located in the identified linkage area (Figure C.2), however this will only occur if other higher priority lands within the Recovery Zone are not available. This process is described and

identified in C.1., C.2, C.2 a-d) . The specified acres of mitigation properties must meet the requirements below.

Table 4. Grizzly Bear Habitat Physically Lost and Grizzly Bear Habitat with Increased and/or new Displacement and Required Replacement habitat compensation acreage, Montanore Mine Project, Alternative 3D-R.**

Habitat Physically lost[1]		Displacement Effects on grizzly bears[2]							
Grizzly bear habitat physically lost (acre)	Required habitat replacement Prior to construction phase (acre)[1]	Displacement Effects Evaluation Phase (acre)			Displacement Effects Construction Phase (acre)			Total Required habitat replacement for mitigation of displacement (acre)[2]	Total Required habitat replacement for both habitat physically lost and displacement effects on grizzly bears (acre)
BMU 5/6		BMU 2	BMU 5	BMU 6	BMU 2	BMU 5	BMU 6		
1,567	3,134	0	500[3]	0	119	1,674[4]	0	2,293[5]	5,427

[1]Requires conservation easement or acquisition; mitigation requirement for habitat physically lost is shown at 2 to 1 ratio.

[2] Requires conservation easement or acquisition; mitigation requirement for habitat affected by displacement is shown at 1 to 1 ratio.

[3]Priority is 500 acres of replacement habitat within the north south corridor, all though displacement actually occurs on 468 acres within north south corridor (includes 5 acre Rock Lake meadow parcel) and 32 acres outside of N-S corridor.

[4]Of the 1,674 acres total within BMU 5, priority is for 776 acres within north south corridor, and the remaining 898 acres following the priority list developed by the FS/FWS/FWP.

[5]Does not include displacement due to helicopter use as that impact is mitigated with timing restriction.

See the revised Displacement and Cumulative Effects Model (CEM) habitat compensation analysis (ERO Resources Corp. 2015) for source of revised compensation acres for displacement effects.

a) The Forest Service will have final approval of mitigation lands prior to closing and recording. In coordination with the FWP and FWS, the Forest Service will prioritize lands for conservation easement or acquisition in the identified linkage areas, or identified by research and/or monitoring, that extend east between the Cabinet-Yaak Ecosystem and the Northern Continental Divide Ecosystem. Up to 897 acres of the replacement acres required for displacement may be in the linkage area as identified in Figure C-2**.** FS in coordination with FWP, and review by FWS, has established and will maintain priorities for potential mitigation lands located within this Linkage area. Lands with existing conservation easements (such as those included within the Thompson-Fisher River Conservation Easement) will be excluded from potential mitigation lands within the Linkage Area. Priorities for potential mitigation lands within the CYRZ have already been established and will be modified as needed. The size and location of land related to grizzly bear habitat improvement (corridors etc.) is included in the priority listing developed by the agencies. Because not all properties are equal in habitat value to grizzly bears, the agencies have established a "grizzly bear credit unit" approach. Because some parcels appear to have greater biological importance the USFWS and the US Forest Service believe that it is appropriate to give additional mitigation incentive to acquire those lands in order to improve baseline grizzly bear habitat conditions prior to a second active mining operation in the Cabinet Mountains portion of the Cabinet-Yaak Ecosystem Recovery Zone. A scoring process to determine additional mitigation value is described and then applied to the corridor mitigation lands priority listings (Kasworm et al 2013b and associated detailed Figure C-4)). The credits will create a cost/benefit incentive. The priority list must still be followed. The priority list process requires the operator to try and purchase the 1st priority and then try to purchase the 2nd , 3rd parcel's etcetera, as outlined in Kasworm et al 2013a parcel description, rank and priority list and associated Figures C-2 and C-3)which replaces USDA, FS 2008 and Kasworm and Johnson 2012b) (see references). A fair market offer must be made on the higher priority parcel first even though lower prioritized parcels may have a higher mitigation credit.

Due to their sensitive nature, details, including Kasworm et al 2013a, Figure C-2 (Potential Mitigation lands by Parcel ID number, Figure C-3 Potential Mitigation lands by Priority Ranking, mitigation credit process paper (Kasworm et al 2013b and associated detailed map Figure C-4)), and locations and owners of properties considered for mitigation will be withheld from public disclosure until acquisitions are finalized, and until determined releasable by lead agencies

b) At an early stage in the acquisition negotiations, the FWS will be consulted with and asked advice on the mitigation lands as they relate to the requirements included in the Biological Opinion on the Montanore Project. The FWS will be requested to advise the Forest Service if it believed the proposed mitigation properties met one or more of the following:

i. restores or improves bear security habitat (core) in the Cabinet Mountains, particularly in the constricted north-south grizzly bear movement corridor;

ii. improves habitat conditions related to established access standards in BMUs 2, 5, and 6;

iii. reduces existing threats of development, food attractants or mortality risks in the Cabinets;

iv. reduces potential threats of development, food attractants or mortality risks in the Cabinets;

v. protect seasonally important habitats, with an primary emphasis on spring, and secondary emphasis on fall habitats; and/or

vi) will maintain or increase MS-1 habitat (including the potential of acquiring and converting MS-3 properties or lands adjacent to the Cabinet-Yaak Ecosystem recovery zone that have high mortality risks to MS-1 if those risks could be eliminated under federal ownership);

c) Fee-title properties must meet standards, requirements, and legal processes for federal acquisition, 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-way, 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 will contribute to meeting the requirements of the Biological Opinion;

vii. meet fair market appraised value, according to Forest Service appraisal processes, as approved by the Comprehensive Grizzly Bear Management Plan (see F.1-2) . Advance 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; and

viii. be acquired, recorded and transferred prior to agency authorization to proceed with the associated phase of the mine, with total acquisitions completed prior to the construction phase of the mine.

ix. any habitat enhancement activities needed to improve the mitigation properties, such as the trail conversion, road access changes or removal of buildings and debris, would be planned and funded prior to construction. Implementation would occur as soon as feasible.

d) Conservation easements must include language approved in the Comprehensive Grizzly Bear Management Plan (see F. 1-2) and meet standards, requirements and legal processes for federal acquisition including, but not limited to:

i. approval by the Office of General Counsel;

ii. attachment of the conservation easement to the Warranty Deed;

iii. comply with Department of Justice standards;

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. the objective of land acquisition will be based on consultation, current priority ratings (including grizzly bear credit units as described by Kasworm et al 2013a, b) and other criteria as established by this plan.;

vii. meet fair market appraised value, according to Forest Service appraisal processes, as approved by the Comprehensive Grizzly Bear Management Plan (see F.1-2), if the affected parcels were consistent with advice from the FWS as being important; and

viii. be acquired and recorded prior to agency authorization to proceed with the associated phase of the mine, with all mitigation habitat acquired and recorded prior to the construction phase of the mine, except for the mitigation habitat associated with the effects of the Rock Lake ventilation adit (about 1 acre). Mitigation habitat for the ventilation adit will be acquired prior to agency authorization to proceed with development of the Rock Lake ventilation adit, should it be necessary.

ix. any habitat enhancement activities needed to improve the mitigation properties, such as the trail conversion or removal of buildings and debris, (or road access changes where applicable), would be planned and funded prior to agency authorization to proceed with construction. Implementation would occur as soon as feasible.

e) The Forest Service will implement access management improvements on mitigation lands. The FWS agrees to work with the Forest Service in determining how road management associated with that property can improve access management for bears, with the goal of managing BMUs 2, 5, and 6 at or better than the standards established by the Access Amendment (USDA 2011), which were based on the benchmarks identified by Wakkinen and Kasworm 1997. The FWS believes the disturbances expected with the Montanore Mine necessitates 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 BMUs 2, 5, and/or 6. Should mitigation property be acquired that will enable access management at or above these levels, the FWS

expects that the Forest Service will provide the bears using BMUs 2, 5, and 6 the optimum level of access management to reduce displacement and mortality risks during the life of the mine.

D. Measures to Address Habitat Constriction and Fragmentation within the North South Movement Corridor that Reduce the Potential to Achieve Cabinet-Yaak Ecosystem Grizzly Bear Recovery Goals

Prior to FS authorization to initiate the Evaluation Phase, MMC, <u>under direction of the FS,</u> **will commit to and implement the following**:

D. 1**.** All acres of replacement habitat required for the evaluation phase impact will be secured prior to the evaluation phase. To specifically reduce fragmentation, displacement and mortality risk and improve the north south connectivity in the Cabinet Mountains movement corridor:

D.1.a) MMC will secure or protect through conservation easement, including motorized route access changes, or acquisition in fee with conveyance of fee or perpetual conservation easement to the Forest Service or private conservation organization independent of MMC from development (including but not limited to housing, motorized access) and use (timber harvest, grazing, and mining) about 5 acres of replacement habitat near Rock Lake Meadows (NW ¼ Section 6, Township 26 North, Range 31 West) that will enhance the north to south habitat corridor in the Cabinet Mountains. The property is located in the East Fork Rock Creek drainage and is accessed by motorized trail #935. These 5 acres contribute towards the 500 acres replacement acres required for displacement.

D. 2. **Prior to FS authorization to initiate the Construction phase,** to reduce fragmentation, displacement and mortality risk and improve the north south connectivity in the Cabinet Mountains movement corridor**, MMC, under direction of the FS, will commit to and implement the following:**

D. 2.a) MMC will provide funding for the Forest Service to create core habitat for grizzly bear along trail #935 (Table 2). This will include but is not limited to: replacement of the gate at the trailhead with a barrier, and conversion of motorized trail tread to foot traffic tread conditions where necessary. This measure has a net result of creating 1,065 acres of core habitat. In addition, 288 acres of core created prior to the evaluation phase through access changes in roads 2316 and 6702 (Table 1) contribute to this measure. The net result is widening of the main constriction area from approximately 0.9 miles to 3.4 miles.

All acres of replacement habitat required for evaluation phase impacts will be secured prior to FS authorization of the evaluation phase and all acres of replacement habitat required for construction phase impacts will be secured prior to FS authorization of the construction phase. See Items C. 1. C. 2 and Table 4 for replacement habitat requirements by phase and specific details on land acquisition and conservation easement requirements. All land interest or conservation easements conveyed to the Forest Service must comply with items C.1 and C.2. a) through d).

D. 3. **Prior to FS authorization to initiate the Construction Phase**, MMC will provide funding for bear monitoring in the area south of Libby between the Cabinet-Yaak Ecosystem and Northern Continental Divide Ecosystem as identified by FWS. The linkage identification work along U.S. 2 will involve 3 years of monitoring movements of grizzly and black bears along the highway to identify movement patterns and key movement sites. Funding will cover aerial flights for 2 hours per week, 30 weeks per year for 3 years, salary for two seasonal worker for 6 months per year for 3 years, and 15 GPS collars and collar rebuilds each year for 3 years. (*). Funding will supplement ongoing research and monitoring activities in the Cabinet-Yaak Ecosystem, will be conducted or coordinated by the FWS' grizzly bear researcher in Libby or the equivalent, and will focus on grizzly bears in the Cabinet Mountains. Other monitoring methods may be considered if approved by the Oversight Committee (see item F.2).

E. Measures to Reduce the Potential for Mortality and Displacement of Grizzly Bears from Occupied Habitat in Grizzly Bear Outside the Recovery Zone (BORZ) Reoccurring Use Areas

E. 1. **Prior to initiating the evaluation phase**, **MMC will** fund and the KNF will implement road access changes in the Cabinet Face BORZ, as described in item E.1.a below.

E. 1. a) The KNF will implement year-long road access changes to three roads (4776A, 4776C, and 4776F) that will reduce open and total road miles within the Cabinet Face BORZ (see Table 2, and Figure C-1). As a result of these changes, open roads within the BORZ will be reduced by 1.2 miles, and total roads will be reduced by 2.5 miles.

E. 2. **Prior to initiating the construction phase**, **MMC will** fund and the KNF will implement road access changes in the Cabinet Face BORZ, as described in item E.2.a below.

E. 2. a) The KNF will implement year-long road access changes that will occur within the Cabinet Face BORZ and will improve grizzly bear habitat. Access change mitigation that will improve grizzly bear habitat in the BORZ are shown in Table 3 and Figure C-1 (4776B, 6205D, 6209E, 6787B and 14442).

Total road access changes shown in Table 2 and Table 3 within the BORZ will be permanent and will decrease open and total road miles in the BORZ by 10.2 miles. Baseline road miles in the Cabinet Face BORZ will not be exceeded during the construction phase.

E.3. **Prior to the operations phase**, **MMC will implement the following:**

E. 3.a) MMC will remove temporary roads built for transmission line installation on NFS lands

E. 4 Impacts from the Montanore Project on grizzly bears in the BORZ and on private and state land will also be mitigated through measures described above in item A, such as funding for grizzly bear personnel described in items A.1.h, A.1.i, A.1.j, and A.2 a funding for education and outreach, providing bear-resistant garbage containers, fencing and electrification of garbage transfer stations, and grizzly bear monitoring.

F. Measures to Ensure Compliance with the Montanore Grizzly Bear Mitigation Plan and Effectiveness of the Comprehensive Grizzly Bear Management Plan

Prior to initiating the Evaluation phase:

F.1. **the Forest Service, Department of Environmental Quality (DEQ), FWP and MMC** will participate in the development of a Memorandum of Understanding (MOU), while only the **Forest Service, DEQ and FWP** will be signers on the MOU:

The Forest Service and DEQ will develop an MOU with FWP, MMC, and other parties deemed appropriate by the Forest Service. The FWS will be an advisor in the development of the MOU. The MOU must be completed prior to the Forest Service issuing MMC the letter to proceed with the construction phase. The MOU will establish roles, responsibilities, and time lines of an Oversight Committee comprised of members of the Forest Service, FWP, and other parties deemed appropriate by the parties named. The FWS will be an ex-officio, non-voting member of the Oversight Committee, with only advisory responsibilities.

The MOU will be completed **prior to MMC** proceeding on **the evaluation** phase and will require the Forest Service to:

a. Ensure the Comprehensive Grizzly Bear Management Plan is completed prior to the **evaluation** phase of the mine. No further evaluation phase activity will continue until the plan is complete
b. Establish time frames for mitigation specified in the Grizzly Bear Management Plan and implementation of other management to occur prior initiation of the phase of the mine associated with that mitigation or management activity.
c. Ensure adequate funding, from MMC, to implement the Grizzly Bear mitigation plan according to the time frames.
d. Comply with legal guidelines or processes in as timely manner as possible in order to meet the Grizzly Bear mitigation plan and/or Comprehensive Grizzly Bear Management Plan implementation schedule.
e. 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 Comprehensive Grizzly Bear Plan meet the requirements in the Biological Opinion. All mitigation properties not specifically mentioned will have undergone all necessary procedures for procurement including recordation, prior to the agencies' letter to proceed on the associated phase of the mine.
f. Establish language and legal procedures to ensure that mitigation properties acquired through fee title, land transfer, or conservation easement:
    i. will be perpetual;
    ii. will meet federal policies and regulations regarding such realty actions (will be reviewed by the FWS who will advise whether they will meet the Biological Opinion requirements;

iii. will be secured and recorded in advance of the phase of the mine with which they are associated ;

iv. will increase or at least maintain a no net loss of MS-1 Cabinet-Yaak Ecosystem habitat;

v. will be adequately funded such that enforcement of easement terms is assured;

vi. will be selected on a priority basis with biologically justifiable rationale and based on the FWS advice that they meet the requirements included in the Biological Opinion; and

vii. will be managed in support of grizzly bear survival and recovery if in public ownership.

F.2. The Oversight Committee will be responsible for the development of a Comprehensive Grizzly Bear Management Plan and its implementation. MMC will have a participating role on the Oversight Committee. The Comprehensive Grizzly Bear Management Plan will focus on the Cabinet portion of the Cabinet-Yaak Ecosystem and will fully include all provisions of the mitigation plan for grizzly bears, except where superseded by the FWS' Biological Opinion. It also will include provisions for adaptive management. The plan will be developed in detail by the parties to ensure that human access to grizzly bear habitat, grizzly bear mortality, and habitat fragmentation will be minimized and that grizzly bear habitat quality will be maintained or improved. Advice and comments on the plan from the FWS will be requested and fully considered, including advice on whether the plan will meet the requirements of the Biological Opinion.

The Oversight Committee, led by the Forest Service, and established prior to the evaluation phase as part of MOU; will over the life of the mine:

F.2. a) assume responsibility for coordinating various aspects of the Comprehensive Grizzly Bear Management Plan/Grizzly Bear Mitigation Plan;

F.2.b) assume responsibility for maintaining effective communication among all Committee members, stake holders, and interested public; and

F.2.c) integrate the principles of adaptive management by collecting, disseminating where needed, and reviewing new information on grizzly bears, the results of implementation of the Comprehensive Grizzly Bear Management Plan over time, and other information related to Cabinet-Yaak Ecosystem grizzly bears. Based on new information, if appropriate to ensure that the objectives of the mitigation plan and conditions of the Biological Opinion are met, conduct additional analyses or develop recommendations for modifications of the mitigation plan to be implemented during the life of the mine. The FWS will be asked to review proposed revisions to the Comprehensive Grizzly Bear Management Plan under appropriate section 7 provisions, if required.

F.3. **Prior to FS authorization to initiate the evaluation phase**,

F.3.a**)** **MMC will** establish a trust fund and/or post a bond, to adequately fund 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 by phase The Oversight Committee (see item F.2) will determine the amount of trust fund deposits, to be made in 5-year increments over the life of the mine. If implementation costs prior/or during either evaluation or construction phases exceed the amount deposited in the trust fund/and or bond, then MMC will contribute additional funds to fully implement those actions in a timely manner (as determined by the KNF in consultation with the FWS). The amount in the fund or posted in a bond will be commensurate with projected work and associated required mitigation items by phase.

F.3. b) Forest Service will lead a stakeholders information annual meeting. Stakeholders may include, but will not be limited to state and federal agencies, county commissioners, mining company, local citizen, and non-governmental organizations representatives. The objectives of the meetings will be to review a) management objectives, b) implementation of mitigation measures, c) monitoring and research results; d) and to hear concerns from the public

F.3. c) Forest Service will agree to adopt management actions in response to new information from monitoring to assure that ongoing management meets the objectives for grizzly bears in the Cabinet-Yaak Ecosystem.

F. 4. The Comprehensive Grizzly Bear Management Plan will include the measures in the Grizzly Bear mitigation plan, except where the mitigation plan has been superseded by the FWS' Biological Opinion. In addition, processes will 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, become available.

Prior to FS authorization to initiate the construction phase:

F. 5. **MMC will** contribute funding to support monitoring of bear movements and population status in the Cabinet Mountains to confirm the effectiveness of mitigation measures. The Forest Service will ensure that adequate funding, provided by MMC, is available to monitor bear movements and use of the Cabinet Mountains to confirm the effective implementation of mitigation measures. Information gained will be useful in determining whether the mitigation plan was working as intended. If not, the information will help in developing new management strategies that will be addressed through appropriate amendments and consultation under ESA section 7. Funding will supplement ongoing research and monitoring activities in the Cabinet-Yaak Ecosystem, will be conducted or directed by the FWS', and will focus on grizzly bears in the Cabinet Mountains. Funding will 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 Service will ensure that

funding, provided by MMC, is available on an annual basis, 2 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 will be outlined in the Management Plan. Funding will be provided prior to starting the construction phase and will continue throughout the life of the mine through the reclamation phase.,(*)

Canada Lynx Mitigation Plan

Prior to FS authorization to initiate the construction phase:

A. **MMC will** fund habitat enhancement on lynx stem exclusion habitat to mitigate for the physical loss of suitable lynx habitat due to the construction of project facilities and transmission line. Enhancement will be at a 2:1 ratio (2 acres treated for every acre lost). Impacts to lynx habitat and required habitat enhancement are shown in Table 5.

Table 5. Impacts to Lynx Habitat and Habitat Enhancement Requirements, Alternative 3D-R.

Lynx Habitat Impacted (acre)	Required Habitat Enhancement (acre)
276	552

Selected stands with poorly-developed understories that do not currently provide winter snowshoe hare habitat will be thinned to allow sun to reach understory vegetation and accelerate development of the dense, horizontal vegetation favored by snowshoe hare. Habitat enhancement work will be done by Forest Service personnel or by others under the direction of the Forest Service.

B. Remote monitoring is difficult and impractical, and new off-road use can easily be monitored from the access roads. To address Northern Rockies Lynx Management guideline HU G4, Forest Service personnel will monitor new snow compaction activities (such as snowmobiling) in the project area and take appropriate action if compaction monitoring identifies increased predator access to new areas.

FOIA EXEMPT Documents Referenced

2013a. Kasworm, W., W. Johnson and J. Holifield. Replacement habitat assessment for the Montanore mine project. 13 pp. (unpublished xcell spread sheet and Mitigation Plan Figure C-2 and Figure C-3) FOIA EXEMPT. Results of meetings held 6/19/2013, 6/21/2013, and 8/15/2013 and **revised November 2013**. This document replaces USDA, FS 2008 (potential replacement habitat assessment for Montanore Mine Project, 9/30/2008) and Kasworm and Johnson 2012b (Corridor Replacement Habitat Assessment for Montanore Mine Project 11/28/2012)

2013b. Kasworm, Johnson and Holifield. **December 09, 2013**. Mitigation Biological Credit Process Paper and detailed map, Mitigation Plan Figure C-4, Revision of Kasworm and Johnson, September 2013. Unpublished white paper 4 pages FOIA EXEMPT

2012a. Kasworm, W., and W. Johnson. November 9, 2012 meeting notes: Montanore project mitigation replacement habitat priorities. Libby,MT. 11/9/2012. 2 pp (unpublished) FOIA EXEMPT

2012b. Kasworm, Wayne and W. Johnson. Corridor replacement Habitat Assessment for Montanore Mine. USFWS, Libby, MT. 8 pp and map. Meeting notes 11/28/2012 (unpublished) FOIA EXEMPT

2008. USDA Forest Service. Potential Replacement Habitat Assessment for Montanore Mine Project. Kootenai National Forest. Libby, MT. 9/30/2008, 26pp and map (unpublished) FOIA EXEMPT

Mitigation Implementation Table by Phase

Final Revised December 2015

LOM: Life of Mine consists of 2 year evaluation phase, construction phase approximately 3, Operations 16 to 20, and estimated the first 5 years of mine closure and reclamation (Phase 1 and first 2 to 3 years of phase 2 as described in the terrestrial Biological Assessment).

Table. 1. Mitigation required prior to FS authorization/letter to proceed to MMC to initiate evaluation phase

Mitigation required prior to initiation of the Evaluation Phase			
Mitigation Purpose	**Item**	**Mitigation Required**	**Responsible Parties**
Minimize displacement and reduce mortality risk during spring season	B.1.a Table 2	Restrict public motorized access on existing open NFS roads 231 and 2316 from April 1 to May 15 for as long as MMC uses and snowplows the two roads – expected thru 2 yr evaluation phase and the 1-year reconstruction of bear Creek Road #278 during the Construction phase. Total 3.5 miles in RZ	KNF[1]
Minimize displacement and reduce mortality risk during spring season	B.1.a Table 2	Restrict public motorized access on existing open NFS roads 4778, 4778E, 5192 and 5192A from April 1 to June 15. Total of 9.3 miles (8.4 mi RZ/ 0.9 mi BORZ)	KNF[2] MMC[3] LOM
Minimize displacement, increase core habitat, and reduce mortality risk during the bear year in within RZ and minimize displacement, reduce mortality risk during spring season within BORZ	B.1.a Table 2 E.1	Reduce motorized access on existing open roads 4776A, 4778C, and 14458; on currently gated roads 4776C, 4776F, 4778C, 6200, 6200D, 6200E, 6200F, 6214, and 6214F, convert gated road (6745) or seasonally open road (4784, if necessary) to a non-motorized trail. Total of 20.2 miles (17.7 mi in RZ/2.5 mi in BORZ)	KNF MMC[3] LOM
Minimize displacement and reduce mortality risk, increase core habitat and mitigate for cumulative effects	B.1.b Table 2	If Rock Creek Mine mitigation has not yet restricted motorized traffic with a berm on the Upper Bear Creek road #4784, then MMC would implement &fund this work at this time (Total 3.1 miles in BMU). **MMC will only implement this change if Rock Creek has not yet done so.**	KNF MMC[3] LOM
Reduce Mortality Risk	A.1.a	Install/maintain fencing surrounding the Libby adit	MMC, LOM
Reduce Mortality Risk	A.1.b	Develop a transportation plan designed to minimize mine related vehicular traffic	MMC, KNF LOM
Reduce Mortality Risk by building public support and understanding of grizzly conservation in CYRZ	A.1.c	Fund/develop information & public relations educational program to begin implementation in evaluation phase & continue through life of mine.	MMC, KNF FWP, FWS LOM
Reduce Mortality Risk	A.1.d	Prohibit use of salt during winter plowing operations	MMC LOM
Reduce Mortality Risk	A.1.e	Remove road killed animals daily	MMC LOM
Reduce Mortality Risk	A.1.f	Monitor frequency of vehicle killed animals & review with KNF & FWP to determine if additional mitigation measures necessary	MMC Pre-Eval thru 1st 3 years of ops.
Reduce Mortality Risk	A.1.g	Report all grizzly bear, lynx, wolf and black bear mortalities within 24 hours	MMC, LOM
Reduce Mortality Risk	A.1.h	Fund local FWP Law Enforcement Officer, 1st 5 year	MMC, FWP

Mitigation required prior to initiation of the Evaluation Phase			
Mitigation Purpose	**Item**	**Mitigation Required**	**Responsible Parties**
		funded, then fund in 5 year increments for LOM	LOM
Reduce Mortality Risk	A.1.i.	Prior to evaluation phase, MMC would fund Habitat Conservation Specialist.	MMC, FWP LOM
Reduce Mortality Risk	A.1.j.	Prior to evaluation phase, if Rock Creek Mine not yet operating, MMC would fund FWP grizzly bear specialist	MMC, FWP LOM
Reduce Mortality Risk	A.1.k	Fund and maintain up to 35 bear-resistant refuse containers for employees and mine facilities	MMC LOM
Reduce Mortality Risk	A.1.l	Fund and or maintain electrification of garbage transfer stations adjacent and throughout CYRZ	MMC LOM
Reduce Mortality Risk	A.1.m	Fund initial 10 electric fencing kits then fund 2 more annually as needed	MMC LOM
Reduce Mortality Risk	A.1.n	Require all employees to attend grizzly bear & wildlife awareness training upon hire and annually thereafter (See MMC Wildlife Awareness Plan, Appendix C).	MMC LOM
Reduce Mortality Risk	A.1.o	Agree all mortality reduction measures would be subject to modification based on adaptive management for life of mine	MMC, KNF FWP LOM
Assure compliance with Mitigation Plan requirements	A.3a-b	Ensure MMC complies with prior to evaluation phase mitigation plan requirements prior to FS authorization of construction phase	KNF
Assure compliance with mitigation plan requirements	F.1 F.2 F.3 F.4	Develop MOU with MMC and MFWP to establish Oversight Committee, & establish roles, responsibilities & time lines. Committee to develop comprehensive grizzly bear management plan for Cabinet Mtn. portion of CYRZ. Oversight Committee to be operational in pre-eval phase	KNF LOM
Ensure compliance with grizzly bear mitigation plan and requirements	F.3.a	MMC post bond or establish trust fund to cover cost of projected mitigation measures, by phase funding deposits made in 5 year increments	MMC, KNF Oversight Committee LOM
Ensure compliance with GB mitigation plan	F.3.b.	Establish and lead annual stakeholders informational meeting	KNF LOM
Ensure compliance with grizzly bear mitigation plan	F.3.c	KNF agree to adopt adaptive management. actions in response to new information from monitoring	KNF LOM
Reduce displacement & mortality risk by improving north south movement corridor connectivity – specifically mitigates for effects of the Libby Adit effects in the north south corridor.	C.1 C.2.a-e D.1.a Table 4	Transfer fee title or conservation easement in perpetuity of MMC owned 5 acre parcel in East Fork Rock Creek. In addition, **acquisition or conservation easement required** on additional 495 acres, for a total of **500 acres of habitat replacement prior to evaluation for Libby Adit displacement effects**.	MMC, KNF

1 - Seasonal Restriction on 231 and 2316 implemented when KNF authorized w/MMC snow plowing permit Nov 2007
2 - Seasonal Restriction on 4778, 4778E, 5192 and 5192A implemented when KNF authorized w/MMC snow plowing permit Nov 2007
*3- MMC would fund the cost of installing and maintaining all access restrictions throughout the life of the project.
KNF: Kootenai National Forest; MMC: Mines Management Corporation; FWP: Montana Fish Wildlife & Parks; FWS: US Fish and Wildlife Service; LOM: Life of Mine; RZ or CYRZ: Cabinet-Yaak Recovery Zone; BORZ: Cabinet Face BORZ

Table 2. Mitigation required prior to FS authorization/letter to proceed to MMC to initiate construction phase

Mitigation required prior to initiation of the Construction Phase			
Mitigation Purpose	**Item**	**Mitigation Required**	**Responsible Parties**
Reduce constricted area within north south movement corridor, Reduce fragmentation, displacement & mortality risk, increase core habitat and mitigate cumulative effects of 2 mines	B.1.b Table 1 Table 3 D.2a	Restrict motorized traffic year-round by converting gated NFS roads 150A (trail #935) (Total 2.9 mi in RZ) (creates 1,065 acres core). Results in decrease in the main constriction (.9 air miles to approximately 3.6 air miles) area.	MMC[3] KNF
Reduce fragmentation, displacement & mortality risk by improving north south corridor connectivity in Cabinet Mtn. movement corridor – and cumulative effects of 2 mines. Core habitat created and minimize disturbance during the early spring use period	B.1.b Table 3	Restrict motorized traffic year-round by converting gated NFS roads, 2317, 4781 and 6701, or portions thereof to a trail and barrier (Total 5 mi in RZ); ; Restrict motorized traffic year-round by converting gated roads 2316 and 6702 to berm (1.1 mi). Total of 4.2 miles in RZ.	MMC[3] KNF
Mitigate for displacement and mortality risk, and cumulative effect of 2 mines. Core habitat created.	B.1.b Table 3	Restrict motorized traffic year round by converting existing gated NFS roads 4725 to barrier. Total of 4.2 miles in RZ.	MMC[3] KNF
KNF access changes to reduce displacement and mortality risk in BORZ recurring use area	E.2 Table 3	Restrict motorized traffic year-round on seasonally restricted road 14442 with a berm, and restrict motorized access on currently open roads 6205D, 6787B, 6209E, 4776B with a berm. Total of 10.2 mi in BORZ.	MMC[3] KNF
Habitat replacement for displacement effects on 2,293 acres affected by increased disturbance associated with haul route, tailings impoundment and facilities. Replace at 1:1 ratio	C.1, C.2a-e Table 4	Purchase or acquire conservation easements in perpetuity on 2,293 acres within the Cabinet portion of the CYRZ (and other lands as described & identified on the priority list, and Mitigation credit process paper (Kasworm et al 2013a, Kasworm et al 2013b). If necessary, MMC would coordinate with KNF, FWP and FWS to modify priorities as needed.	MMC KNF
Habitat replacement for direct physical loss of 1,567 acres from facilities, roads, tailings impoundment, and other features. Replacement at 2:1 ratio.	C.1, C.2a-e Table 4	Purchase or acquire conservation easement in perpetuity on 3,114 acres within Cabinet portion of CYRZ, or other lands as identified on the priority list, and mitigation credit process paper (Kasworm et al 2013a, Kasworm et al 2013b). MMC would coordinate with KNF, FWP and FWS to modify priorities as needed.	MMC KNF
Confirm effectiveness of mitigation measures	F.5	Fund ongoing research & monitoring of bear movements in Cabinet Mountains conducted/directed by FWS	MMC FWS, LOM
Confirm connectivity between south Cabinet Mountains and NCDE	D.3	Fund 3 years of bear monitoring along US Hwy 2 south of Libby conducted by FWS	MMC FWP
Reduce Mortality Risk by building public support and understanding of grizzly conservation in CYRZ	A.1.c	Continue to fund & develop information & public relations educational program started prior to evaluation phase. Full funding and implementation prior to construction phase	MMC, KNF FWP, FWS LOM
Reduce mortality risk	A.2.a	See item A.1.j. to determine if additional grizzly bear	KNF,

Mitigation required prior to initiation of the Construction Phase			
Mitigation Purpose	**Item**	**Mitigation Required**	**Responsible Parties**
		specialist needed at this time, positions may have been filled prior to evaluation phase. If Rock Creek has not funded second grizzly bear specialist position, then MMC fund	MMC, FWP LOM
Reduce mortality risk	A.2.c	Fund initial 100 bear resistant garbage containers plus additional 20 per year for distribution to general public, and maintain and replace for life of mine	MMC FWP
Reduce mortality risk	A.2.d	Coordinate with KNF to fund acquisition and maintenance of bear resistant garbage containers for all developed campgrounds in the entire Cabinet Yaak Recovery Zone	MMC KNF LOM
Reduce mortality risk	A.2.e	Appropriate use of clover in planting roadsides, no use on open roads	MMC KNF
Reduce mortality risk by monitoring public attitude Adaptive management	A.2.b.2	MMC will fund and implement a long-term public attitude and input survey so I&E program described in itesm A.1.c can respond	MMC FWP
Assure compliance with Mitigation Plan requirements	A.3a-b	FS will ensure MMC complies with prior to construction phase mitigation plan requirements	KNF
Assure compliance with mitigation requirements	F.3.a	Trust or bond established prior to evaluation phase with payments made in 5-year increments (F.3.a)- MMC post bond or make payment to trust fund to cover cost of construction phase mitigation.	MMC Oversight Committee LOM
Assure compliance with mitigation requirements	F.4	Continue development and revising of Grizzly bear Management Plan and processes contained within as necessary	KNF, Oversight Committee LOM
Habitat replacement for direct physical habitat loss of 276 ac. of lynx habitat from facilities, roads, tailing impoundment and other features. Improve availability of lynx habitat successional stages	Lynx A.	Fund habitat enhancement on 552 acres of lynx stem exclusion habitat	MMC KNF
Reduce mortality risk and address NRLMD HU G-4	Lynx B.	Monitor new snow compaction in project area from access roads for life of mine	KNF MMC LOM

[3]MMC would fund the cost of installing and maintaining all access restrictions throughout the life of the project.

KNF: Kootenai National Forest; MMC: Mines Management Corporation; FWP: Montana Fish Wildlife & Parks; FWS: US Fish and Wildlife Service; LOM: Life of Mine; RZ or CYRZ: Cabinet-Yaak Recovery Zone; BORZ: Cabinet Face BORZ

Table. 3. Mitigation required during the construction phase

Mitigation required during the Construction Phase			
Mitigation Purpose	**Item**	**Mitigation Required**	**Primary Party**
Reduce mortality risk, displacement Eliminates transmission line construction activity during the spring and denning seasons	A.4	All activities for transmission line construction within the CYRZ and Cabinet Face BORZ, including use of the helicopter, will occur between June 16 and October 14 on federal lands	MMC KNF

KNF: Kootenai National Forest; MMC: Mines Management Corporation; LOM: Life of Mine; RZ or CYRZ: Cabinet-Yaak Recovery Zone; BORZ: Cabinet Face BORZ

Table 4. Mitigation required prior to FS letter to proceed/authorization for MMC to initiate Operations Phase

Mitigation required prior to initiation of the Operations Phase			
Mitigation Purpose	**Item**	**Mitigation Required**	**Responsible Party**
Reduce mortality risk in RZ & BORZ	E.3.a	Remove temporary roads built for transmission line installation on NFS lands	MMC KNF
Reduce displacement within the RZ	B.2.a.	Surface and mill equipment operated would not exceed 55 dBA measured at 250 feet from mill site for periods exceeding one hour. Intake and exhaust fans would generate less than 83 dBA measured at 50 feet down wind of portals, or ventilation adits. If necessary low-noise fan blades or noise suppression equipment would be installed to reduce fan noise to about 16 dBA, which would not be audible over ambient noise levels (Big Sky Acoustics 2006). Some of these MMC actions could be implemented as early as the construction phase.	MMC KNF

KNF: Kootenai National Forest; MMC: Mines Management Corporation; LOM: Life of Mine; RZ or CYRZ: Cabinet-Yaak Recovery Zone; BORZ: Cabinet Face BORZ

Table 5. Mitigation required during the Reclamation and Closure Phase

Mitigation required during Phase 1 of the Reclamation Phase			
Mitigation Purpose	**Item**	**Mitigation Required**	**Responsible Party**
Reduce mortality risk Minimizes transmission line removal activity during the spring and denning seasons	A.4	All activities for transmission line removal within the CYRZ and Cabinet Face BORZ will occur between June 16 and October 14 on federal lands	MMC KNF

KNF: Kootenai National Forest; MMC: Mines Management Corporation; LOM: Life of Mine; RZ or CYRZ: Cabinet-Yaak Recovery Zone; BORZ: Cabinet Face BORZ

Attachment 5 – KNF’s Mitigation Plan for Bull Trout

Bull Trout Mitigation Plan for the Montanore Minerals Corporation Montanore Project

February 2013

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Project Overview

Montanore Minerals Corporation (MMC) proposes to develop an underground copper and silver mine, an ore processing plant, a tailings impoundment, a power transmission line, and associated facilities. Most of the area where the proposed project would occur is National Forest System lands. The U.S. Forest Service (FS) is the lead federal agency overseeing authorization of the proposed project, which would require various permits, licenses, and approvals from the FS, the U.S. Fish and Wildlife Service (FWS), and other agencies. The federally proposed action is Alternative 3 D-R, which is the agency mitigated Poorman Impoundment Site and the revised Miller Creek Transmission Line (FS and DEQ 2013). Beginning with issuance of a FS Record of Decision, the project would occur in four phases: Resource Evaluation (estimated at two years), Construction (three to four years), Operations (from 16 to 20 years), and mine Closure and Reclamation phases (up to 20 years or longer) (FS and DEQ 2013).

In addition to mitigation actions proposed in the "federally proposed action", above, the FS and MMC are proposing this Bull Trout Mitigation Plan (Plan) as an integral part of the federally proposed action under consideration in the "Biological Assessment (BA) for Threatened, Endangered, and Proposed Aquatic Species and Designated Aquatic Critical Habitat on the Montanore Minerals Corp. Montanore Project" (February 2013). This Plan requires MMC to provide funding for planning, coordination, implementation, construction, monitoring, and evaluation of mitigation measure effects of a number of mitigations that are required to offset projected potential long-term losses in numbers of bull trout in local populations by re-establishing local populations, by maintaining or improving stream habitat quality, by creating bull trout genetic reserves; by improvement of existing and historic bull trout habitat, by protecting local bull trout populations associated with stream baseflow impacts or proposed mitigation measures; and by reducing hybridization risks. The Plan provides administrative review/approval mechanisms to assure timely implementation compliance and accommodates adaptive management changes to the Plan, if necessary.

Potential Impacts to Bull Trout

The Proposed Action would increase sediment input to Libby Creek, Big Cherry Creek, Bear Creek, Cable Creek, Midas Creek, Poorman Creek, Ramsey Creek, Fisher River, West Fisher Creek, Rock Creek and East Fork Rock Creek for two to four years, followed by long-term reductions. This would result in temporary adverse impacts to bull trout populations followed by long-term benefits in these streams to designated critical habitat in Libby Creek, Bear Creek, West Fisher Creek, Rock Creek, and East Fork Rock Creek.

Long-term sediment reductions could benefit non-native fish species to the detriment of bull trout in Libby Creek downstream of the barrier falls, Big Cherry Creek, Bear Creek, Cable Creek, Midas Creek, Ramsey Creek, Fisher River, West Fisher Creek and Rock Creek.

The Proposed Action has been modeled to decrease streamflow during low flow conditions in Libby Creek in a reach above the barrier falls, Poorman Creek, Rock Creek, East Fork Rock Creek, and East Fork Bull River which would reduce bull trout populations and adversely impact designated critical habitat in Libby Creek, Rock Creek, East Fork Rock Creek, and East Fork Bull River. Bull trout are unlikely to be impacted by minor streamflow reductions during low

flow conditions in Ramsey Creek and might benefit from short-term increased streamflow during low flow conditions in a reach of Libby Creek near and including the barrier falls.

The Proposed Action would maintain or increase bull trout populations in Libby Creek (Flower Creek, in lieu of Libby Creek), West Fork Rock Creek, and Copper Gulch through proposed mitigation. The Proposed Action as modeled might decrease local populations in Rock Creek, East Fork Rock Creek, East Fork Bull River, and Libby Creek above the barrier falls. With benefits to other streams in the Action Area and successful proposed mitigation, the Proposed Action would increase bull trout numbers in the Rock Creek drainage, the Libby Creek drainage (Flower Creek, in lieu of Libby Creek), the Lower Clark Fork Core Area and Kootenai Core Area and offset projected impacts to designated critical habitat in the two Core Areas.

Proposed Bull Trout Mitigation

Objectives

The objectives of proposed bull trout mitigation measures are to establish conservation actions that in the long-term would fully offset projected impacts from the mine project to bull trout populations and bull trout critical habitat. Because of the uncertainties involved in conservation measure development, and the uncertainties in biological response of bull trout to the measures, it is proposed that planning and other activities leading to implementation of the conservation measures be assessed during the Resource Evaluation phase with an aggressive bull trout mitigation program to follow. An adaptive management approach to the overall mitigation plan would be adopted to implement mitigation.

A hydrologic assessment would be completed during the Resource Evaluation phase which will be critical to understanding the extent that streamflow depletion may occur based on a revised and improved numerical groundwater model. Assessment of the various stream reaches proposed in this mitigation plan would be conducted during the Resource Evaluation phase to provide guidance to the agencies regarding the implementation of the proposed mitigation. Once the hydrology model results are known, then an aggressive bull trout mitigation program could be focused to address the impacts predicted to occur well into the future. This would allow a data-based decision making process. The objective of including mitigation planning and assessments in the Resource Evaluation phase is to allow substantive construction of mitigation measures to occur during the Construction phase This would help meet the objective of allowing ample time for mitigation measure validation monitoring on bull trout populations and critical habitat components to occur during the Operational phase of the mine. To achieve the objectives, it is proposed that MMC would take the lead in facilitating and coordinating bull trout mitigation activities, with approval of the Forest Service in consultation with FWS, by establishing and funding for the life of the mine, a local Bull Trout Mitigation Coordinator position. It is also proposed that timely accomplishment of mitigation objectives would be facilitated by MMC commitment during the Resource Evaluation phase to funding comprehensive assessments of two mitigation projects (see below).

This Plan describes actions and implementation mechanisms developed with objectives to offset potential adverse impacts to bull trout populations and projected adverse modifications to bull trout critical habitat in the two bull trout Core Areas associated with the proposed project: the Lower Clark Fork Core Area (including Rock Creek, East Fork Rock Creek, and East Fork Bull

River) and the Kootenai Core Area (including Libby Creek). To this end, mitigations were developed for each Core Area that have the potential to reestablish, maintain, create or improve self-sustaining local bull trout populations in stream reaches where they occurred historically but are currently absent, occur at low densities, are at risk of invasion by non-native fish species, or are at risk of being detrimentally impacted by the proposed project, and to improve habitat conditions in Core area streams that are currently not designated as critical habitat. Project milestones, such as the Record of Decision and various required FS authorizations, function as hard triggers for specific bull trout mitigations to provide timely implementation of the various mitigation measures. The Plan also describes MMC staffing and the administrative mechanisms that would insure timely funding, scheduling, conservation action implementation, monitoring, adaptive management for possible Plan changes, and regulatory coordination and compliance.

Measures to offset bull trout population and critical habitat impacts in the Kootenai and Lower Clark Fork Core Areas

1. MMC, under direction of the Forest Service, will implement the following actions during the initiation of the Resource Evaluation phase and not starting later than six months after implementation of the Evaluation Phase is authorized by the Forest Service.

    a. MMC, within 6 months of receiving Forest Service authorization to begin the Resource Evaluation phase, will employ or fund a local Bull Trout Mitigation Coordinator, to lead MMC planning, coordination, implementation, and monitoring activities. Employment, or funding, for the Coordinator position will be provided within 6 months of MMC receiving final FS authorization to initiate the Resource Evaluation phase as agreed to by FS in consultation with FWS. MMC will commit to employment of the Coordinator position, or provide funding in advance, in 5-year increments for the life of the mine and through the Closure and Reclamation phase, or as otherwise agreed by FS in consultation with FWS. MMC (Coordinator) will prepare annually, by January 1, for Forest Service approval, in consultation with FWS, annual work plans, including: MMC funding needed in the calendar year, identification of data collection needs, proposed feasibility studies, engineering design needs, and implementation planning documents necessary to accomplish mitigation actions identified in Core Area specific Bull Trout Mitigation Plans and/or other mitigation actions determined appropriate by FS in consultation with FWS. Same Coordinator will prepare by March 1 of each year for FS approval, in consultation with FWS, annual completion reports describing activities undertaken in the previous calendar year and the status of those activities to include results of any studies conducted.

    b. MMC will prepare for FS approval, in consultation with FWS and Montana Fish Wildlife and Parks (MFWP) prior to FS authorization to initiate the Resource Evaluation phase for the Montanore Project, a bull trout mitigation plan specific to each bull trout Core Area potentially affected by the Project. The Core Area Bull Trout Mitigation Plans for the Kootenai and Lower Clark Fork Core Areas will identify and quantitatively evaluate potential bull trout population effects, potential

habitat effects, and overall bull trout conservation effects of specific mitigation concepts identified below in the "Conceptual Bull Trout Mitigation Plan" section. These potential beneficial effects of proposed mitigation actions will be compared to potential adverse effects to bull trout populations and critical habitat identified in the BA. The Core Area Bull Trout Mitigation Plans will identify success criteria and monitoring effort (see 1. c, below) needed to verify that objectives of the subject mitigation proposals have been met.

c. MMC will prepare for Forest Service approval, in consultation with MFWP and FWS prior to Forest Service authorization to implement the Evaluation Phase for the Montanore Project, a comprehensive Fisheries Monitoring Plan that addresses all fisheries related monitoring needed to document and verify project effects, including short-term effects of projected sediment inputs to bull trout streams, and mitigation measure effects of proposed mitigation actions. The Fisheries Monitoring Plan will identify the techniques, intensity, duration, and frequency of fisheries and habitat monitoring needed in all affected streams or other water bodies in the Action Area. The Fisheries Monitoring Plan will specifically address monitoring needs of proposed or anticipated bull trout mitigation projects ("before the action" data collection) and will take into account the amount of time and monitoring effort needed to fully assess the effects of the mitigation projects (for example, two bull trout life cycles or 14 years). MMC will make long-term binding arrangements, see MOU below, with MFWP (or other entities approved by MFWP, FS and FWS) for accomplishment, reporting, and approval of annual monitoring efforts.

d. MMC will prepare for Forest Service approval, in consultation with MFWP and FWS (and other stakeholders deemed appropriate by the Forest Service), and within one calendar year of issuance of the Forest Service authorization to implement the Evaluation Phase of the Montanore Project, a preliminary feasibility assessment of actions needed (with tasks, costs, scheduling, etc.) to further develop mitigation planning implementation of the Upper Libby Creek Bull Trout Conservation Project, see below. Prior to submittal to the Forest Service for approval of the Upper Libby Creek Bull Trout Conservation Project assessment, MMC will conduct a meeting to facilitate consultation with the MFWP, FS, FWS, and other appropriate regulatory agencies and stakeholders as determined by the FS. Mitigation implemented in Flower Creek would be a contingency to failed mitigation in Upper Libby Creek.

e. MMC will prepare for Forest Service approval, in consultation with the City of Libby, MFWP and FWS (and other stakeholders deemed appropriate by the Forest Service), and within one calendar year of issuance of the Forest Service authorization to implement the Evaluation Phase of the Montanore Project, a preliminary feasibility assessment of actions needed (with tasks, costs, scheduling, etc.) to further develop mitigation planning implementation of the contingency Flower Creek Bull Trout Conservation Project, see below. Prior to submittal to the Forest Service for approval of the Flower Creek Bull Trout Conservation Project assessment, MMC will conduct a meeting to facilitate consultation with the City of Libby, MFWP, FS, FWS, and other appropriate regulatory agencies and stakeholders as determined by the FS.

f. MMC will prepare for Forest Service approval, in consultation with MFWP, Avista Corporation (Avista), Revett RC Resources Corporation (Revett), and FWS (and other stakeholders deemed appropriate by the Forest Service), and within one calendar year of issuance of the Forest Service authorization to implement the Evaluation Phase of the Montanore Project, a preliminary feasibility assessment of actions needed (with tasks, costs, scheduling, etc.) to further develop mitigation planning implementation of the Rock Creek Invasive Species Eradication Project, see below. Prior to submittal to the Forest Service for approval of the Rock Creek Invasive Species Eradication Project assessment, MMC will conduct a meeting to facilitate consultation with Avista, Revett, MFWP, FS, FWS, and other appropriate regulatory agencies and stakeholders (as determined by the FS).

g. During the Resource Evaluation phase and prior to development and signing of MOU(s) (see below, "Measures to Ensure Compliance with the Core Area Bull Trout Mitigation Plans and to Ensure Effectiveness of the Plans"), MMC will commit to fund the Bull Trout Mitigation Coordinator position (including needed support), development of annual work plans and annual completion reports, development of two Bull Trout Core Area Mitigation Plans, a Fisheries Monitoring Plan, preliminary mitigation project feasibility assessments (Upper Libby Creek Bull Trout Conservation Project, Flower Creek Bull Trout Conservation Project and Rock Creek Invasive Species Eradication Project), and any supporting studies needed to complete the tasks as deemed appropriate by FS in consultation with MFWP and FWS.

2. MMC, under direction of the Forest Service, will implement the following actions after the implementation of the Evaluation Phase and prior to receiving FS authorization to begin the Construction phase:

   a. Prior to FS authorization to initiate the Construction phase, MMC will establish a trust fund and/or post a bond, to adequately fund implementation costs during the Construction phase of the overall Bull Trout Mitigation Plan, the two Core Area specific Bull Trout Mitigation Plans (specifically including projected costs of implementing the Upper Libby Creek Bull Trout Conservation Project, Flower Creek Bull Trout Conservation Project and Rock Creek Invasive Species Eradication Project, see 2. b, below), and the Fisheries Monitoring Plan. [If implementation costs during the Construction phase of the above items exceed the amount deposited in the trust fund, then MMC will contribute additional funds to fully implement those actions in a timely manner (as determined by the FS in consultation with FWS).] The amount in the trust fund or posted in a bond will be commensurate with projected mitigation planning, coordination, study, monitoring, design, construction, and other conservation activities needed to accomplish the mitigation projects in a timely manner, as will be defined in the Core Area Bull Trout Mitigation Plans and the Fisheries Monitoring Plan (items 1. b and c, above).

   b. Prior to FS authorization of the Construction phase, an initial deposit will be made to the trust fund, 1. a, above designated for planning, development, and construction of the Upper Libby Creek Bull Trout Conservation Project which will involve habitat

enhancement, restoration and population monitoring, the Flower Creek Bull Trout Conservation Project as a contingency to the Libby Creek Project, (see 1. e, above), and the Rock Creek Invasive Species Eradication Project. If implementation costs during the Construction phase for the Upper Libby Creek Bull Trout Conservation Project, the Flower Creek Bull Trout Conservation Project and Rock Creek Invasive Species Eradication Project exceed the amount deposited in the trust fund, then MMC will contribute additional funds to fully implement those actions in a timely manner (as determined by the FS in consultation with FWS).

c. Prior to FS authorization of the Construction phase, MMC will separately commit ((MOU(s), below)) to fund during the Construction phase all costs associated with the Bull Trout Mitigation Coordinator and support (if that position is filled by a MMC employee or contractor), and to costs of funding activities in 1. f, above (if implementation of 1. f activities occurs during the Construction phase).

d. Prior to FS authorization of the Construction phase, and not later than two calendar years from FS issuance of authorization to implement the Evaluation Phase of for the Montanore Project, MMC will prepare an overall bull trout mitigation audit report detailing and quantifying progress toward accomplishment of bull trout mitigation objectives. Findings and MMC recommendations will be presented for approval by the FS, in consultation with FWS and MFWP. The purpose of the mitigation audit report will be to determine if and what adaptive management changes will be required by the FS to the Bull Trout Core Area Mitigation Plans, Fisheries Monitoring Plan, or MOU(s) (see below) prior to authorization of the Construction phase in order to meet the objectives of this Bull Trout Mitigation Plan.

3. MMC, under direction of the Forest Service, will implement the following actions during the Construction phase and not later than 5 years after FS authorization to initiate the Construction phase:

   a. MMC will fully complete, unless otherwise agreed to by FS in consultation with FWS, implementation of mitigation measures identified, and approved by FS in consultation with FWS, in the overall Bull Trout Mitigation Plan, the two Core Area specific Bull Trout Mitigation Plans (specifically including the Upper Libby Creek Bull Trout Conservation Project, the Flower Creek Bull Trout Conservation Project and Rock Creek Invasive Species Eradication Project, see 2. b, above), and the Fisheries Monitoring Plan.

   b. MMC will separately commit ((MOU(s), below)) to fund and otherwise support throughout the Construction phase all costs and activities associated with the Bull Trout Mitigation Coordinator (including administrative support if that position is filled by a MMC employee or contractor), and to completing activities in 1. f, above (if implementation of 1. f activities occurs during the Construction phase).

4. MMC, under direction of the Forest Service, will implement the following actions prior to receiving FS authorization to begin the Operations phase:

a. Prior to FS authorization to initiate the Operations phase, MMC will contribute funds to the trust fund and/or post a bond (2. a, above), to fund any remaining implementation costs during the Operations phase of the overall Bull Trout Mitigation Plan, the two Core Area specific Bull Trout Mitigation Plans, and the Fisheries Monitoring Plan. The amount contributed to the trust fund or posted in a bond for the Operations phase will be commensurate with projected mitigation planning, coordination, study, monitoring, design, construction, and other conservation activities needed to accomplish the mitigation projects in a timely manner, as will be defined in the Core Area Bull Trout Mitigation Plans and the Fisheries Monitoring Plan (item 1. b and c, above).

b. MMC will separately commit ((MOU(s), below)) to funding costs associated with the Bull Trout Mitigation Coordinator (if that position is filled by a MMC employee or contractor) and to costs of funding activities in 1. a, above.

c. Prior to FS authorization of the Operation phase, and not later than two calendar years from FS authorization of the Construction Phase for the Montanore Project, MMC will prepare an overall bull trout mitigation audit report detailing and quantifying progress toward accomplishment of bull trout mitigation objectives. Findings and MMC recommendations will be presented for approval by the FS, in consultation with FWS and MFWP. The purpose of the mitigation audit report will be to determine if and what adaptive management changes will be required by the FS to the Bull Trout Core Area Mitigation Plans, Fisheries Monitoring Plan, or MOU(s) (see below) prior to authorization of the Operation phase in order to meet the objectives of this Bull Trout Mitigation Plan.

5. MMC, under direction of the Forest Service, will implement the following actions during the Operation phase (estimated to last 16 – 20 years following the Construction phase):

a. During the Operation phase, MMC will fully complete, unless otherwise agreed to by FS in consultation with FWS, implementation of mitigation measures identified, and approved by FS in consultation with FWS, in the overall Bull Trout Mitigation Plan, the two Core Area specific Bull Trout Mitigation Plans and the Fisheries Monitoring Plan.

b. During the Operation phase, beginning not later than eight calendar years from FS authorizing the Evaluation Phase for the Montanore Project, MMC will prepare an overall bull trout mitigation audit report detailing and quantifying progress toward accomplishment of bull trout mitigation objectives. A bull trout mitigation audit report will be prepared for FS approval every three years throughout the Operation phase. Findings and MMC recommendations will be presented for approval by the FS, in consultation with FWS and MFWP. The purpose of the mitigation audit report will be to determine if and what adaptive management changes will be required by the FS to the Bull Trout Core Area Mitigation Plans, Fisheries Monitoring Plan, or MOU(s) (see below) during the Operation phase in order to meet the objectives of this Bull Trout Mitigation Plan.

c. MMC will separately commit ((MOU(s), below)) to fund and otherwise support throughout the Operation phase all costs and activities associated with the Bull Trout Mitigation Coordinator (including administrative support if that position is filled by a MMC employee or contractor), and to completing activities in 1. f, above (if implementation of 1. f activities occurs during the Operation phase).

6. MMC, under direction of the Forest Service, will implement the following actions prior to receiving FS authorization to begin the Closure and Reclamation phase:

   a. Prior to authorization of the Closure and Reclamation phase, MMC will prepare an overall bull trout mitigation audit report detailing and quantifying progress toward accomplishment of bull trout mitigation objectives. Findings and MMC recommendations will be presented for approval by the FS, in consultation with FWS and MFWP. The purpose of the mitigation audit report will be to determine if and what adaptive management changes will be required by the FS to the Bull Trout Core Area Mitigation Plans, Fisheries Monitoring Plan, or MOU(s) (see below) prior to authorization of the Closure and Reclamation phase in order to meet the objectives of this Bull Trout Mitigation Plan. If bull trout mitigation objectives have not been met by the final bull trout mitigation audit report during the Operation phase, then MMC will determine the amount of funds needed to be deposited in the trust fund and other MMC commitments needed to accomplish, maintain and monitor implementation of bull trout mitigation measures through the Closure and Reclamation phase. Adaptive management changes to the Bull Trout Core Area Mitigation Plans, Fisheries Monitoring Plan, or MOU(s) (see below) may be required prior to authorization of the Closure and Reclamation phase in order to meet the objectives of this Bull Trout Mitigation Plan.

   b. Prior to authorization of the Closure and Reclamation phase, MMC will contribute adequate funds to the trust fund and/or post a bond, to fund implementation, maintenance, and monitoring costs during the Closure and Reclamation phases (and in perpetuity, if deemed appropriate) of the overall Bull Trout Mitigation Plan, the two Core Area specific Bull Trout Mitigation Plans, and the Fisheries Monitoring Plan. The amount to be deposited in the trust fund or posted in a bond will be commensurate with projected mitigation planning, coordination, study, monitoring, design, construction, and other conservation activities needed to accomplish the mitigation projects in a timely manner, as determined by the FS in consultation with FWS (see 6. a, above). MMC will separately commit ((MOU(s), below)) to funding costs associated with the Bull Trout Mitigation Coordinator (if that position is filled by a MMC employee or contractor) and to costs of funding activities in 1. f, above, if appropriate during the Closure and Reclamation phases.

7. MMC, under direction of the Forest Service, will implement the following actions during the Closure and Reclamation phase (estimated to last 20 years or more following the Operation phase):

   a. During the Closure and Reclamation phase, MMC will fully complete, unless otherwise agreed to by FS in consultation with FWS, implementation of any

remaining mitigation measures identified, and approved by FS in consultation with FWS, in the overall Bull Trout Mitigation Plan, the two Core Area specific Bull Trout Mitigation Plans and the Fisheries Monitoring Plan.

b. During the Closure and Reclamation phase, MMC will prepare an overall bull trout mitigation audit report detailing and quantifying progress toward accomplishment of bull trout mitigation objectives. A bull trout mitigation audit report will be prepared for FS approval every three years throughout the Closure and Reclamation phase. Findings and MMC recommendations will be presented for approval by the FS, in consultation with FWS and MFWP. The purpose of the mitigation audit report will be to determine if and what adaptive management changes will be required by the FS to the Bull Trout Core Area Mitigation Plans, Fisheries Monitoring Plan, or MOU(s) (see below) during the Closure and Reclamation phase in order to meet the objectives of this Bull Trout Mitigation Plan.

c. MMC will separately commit ((MOU(s), below)) to fund and otherwise support throughout the Closure and Reclamation phase, as needed, all costs and activities associated with the Bull Trout Mitigation Coordinator (including administrative support if that position is filled by a MMC employee or contractor).

Measures to Ensure Compliance with the Core Area Bull Trout Mitigation Plans and to Ensure Effectiveness of the Plans

8. Prior to completion of the Resource Evaluation phase, the Forest Service and MMC will participate in the development of and be signers of a Memorandum of Understanding (MOU): The Forest Service will develop a MOU with MFWP, MMC, and other cooperating parties deemed appropriate by the Forest Service. The FWS will be an advisor in the development of the MOU. The MOU must be completed prior to the Forest Service issuing MMC a letter to proceed with the construction phase, and not later than two calendar years from the date of FS authorization to implement the Evaluation Phase of the Montanore Project. The MOU will identify and define Forest Service roles, responsibilities and time lines for insuring MMC compliance with the Core Area Bull Trout Mitigation Plans and the Fisheries Monitoring Plan.

   The MOU would require the Forest Service to:

   a. Ensure the Core Area Bull Trout Mitigation Plans and the Fisheries Monitoring Plan are completed, and approved, prior to completion of the Resource Evaluation phase of the mine.

   b. Establish, in consultation with FWS, time frames, consistent with this Bull Trout Mitigation Plan, Core Area Bull Trout Mitigation Plans, Fisheries Monitoring Plan and mitigation plan development assessments (1. d and e, above).

   c. Ensure adequate funding is planned for and provided annually, from MMC, to fund the Trust Fund (2. a, above), the Bull Trout Mitigation Coordinator position (including administrative, office, transportation, and needed field equipment

expenses), and to fund implementation of the mitigation measures identified and scheduled per the Core Area Bull Trout Plans and Fisheries Monitoring Plan (and per the annual work plan, item 1. a, above).

d. Comply with legal guidelines and permitting processes in a timely manner to meet the Core Area Bull Trout Mitigation Plans and Fisheries Monitoring Plan and annual work plan schedules.

e. Ensure that the FWS is consulted annually to determine if implementation of mitigation measures, and progress toward their accomplishment, is adequate to meet the requirements of the Biological Opinion, including mandatory Reasonable and Prudent Measures and their implementing Terms and Conditions.

9. Forest Service and MMC, in consultation with FWS, will agree to integrate the principles of adaptive management by collecting, disseminating where needed, and reviewing new information on bull trout, the results of implementation of the Core Area Bull Trout Mitigation Plans and Fisheries Monitoring Plan over time, consider the revised numerical groundwater model prepared during the Resource Evaluation program and other information related to bull trout near the project area. Based on new information, if appropriate to ensure that the objectives of the mitigation plans and conditions of the Biological Opinion are met, conduct additional analyses or develop alternatives or modifications to the Core Area Bull Trout Mitigation Plans.

Conceptual Bull Trout Mitigation Plan

The following outlines proposed mitigation projects and technical details that are proposed to be considered for inclusion in Bull Trout Core Area Mitigation Plans. Development of these Plans by MMC and approval by the FS, in consultation with FWS, will be required within the Resource Evaluation phase and within 18 months of FS approval for MMC to initiate the Resource Evaluation phase (see 1. b, above). If initial fish population and habitat surveys on a subject streams, see below, indicate that the proposed mitigation measure is not feasible, then additional mitigation measures on that stream or on other bull trout occupied or historically occupied streams within the subject bull trout Core Area may be substituted for these initial mitigation measure concepts. It is anticipated that the Bull Trout Mitigation Plan, Core Area Bull Trout Mitigation Plans, Fisheries Monitoring Plan and supporting MOU(s) and other MMC commitments may be modified or amended on a recurring three year basis throughout the life of the mine.

Locations

Two streams in each Bull Trout Core Area were initially selected for assessment of bull trout mitigation measures to meet mitigation objectives:

- Lower Clark Fork Core Area
  Copper Gulch
  West Fork Rock Creek (and Rock Creek mainstem)

- Kootenai Core Area
  Libby Creek
  Flower Creek (Secondary to upper Libby Creek)

Lower Clark Fork Core Area

Copper Gulch (a.k.a. Copper Creek) flows approximately 8 km to the Bull River. The lower 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. This makes upper reaches unavailable to fall spawners. A private bridge crossing restricts flow during spring runoff. Shallow riffles predominate in the lower reach due to a lack of pool-forming structures such as large woody debris. Unstable bedload accumulations prevent distribution of spawning gravel. The central reach is more stable and complex than the lower reach, with moderate amounts of large woody debris. Spawning habitat is limited to gravel accumulations behind obstructions. Adequate rearing and overwintering habitat is available in the form of deep, low-velocity areas of the channel and substrate interstices. The upper 5.5 km exhibits seasonal drying (LWC 2001). Bull trout are considered to have been historically present (Pratt and Huston 1993) but are currently absent. During a year 2012 survey, brook trout, brown trout, and rainbow/cutthroat trout hybrids (field identification) were captured in the lower reach. Cutthroat trout were abundant near the upper end of the perennial reach and were the only salmonid captured (MT Dept. of Fish, Wildlife, and Parks, reported in Kline and Savor 2012).

West Fork Rock Creek flows approximately 6.5 km to Rock Creek. The lower 320 m is seasonally dry. A natural barrier to upstream movement of fish occurs 3.2 km from the confluence with Rock Creek. Fish habitat consists primarily of high gradient riffles and pools. Substrate is dominated by gravel and small cobble, with high amounts of fine sediment. The riparian zone is functional, providing moderate amounts of large woody debris. The drainage is subject to high flow events (Washington Water Power 1996, FS data reported in Littlejohn 2012 and in Kline and Savor 2012). Fish surveys were conducted during 1996 using multiple pass electrofishing and snorkel counts. Cutthroat trout and bull trout were reported to occur at densities of approximately 200 and 300 fish per 1,000 m, respectively, throughout the reach that is below the fish barrier (WWP 1996). During 2012, 762 m in the central portion of the same reach was electrofished using a single pass, resulting in the capture of 42 cutthroat trout and 6 bull trout (FS data reported in Kline and Savor 2012). While the difference in effort during the 1996 and 2012 do not allow direct comparison of results, they do indicate that bull trout abundance was drastically lower during 2012 compared to 1996. In comparing the two species, the number of cutthroat trout that were captured during 2012 was approximately 25% of the 1996 cutthroat trout density estimates, whereas the number of bull trout that were captured was approximately 3% of the 1996 bull trout density estimates. This indicates a substantial reduction in bull trout abundance relative to cutthroat trout.

Rock Creek (mainstem) flows 5.3 miles to the Clark Fork River. Historic timber harvest resulted in current low levels of instream woody debris and caused adverse changes in channel morphology and substrate composition. The loss of woody debris affects macroinvertebrate production, sediment sorting, spawning gravel retention... There are some sediment sources in the drainage but they do not appear to have a significant effect on fish habitat. Substrate is dominated by cobble, and fine sediment is readily transported out of the mainstem or deposited

in side-channels. Westslope cutthroat trout in Rock Creek are assumed to be mainly resident. Bull trout occur in the mainstem and some bull trout redds have been located, but the majority of the bull trout population and spawning occurs in East Fork Rock Creek. There is a seasonally dewatered stretch in lower Rock Creek that apparently keeps brook trout from colonizing the East Fork (Avista 2008). Intermittent reaches limit bull trout access to potential spawning habitat during the late summer and fall, and may restrict non-native brook trout to below Engle Creek. Capture of a single Westslope cutthroat x rainbow trout hybrid at site 2 in 2010 was the first record of a non-native salmonid in upper Rock Creek. To date no bull trout/brook trout hybrids have been documented (Salmon Environmental Services 2012).

Kootenai River Core Area

Libby Creek flows approximately 47 km to the Kootenai River. A falls at stream km 42 blocks upstream fish passage. Bull trout are the only fish species that have been reported upstream of the falls. The average bull trout density in a reach between the downstream end of the Libby Adit disturbance boundary and the falls is 0.037 per square meter (n = 8, 2003-2011). Fish habitat includes low gradient riffle/run complexes with pools formed by boulders, bedrock, and large woody debris, steep riffles, and diversified habitat with large pools due, in part, to many downed trees with attached rootwads. Upstream of the Cabinet Mountains Wilderness Area boundary, the stream is bedrock controlled, cobble substrate is common, the width to depth ratio is low, stream gradient is high, large woody debris is lacking, and there are high quality pocket pools. A fish survey conducted upstream of the Cabinet Wilderness Area boundary during 1988 reported no fish. The most upstream report of bull trout is at stream km 45 during 2006 (Kline 2007). These results indicate that there may be a fish barrier near or downstream of the Cabinet Mountains Wilderness Area boundary (Watershed and Kline 2005, Kline 2007). Within the reach where bull trout occurrence has been confirmed, adjacent to the Libby Adit site, there is a wide cobble dominated reach that displays braiding, channel shifting, and an open canopy.

Flower Creek flows approximately 21 km to the Kootenai River. Headwater tributaries begin in a series of small lakes. The lower portion flows through the city of Libby, Montana. Two man-made dams are present in the lower half of Flower Creek. The lower dam is used as a diversion point for a water intake that feeds by gravity to a water treatment plant. Upper Flower Creek Dam is operated by the city as part of their water supply storage system. The 58-foot high concrete arch dam was completed in 1945. The Upper Flower Creek reservoir has a normal capacity of 221 acre-feet. The upper dam is substandard with regard to failure risk. The City of Libby has begun the process to replace the upper dam within about a 5-year time frame. The stream is considered to have substantial fisheries resource value above the dams. Bull trout are known to have occurred in Flower Creek. Prior to 2012, the only salmonids captured in recent surveys have been brook trout and hybridized Westslope cutthroat trout (MFISH). During 2012, one bull trout/brook trout hybrid was captured below the lower reservoir and one was captured upstream of the upper reservoirs. This indicates that bull trout are or recently were present but are not common.

Actions

Proposed mitigation actions for these streams may include:

- Create or secure genetic reserves through bull trout transplanting or habitat restoration to protect existing bull trout populations from catastrophic events;
- Rectify factors that are limiting the potential of streams to support increased production of bull trout;
- Eradicate non-native fish species, especially brook trout that are a hybridization threat to bull trout.

Based on available information on the current condition of the selected streams, factors that influence bull trout populations and the mitigation potential of each stream have been tentatively identified, as described below.

Copper Gulch

Restoration of the aggraded lower reach would be the focus for mitigation. It is anticipated that modification of this reach would provide habitat, and alleviate seasonal drying to allow improved access for migratory bull trout to the central perennial reach where habitat is available to support a viable, self-sustaining bull trout population. An integral part of mitigation planning on Cooper Gulch will be an assessment of the feasibility of eliminating brook trout from the stream, and development of a stream rehabilitation plan, if brook trout removal is feasible. Additional feasibility studies for potential bull trout donor stocks will be required to determine genetic health and availability of nearby bull trout populations (e.g. East Fork Bull River), and development of a genetic management plan (if re-introduction of bull trout is considered). If successfully implemented, fish passage restoration and bull trout reintroduction in Copper Gulch could potentially contribute to offsetting both projected losses of bull trout numbers and critical habitat in the East Fork Bull River and the lower Clark Fork Core Area.

West Fork Rock Creek

Available data for this stream indicates that habitat is underutilized by bull trout compared to previous population density estimates. Additional habitat and population surveys would be conducted to identify limiting factors for bull trout in this stream and to evaluate its potential to provide spawning opportunities for migratory bull trout. If the limiting factors analyses so indicate, mitigation measures in this drainage may be able to partially offset both the projected reductions of bull trout populations and the loss of bull trout critical habitat in Rock Creek and the Lower Clark Fork Core Area.

Rock Creek

It has been suggested (Littlejohn 2012) that bull trout populations in East Fork and West Fork Rock Creek are currently isolated from the threat of brook trout hybridization by an expanse of seasonally intermittent stream which separates the primary bull trout population from a brook trout population downstream of the intermittent stream reach. Removal of the brook trout population in lower Rock Creek (Rock Creek Invasive

Species Eradication Project) would lower the risk of brook trout invading the bull trout habitat further upstream. As such this mitigation measure would complement any habitat of bull trout population mitigation measures deemed appropriate in the West Fork Rock Creek (see above). Additionally, if this mitigation measure (brook trout removal from Rock Creek) is feasible and implemented in a timely manner (before brook trout invade upstream bull trout habitat) it could enhance the chances of success of any mitigation actions taken in the West Fork Rock Creek and contribute to offsetting projected losses of bull trout in Rock Creek. Additionally, migratory bull trout are known to spawn and rear in the stream reach currently occupied by brook trout in lower Rock Creek, implementation of a bull trout population enhancing mitigation measure (removal of brook trout) could contribute to offsetting losses to upstream bull trout populations in Rock Creek.

Libby Creek

On-site mitigation proposed in upper Libby Creek would be preferable to offset potential detrimental impacts to the bull trout population and critical habitat in that stream reach as it would be directly impacted. Projected effects are based on current modeled streamflow depletion estimates which hypothetically could be off-set by habitat improvements to increase the quality of available habitat. The Flower Creek mitigation, which is proposed as primarily a genetic reserve for the unique upper Libby Creek resident bull trout would be retained as a contingency measure to be considered if the Libby Creek mitigation is not successful. Mitigation success would be based on long term trend monitoring of bull trout densities in the affected reach showing either a maintained or increasing bull trout population.

The reach of Libby Creek upstream of the falls and adjacent to the Libby Adit site displays braiding and channel shifting. Decreased baseflows would further reduce the quality of existing habitat. Installing large formidable wood structures in the floodplain and riparian zone would stabilize this reach, restore riparian function, improve spawning and rearing habitat for bull trout by increasing channel depth, complexity and stability, and sediment retention. Large formidable wood structures would also allow establishment of riparian vegetation, specifically black cottonwood. There are no brook trout in this reach so there would be no concern for increased interspecific competition for available habitat or a threat of hybridization.

Flower Creek

If the mitigation in Libby Creek above the falls fails, the next highest potential for effective bull trout mitigation in the Kootenai River Core Area lies in Flower Creek. Flower Creek provides a limited contingency to the proposed Libby Creek mitigation. Flower Creek, a historic bull trout stream, is the municipal water supply for the city of Libby. Brook trout are present above and below the existing dams and complete eradication would be impossible. Securing the reach above the upper dam as bull trout habitat would require repeated physical removal of brook trout through electrofishing and gillnetting. Piscicides would never be an option as the watershed is the sole municipal water supply for the city of Libby.

There are several additional mitigation options available in Flower Creek: 1) salvage the Flower Creek bull trout population (if it is still functional) upstream of the water storage dam and rehabilitate the watershed with a non-native species (brook trout) eradication program, 2) establish a genetic reserve with bull trout from upper Libby Cr. and Bear Cr. in the water supply storage reservoir and upstream in Flower Creek by implementing non-native fish eradication and transferring bull trout to the Flower Creek drainage, 3) re-establish cold water habitats downstream of the water storage dam through construction of a selective withdrawal mechanism in the dam or a stream water by-pass system through the reservoir, 4) rehabilitate the new cold water channel (3, above) with a non-native species eradication program and re-introduce migratory bull trout to the stream, 5) re-establish cold water stream habitat in Flower Creek downstream of the water storage dam through construction of a water bypass channel through the diversion dam reservoir, and 6) re-establish a migratory bull trout population above and below the water diversion dam utilizing fish transfer from other bull trout populations, non-native fish eradication, and selective upstream passage techniques at the low-head water diversion dam. Re-established bull trout populations would offset projected bull trout population declines in the Kootenai River Core Area, re-established quality bull trout habitat would offset projected permanent losses of bull trout critical habitat, and establishment of a bull trout genetic reserve that would protect existing at risk bull trout populations (Libby Creek) by lowering the risk of catastrophic mine related incidents affecting that population.

Preferably, Upper Libby Creek mitigation would restore habitat for an existing bull trout population in the area of predicted flow depletion. Flower Creek would provide contingency mitigation in the event mitigation in the Upper Libby Creek reach above the falls is determined unsuccessful. At that point the Flower Creek mitigation concepts would be further prioritized based on habitat conditions below the lower dam, habitat conditions between the two dams, non-native species suppression opportunities above the upper dam, the potential to create a genetic reserve, assessment of fish transfer and passage for the lower dam, and assessment of cold water release feasibility.

Timing

Logically, the Core Area Bull Trout Mitigation Plans would be developed in phases to support advancement of more detailed plans and designs. The phases are intended to allow an iterative approach for MMC to collaboratively work with the FS, MFWP and FWS on any modifications that may be determined necessary as more information is collected on the selected streams and improvements are made to the numerical groundwater model during the Resource Evaluation Phase of the proposed action. The first three periods, described below, are essentially planning phases involving supplemental data collection, project-level plan and design development, and implementation plan and specific work plan development. These activities will begin immediately upon FS authorization to implement the Evaluation Phase of the Montanore Project, and be completed during the Resource Evaluation Program. Phase Four is mitigation project implementation which would be time dependent on a number of factors and would likely not begin for most projects until the FS authorizes MMC to begin the mine Construction phase (estimated to last 3 – 4 years). Phase Five is monitoring and maintenance of all fisheries related mitigation measures, including bull trout, this phase would extend from issuance of FS authorization to implement the Evaluation Phase through when monitoring data indicates

mitigation is successful and sustainable. The timeframe for this phase may extend well beyond closure and reclamation of the mine. Depending on the actual post-mining effects on stream baseflows and the success of mitigation measures, all mitigation plan phases could be extended beyond the mine Reclamation phase (this would require additional MMC funding or forfeiture of an appropriately sized bond).

A subset of the Core Area Bull Trout Mitigation Plans would be the "feasibility assessments" needed to ascertain the steps necessary to proceed with selected mitigation proposals in each Core Area; Upper Libby Creek Conservation Project, Flower Creek Bull Trout Conservation Project and Rock Creek Invasive Species Eradication Project (see 1. d, e and f, above). It is proposed that these assessments and subsequent planning phases will begin immediately upon issuance of the FS authorization to implement the Evaluation Phase. Based on the feasibility assessments, and be completed within 18 months of initiation of the Resource Evaluation phase, preliminary work plans will be prepared for consideration of approval by the FS, in consultation with MFWP and FWS (and other partners as deemed appropriate by FS).

Phase One: Study Plan

One of the first activities to be conducted under phase one of mitigation planning would be to conduct more detailed surveys of the proposed bull trout mitigation streams. These fisheries and habitat surveys would be designed to gain a better understanding of the status of bull trout populations, non-native fish populations, barriers, and habitat quality. Stream specific study plans will be developed by MMC and submitted as a component of a proposed annual work plan to the FS and appropriate agencies for review and approval. The study plans will describe the methods, effort and costs that would be necessary to collect information needed to support the development of specific objectives and preliminary mitigation project designs for each stream.

Phase Two: Preliminary Design and Supplemental Information

The results from Phase One would be used to refine development of the objectives and preliminary mitigation designs for each proposed mitigation project. It is expected that additional mitigation opportunities could be identified to enhance the original planned mitigation measures. Results from Phase One and the revised numerical groundwater model that will be generated during the Resource Evaluation Program may identify a need for supplemental investigation to support a final mitigation project design. If so, supplemental study plans could be developed prior to or in conjunction with the preliminary mitigation project design. Preliminary mitigation project designs will be submitted to the FS for approval before further planning commences.

Phase Three – Mitigation Work Plan

After completion of Phase One and Phase Two, MMC would advance the approved preliminary design into a final design and proposed implementation work plan. Again, it is possible that additional field work or design work (Phases One and Two) would be required to provide final details prior to completion of a final implementation work plan. A schedule of activities would be part of the final work plan that would consider seasonal flows, fish spawning, and other factors that would influence timing of implementation of the work plan. The final work plan would also include a description of monitoring and maintenance to ensure that mitigation measures are stable and meet objectives (for long-term effectiveness assessments, any fishery

monitoring will be incorporated into the Fisheries Monitoring Plan and proposed annual work plans). A draft plan will be submitted for FS and other agency review and approval. Based on the FS direction, MMC will prepare a Final Mitigation Project Work Plan.

The work plan would also describe what authorizations, approvals, and permits may be required before implementation. MMC would be responsible for applying for and obtaining necessary approvals to support in-stream work and other activities that have not been obtained as part of the overall Montanore Project approval, including access agreements or other similar legal documents that may be required. MMC would provide the agencies with all authorizations to ensure compliance with applicable laws and regulations.

Phase Four – Implementation

MMC would implement the Final Mitigation Project Work Plan following FS approval of the Plan and of an annual work plan. Implementation would be conducted in cooperation with the various agencies, property owners, and other parties as appropriate. Due, in part, to seasonal constraints, the implementation schedule may take several seasons to complete and would be coordinated with all parties involved.

Phase Five – Monitoring and Maintenance

The final phase of the plan would be fish population and stream habitat monitoring to assess mitigation success and stability of any stream modifications. Maintenance and repairs would be accomplished by MMC based on the monitoring results. Based on principals of adaptive management, this phase would include any modifications or re-implementation that would be required if mitigation objectives were not being met. Through principals of adaptive management, this could include the development and implementation of new mitigation measures within the affected Core Areas.

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Attachment 6 – USFWS Terms and Conditions in the Biological Opinion for the Grizzly Bear

Biological Opinion for the Grizzly Bear

On March 31, 2014, the United States Fish and Wildlife Service (Service) issued its *Final Biological Opinion on the Effects to Grizzly Bears from the Implementation of Proposed Actions Associated with Plan of Operations for the Montanore Minerals Corporation Copper/Silver Mine*. Below are the BO's Reasonable and Prudent Measures, terms and conditions, and Reporting Requirements (pp. 137 – 139).

C. Reasonable and Prudent Measures

Biological opinions typically provide reasonable and prudent measures that are expected to reduce the amount of incidental take. Reasonable and prudent measures are those measures necessary and appropriate to minimize incidental take resulting from the proposed Montanore Mine Project. Reasonable and prudent measures are nondiscretionary and must be implemented by the agency in order for the exemption in section 7(o)(2) to apply.

1. Reduce the potential for incidental take of grizzly bears resulting from bear-human encounters.

2. Reduce the potential for incidental take of grizzly bears resulting from displacement of grizzly bears and improve habitat conditions in the north-south corridor in the Cabinet Mountains.

D. 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 which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. The following terms and conditions implement RPM 1:

    a. MMC will develop a public outreach (information and education) plan in detail for Forest approval prior to starting the construction phase of the Montanore mine. Appendix I [of the Biological Opinion] outlines essential features of the plan.

    b. The Forest will review and approve, with Service advice, MMC's detailed program for public outreach prior to the start of the construction phase of the Montanore mine.

2. The following terms and conditions implement RPM 2:

    a. Under the direction of the Forest Service, MMC will fund or implement the conversion of Forest Trail #935 (East Fork Rock Creek) from motorized to non-motorized, thus creating additional grizzly bear core habitat prior to the start of the evaluation adit phase.

    b. The Forest Service will require MMC to change the primary access and haul route from the Bear Creek road (Forest Road 278) to the Libby Creek road (Forest Road 231). This change reduces the likelihood that traffic levels on Forest Road 278 will create a fracture zone disrupting grizzly bear movements from den areas west of the road toward spring habitat to the east. It also maintains existing

movement corridors toward the linkage area with the NCDE. See Appendix H [of the Biological Opinion] for comparison of the two routes.

c. In coordination with and approval by the Forest Service and Service, MMC will plan, fund and implement access management strategies on acquired mitigation land parcels consistent with the intent of the mitigation plan to improve core and access parameters (OMRD and TMRD) prior to transfer to the Forest Service.

d. The Forest Service will complete an environmental assessment for potential access management changes on National Forest System lands associated with all acquired mitigation parcels located in the CYERZ within five years from the start of the Montanore Mine construction phase.

e. The Forest Service will implement access changes approved under T&C 2d within two years of that decision signing.

E. Reporting Requirements

a. By April of each year, the Forest shall prepare and submit to the Service an annual report of grizzly bear and black bear sanitation incidents and corrective measures that have occurred within the Cabinet Mountains portion of the CYE and Cabinet Face BORZ taken during the previous year.

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

The Service believes that no more than one grizzly bear will be incidentally taken as a result of the proposed action. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the likelihood of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiating consultation and review of the reasonable and prudent measures provided. The Federal agency must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

Attachment 7 – USFWS Terms and Conditions in the Biological Opinion for the Bull Trout and Bull Trout Critical Habitat

Biological Opinion for Bull Trout and Bull Trout Critical Habitat

On March 31, 2014, the United States Fish and Wildlife Service issued its *Final Biological Opinion on the Effects to Bull Trout and Bull Trout Critical Habitat From the Implementation of Proposed Actions Associated with the Plan of Operations for the Montanore Minerals Corporation Copper/Silver Mine*. Below are the BO's Reasonable and Prudent Measures (pp. 139) and terms and conditions (Appendix E from Incidental Take Statement section VIII of the Biological Opinion).

C. Reasonable and Prudent Measures

The KNF BA (2013, Appendix A) Proposed Action includes a Bull Trout Mitigation Plan that contains specific and conceptual mitigation measures intended to offset projected adverse effects to bull trout including incidental take as a result of implementation of the proposed Montanore Project. As previously stated, the Service has determined that some measures of the proposed Plan (as described in the 2013 KNF BA) - that is, certain elements of the Bull Trout Mitigation Plan - are unlikely to be implemented or unlikely to be implemented in a timely manner. Therefore, to avoid the uncertainty that measures in the Plan will not be implemented in a timely manner the Service includes these proposed mitigation measures in this Incidental Take Statement as Reasonable and Prudent Measures along with the associated Terms and Conditions (see Appendix E [of the Biological Opinion]). We expect that the KNF will implement these minimization measures as they become binding conditions of any contract or permit issued to any party, as appropriate, for the exemption in section 7(o)(2) of the Act to apply.

The KNF proposed Bull Trout Mitigation Plan consists of 27 "measures to offset bull trout population and critical habitat impacts in the Kootenai River and Lower Clark Fork River core areas". The Plan also contains a "conceptual bull trout mitigation plan" which outlines proposed mitigation projects that are intended for further evaluation, assessment, and planning stages prior to implementation. The Reasonable and Prudent Measures identified below (and their following Terms and Conditions, Appendix E [of the Biological Opinion]) were based on the KNF proposed Plan; the significant exception occurs in KNF proposed mitigation for bull trout in Libby Creek.

The Service has determined the following Reasonable and Prudent Measures are necessary and appropriate to minimize the incidental take of bull trout:

1. Identify and implement, in a timely manner, means to minimize predicted adverse project effects to bull trout in the action area (within the Kootenai River and Lower Clark Fork River core areas) of the proposed Montanore Project. Identify an adaptive management plan/process as a means to use new information to make changes to minimization measures to assure and verify that the specified level of incidental take associated with the Montanore Project is not exceeded.

2. Monitor activities associated with the proposed action: to ensure that all specified project activities comply with Best Management Practices described as Proposed Actions in the KNF BA (2013) and to required terms and conditions of this biological opinion (see Appendix E [of the Biological Opinion]).

D. Terms and Conditions

The Proposed Action in the KNF BA (2013, Appendix A) includes a Bull Trout Mitigation Plan that proposes specific mitigation measures that could minimize the take of bull trout resulting from adverse effects of predicted water depletions, predicted increased water temperatures in Libby Creek, and predicted increases in sediment. Each mitigation measure is proposed with

specific timing for implementation related to dates of KNF authorization of particular mine phases of the Montanore Project. The timing of mitigation implementation is related to uncertainties in determining mitigation measure feasibility and to determining achievement and documentation of biological success of mitigation actions. However, some statements in the KNF's Bull Trout Mitigation Plan text suggest that timing of mitigation measures or prioritization of measures could be dependent upon further studies (hydrology and modeling studies). The Service has determined that timing of implementation measures to minimize take should most appropriately be linked to feasibility assessments and verification of success, rather than to further studies. The Service has further determined that because of the qualifying statements, it is unlikely that KNF's Bull Trout Mitigation Plan will be implemented in its entirety and unlikely to be implemented in a timely manner and therefore cannot be considered to minimize the effects of the proposed action in this BO.

The terms and conditions of this Biological Opinion are intended to do the following: 1) clarify commitments and timing regarding implementation of measures contributing to minimization of incidental take of bull trout (and other details) proposed in the KNF BA (2013), 2) focus appropriate monitoring activities to assure the success of projects to minimize take, and 3) verify that the specified level of take is not exceeded and allow changes to mitigation projects as new information is collected. In addition, several minor modifications to timing of the KNF Proposed Action are included to account for minimization of take measures determined to be necessary by the Service (especially pertaining to proposed mitigation measures identified to offset adverse impacts to bull trout predicted to occur in Libby Creek).

In order to be exempt from the prohibitions of section 9 of the Act, KNF shall comply and shall require MMC to comply with the following terms and conditions which implement the Reasonable and Prudent Measures (see Incidental Take Statement, section VIII, described above). These Terms and Conditions are non-discretionary.

The Following Terms and Conditions are established to Implement Reasonable and Prudent Measure #1:

1. MMC, under direction of the FS, will implement the following actions prior to and/or during the Resource Evaluation phase of the Montanore Project:

    a. Prior to FS authorization to initiate the Resource Evaluation Phase for the Montanore Project, MMC will prepare for FS approval, in consultation with the Service and Montana Fish Wildlife and Parks (MFWP), a bull trout mitigation guidance plan specific to each bull trout Core Area potentially affected by the Project. The <u>Core Area Bull Trout Mitigation Guidance Plans</u> (Kootenai River and Lower Clark Fork River Core Areas) will identify and quantitatively evaluate potential bull trout population effects, potential habitat effects, and overall bull trout conservation effects of specific mitigation concepts described below in the "Conceptual Bull Trout Mitigation Plan" section. These potential beneficial effects of proposed mitigation actions will be compared to predicted adverse effects to bull trout populations identified in the KNF BA (2013) and this BO. The Core Area Bull Trout Mitigation Guidance Plans will identify success criteria and monitoring effort (see 8, below) needed to verify that objectives of the subject mitigation proposals have been met. The Core Area Bull Trout Mitigation Guidance Plans will be finalized and approved by the FS, following consultation with the Service and MFWP, within 6 months of

MMC receiving final authorization from the FS to initiate the Resource Evaluation Phase.

b. Within 6 months of MMC receiving final authorization from the FS to initiate the Resource Evaluation Phase, MMC will employ or fund a local Bull Trout Mitigation Coordinator to lead MMC planning, coordination, implementation, and monitoring activities. Method of employment and personnel selection for the Coordinator position will be approved by the FS in consultation with the Service. MMC will commit to employment of the Coordinator position (including administrative, staff, and other support), or provide funding in advance, in 5-year increments for the life of the mine and through the Closure and Reclamation phase, or as otherwise agreed by FS in consultation with the Service (assuming the sequential mining phases proceed following the Resource Evaluation Phase). The MMC (Coordinator) will prepare annually, by January 1 of each year, for Forest Service approval, in consultation with FWS, annual work plans, including: identification of data collection needs; proposed feasibility studies; engineering design needs; and implementation planning documents necessary to accomplish mitigation actions identified in Core Area Bull Trout Mitigation Guidance Plans (see 1.a. above), and/or other mitigation actions determined appropriate by FS in consultation with FWS; and MMC funding needed in the calendar year to fully complete these tasks. Same Coordinator will prepare by March 1 of each year for FS approval, in consultation with FWS, annual completion reports describing activities undertaken in the previous calendar year and the status of those activities and results of any studies conducted.

c. Within one calendar year of issuance of the FS authorization to implement the Resource Evaluation Phase of the Montanore Project, MMC will prepare for FS approval, in consultation with MFWP and the Service (and other stakeholders deemed appropriate by the FS), a feasibility assessment of actions needed (with tasks, costs, scheduling, etc.) to further develop mitigation planning and implementation of the Libby Creek mitigation project, see “Conceptual Bull Trout Mitigation Plan”, below. Prior to submittal to the FS for approval of the Libby Creek mitigation project feasibility assessment, MMC will conduct a meeting to facilitate consultation with the MFWP, FS, Service, and other appropriate regulatory agencies and stakeholders as determined by the FS. Final designs by MMC and construction authorizations by FS, if the project is deemed feasible by the FS in consultation with the agencies, will be completed within one year of FS approval of the feasibility assessment.

d. Within one calendar year of issuance of the FS authorization to implement the Resource Evaluation Phase of the Montanore Project, MMC will prepare for FS approval, in consultation with the City of Libby, MFWP and the Service (and other stakeholders deemed appropriate by the Forest Service), a feasibility assessment of actions needed (with tasks, costs, scheduling, etc.) to further develop mitigation planning and implementation of the Flower Creek mitigation project, see “Conceptual Bull Trout Mitigation Plan”, below. Prior to submittal to the FS for approval of the Flower Creek mitigation project feasibility assessment, MMC will conduct a meeting to facilitate consultation with the City of Libby, MFWP, FS, Service, and other appropriate regulatory agencies and stakeholders as determined by the FS. Final designs by MMC and construction authorizations by FS, if the project (or components thereof) is deemed feasible by the FS in consultation with the

agencies, will be completed within one year of FS approval of the feasibility assessment.

e. Within one calendar year of issuance of the FS authorization to implement the Resource Evaluation Phase of the Montanore Project, MMC will prepare for FS approval, in consultation with MFWP, Avista Corporation (Avista), Revett RC Resources Corporation (Revett), and the Service (and other stakeholders deemed appropriate by the FS), a feasibility assessment of actions needed (with tasks, costs, scheduling, etc.) to further develop mitigation planning and implementation of the Rock Creek Invasive Species Eradication Project, see "Conceptual Bull Trout Mitigation Plan", below. Prior to submittal to the FS for approval of the Rock Creek mitigation project feasibility assessment, MMC will conduct a meeting to facilitate consultation with Avista, Revett, MFWP, FS, Service, and other appropriate regulatory agencies and stakeholders (as determined by the FS). Final implementation plans (prepared by MMC in consultation with the entities, above) and permitting authorizations by FS and other agencies, if the project is deemed feasible by the FS in consultation with the agencies, will be completed within one year of FS approval of the feasibility assessment.

f. Within one calendar year of issuance of the FS authorization to implement the Resource Evaluation Phase of the Montanore Project, MMC will prepare for FS approval, in consultation with MFWP and the Service (and other stakeholders deemed appropriate by the FS), a feasibility assessment of actions needed (with tasks, costs, scheduling, etc.) to further develop mitigation planning and implementation of the Copper Gulch mitigation project, see "Conceptual Bull Trout Mitigation Plan", below. Prior to submittal to the FS for approval of the Copper Creek mitigation project feasibility assessment, MMC will conduct a meeting to facilitate consultation with the affected land owners, MFWP, FS, Service, and other appropriate regulatory agencies and stakeholders as determined by the FS. Final designs by MMC, land owner agreements, and construction authorizations by FS, if the project is deemed feasible by the FS in consultation with the agencies, will be completed within one year of FS approval of the feasibility assessment.

g. Within one calendar year of issuance of the FS authorization to implement the Resource Evaluation Phase of the Montanore Project, MMC will prepare for FS approval, in consultation with MFWP and the Service (and other stakeholders deemed appropriate by the FS) a feasibility assessment of actions needed (with tasks, costs, scheduling, etc.) to further develop mitigation planning and implementation of the West Fork Rock Creek mitigation project, see "Conceptual Bull Trout Mitigation Plan", below. Prior to submittal to the FS for approval of the West Fork Rock Creek mitigation project feasibility assessment, MMC will conduct a meeting to facilitate consultation with the MFWP, FS, Service, and other appropriate regulatory agencies and stakeholders as determined by the FS. Final designs by MMC and construction authorizations by FS, if the project is deemed feasible by the FS in consultation with the agencies, will be completed within one year of FS approval of the feasibility assessment.

h. During the Resource Evaluation Phase and prior to development and signing of MOU(s) (see below), MMC will commit to fund the Bull Trout Mitigation

Coordinator position (including needed support; see 1. b.), development of annual work plans, and annual completion reports, development of two Bull Trout Core Area Mitigation Guidance Plans, a Fisheries Monitoring Plan, preliminary mitigation project feasibility assessments (Upper Libby Creek Project, Flower Creek Project, Rock Creek Invasive Species Eradication Project, Cooper Creek Project, and West Fork Rock Creek Project), and any supporting studies needed to complete the tasks as deemed appropriate by FS in consultation with MFWP and Service.

2. MMC, under direction of the FS, will implement the following actions during the Resource Evaluation Phase (which commences at the date of final FS authorization to initiate the Resource Evaluation Phase of the Montanore Mine Project) and prior to MMC receiving FS authorization to begin the Construction phase:

   a. Prior to FS authorization to initiate the Construction phase, MMC will establish a trust fund and/or post a bond, to adequately fund implementation costs (planning, development, construction, and monitoring) during the Construction phase of the overall Bull Trout Mitigation Plan (KNF BA 2013), the two Core Area Bull Trout Mitigation Guidance Plans (specifically including projected costs of implementing the Libby Creek mitigation project, Flower Creek mitigation project, Rock Creek mitigation project, Copper Gulch mitigation project, and West Fork Rock Creek mitigation project (see 1. c. through g, above), and the Fisheries Monitoring Plan (see 8, below). The amount in the trust fund or posted in a bond will be approved by the FS in consultation with the Service (and other stakeholders as determined by the FS), and will be commensurate with projected mitigation planning, coordination, study, monitoring, design, construction, and other conservation activities needed to accomplish the mitigation projects in a timely manner, as will be defined in the Core Area Bull Trout Mitigation Plans and the Fisheries Monitoring Plan (items 1. a., above; and 8, below). If implementation costs during the Construction phase of the above items exceed the amount deposited in the trust fund or posted in a bond, then MMC will contribute additional funds to fully implement those actions in a timely manner as determined by the FS in consultation with the Service.

   b. Prior to FS authorization of the Construction Phase, an initial deposit will be made to the trust fund, 2. a. above, designated for planning, development, and construction of: Upper Libby Creek project (see 1. c. above) which will involve habitat enhancement, restoration and population monitoring; Flower Creek Project (see 1. d. above); the Rock Creek Invasive Species Eradication Project (see 1. e. above); Copper Creek Project (see 1. f. above); and, West Fork Rock Creek Project (see 1. g. above). If implementation costs during the Construction Phase for these projects exceed the amount deposited in the trust fund, then MMC will contribute additional funds to fully implement and monitor those actions in a timely manner (as determined by the FS in consultation with the Service).

   c. Prior to FS authorization of the Construction Phase, MMC will separately commit ((MOU(s), below)) to fund during the Construction Phase all costs associated with the Bull Trout Mitigation Coordinator and support (if that position is filled by a MMC employee or contractor), and to costs of funding activities in 1. h., above (if implementation of 1. h. activities occurs during the Construction Phase; see 1. b. and 1. h.).

d. Prior to FS authorization of the Construction Phase, and not later than two calendar years from FS issuance of authorization to implement the Resource Evaluation Phase for the Montanore Project, MMC will prepare an overall bull trout mitigation audit report detailing and quantifying progress toward accomplishment of bull trout mitigation objectives. Findings and MMC recommendations will be presented for approval by the FS, in consultation with the Service and MFWP. The purpose of the mitigation audit report will be to determine if and what adaptive management changes will be required by the FS to the Bull Trout Core Area Mitigation Guidance Plans, Fisheries Monitoring Plan, or MOU(s) (see below) prior to authorization of the Construction Phase in order to meet the objectives of the KNF proposed Bull Trout Mitigation Plan and terms and conditions of this biological opinion intended to minimize the take of bull trout.

e. Prior to completion of the Resource Evaluation phase, the FS and MMC will develop and sign a Memorandum of Understanding (MOU): The FS will develop a MOU with MFWP, MMC, and other cooperating parties deemed appropriate by the FS. The Service will be an advisor in the development of the MOU. The MOU must be completed prior to the FS issuing MMC a letter of authorization to proceed with the Construction Phase, and not later than two calendar years from the date of final FS authorization to implement the Resource Evaluation Phase for the Montanore Project. The MOU will identify and define FS roles, responsibilities and time lines for insuring diligent implementation by MMC and compliance with tasks identified, and annually approved by the FS, in the Bull Trout Mitigation Plan (KNF BA 2013), Core Area Bull Trout Mitigation Guidance Plans (item 1. a, above), Fisheries Monitoring Plan (item 8, below), and terms and conditions of this biological opinion.

The MOU will require the FS to:

i. Ensure the Core Area Bull Trout Mitigation Guidance Plans and the Fisheries Monitoring Plan are completed, and approved, prior to completion of the Resource Evaluation phase of the mine.
ii. Establish, in consultation with the Service, time frames, consistent with the Bull Trout Mitigation Plan (KNF BA 2013), Core Area Bull Trout Mitigation Guidance Plans, Fisheries Monitoring Plan, mitigation plan development assessments (1. c. through g., above), and terms and conditions of this biological opinion.
iii. Ensure adequate funding is planned for and provided annually, from MMC, to fund the Trust Fund (2. a. and b., above), the Bull Trout Mitigation Coordinator position (including administrative, office, transportation, and needed field equipment expenses), and to fund implementation of the mitigation measures identified in the previous terms and conditions of this biological opinion.
iv. Comply with legal guidelines and permitting processes in a timely manner to meet implementation schedules identified in pertinent plans, including the Core Area Bull Trout Mitigation Guidance Plans and Fisheries Monitoring Plan, and annual work plan schedules approved by the FS.
v. Ensure that the Service is consulted annually to determine if implementation of mitigation measures, and progress toward their accomplishment, is

adequate to meet the requirements of the Biological Opinion, including mandatory Reasonable and Prudent Measures and their implementing Terms and Conditions to minimize the take of bull trout.

3. MMC, under direction of the Forest Service, will implement the following actions during the Construction phase and not later than 5 years after FS authorization to initiate the Construction phase:

   a. Within 5 years of MMC receiving FS authorization to commence the Construction Phase, MMC will fully complete, unless otherwise agreed to by FS in consultation with the Service, implementation of mitigation measures identified, and approved by FS in consultation with FWS, in the overall Bull Trout Mitigation Plan (KNF BA 2013), the two Core Area Bull Trout Mitigation Guidance Plans (specifically including the Libby Creek, Flower Creek, Rock Creek, Copper Gulch, and West Fork Rock Creek mitigation projects, see 1. a, and 1. c. thru g, above), and continuation of the Fisheries Monitoring Plan (see 8, below).

   b. Throughout the Construction Phase, MMC will separately commit (see 2. a. and b, above) to fund and otherwise support all costs and activities associated with the Bull Trout Mitigation Coordinator (see 1. b., 1. h., and 2. c., above) (including administrative support), and to completing activities in 1. h. (above), if implementation of 1. h. activities occur during the Construction phase.

4. MMC, under direction of the FS, will implement the following actions prior to receiving FS approval to begin the Operations phase:

   a. Prior to FS authorization to initiate the Operations Phase, MMC will contribute funds to the trust fund and/or post a bond (2. a, above), to fund any remaining implementation costs during the Operations phase of the overall Bull Trout Mitigation Plan (KNF BA 2013), the two Core Area specific Bull Trout Mitigation Guidance Plans, and continuation of the Fisheries Monitoring Plan. The amount in the trust fund or posted in a bond will be approved by the FS in consultation with the Service (and other stakeholders as determined by the FS), and will be commensurate with projected mitigation planning, coordination, study, monitoring, design, construction, and other conservation activities needed to accomplish the mitigation projects in a timely manner within the Operations Phase of the Montanore Mine Project, as defined in the Core Area Bull Trout Mitigation Guidance Plans and the Fisheries Monitoring Plan (items 1. a. and 8.).

   b. MMC will separately commit to funding costs associated with the Bull Trout Mitigation Coordinator (see 1. b., 1. h., 2. c. and 3. b., above) and administrative support and to costs of funding activities identified in the Fisheries Monitoring Plan (see item 8, below).

   c. Prior to authorization of the Operation phase, and not later than two calendar years from FS authorization of the Construction phase for the Montanore Project, MMC will prepare an overall bull trout mitigation audit report detailing and quantifying progress toward accomplishment of bull trout mitigation objectives. Findings and MMC recommendations will be presented for approval by the FS, in consultation

with the Service and MFWP. The purpose of the mitigation audit report will be to determine if and what adaptive management changes will be required by the FS to the Bull Trout Core Area Mitigation Guidance Plans, Fisheries Monitoring Plan, or MOU(s) prior to authorization of the Operation phase in order to meet the objectives of the Plans and terms and conditions of this biological opinion intended to minimize take of bull trout.

5. MMC, under direction of the FS, will implement the following actions during the Operation phase (estimated to last 16 – 20 years following the Construction Phase):

   a. During the Operation phase, MMC will fully complete, unless otherwise agreed to by FS in consultation with the Service, implementation of mitigation measures and activities identified, and approved by FS in consultation with the Service, in the overall Bull Trout Mitigation Plan (KNF BA 2013), the two Core Area specific Bull Trout Mitigation Guidance Plans and the Fisheries Monitoring Plan.

   b. During the Operation phase, beginning not later than eight calendar years from FS final authorization for MMC to commence the Resource Evaluation Phase for the Montanore Project, MMC will prepare an overall bull trout mitigation audit report detailing and quantifying progress toward accomplishment of bull trout mitigation objectives. A bull trout mitigation audit report will be prepared for FS approval every three years throughout the Operation phase. Findings and MMC recommendations will be presented for approval by the FS, in consultation with the Service and MFWP. The purpose of the mitigation audit report will be to determine if and what adaptive management changes will be required by the FS to the Bull Trout Core Area Mitigation Guidance Plans, Fisheries Monitoring Plan, or MOU(s) during the Operation Phase in order to meet the objectives of the Plans and to document and minimize the take of bull trout.

   c. MMC will separately commit to fund and otherwise support throughout the Operation phase all costs and activities associated with the Bull Trout Mitigation Coordinator (see 1. b., 1. h., 2. c., 3. b., and 4. b. above) and administrative support, and to costs of funding activities identified in the Fisheries Monitoring Plan (see item 8, below).

6. MMC, under direction of the FS, will implement the following actions prior to receiving FS approval to begin the Closure and Reclamation phase:

   a. Prior to authorization of the Closure and Reclamation phase, MMC will prepare an overall bull trout mitigation audit report detailing and quantifying progress toward accomplishment of bull trout mitigation objectives. The audit report will include documentation of the extent and magnitude of take that occurred to bull trout as a result of the Proposed Action. Findings and MMC recommendations will be presented for approval by the FS, in consultation with the Service and MFWP. The purpose of the mitigation audit report will be to determine if and what adaptive management changes will be required by the FS to the Bull Trout Core Area Mitigation Guidance Plans, Fisheries Monitoring Plan, or MOU(s) (see 2. b, above) prior to authorization of the Closure and Reclamation phase in order to meet the objectives of the Bull Trout Mitigation Plan (KNF BA 2013). If bull trout mitigation

objectives have not been met by the final bull trout mitigation audit report during the Operation phase, then MMC will determine the amount of funds needed to be deposited in the trust fund and other MMC commitments needed to accomplish, maintain and monitor implementation of bull trout mitigation measures through the Closure and Reclamation phase. Adaptive management changes to the Bull Trout Core Area Mitigation Guidance Plans, Fisheries Monitoring Plan, or MOU(s) may be required prior to authorization of the Closure and Reclamation phase in order to meet the objectives of the Plans and to minimize the take of bull trout.

b. Prior to authorization of the Closure and Reclamation phase, MMC will contribute adequate funds to the trust fund and/or post a bond, to fund implementation, maintenance, and monitoring costs during the Closure and Reclamation phases (and in perpetuity, if deemed appropriate) of the overall Bull Trout Mitigation Plan (KNF BA 2013), the two Core Area specific Bull Trout Mitigation Guidance Plans, and continuation of the Fisheries Monitoring Plan. The amount to be deposited in the trust fund or posted in a bond will be determined by FS in consultation with the Service (and other stakeholders as determined by the FS) and will be commensurate with projected mitigation planning, coordination, study, monitoring, design, construction, and other conservation activities needed to accomplish the mitigation projects in a timely manner, as determined by the FS in consultation with the Service.

c. MMC will separately commit to funding costs associated with the Bull Trout Mitigation Coordinator and support and to costs of funding activities deemed appropriate by FS in consultation with the Service (and other stakeholders as determined by FS) that will be necessary to achieve full mitigation during the Closure and Reclamation Phases.

7. MMC, under direction of the FS, will implement the following actions during the Closure and Reclamation phase (estimated to last 20 years or more following the Operation phase):

a. During the Closure and Reclamation phase, MMC will fully complete, unless otherwise agreed to by FS in consultation with the Service, implementation of any remaining mitigation measures identified, and approved by FS in consultation with the Service, in the overall Bull Trout Mitigation Plan (KNF BA 2013), the two Core Area specific Bull Trout Mitigation Guidance Plans and continuation of the Fisheries Monitoring Plan.

b. During the Closure and Reclamation phase, MMC will prepare an overall bull trout mitigation audit report detailing and quantifying progress toward accomplishment of bull trout mitigation objectives. A bull trout mitigation audit report will be prepared for FS approval every three years throughout the Closure and Reclamation phase. Findings and MMC recommendations will be presented for approval by the FS, in consultation with the Service and MFWP. The purpose of the mitigation audit report will be to determine if and what adaptive management changes will be required by the FS to the Bull Trout Core Area Mitigation Guidance Plans, Fisheries Monitoring Plan, or MOU(s) during the Closure and Reclamation Phase in order to meet the objectives of the Plans and to minimize the take of bull trout.

c. MMC will separately commit to fund and otherwise support throughout the Closure and Reclamation Phases, as needed, all costs and activities associated with the Bull Trout Mitigation Coordinator and support and to costs of funding activities deemed appropriate by FS in consultation with the Service (and other stakeholders as determined by FS) that will be necessary to achieve full mitigation during the Closure and Reclamation Phases.

8. FS and MMC, in consultation with the Service (and other stakeholders as determined by FS), will agree to integrate the principles of adaptive management by collecting, disseminating where needed, and reviewing new information on bull trout, the results of implementation of the Core Area Bull Trout Mitigation Guidance Plans and Fisheries Monitoring Plan over time, consider the revised numerical groundwater model prepared during the Resource Evaluation Phase and other information related to bull trout near the project area. Based on new information, if appropriate to ensure that the objectives of the mitigation plans and conditions of the Biological Opinion are met (and to verify and document the extent of take of bull trout associated with the Proposed Action), conduct additional analyses or develop alternatives or modifications to the Core Area Bull Trout Mitigation Guidance Plans and Fisheries Monitoring Plan.

9. In order to assure the minimization of take of bull trout by the proposed Montanore Project, the Service requires the following "Conceptual Bull Trout Mitigation Plan" ((modified from the KNF BA (2013) proposed action)) be fully considered during development of Core Area Bull Trout Mitigation Guidance Plans for the Kootenai River and Lower Clark Fork River Core Areas and in development of the Fisheries Monitoring Plan.

Conceptual Bull Trout Mitigation Plan

The following outlines conceptual mitigation projects and some technical mechanisms and details that should be considered for inclusion in Bull Trout Core Area Mitigation Guidance Plans. Development of these Plans by MMC and approval by the FS, in consultation with the Service, is required prior to FS authorization to initiate the Resource Evaluation Phase (see VIII. D. 1. a., above). If initial fish population and habitat surveys, see Fisheries Monitoring Plan (VIII. D. 10., below), or other studies and considerations on subject streams indicate that any of the proposed conceptual mitigation measures are not feasible, then the Service requires that additional mitigation measures on that stream or on other bull trout occupied or historically occupied streams within the subject bull trout Core Area may be substituted for these initial mitigation measure concepts (see "adaptive management", VIII. D. 8., above). The Service further requires that any substitute mitigation actions be comparable in function and magnitude to those listed below. It is anticipated that the Bull Trout Mitigation Plan (KNF BA 2013), Core Area Bull Trout Mitigation Guidance Plans, Fisheries Monitoring Plan and supporting MOU(s) and other MMC commitments may be modified or amended on a recurring three year basis throughout the life of the mine (see "bull trout mitigation audit reports", above).

Locations

Two streams in each Bull Trout Core Area were initially selected for assessment of bull trout mitigation measures to meet mitigation objectives:

- Lower Clark Fork Core Area

  Copper Gulch
  West Fork Rock Creek (and Rock Creek proper)

- Kootenai Core Area

  Flower Creek
  Libby Creek

Lower Clark Fork Core Area

Copper Gulch (a.k.a. Copper Creek) flows approximately 5 miles or 8 kilometers to the Bull River. The lower 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. This makes upper reaches unavailable to fall spawners. A private bridge crossing restricts flow during spring runoff. Shallow riffles predominate in the lower reach due to a lack of pool-forming structures such as large woody debris. Unstable bedload accumulations prevent distribution of spawning gravel. The central reach is more stable and complex than the lower reach, with moderate amounts of large woody debris. Spawning habitat is limited to gravel accumulations behind obstructions. Adequate rearing and overwintering habitat is available in the form of deep, low-velocity areas of the channel and substrate interstices. The upper 3.4 miles (5.5 kilometers) exhibits seasonal drying (LWC 2001). Bull trout are considered to have been historically present (Pratt and Huston 1993) but are currently absent. During a year 2012 survey, brook trout, brown trout, and rainbow/cutthroat trout hybrids (field identification) were captured in the lower reach. Cutthroat trout were abundant near the upper end of the perennial reach and were the only salmonid captured (MT Dept. of Fish, Wildlife, and Parks, reported in Kline and Savor 2012).

West Fork Rock Creek flows approximately four miles (6.5 kilometers) to Rock Creek. The lower 1,050 feet (320 meters) is seasonally dry. A natural barrier to upstream movement of fish occurs two miles (3.2 kilometers) from the confluence with Rock Creek. Fish habitat consists primarily of high gradient riffles and pools. Substrate is dominated by gravel and small cobble, with high amounts of fine sediment. The riparian zone is functional, providing moderate amounts of large woody debris. The drainage is subject to high flow events (Washington Water Power 1996, FS data reported in Littlejohn 2012 and in Kline and Savor 2012). Fish surveys were conducted during 1996 using multiple pass electrofishing and snorkel counts. Cutthroat trout and bull trout were reported to occur at densities of approximately 200 and 300 fish per 3,280 feet (1,000 meters), respectively, throughout the reach that is below the fish barrier (WWP 1996). During 2012, 2,500 feet (762 meters) in the central portion of the same reach was electrofished using a single pass, resulting in the capture of 42 cutthroat trout and 6 bull trout (FS data reported in Kline and Savor 2012). While the difference in effort during the 1996 and 2012 do not allow direct comparison of results, they do indicate that bull trout abundance was drastically lower during 2012 compared to 1996. In comparing the two species, the number of cutthroat trout that were captured during 2012 was approximately 25% of the 1996 cutthroat trout density estimates, whereas the number of bull trout that were captured was approximately 3% of the 1996 bull trout density estimates. This indicates a substantial reduction in bull trout abundance relative to cutthroat trout.

Rock Creek (mainstem) flows 5.3 miles to the Clark Fork River. Historic timber harvest resulted in current low levels of instream woody debris and caused adverse changes in channel morphology and substrate composition. The loss of woody debris affects macroinvertebrate production, sediment sorting, spawning gravel retention. There are some sediment sources in the drainage but they do not appear to have a significant effect on fish habitat. Substrate is dominated by cobble, and fine sediment is readily transported out of the mainstem or deposited in side-channels. Westslope cutthroat trout in Rock Creek are assumed to be mainly resident. Bull trout occur in the mainstem and some bull trout redds has been located, but the majority of the bull trout population and spawning occurs in East Fork Rock Creek. There is a seasonally dewatered stretch in lower Rock Creek that apparently keeps brook trout from colonizing the East Fork (Salmon Environmental Services 2012). Intermittent reaches limit bull trout access to potential spawning habitat during the late summer and fall, and may restrict non-native brook trout to below Engle Creek. Capture of a single westslope cutthroat x rainbow trout hybrid at site 2 in 2010 was the first record of a non-native salmonid in upper Rock Creek. To date no bull trout/brook trout hybrids have been documented (Salmon Environmental Services 2012).

Kootenai River Core Area

Flower Creek flows approximately 13 miles (21 kilometers) to the Kootenai River. Headwater tributaries begin in a series of small lakes located on Forest Service lands within the Cabinet Mountains Wilderness. The lower portion flows through the city of Libby, Montana. Two man-made dams, owned and operated by the City of Libby, are located private and State of Montana owned lands in the lower half of Flower Creek. The furthest downstream dam is used as a diversion point for a water intake that feeds by gravity to a water treatment plant. Upper Flower Creek Dam is operated by the City as part of their water supply storage system. The 58-foot high concrete arch dam was completed in 1945. The Upper Flower Creek reservoir has a normal capacity of 221 acre-feet. The upper dam is substandard with regard to failure risk. The City of Libby has begun the process to replace the upper dam within about a 5-year time frame (City of Libby web site). The stream is considered to have substantial fisheries resource value upstream of the dams on lands primarily managed by the Forest Service. Substantial portions of the segment of Libby Creek located between the two dams are located on lands managed by the Forest Service. Bull trout are known to have occurred in Flower Creek historically. Prior to 2012, the only salmonids captured in recent surveys have been brook trout and hybridized westslope cutthroat trout (MFISH). During 2012, one bull trout/brook trout hybrid was captured downstream of the lower reservoir and one was captured upstream of the upper reservoir. This indicates that bull trout are or recently were present in the Flower Creek drainage.

Libby Creek flows approximately 29 miles (47 kilometers) to the Kootenai River. A barrier falls at stream mile 26 (stream kilometer 42) blocks upstream fish passage. Bull trout are the only fish species that have been reported upstream of the falls. The average bull trout density in a reach between the downstream end of the Libby Adit disturbance boundary and the falls is 0.031 fish per square yard or 0.037 per square meter (n = 8, 2003 – 2011). Fish habitat includes low gradient riffle/run complexes with pools formed by boulders, bedrock, and large woody debris, steep riffles, and diversified habitat with large pools due, in part, to many downed trees with attached rootwads. Upstream of the Cabinet Mountains Wilderness Area boundary, the stream is bedrock controlled, cobble substrate is common, the width to depth ratio is low, stream gradient is high, large woody debris is lacking, and there are high quality pocket pools. A fish survey conducted upstream of the Cabinet wilderness Area boundary during 1988 reported no fish. The most upstream report of bull trout is at stream mile 28 (stream kilometer 45) during 2006 (Kline

2007b). These results indicated that there may be a fish barrier near or downstream of the Cabinet Mountains Wilderness Area boundary (Watershed and Kline 2005, Kline 2007b). Within the reach where bull trout occurrence has been confirmed, adjacent to the Libby Adit site, there is a wide cobble dominated reach that displays braiding, channel shifting, and an open canopy.

Actions

Proposed mitigation actions for these streams may include:

- Create genetic reserves through bull trout transplanting to protect existing bull trout populations (Libby Creek and Bear Creek) from catastrophic events;
- Rectify unnatural blockages to bull trout passage that are prohibiting access to spawning and rearing habitat;
- Rectify other factors that are limiting the potential of streams to support increased production of bull trout;
- Eradicate or suppress non-native fish species, especially brook trout that are a hybridization threat to bull trout.

Based on available information on the current condition of the selected streams, factors that influence bull trout populations and the mitigation potential of each stream have been tentatively identified, as described below.

Copper Gulch

Restoration of the aggraded lower reach will be the focus for mitigation. It is anticipated that modification of this reach will provide habitat, and alleviate seasonal drying to allow improved access for migratory bull trout to the central perennial reach where habitat is available to support a viable, self-sustaining bull trout population. An integral part of mitigation planning on Cooper Gulch will be an assessment of the feasibility of eliminating brook trout from the stream, and development of a stream rehabilitation plan, if brook trout removal is feasible. Additional feasibility studies for potential bull trout donor stocks will be required to determine genetic health and availability of nearby bull trout populations (e.g., East Fork Bull River), and development of a genetic management plan (if re-introduction of bull trout is considered). If successfully implemented, fish passage restoration and bull trout reintroduction in Copper Gulch could potentially contribute to offsetting both projected losses of bull trout numbers (minimize take) and offset adverse impacts to bull trout habitat in the East Fork Bull River and the lower Clark Fork River Core Area.

West Fork Rock Creek

Available data for this stream indicates that habitat is underutilized by bull trout compared to previous population density estimates. Additional habitat and population surveys will be conducted to identify limiting factors for bull trout in this stream and to evaluate its potential to provide spawning opportunities for migratory bull trout. If the limiting factors analyses so indicate, mitigation measures in this drainage may be able to partially offset both the projected reductions of bull trout populations (minimize take) and the loss of bull trout habitat in Rock Creek and the Lower Clark Fork River Core Area.

Rock Creek

It has been suggested (Salmon Environmental Services 2012) that bull trout populations in East Fork and West Fork Rock Creek are currently isolated from the threat of brook trout hybridization by an expanse of seasonally intermittent stream which separates the primary bull trout population from a brook trout population downstream of the intermittent stream reach. Removal of the brook trout population in lower Rock Creek (Rock Creek Invasive Species Eradication Project) will lower the risk of brook trout invading the bull trout habitat further upstream. As such this mitigation measure will complement any bull trout habitat or population mitigation measures deemed appropriate in the West Fork Rock Creek (see above). Additionally, if this mitigation measure (brook trout removal from Rock Creek) is feasible and implemented in a timely manner (before brook trout invade upstream bull trout habitat) it could enhance the chances of success of any mitigation actions taken in the West Fork Rock Creek and contribute to offsetting projected losses (minimize take) of bull trout in Rock Creek. Additionally, migratory bull trout are known to spawn and rear in the stream reach currently occupied by brook trout in lower Rock Creek, implementation of a bull trout population enhancing mitigation measure (removal of brook trout) could contribute to offsetting losses (minimize take) to upstream bull trout populations in Rock Creek.

Flower Creek

The highest potential for effective bull trout mitigation (and for effective measures to minimize the take of bull trout in Libby Creek) in the Kootenai River Core Area lies in Flower Creek. There are several possible mitigation options potentially available in Flower Creek: 1) salvage the local bull trout population (if it is still functional) upstream of the water storage dam and rehabilitate the watershed with a non-native species (brook trout) eradication or suppression program, 2) establish a genetic reserve with bull trout from local populations in Libby Creek and Bear Creek in the water supply storage reservoir and upstream in Libby Creek by implementing non-native fish eradication (or suppression) and transferring bull trout to the Flower Creek drainage, 3) rehabilitate the segment of Libby Creek between the two dams with a non-native fish species (brook trout) eradication or suppression program and re-introduce migratory bull trout to the stream, and 4) re-establish a migratory bull trout population above and below the water diversion dam utilizing fish transfer from other bull trout populations, non-native fish eradication or suppression, and selective upstream passage techniques (fish ladder) at the low-head water diversion dam. Re-established bull trout populations could offset (minimize take) projected bull trout population declines in the Kootenai River Core Area, re-established quality bull trout habitat could offset projected permanent losses of bull trout habitat, and establishment of a bull trout genetic reserve that could protect an existing “at risk” bull trout population (Libby Creek) by lowering the risk (minimize potential for take) of catastrophic mine related incidents affecting that population.

Libby Creek

In upper Libby Creek there is an opportunity for some on-site mitigation to partially offset (partially minimize take) the direct effects to bull trout and bull trout habitat of the nearby proposed mining activities. Adverse impacts to the subject stream reach and its small and isolated bull trout population are predicted to occur throughout (and following) the active mine life from relatively warm water effluent from the mine adit entering the stream 1,145 feet (349 meters) upstream of Libby Creek Falls. This effluent will have its greatest effect on changing bull trout habitat (warming the normally cold water) when streamflows are at their lowest (near baseflow conditions); this timing of most severe affect coincides with the most sensitive times for bull trout

reproduction (spawning and egg incubation). Other adverse impacts to the bull trout population and its habitat are projected to occur throughout the mine life and beyond due to baseflow depletions in the bull trout occupied reach of Libby Creek upstream of the mine effluent inflow point (approximately 7,216 feet or 2,020 meters of bull trout occupied habitat lies upstream of the effluent discharge point). Adverse effects to bull trout and their habitat from this predicted impact will also have their greatest effect (decreasing streamflow) when normal streamflows are at their lowest (near baseflow) and by potentially disrupting hyporheic flows through the gravels, thus potentially affecting spawning and egg incubation.

The reach of Libby Creek upstream of the falls and adjacent to the Libby Adit site displays braiding and channel shifting. Predicted decreased baseflows will further reduce the quantity and quality of the existing habitat. It is possible that installation of large formidable wood structures in the floodplain and riparian zone could stabilize this reach, restore riparian function, improve spawning and rearing habitat for bull trout by increasing channel depth, complexity and stability, and sediment retention. This proposed mitigation action could potentially improve approximately 1,176 feet or 450 meters of stream habitat and increase the ability of that habitat to support more bull trout. If successful, and if maintained in perpetuity, installation of the habitat enhancement structures could constitute partial mitigation (partial minimization of take) for predicted mining impacts. However, because of magnitude of the two projected impacts (warm water effluent influencing 1,145 feet (349 meters) of bull trout habitat and baseflow depletions affecting 7,216 feet or 2,020 meters of bull trout habitat), this action by itself will not fully mitigate projected impacts. Additional mitigating measures (measures to minimize take) will be needed to meet the objective of the Proposed Action as described in the Bull Trout Mitigation Plan, "…establish conservation actions that in the long-term will fully offset projected impacts from the mine project to bull trout populations and bull trout critical habitat" (KNF BA 2013).

The Following Terms and Conditions are established to implement Reasonable and Prudent Measure #2:

1. Prior to FS authorization to implement the Resource Evaluation Phase for the Montanore Project, MMC will prepare for FS approval, in consultation with MFWP and the Service, a final comprehensive Fisheries Monitoring Plan that addresses all fisheries related monitoring needed to document and verify project effects, including: verification of the extent and magnitude of take (see VIII. A., above) associated with project impacts; long-term effects of baseflow depletions, and effectiveness of mitigation measures intended to minimize take of bull trout; effects of "warm water" supplementation to Libby Creek from mine Adit sources; and short-term effects of projected sediment inputs to bull trout in the affected streams. The Fisheries Monitoring Plan will identify the techniques, intensity, duration, and frequency of fisheries population and habitat monitoring needed in all affected streams or other water bodies in the Action Area. The Fisheries Monitoring Plan will specifically address monitoring needs of proposed or anticipated bull trout mitigation projects ("before the action" data collection) and will take into account the amount of time and monitoring effort needed to fully assess the effects of the mitigation projects (for example, two bull trout life cycles or 14 years may be needed to verify short-term and long-term effects of particular actions).

2. Prior to FS authorization to implement the Resource Evaluation Phase for the Montanore Project, MMC will make long-term binding arrangements with MFWP (or other entities approved by MFWP and FS in consultation with the Service) for immediate

implementation (beginning with final FS authorization to initiate the Resource Evaluation Phase) of the Fisheries Monitoring Plan, including reporting and approval requirements of annual monitoring efforts to the FS. The Fisheries Monitoring Plan will contain provisions for documenting, collecting data, and annual reporting of the actual extent of "take" documented for particular factors noted in the preceding section, above. The "Take Statement" will be approved by the FS and submitted by KNF to the Service by March 1 of each following calendar year.

3. Reporting Requirements

a. By March l of each year, the Forest shall prepare and submit to the Service an annual report that summarizes actions taken to comply with the above terms and conditions implementing RPMs 1 and 2 during the previous year.

b. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiating consultation and review of the reasonable and prudent measures provided. The Federal agency must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

Attachment 8 – Environmental Specifications for Montanore 230-kV Transmission Line

STATE OF MONTANA/USDA FOREST SERVICE
ENVIRONMENTAL SPECIFICATIONS FOR
MONTANORE 230-KV TRANSMISSION LINE

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DEFINITIONS

ACCESS EASEMENT: Any land area over which the OWNER has received an easement from a LANDOWNER allowing travel to and from the project. Access easements may or may not include access roads.

ACCESS ROAD: Any travel course which is constructed by substantial recontouring of land and which is intended to permit passage by most four-wheeled vehicles.

ARM: Administrative Rules of Montana

BEGINNING OF CONSTRUCTION: Any project-related earthmoving or removal of vegetation (except for clearing of survey lines).

BOARD: Montana Board of Environmental Review

CERTIFICATE: Certificate of Compliance

CFR: Code of Federal Regulations

CONTRACTOR: Constructors of the Facility (agent of owner)

DAY: Monday through Friday, excluding all state or federal holidays

DEQ: Montana Department of Environmental Quality

DNRC: Montana Department of Natural Resources and Conservation

FWP: Montana Fish, Wildlife, and Parks

FS: United States Department of Agriculture, Forest Service

INSPECTORS: DEQ or KNF employee or their designee charged with inspecting the transmission line for compliance with the Environmental Specifications.

KNF: Kootenai National Forest

KNF INSPECTOR: KNF employee or designee charged with inspecting the transmission line for compliance with the KNF requirements.

LANDOWNER: The owner of private property

MCA: Montana Code Annotated

MDT:	Montana Department of Transportation
NFSL:	National Forest System Lands
OWNER:	The owner(s) of the facility, or the owner's agent.
ROD:	Record of Decision
SENSITIVE AREA:	Area which exhibits environmental characteristics that may make them susceptible to impact from construction of a transmission facility. The extent of these areas is defined for each project and may include any of the areas listed in Circular MFSA-2 (2004 Edition), Sections 3.2(1)(d) and 3.4(1).
SHPO:	State Historic Preservation Office
STATE SPECIAL: USE SITES	All locations other than structure locations and roads needed for the construction, operation, and decommissioning of the transmission line, and shall include, staging areas, helicopter landing and fueling sites, pulling and tensioning sites, stockpile sites, splicing sites, borrow pits, and storage or other building sites.
STATE INSPECTOR:	DEQ employee or DEQ's designee with the responsibility for monitoring the OWNER's contractor compliance with terms and conditions of the CERTIFICATE issued for the Project.

INTRODUCTION

The purpose of these specifications is to ensure the prevention or mitigation of potential environmental impacts during the construction and interim reclamation of the 230-kV transmission facility associated with the proposed Montanore Project. These specifications do not apply to the Sedlak Park substation, loop line, buried 34.5-kV powerline associated with the Montanore Mine, or to the mine itself. All other mine-related disturbances are covered by a Montana Department of Environmental Quality (DEQ) hard rock operating permit and Forest Service (FS) Plan of Operations. These specifications vary from those typically prepared by DEQ for other transmission line facilities because the specifications also incorporate FS requirements. These specifications are intended to be incorporated into the texts of contracts, plans, Plan of Operations, and specifications.

Decommissioning of the transmission line will be covered by the final reclamation and closure plan described in Appendix N at the end of this document.

Authority to determine compliance of the proposal facility with state and federal requirements for air and water quality standards, lies with the respective agencies. State laws for the protection of employees engaged in the construction, operation on maintenance of the proposal facility also remain in effect (Section 75-20-401, MCA).

Appendices at the end of these specifications refer to individual topics of concern and to site-specific concerns. Certain of these Appendices, shall be prepared by the OWNER working in consultation with DEQ and FS prior to the start of construction and submitted for approval by the DEQ and FS.

0.0. GENERAL SPECIFICATIONS

0.1. SCOPE

These specifications apply to all lands affected by the 230-kV transmission line, excluding the Sedlak Substation and loop line and the 34.5-kV power line. As provided in ARM 17.20.1902 (10), the certificate holder may contract with the LANDOWNER for revegetation or reclamation if the LANDOWNER wants different reclamation standards from (10)(a) applied on the property and that not reclaiming to the standards specified in (10)(a) and (b) would not have adverse impacts on the public and other LANDOWNERS. Where the LANDOWNER requests practices other than those listed in these specifications, DEQ may authorize such a change provided that the STATE INSPECTOR is notified in writing of the change and that the change will not be in violation of: (1) the Certificate; (2) any conditions imposed by the DEQ; (3) the DEQ's finding of minimum adverse impact or (4) the regulations in ARM 17.20.1701 through 17.20.1706, 17.20.1901, and 17.20.1902.

On private land, these specifications shall be enforced by the STATE INSPECTOR. On NFSL, enforcement shall be the joint responsibility of the STATE INSPECTOR and the KNF INSPECTOR.

0.2. ENVIRONMENTAL PROTECTION

The OWNER shall conduct all operations in a manner to protect the quality of the environment.

0.3. CONTRACT DOCUMENTS

It is the OWNER'S responsibility to ensure compliance with these specifications. If appropriate, these specifications can be part of or incorporated into contract documents to ensure compliance; in any case, the OWNER is responsible for its agent's adherence to these specifications in performing the work.

0.4. BRIEFING OF EMPLOYEES

The OWNER shall ensure that the CONTRACTOR and all field supervisors are provided with a copy of these specifications and informed of the applicability of individual sections to specific procedures. It is the responsibility of the OWNER to ensure its CONTRACTOR and CONTRACTOR's Construction Supervisors comply with these measures. The OWNER'S Project Supervisor shall ensure all employees are informed of the applicable environmental specifications discussed herein prior to and during construction. Site-specific measures provided in the appendices attached hereto shall be incorporated into the design and construction specifications or other appropriate contract document. The OWNER shall have regular contact and site supervision to ensure compliance is maintained.

0.5. COMPLIANCE WITH REGULATIONS

All project-related activities of the OWNER shall comply with all applicable local, state, and federal laws, regulations, and requirements that are not superseded by the Major Facility Siting Act.

0.6. LIMITS OF LIABILITY

The OWNER is not responsible for correction of environmental damage or destruction of property caused by negligent acts of DEQ or FS employees during construction, operation maintenance, decommissioning, and reclamation of the proposal project.

0.7. DESIGNATION OF SENSITIVE AREAS

DEQ and FS, in their evaluation of the transmission line, have designated certain areas along the right-of-way or access roads as SENSITIVE AREAS as indicated in Appendix A. The OWNER shall take all necessary actions including the measures listed in Appendix A to avoid adverse impacts in these SENSITIVE AREAS.

0.8. PERFORMANCE BONDS

To ensure compliance with these specifications, prior to any ground disturbing activity, the OWNER shall submit a joint transmission line construction and reclamation bond to DEQ and FS pertaining specifically to the reclamation of designated access roads, special use areas, and adjacent land disturbed during construction (Appendix B). The transmission line construction and reclamation bond shall be held to ensure cleanup and construction reclamation are complete and revegetation is proceeding satisfactory. At the time cleanup and construction reclamation are complete and revegetation is proceeding satisfactory, the OWNER shall be released from its obligation for transmission line construction reclamation and the transmission line construction and reclamation bond shall be released.

Concurrently, the OWNER shall submit a separate joint transmission line decommissioning bond to the DEQ and FS pertaining specifically to monitoring, decommissioning of the transmission line and reclamation following decommissioning. The joint decommissioning bond shall be subject to the FS and DEQ bond release provisions as outlined in the Reclamation Plan approved by the FS and DEQ. The approved Reclamation Plan shall contain reclamation standards as stringent as those found in ARM 17.20.1902(10).

DEQ's issuance of the Certificate of Compliance for the transmission line is conditioned upon the OWNER obtaining DEQ's approval of amendments for the Construction, Operation, Closure and Post-Closure Phases of the Montanore Project to make Operating Permit No. 00150 consistent with the FS's approval of Alternative 3- Agency Mitigated Poorman Impoundment

Alternative. DEQ and the FS will calculate the amount of the joint transmission line construction and reclamation bond and the joint decommissioning bond within 45 days after DEQ's approval of amendments to Operating Permit No. 00150 for the Construction, Operation, Closure and Post Closure Phases of the Montanore Project to make Operating Permit No. 00150 consistent with the FS's approval of Alternative 3- Agency Mitigated Poorman Impoundment Alternative

0.9. DESIGNATION OF STRUCTURES

Each structure for the transmission line shall be designated by a unique number on plan and profile maps and referenced consistently. Any reference to specific poles or structures in the Appendices shall use these numbers. If this information is not available because the survey is not complete, station numbers or mileposts shall indicate locations along the centerline. Station numbers or mileposts of all angle points shall be designated on plan and profile maps.

0.10. ACCESS

When easements for construction access are obtained for construction personnel, provision shall be made by the OWNER to ensure that DEQ will be allowed access to the special use areas, right-of-way, and to any off-right-of-way access roads. Where such easements are obtained on private land to provide access to NFSL, such provisions shall also be made for the KNF INSPECTOR. Liability for damage caused by providing such access for the STATE INSPECTOR or KNF INSPECTOR shall be limited by section 0.6 LIMITS OF LIABILITY.

0.11. DESIGNATION OF STATE INSPECTOR AND KNF INSPECTOR

DEQ shall designate a STATE INSPECTOR(S) to monitor the OWNER’S compliance with these specifications and any other project–specific mitigation measures adopted by DEQ as provided in ARM 17.20.1901 through 17.20.1902. The FS shall designate a KNF INSPECTOR(S) to monitor the OWNER’S compliance with the Plan of Operations for activities on NFSL. The STATE INSPECTOR shall be the OWNER’s liaison with the State of Montana on construction, post-construction, and construction reclamation activities for the certified transmission line on all lands. The KNF INSPECTOR and the STATE INSPECTOR shall coordinate lead roles for construction, post-construction, and reclamation activities for the certified transmission line on NFSL. All communications regarding the project shall be directed to the STATE INSPECTOR and on NFSL, to the KNF INSPECTOR and STATE INSPECTOR. The names of the INSPECTORS are in Appendix C.

1.0. PRECONSTRUCTION PLANNING AND COORDINATION

1.1. PLANNING

1.1.1. Planning of all stages of construction and maintenance activities is essential to ensure that construction-related impacts shall be kept to a minimum. The CONTRACTOR and OWNER shall, to the extent possible, plan the timing of construction, construction and maintenance access

requirements, location of special use areas, and other details before the commencement of construction.

1.1.2. At least 45 days before the start of construction, the OWNER shall submit plan and profile map(s), both on paper and an electronic equivalent agreed to by the DEQ and FS, to DEQ and the FS depicting the location of the centerline and of all construction access roads, maintenance access roads, structures, clearing back lines, operational right-of-way width, vehicle wash or cleaning stations specified by county Weed Control Plan, and, to the extent known, STATE SPECIAL USE SITES. The scale of the map shall be 1:24,000 or larger. Specifications and typical sections for construction and maintenance access roads shall be submitted with the plan and profile maps(s) and an electronic equivalent agreed to by the DEQ and FS. When these materials are submitted, access road locations shall have been flagged on the ground for review by the KNF and STATE INSPECTORS.

1.1.3. At least 45 days before the BEGINNING OF CONSTRUCTION, the OWNER shall submit a Road Management Plan to the FS and DEQ. This plan shall detail the specific location of all roads that need to be opened, constructed, or reconstructed. The OWNER must receive written approval of the plan from the FS and DEQ prior to gaining access on any closed road or beginning any surface disturbing activity. This plan, once approved, shall be incorporated into Appendix D.

1.1.4. If special use areas are not known at the time of submission of the plan and profile, the following information shall be submitted no later than 5 days prior to the BEGINNING OF CONSTRUCTION. The location of special use areas shall be plotted on one of the following and submitted to the KNF and STATE INSPECTORS: aerial imagery of a scale 1:24,000 or larger, or available USGS 7.5' plan and profile maps of a scale 1:24,000 or larger, and an electronic equivalent agreed to by the DEQ and FS.

1.1.5. Changes or updates to the information submitted in 1.1.2 through 1.1.4 shall be submitted within 10 days to the DEQ and FS for approval. In no case shall a change be submitted less than 5 days prior to its anticipated date of construction. Where changes affect designated SENSITIVE AREAS, these changes must be submitted to DEQ and FS 15 days before construction and approved by the STATE INSPECTOR on all lands and the KNF on FS lands prior to construction.

1.2. PRECONSTRUCTION CONFERENCE

1.2.1. At least one week before the BEGINNING OF CONSTRUCTION, the OWNER shall schedule a preconstruction conference with DEQ and the FS. The KNF and STATE INSPECTORS shall be notified of the date and location for this meeting.

1.2.2. The OWNER's representative, the CONTRACTOR's representative, the designated INSPECTORS, and representatives of affected state and federal agencies who have land management or permit and easement responsibilities shall be invited to attend the preconstruction conference.

1.3. PUBLIC CONTACT

1.3.1. Written notification by the OWNER's field representative or the CONTRACTOR shall be given to local public officials in each affected community prior to the BEGINNING OF CONSTRUCTION to provide information on the temporary increase in population, when the increase is expected, and where the workers will be stationed. If local officials require further information, the OWNER shall hold meetings to discuss potential temporary changes. Officials contacted shall include the county commissioners, city administrators, and law enforcement officials. It is also suggested that local fire departments, emergency service providers, and a representative of the Chamber of Commerce be contacted.

1.3.2. The OWNER shall negotiate with the LANDOWNER in determining the best location for access easements and the need for gates.

1.3.3. The OWNER shall contact local government officials, MDT, or the managing agency, as appropriate, regarding implementation of required traffic safety measures.

1.4. PRECONSTRUCTION SURVEYS

1.4.1. The Construction Phase will begin after OWNER submits final design plans to the agencies described in Section 1.1, and received agency approval to implement the Construction Phase. Before OWNER receives agency approval to implement the Construction Phase and any ground-disturbing activities occurs, Owner shall complete the surveys described below on all areas where such surveys have not been completed and that will be disturbed by the transmission line.

1.4.2. OWNER shall complete an intensive cultural resource inventory of the Area of Potential Effect that will meet the requirements of the 36 CFR 800, the guidelines in the 2009 FS and DEQ Site Inventory Strategy, and Montana SHPO. An intensive cultural resource inventory is a pedestrian survey with transects no more than 100 feet apart that covers the entire Area of Potential Effect. The adequacy of past intensive cultural resource inventories shall be decided by the FS and DEQ in consultation with the Montana SHPO. OWNER shall submit to the FS and DEQ an inventory report meeting Montana SHPO requirements. The report shall include eligibility for listing on the National Register of Historic Places recommendations for all identified historic properties. When an adverse effect to an eligible historic property is anticipated, OWNER may choose to redesign the project to avoid the property. If avoidance is not feasible, OWNER shall undertake actions to mitigate any adverse effect following the requirements of 36 CFR 800.6. A mitigation plan shall be developed by OWNER, reviewed by the FS and DEQ, reviewed by culturally affiliated tribes, and submitted to the SHPO and the Advisory Council on Historic Preservation for approval. OWNER will implement the approved mitigation plan and receive FS and DEQ concurrence of mitigation implementation before any ground-disturbing activities. In addition, the OWNER shall adhere to all provisions outlined in the Programmatic Agreement, and Tribal Monitoring Plan (Appendix E), if developed.

1.4.3. The OWNER shall complete a survey for threatened, endangered, or Forest sensitive plant species on NFSL for any areas where such surveys have not been completed and that will be disturbed by transmission line construction. Similarly, the OWNER, in coordination with the DNRC and LANDOWNER, shall conduct surveys in habitat suitable for threatened, endangered, and state-listed plant species potentially occurring on non-NFSL lands. The surveys shall be submitted to the DEQ and FS for approval. If adverse effects could not be avoided, OWNER shall develop appropriate mitigation plans for agency approval. OWNER shall implement the approved mitigation plan and receive FS and DEQ concurrence of mitigation implementation before any ground-disturbing activities.

1.4.4. The OWNER shall complete a jurisdictional wetland delineation of all areas proposed for ground disturbance associated with the transmission line, including all crossings of waters of the U.S. by roads. The delineation shall be submitted to the U.S. Army Corps of Engineers for a jurisdictional determination. If discharge of dredge or fill material into waters of the U.S. cannot be avoided, OWNER shall develop appropriate mitigation plans for Corps, FS, and DEQ approval. OWNER shall implement the approved mitigation plan and receive FS and DEQ concurrence of mitigation implementation before any ground-disturbing activities. All conditions associated with a 404 permit shall be incorporated into these specifications.

1.4.4. The OWNER shall either fund or conduct field and/or aerial reconnaissance surveys to locate any new bald eagle or osprey nests along specific segments of the transmission line corridor or implement timing restrictions listed in Appendix I. Surveys shall be conducted between March 15 and April 30, one nesting season immediately prior to transmission line construction.

2.0. CONSTRUCTION

2.1. GENERAL

2.1.1. The preservation of the natural landscape contours and environmental features shall be an important consideration in the location of all construction facilities, including roads and special use areas. Construction of these facilities shall be planned and conducted so as to minimize destruction, scarring, or defacing of the natural vegetation and landscape. Any necessary earthmoving shall be planned and designed to be as compatible as possible with natural landforms.

2.1.2. Temporary special use areas shall be the minimum size necessary to perform the work. Such areas shall be located where most environmentally compatible, considering slope, fragile soils or vegetation, and risk of erosion. After construction, these areas shall be reclaimed as specified in Section 3.0 of these specifications unless a specific exemption is authorized in writing by the STATE INSPECTOR. On NFSL, these areas shall be reclaimed as specified in Section 3.0 of these specifications unless a specific exemption is authorized in writing by the KNF and STATE INSPECTOR.

2.1.3. All work areas shall be maintained in a neat, clean, and sanitary condition at all times. Trash or construction debris (in addition to solid wastes described in section 2.14) shall be regularly removed during the construction and reclamation periods.

2.1.4. If mixing of soil horizons will lead to a significant reduction in soil productivity, difficulty in establishing permanent vegetation, or an increase in weeds, mixing of soil horizons shall be avoided insofar as possible. This may be done by removing and stockpiling topsoil, where practical, so that it may be spread over subsoil during site reclamation.

2.1.5. Vegetation such as trees, plants, shrubs, and grass on or adjacent to the right-of-way that does not interfere with the performance of construction work or operation of the line itself shall be preserved. The Vegetation Removal and Disposition Plan (Appendix F) shall identify the specific areas where vegetation will be removed or retained to minimize impacts from the construction and operation of the transmission line. This plan must be approved by the inspectors in their areas of jurisdiction prior to construction.

2.1.6. The OWNER shall take all necessary actions to avoid adverse impacts to SENSITIVE AREAS listed in Appendix A and implement the measures listed in Appendix A in these areas. The STATE INSPECTOR shall be notified 5 days in advance of initial clearing or construction activity in these areas. In addition the KNF INSPECTOR shall be notified 5 days in advance of initial clearing or construction activity on NFSL in these areas. The OWNER shall mark or flag the clearing backlines and limits of disturbance in certain SENSITIVE AREAS as designated in Appendix A. All construction activities must be conducted within this marked area.

2.1.7. The OWNER shall either acquire appropriate land rights or provide compensation for damage for the land area disturbed by construction. The width of the area disturbed by construction shall not exceed a reasonable distance from the centerline as necessary to perform the work. For this project, construction activities except access road construction and use of special use areas shall be contained within the area specified in Appendix G.

2.1.8. Flow in a stream course may not be permanently diverted. If temporary diversion is necessary for culvert installation, flow shall be restored immediately after culvert installation, as determined by the STATE INSPECTOR on all lands, and KNF INSPECTOR on NFSL.

2.2. CONSTRUCTION MONITORING

2.2.1. The STATE INSPECTOR is responsible for implementing the compliance monitoring required by ARM 17.20.1902. The STATE and KNF INSPECTORS are responsible for implementing the compliance monitoring on NFSL. The plan specifies the type of monitoring data and activities required and terms and schedules of monitoring data collection, and assigns responsibilities for data collection, inspection reporting, and other monitoring activities. It is attached as Appendix H.

2.2.2. The INSPECTORS, the OWNER, and the OWNER'S agents shall attempt to rely upon a cooperative working relationship to reconcile potential problems relating to construction in

SENSITIVE AREAS and compliance with these specifications. When construction activities cause excessive environmental impacts due to seasonal field conditions or damage to sensitive features, the designated INSPECTORS shall talk with the OWNER about possible mitigating measures or minor construction rescheduling to avoid these impacts and may impose additional mitigating measures. The INSPECTORS shall be prepared to provide the OWNER with written documentation of the reasons for the additional mitigating measures within 24 hours of their imposition. All parties shall attempt to adequately identify and address these areas and planned mitigation, to the extent practicable, during final design to minimize conflicts and delays during construction activities.

2.2.3. The INSPECTORS may require mitigating measures or procedures at some sites beyond those listed in Appendix A in order to minimize environmental damage due to unique circumstances that arise during construction, such as unanticipated discovery of a cultural site. The KNF INSPECTOR may require additional mitigating measures on NFSL. The INSPECTORS shall follow procedures described in the monitoring plan when such situations arise.

2.2.4. In the event that the STATE INSPECTOR shows reasonable cause that compliance with these specifications is not being achieved, and the OWNER has not taken reasonable efforts to remediate the situation, DEQ shall take corrective action as described in 75-20-408, MCA. In the event that the KNF INSPECTOR shows reasonable cause that compliance with these specifications is not being achieved, FS shall implement measures described in 36 CFR 228.7(b).

2.3. TIMING OF CONSTRUCTION

2.3.1. Construction and motorized travel may be restricted or prohibited at certain times of the year in certain areas. Exemptions to these timing restrictions may be granted by DEQ and FS in writing if the OWNER can clearly demonstrate that no significant environmental impacts will occur as a result. No waiver of winter range timing restrictions shall be approved on National Forest System or state trust lands where the grizzly bear mitigations apply. These areas are listed in Appendix I.

2.3.2. In order to prevent rutting and excessive damage to vegetation, construction shall not take place during periods of high soil moisture when construction vehicles will cause severe rutting deeper than four inches requiring extensive reclamation.

2.4. PUBLIC SAFETY

2.4.1. All construction activities shall be done in compliance with existing health and safety laws.

2.4.2. Requirements for aeronautical hazard marking shall be determined by the OWNER in consultation with the Montana Aeronautical Division, the Federal Aviation Administration the DEQ, and FS. These requirements are listed in Appendix J. Where required, aeronautical hazard

markings shall be installed at the time the wires are strung, according to the specifications listed in Appendix J.

2.4.3. Noise levels shall not exceed established DEQ standards as a result of operation of the facility and associated facilities. For electric transmission facilities, the average annual noise levels, as expressed by an A-weighted day-night scale (Ldn) shall not exceed 50 decibels at the edge of the right-of-way in residential and subdivided areas unless the affected LANDOWNER waives this condition.

2.4.4. The facility shall be designed, constructed, and operated to adhere to the National Electrical Safety Code regarding transmission lines.

2.4.5. The electric field at the edge of the right-of-way shall not exceed 1 kilovolt per meter measured 1 meter above the ground in residential or subdivided areas unless the affected LANDOWNER waives this condition, and that the electric field at road crossings under the facility shall not exceed 7 kilovolts per meter measured 1 meter above the ground.

2.5. PROTECTION OF PROPERTY

2.5.1. Construction operations shall not take place over or upon the right-of-way of any railroad, public road, public trail, or other public property until negotiations and/or necessary approvals have been completed with the LANDOWNER or FS, and on lands subject to a conservation easement, FWP. Designated roads and trails as listed in Appendix A and Appendix D shall be protected and kept open for public use. Where it is necessary to cross a trail with access roads, the trail corridor shall be restored. Adequate signing and/or blazes shall be established so the user can find the route. All roads and trails designated by any government agency as needed for fire protection or other purposes shall be kept free of logs, brush, and debris resulting from operations under this agreement. Any such road or trail damaged by project construction or maintenance shall be promptly restored to its original condition.

2.5.2. Reasonable precautions shall be taken to protect, in place, all public land monuments and private property corners or boundary markers. If any such land markers or monuments are destroyed, the marker shall be reestablished and referenced in accordance with the procedures outlined in the “Manual of Instruction for the Survey of the Public Land of the United States” or, in the case of private property, the specifications of the county engineer. Reestablishment of survey markers shall be at the expense of the OWNER.

2.5.3. Construction shall be conducted so as to prevent any damage to existing real property including transmission lines, distribution lines, telephone lines, railroads, ditches, and public roads crossed. If such property is damaged during construction, operation, or decommissioning, the OWNER shall repair such damage immediately to a reasonably satisfactory condition in consultation with the LANDOWNER, the LANDOWNER shall be compensated for any losses to personal property due to construction, operation, or decommissioning activities.

2.5.4. In areas with livestock, the OWNER shall make a concerted effort to comply with the reasonable requests of LANDOWNERS regarding measures to control livestock. Unless requested by a LANDOWNER, care shall be taken to ensure that all gates are closed after entry or exit. Gates shall be inspected and repaired when necessary during construction and missing padlocks shall be replaced. The OWNER shall ensure that gates are not left open at night or during periods of no construction activity unless other requests are made by the LANDOWNER. Any fencing or gates cut, removed, damaged, or destroyed by the OWNER shall immediately be replaced with new materials. Fences installed shall be of the same height and general type as the fence replaced or nearby fence on the same property, and shall be stretched tight with a fence stretcher before stapling or securing to the fence post. Temporary gates shall be of sufficiently high quality to withstand repeated opening and closing during construction, to the satisfaction of the LANDOWNER.

2.5.5. The OWNER must notify the STATE INSPECTOR, KNF INSPECTOR and, if possible, the affected LANDOWNER within 2 days of damage to land, crops, property, or irrigation facilities, contamination or degradation of water, or livestock injury caused by the CONTRACTOR and/or the OWNER's activities, and the OWNER shall reasonably restore any damaged resource and/or replace where applicable damaged property. The OWNER shall provide reasonable compensation for damages to the affected LANDOWNER.

2.5.6. Pole holes and anchor holes must be covered or fenced in all locations if left open longer than eight hours or where a LANDOWNER's requests can be reasonably accommodated.

2.5.7. When requested by the LANDOWNER, all fences crossed by permanent access roads shall be provided with a gate. All fences to be crossed by access roads shall be braced before the fence is cut. Fences not to be gated should be restrung temporarily during construction and restrung permanently within 30 days following construction, subject to the reasonable desires of the LANDOWNER.

2.5.8. Where new access roads cross fence lines, the OWNER shall make reasonable effort to accommodate the LANDOWNER's wishes on gate location and width.

2.5.9. Any breaching of natural barriers to livestock movement by construction activities shall require fencing sufficient to control livestock.

2.6. TRAFFIC CONTROL

2.6.1. At least 30 days before any construction within or over any state or federal highway right-of-way or paved secondary highway for which MDT has maintenance, the OWNER shall notify the appropriate MDT field office to review the proposed occupancy and to obtain appropriate permits and authorizations. The OWNER must supply DEQ and FS with documentation that this consultation has occurred. This documentation shall include any measures recommended by MDT that apply to state highways and to what extent the OWNER has agreed to comply with these measures. In the event that recommendations or regulations will not be followed, DEQ shall resolve any disputes regarding state highways.

2.6.2. In areas where the construction creates a hazard, traffic shall be controlled according to the applicable MDT regulations. Safety signs advising motorists of construction equipment shall be placed on major state highways, as recommended by MDT. The installation of proper road signing shall be the responsibility of the OWNER.

2.6.3. The managing agency shall be notified, as soon practicable, when it is necessary to close public roads to public travel for short periods to provide safety during construction.

2.6.4. Construction vehicles and equipment shall be operated at speeds safe for existing road and traffic conditions.

2.6.5. Traffic delays shall be restricted on primary access routes, as determined by MDT on state or federal highways or FS on its roads.

2.6.6. Access for fire and emergency vehicles shall be provided for at all times.

2.6.7. Public travel through and use of active construction areas shall be limited at the discretion of the managing agency.

2.7. ACCESS ROADS AND VEHICLE MOVEMENT

2.7.1. Construction of new roads shall be the minimum reasonably required to construct and maintain the facility in accordance with the Road Management Plan in Appendix D. National Forest System, State, county, and other existing roads shall be used for construction access wherever possible. The location of access roads and structures shall be established in consultation with affected LANDOWNERS and LANDOWNER concerns shall be accommodated where reasonably possible and not in contradiction to these specifications or other appropriate FS and DEQ conditions.

2.7.2. All new roads, both temporary and permanent, shall be constructed with the minimum possible clearing and soil disturbance to minimize erosion, as specified in Section 2.11 of these specifications.

2.7.3. Where practical, all roads shall be initially designed to accommodate one-way travel of the largest piece of equipment required to use them; road width shall be no wider than necessary.

2.7.4. Roads shall be located as approved in the Road Management Plan (Appendix D). Travel outside the right-of-way to enable traffic to avoid cables and conductors during conductor stringing shall be kept to the minimum possible. Road crossings of the right-of-way shall be near support structures to the extent feasible.

2.7.5. Helicopter construction techniques shall be used as specified on Figure D-1 of this Appendix. Helicopter stringing shall also be used on the line. Where overland travel routes are used, they shall not be graded or bladed unless necessary and shall be flagged or otherwise

marked to show their location and to prevent travel off the overland travel route. Where temporary roads are required, they shall be constructed on the most level land available.

2.7.6. In order to minimize soil disturbance and erosion potential, cutting and filling for access road construction shall be kept to a minimum to the extent practicable, in areas of up to 5 percent side slope. In areas of over 5 percent side slope, roads shall be constructed to prevent channeling of runoff.

2.7.7. The OWNER shall complete the measures necessary so the KNF could place all new roads constructed for the transmission line on NFSL into intermittent stored service. Such requirements are described in Appendix D. The OWNER shall restrict access to closed roads during construction. Closure devices shall be reinstalled following construction on existing closed roads. The OWNER shall cooperate with the LANDOWNER regarding private lands and the DNRC on State lands to develop a similar approach to meet the LANDOWNER's land use requirements while minimizing environmental impacts.

2.7.8. Any damage to existing private roads, including rutting, resulting from project construction, operation, or decommissioning shall be repaired and restored to a condition as good or better than original as soon as possible. Repair and restoration of roads shall be accomplished during and following construction as necessary to reduce erosion.

2.7.9. Any necessary snow removal shall be done in a manner to preserve and protect roads, signs, and culverts, to ensure safe and efficient transportation, and to prevent excessive erosion damage to roads, streams, and adjacent land. All snow removal shall be done in compliance with INFS standards.

2.7.10. At least 30 days prior to construction of a new access road approach intersecting a state or federal highway, or of any structure encroaching upon a highway right-of-way, the OWNER shall submit to MDT a plan and profile map showing the location of the proposed construction. At least five days prior to construction, the OWNER shall provide the designated INSPECTORS written documentation of this consultation and actions to be taken by the OWNER as provided in 2.6.1.

2.8. EQUIPMENT OPERATION

2.8.1. During construction, unauthorized cross-country travel and the development of roads other than those approved shall be prohibited. The OWNER shall be liable for any damage, destruction, or disruption of private property and land caused by his construction personnel and equipment as a result of unauthorized cross-country travel and/or road development.

2.8.2. To prevent excessive soil damage in areas where a graded roadway has not been constructed, the limits and locations of access for construction equipment and vehicles shall be clearly marked or specified at each new site before any equipment is moved to the site. CONTRACTOR personnel shall be well versed in recognizing these markers and shall understand the restriction on equipment movement that is involved.

2.8.3. Dust control measures on all roads used for construction shall be implemented in accordance with DEQ's air quality permit and the KNF's Plan of Operations. Where requested by residents living within 500 feet of the line, the OWNER shall control dust created by transmission line construction activities. Oil or similar petroleum-derivatives shall not be used to control dust.

2.8.4. Work crew foremen shall be qualified and experienced in the type of work being accomplished by the crew they are supervising. Earthmoving equipment shall be operated only by qualified, experienced personnel. Correction of environmental damage resulting from operation of equipment by inexperienced personnel shall be the responsibility of the OWNER. Repair of damage to a condition reasonably satisfactory to the LANDOWNER, FS, or if necessary, DEQ, shall be required.

2.8.5. Sock lines or pulling lines shall be strung using a helicopter to minimize disturbance of soils and vegetation.

2.8.6. Following construction in areas designated by the local weed control board, DEQ, or FS on NFSL as a noxious weed areas, the CONTRACTOR shall thoroughly clean all vehicles and equipment to remove weed parts and seeds immediately prior to leaving the area. Such areas are shown in Appendix K.

2.9. RIGHT-OF-WAY CLEARING AND SITE PREPARATION

2.9.1. The STATE INSPECTOR shall be notified at least 10 days prior to any vegetation clearing; the STATE INSPECTOR and KNF shall be notified at least 10 days prior to any vegetation clearing on NFSL. The STATE INSPECTOR shall be responsible for notifying the DNRC Forestry Division. All vegetation clearing shall be conducted in accordance with the Vegetation Removal and Disposition Plan (Appendix F).

2.9.2. Right-of-way clearing shall be kept to the minimum necessary to meet the requirements of the National Electrical Safety Code. Clearing shall produce a "feathered edge" right-of-way configuration, where only specified hazard trees and those that interfere with construction or conductor clearance are removed. Trees to be saved within the clearing back lines and danger trees located outside the clearing back lines shall be marked. Clearing back lines in SENSITIVE AREAS shall be indicated on plan and profile maps. All snags and old growth trees that do not endanger the line or maintenance equipment shall be preserved. In designated SENSITIVE AREAS, the INSPECTORS may approve clearing measures and boundaries that vary from the design plan prior to clearing.

2.9.3. During clearing of survey lines or the right-of-way, small trees and shrubs shall be preserved to the greatest extent possible in accordance with the Vegetation Removal and Disposition Plan and in compliance with the National Electrical Safety Code. Shrub removal shall be limited to crushing where necessary. Plants may be cut off at ground level, leaving roots undisturbed so that they may re-sprout.

2.9.4. In no case shall the cleared width be greater than that described in the Vegetation Removal and Disposition Plan and the National Electrical Safety Code, unless approved by the INSPECTORS on NFSL and the STATE INSPECTOR and LANDOWNER on State and private land.

2.9.5. Soil disturbance and earth moving shall be kept to a minimum.

2.9.6. The OWNER shall be held liable for any unauthorized cutting, injury or destruction to timber whether such timber is on or off the right-of-way.

2.9.7. Unless otherwise requested by the LANDOWNER or FS, felling shall be directional in order to minimize damage to remaining trees. Maximum stump height shall be no more than 8 inches or less above the existing grade. Trees shall not be pushed or pulled over. Stumps shall not be removed unless they conflict with a structure, anchor, or roadway.

2.9.8. Crane landings shall be constructed on level ground unless extreme conditions (such as soft or marshy ground) make other construction necessary. In areas where more than one crane landing per structure site is built, the STATE INSPECTOR shall be notified at least 5 days prior to the beginning of construction at those sites. Topsoil will be salvaged at crane landings and used in reclamation of these disturbed areas.

2.9.9. No motorized travel on, scarification of, or displacement of talus slopes shall be allowed except where approved by the STATE INSPECTOR on all lands, the KNF INSPECTOR on NFSL, and LANDOWNER.

2.9.10. To avoid unnecessary ground disturbance, counterpoise should be placed or buried in disturbed areas whenever possible. If ground conditions do not allow for the drilling of counterpoises and excavations are required, topsoil must be salvaged. The topsoil will be used in reclamation of these disturbed areas.

2.9.11. Slash resulting from project clearing that may be washed out by high water the following spring shall be removed and piled outside the floodplain before runoff. Any instream slash resulting from project clearing to be removed shall be removed within 24 hours. OWNER shall leave large woody material for small mammals and other wildlife species within the cleared area on NFSL.

2.9.12. Use of heavy equipment to clear and remove vegetation in riparian areas shall be minimized.

2.9.13. Topsoil shall be salvaged from excavated structure holes and reapplied to the base of the structures.

2.9.14. If material drilled out for structures is not used to backfill the structure holes, the material must first be offered to the landowner. If the landowner does not want the material, the OWNER shall dispose of the material in consultation with the STATE INSPECTOR.

2.10. GROUNDING

2.10.1 Grounding of fences, buildings, and other structures on and adjacent to the right-of-way shall be done according to the specifications of the National Electrical Safety Code.

2.11. EROSION AND SEDIMENT CONTROL

2.11.1. Clearing and grubbing for roads and rights-of-way and excavations for stream crossings shall be carefully controlled to minimize silt or other water pollution downstream from the rights-of-way. At a minimum, erosion control measures described in the OWNER's Storm Water Pollution Prevention Plan and INFS standards shall be implemented as appropriate following the review of the plan and profile map(s) required under Section 0.9 and 1.1.2.

2.11.2. Roads shall cross drainage bottoms at sharp or nearly right angles and level with the stream bed whenever possible. Temporary bridges, fords, culverts, or other structures to avoid stream bank damage shall be installed.

2.11.3. Under no circumstances shall stream bed materials be removed for use as backfill, embankments, road surfacing, or for other construction purposes.

2.11.4. No excavations shall be allowed on any river or perennial stream channels or floodways at locations likely to cause detrimental erosion or offer a new channel to the river or stream at times of flooding.

2.11.5. Installation of culverts, bridges, fords, or other structures at perennial stream crossings shall be done as specified by the INSPECTORS following on-site inspections conducted by the STATE INSPECTOR. The STATE INSPECTOR shall invite the OWNER, landowner, FWP, and local conservation districts to participate in these inspections. Installation of culverts or other structures in a water of the United States shall be in accordance with the U.S. Army Corps of Engineers 404. Activities affecting water of the State of Montana shall be in accordance with DEQ 318 permit conditions. All culverts shall be sized according to current KNF stream crossing flow calculations and the Revised Hydraulic Guide Kootenai National Forest (1990) and amendments. Where new culverts are installed, they shall be installed with the culvert inlet and outlet at natural stream grade or ground level. Water velocities or positioning of culverts shall not impair fish passage. Stream crossing structures need to be able to pass the 100 year flow event.

2.11.6. Following submittal of a plan and profile maps, but prior to construction of access roads, bridges, fill slopes, culverts, impoundments, or channel changes within the high-water mark of any perennial stream, lake, or pond, the OWNER shall discuss proposed activities with the STATE INSPECTOR, FWP, local conservation district, and KNF personnel. This site review shall determine the specific mitigation measures to minimize impacts appropriate to the conditions present. These measures shall be added to Appendix A by the STATE INSPECTOR and as appropriate by the KNF INSPECTOR.

2.11.7. No blasting shall be allowed in streams. Blasting may be allowed near streams if precautions are taken to protect the stream from debris and from entry of nitrates or other contaminants into the stream. No blasting debris shall be placed into a water of the United States without a U.S. Army Corps of Engineers 404 and DEQ 318 permit.

2.11.8. The OWNER shall maintain roads on private lands while using them. All ruts made by machinery shall be filled or graded to prevent channeling. In addition, the OWNER must take measures to prevent the occurrence of erosion caused by wind or water during and after use of these roads. Some erosion-preventive measures include but are not limited to, installing or using cross-logs, drain ditches, water bars, and wind erosion inhibitors such as water, straw, gravel, or combinations of these. Erosion control shall be accomplished as described in the OWNER's General Stormwater Permit (or MPDES Permit) and the Storm Water Pollution Prevention Plan.

2.11.9. The OWNER shall prevent material from being deposited in any watercourse or stream channel. Where necessary, measures such as hauling of fill material, construction of temporary barriers, or other approved methods shall be used to keep excavated materials and other extraneous materials out of watercourses. Any such materials entering watercourses shall be removed immediately.

2.11.10. The OWNER shall be responsible for the stability of all embankments created during construction. Embankments and backfills shall contain no stream sediments, frozen material, large roots, sod, or other materials that may reduce their stability.

2.11.11. No fill material other than that necessary for road construction shall be piled within the high water zone of streams where floods can transport it directly into the stream. Excess floatable debris shall be removed from areas immediately above crossings to prevent obstruction of culverts or bridges during periods of high water.

2.11.12. No skidding of logs or driving of vehicles across a perennial watercourse shall be allowed, except via authorized construction roads.

2.11.13. Skidding with tractors shall not be permitted within 100 feet of streams containing flowing water except in places designated in advance, and in no event shall skid roads be located on these stream courses. Skid trails shall be located high enough out of draws, swales, and valley bottoms to permit diversion of runoff water to natural undisturbed forest ground cover.

2.11.14. Construction methods shall prevent accidental spillage of solid matter, contaminants, debris, petroleum products, and other objectionable pollutants and wastes into watercourses, lakes, and underground water sources. Secondary containment catchment basins capable of containing the maximum accidental spill shall be installed at areas where fuel, chemicals or oil are stored. Any accidental spills of such materials shall be cleaned up immediately.

2.11.15. To reduce the amount of sediment entering streams, vegetation clearing in Riparian Habitat Conservation Areas on NFSL and other riparian areas on private lands shall be conducted in accordance with the Vegetation Removal and Disposition Plan and the Storm Water Pollution Prevention Plan, to be submitted for approval by the DEQ and the FS.

2.11.16. Damage resulting from erosion or other causes from construction activities and disturbance areas shall be repaired after completion of grading and before revegetation is begun.

2.11.17. Stormwater discharge of water shall be dispersed in a manner to avoid erosion or sedimentation of streams as required in DEQ permits.

2.11.18. Riprap or other erosion control activities shall be planned based on possible downstream consequences of activity, and installed during the low flow season if possible. Timing restrictions are presented in Appendix I.

2.11.19. Water used in embankment material processing, aggregate processing, concrete curing, foundation and concrete lift cleanup, and other wastewater processes shall not be discharged into surface waters without a valid discharge permit from DEQ.

2.12. CULTURAL AND PALEONTOLOGIC RESOURCES

2.12.1. All construction activities shall be conducted so as to prevent damage to significant archaeological, historical, or paleontological resources, in accordance with the requirements of 1.4.1 and the PA (Appendix E). Any Mitigation or Treatment plans involving privately owned property will be submitted to DEQ. DEQ will review submitted plans and then forward them to SHPO for approval. Both DEQ and SHPO require 30 days to review and approve any submitted plans.

2.12.2. In the event of any unanticipated discoveries, procedures outlined in the PA (Appendix E) will be followed. For notification purposes, the FS maintains jurisdiction on NFSL lands, DEQ maintains jurisdiction on private lands.

2.12.3. The OWNER shall conform to treatments recommended for cultural or paleontological resources by SHPO and DEQ on private land, with concurrence by the LANDOWNER, and the FS if on NFSL.

2.13. PREVENTION AND CONTROL OF FIRES

2.13.1. Burning, fire prevention, and fire control shall meet the requirements of the managing agency and/or the fire control agencies having jurisdiction. The STATE and KNF INSPECTORS shall be invited to attend all meetings with these agencies to discuss or prepare these plans. A copy of agreed upon plans shall be included in Appendix L

2.13.2. The OWNER shall direct the CONTRACTOR to comply with regulations of any county, town, state or governing municipality having jurisdiction regarding fire laws and regulations.

2.13.3. Blasting caps and powder shall be stored only in approved areas and containers and always separate from each other.

2.13.4. The OWNER shall direct the CONTRACTOR to properly store and handle combustible material that could create objectionable smoke, odors, or fumes. The OWNER shall direct the CONTRACTOR not to burn refuse such as trash, rags, tires, plastics, or other debris, except as permitted by the county, town, state, or governing municipality having jurisdiction.

2.14. WASTE DISPOSAL

2.14.1. The OWNER shall direct the CONTRACTOR to use licensed solid waste disposal sites. Inert materials (Group III wastes) may be disposed of at licensed Class III landfill sites; mixed refuse (Group II wastes) must be disposed of at licensed Class II landfill sites.

2.14.2. Emptied pesticide containers or other chemical containers must be triple rinsed to render them acceptable for disposal in Class II landfills or for scrap recycling pursuant to ARM 44.10.803 for treatment or disposal. Pesticide residue and pesticide containers shall be disposed of in accordance with ARM 4.10.805 and 806.

2.14.3. All waste materials constituting a hazardous waste defined in Section 75-10-403, MCA, and wastes containing any concentration of polychlorinated biphenyls must be transported to an approved designated hazardous waste management facility (as defined in ARM 17.50.504) for treatment or disposal.

2.14.4. All used oil shall be hauled away and recycled or disposed of in a licensed Class II landfill authorized to accept liquid wastes or in accordance with 2.14.2 and 2.14.3 above. There shall be no intentional release of oil or other toxic substances into streams or soil. In the event of an accidental spill into a waterway, the INSPECTORS shall be contacted immediately. Any spill of refined petroleum products greater than 25 gallons must be reported to the State at the Department of Military Affairs, Disaster and Emergency Services Division at 406-841-3911. All spills shall be cleaned up in accordance with the OWNER's Emergency Spill Response Plan.

2.14.5. Sewage shall not be discharged into streams or streambeds. The OWNER shall direct the CONTRACTOR to provide refuse containers and sanitary chemical toilets, convenient to all principal points of operation. These facilities shall comply with applicable federal, state, and local health laws and regulations. A septic tank pump licensed by the State shall service these facilities.

2.14.6. Slash from vegetation clearing along the transmission line shall be managed in accordance with the Vegetation Removal and Disposition Plan, Montana law regarding reduction of slash (76-13-407, MCA) and, on NFSL, KNF objectives regarding fuels reduction.

2.14.7 On NFSL, merchantable timber shall be transported to designated landings or staging areas, and branches and tops shall be removed and piled. The FS shall be responsible for disposing of the piles on NFSL and the OWNER shall be responsible for disposal of the piles on other lands. All merchantable timber shall be removed from the transmission line clearing area on NFSL unless authorized in writing by an authorized FS representative. Non-merchantable

trees and coniferous forest debris shall be removed using a brush blade or excavator to minimize soil accumulation. Excess slash shall be removed or burned in all timber harvest areas and within ½ mile of any residence. The FS shall be responsible for disposing of the piles on FS land and the OWNER shall be responsible for disposal of the piles on other lands. Non-merchantable material left within the transmission line clearing area shall be lopped and scattered unless otherwise requested by the KNF.

2.14.8. On private land, management of merchantable and non-merchantable trees as well as slash shall be negotiated between LANDOWNER and OWNER. On State land, management of merchantable and non-merchantable trees as well as slash shall be negotiated between DNRC and OWNER.

2.14.9. Refuse burning shall require the prior approval of the LANDOWNER and a Montana Open Burning Permit must be obtained from the DEQ. Any burning of wastes shall comply with section 2.13 of these specifications.

2.14.10. Burning of vegetation shall be in accordance with the Vegetation Removal and Disposition Plan. Piling and windrowing of material for burning shall use methods that shall prevent significant amounts of soil from being included in the material to be burned and minimize destruction of ground cover. Piles shall be located so as to minimize danger to timber and damage to ground cover when burned.

2.15. SPECIAL MEASURES

2.15.1 Structures with low reflectivity and non-specular conductors shall be used to reduce potential for visual contrast.

2.15.2 Crossings of rivers should be at approximately right angles. Strategic placement of structures should be done both as a means to screen views of the transmission line and right-of-way and to minimize the need for vegetative clearing.

2.15.3 Based on the analysis contained in the EIS and findings made by the DEQ, general mitigations also may apply to construction and operation of the project. These measures are found in Appendix A.

3.0. POST-CONSTRUCTION CLEANUP AND RECLAMATION

3.1. CLEANUP

3.1.1. All litter resulting from construction is to be removed, to the satisfaction of the LANDOWNER on private lands, the DNRC on State lands, and the FS on NFSL, from the right-of-way and along access roads leading to the right-of-way. Such litter shall be legally disposed of as soon as possible, but in no case later than 60 days following completion of wire clipping.

3.1.2. Insofar as practical, all signs of temporary construction facilities such as haul roads, work areas, buildings, foundations or temporary structures, soil stockpiles, excess or waste materials, or any other vestiges of construction shall be removed and the areas restored to as natural a condition as is practical, in consultation with the LANDOWNER and the FS on NFSL.

3.2. RECLAMATION

3.2.1 Revegetation of the right-of-way, access roads, all special use area, or any other disturbance shall be consistent with the reclamation and revegetation standards and provisions contained in ARM 17.20.1902 and the approved Plan of Operations on NFSL. This plan and any conditions to the certificate approved by DEQ shall be attached as Appendix M.

3.2.2 Scarring or damage to any landscape feature listed in Appendix A shall be reclaimed as nearly as practical to its original condition. Bare areas created by construction activities shall be reseeded in compliance with Appendix M to prevent soil erosion.

3.2.3 After construction is complete, NFSL roads shall be reclaimed as described in Appendix D. Roads on private lands shall be managed in accordance with the agreement between LANDOWNER and OWNER and between DNRC and OWNER on State land.

3.2.4. Fill slopes associated with access roads adjacent to stream crossing shall be regraded at slopes less than the normal angle of repose for the soil type involved.

3.2.5. All drainage channels, where construction activities occurred, shall be restored to a gradient and width that shall prevent accelerated gully erosion (see Section 2.11.11).

3.2.6. Drive-through dips, open-top box culverts, waterbars, or cross drains shall be added to roads at the proper spacing and angle as necessary to prevent erosion. The suggested spacing of drive thru dips and relief culverts is discussed in the KNF Revised Hydraulic Guide (1990) and Parrett and Johnson (2004) unless superseded by the Corps' 404 and DEQ 318 permit conditions and shall be used to establish the locations of these items.

3.2.7. Interrupted drainage systems shall be restored.

3.2.8. Sidecasting of waste materials may be allowed on slopes over 40 percent after approval by the LANDOWNER, DNRC, or FS, however, this will not be allowed within the buffer strip established for stream courses, in areas of high or extreme soil instability, or in other SENSITIVE AREAS identified in Appendix A. Surplus materials shall be hauled to sites approved by LANDOWNER, DNRC, or FS in such areas.

3.2.9. Seeding prescriptions to be used in revegetation, requirements for hydroseeding, fertilizing, and mulching, as jointly determined by representatives of the OWNER, DEQ, DNRC, FS, and other involved state and federal agencies, are specified in Appendix M.

3.2.10. During the initial reclamation of construction disturbance in areas where topsoil has been stockpiled, the surface shall be graded to a stable configuration and the topsoil shall be replaced on the disturbed area. The STATE INSPECTOR may waive the requirement for topsoil replacement on private lands on a site-specific basis where additional disturbance at a site increases erosion, sedimentation, or reclamation problems. Similarly, the KNF INSPECTOR may waive such requirements on NFSL.

3.2.11. Excavated material not suitable or required for backfill shall be evenly spread onto the cleared area prior to spreading any stockpiled soil. Large rocks and boulders uncovered during excavation and not buried in the backfill shall be disposed of as approved by the STATE and KNF INSPECTORS and/or LANDOWNER.

3.2.12. Application rates, timing of seeds and fertilizer, and purity and germination rates of seed mixtures shall be as determined in consultation with DEQ and FS. Reseeding shall be done at the first appropriate opportunity after construction ends.

3.2.13. Where appropriate, hydro seeding, drilling, or other appropriate methods shall be used to aid revegetation. Mulching with straw, wood chips, or other means shall be used where necessary. Areas requiring such treatment are listed in Appendix M.

3.3. MONITORING CONSTRUCTION AND RECLAMATION ACTIVITIES

3.3.1. Upon notice by the OWNER, the INSPECTORS shall schedule initial post-construction field inspections following clean up and road closure. Follow-up visits shall be scheduled as required to monitor the effectiveness of erosion controls, reseeding measures, and the Reclamation and Revegetation Plan (Appendix M). The OWNER shall contact the LANDOWNER for post-construction access and to determine LANDOWNER satisfaction with the OWNER'S reclamation measures.

3.3.2. The STATE INSPECTOR shall document observations on all lands for inclusion in monitoring reports regarding bond release required by DEQ. Such observations shall be coordinated with the KNF INSPECTOR on NFSL and the OWNER.

3.3.3. Release of the Transmission Line Construction and Reclamation Bond shall be based on completing the activities specified in the Reclamation and Revegetation Plan (Appendix M). Failure of the OWNER to complete the activities on disturbed areas in accordance with Appendix M and successfully revegetate disturbed areas shall be cause for forfeiture for the BOND or penalties described in Section 0.3. Failure of the OWNER to adequately reclaim all disturbed areas in accordance with section 3.2 and Appendix M of these specifications shall be cause for forfeiture of the BOND or penalties described in Section 0.9. Reclamation shall be in accordance with the standards established in ARM 17.20.1902 and in forested areas the right of way and unneeded roads shall be stocked naturally or planted with trees so that upon maturity, the canopy cover approximates that of adjacent undisturbed areas. Noxious weeds shall be controlled on disturbed areas.

4.0. OPERATION AND MAINTENANCE

4.1. RIGHT-OF-WAY MANAGEMENT

4.1.1. Maintenance of the right-of-way shall be as specified in the Weed Control Plan (Appendix K) and other monitoring and mitigation plans described in the KNF's Plan of Operations. This plan shall provide for the protection of SENSITIVE AREAS identified prior to and during construction. OWNER and CONTRACTOR activities off the right-of–way such as along access roads shall be consistent with best management practices and environmental protection measures contained in these specifications.

4.1.2. Vegetation that has been saved through the construction process and which does not pose a hazard or potential hazard to the transmission line, particularly that of value to fish and wildlife as specified in Appendix A, shall be allowed to grow on the right-of-way. Vegetation management shall be in accordance with the Vegetation Removal and Disposition Plan (Appendix F).

4.1.3. Vegetative cover along the transmission line and roads shall be maintained in cooperation with the LANDOWNER on private lands, DNRC on State lands, and the FS on NFSL.

4.1.4. Grass cover, water bars, cross drains, the proper slope, and other agreed to measures shall be maintained on permanent access roads on private lands and service roads in order to prevent soil erosion.

4.2. MAINTENANCE INSPECTIONS

4.2.1. The OWNER shall have responsibility to correct soil erosion or revegetation problems on the right-of-way or access roads as they become known. Maintenance of roads on NFSL shall be in accordance with the Road Management Plan. Appropriate corrective action shall be taken where necessary. The OWNER, through agreement with the LANDOWNER, DNRC, or FS, may provide a mechanism to identify and correct such problems.

4.2.2. Operation and maintenance inspections using ground vehicles shall be timed so that routine maintenance shall be done when access roads are firm, dry, or frozen, wherever possible. New roads, and existing barriered or impassable roads used for transmission line construction on NFSL shall not be used for routine maintenance; use of such roads shall be for emergency maintenance only. Maintenance vegetative clearing shall be done according to criteria described in Appendix F.

4.3. CORRECTION OF LANDOWNER PROBLEMS

4.3.1. When the facility causes interference with radio, TV, or other stationary communication systems, the OWNER shall correct the interference with mechanical corrections to facility

hardware, or antennas, or shall install remote antennas or repeater stations, or shall use other reasonable means to correct the problem.

4.3.2. The OWNER shall respond to complaints of interference by investigating complaints to determine the origin of the interference. If the interference is not caused by the facility, the OWNER shall so inform the person bringing the complaint. The OWNER shall provide the STATE INSPECTOR with documentation of the evidence regarding the source of the interference if the person brings the complaint to the STATE INSPECTOR or DEQ.

4.4. HERBICIDES AND WEED CONTROL

4.4.1. To minimize spreading weeds during construction, a joint weed inspection of the transmission line corridor and/or construction areas may be completed prior to construction areas. The joint inspection is intended to identify areas with existing high weed concentration. This joint review may include the OWNER, affected weed control boards, FS, DNRC and LANDOWNERS.

4.4.2. Weed control, including any application of herbicides in the right-of-way, shall be done by applicators licensed in Montana and in accordance with recommendations of the Montana Department of Agriculture, FS on NFSL, and in accordance with the Weed Control Plan in Appendix K.

4.4.3. Herbicides shall not be used in certain areas identified by DEQ, FS, and FWP, as listed in Appendix K.

4.4.4. Proper herbicide application methods shall be used to keep drift and nontarget damage to a minimum.

4.4.5. The OWNER shall notify the STATE and KNF INSPECTORS (if involving NFSL) in writing 30 days prior to any broadcast or aerial spraying of herbicides. The notice shall provide details as to the time, place, and justification for such spraying. DEQ, FWP, the Montana Department of Agriculture, and FS, if involving NFSL, shall have the opportunity to inspect the portion of the right-of-way or access roads schedule for such treatment before, during, and after spraying.

4.5. CONTINUED MONITORING

4.5.1. The KNF and DEQ may continue to monitor operation and maintenance activities for the life of the transmission line in order to ensure compliance with the KNF's Plan of Operations and the Certificate of Compliance.

5.0. ABANDONMENT, DECOMMISSIONING AND RECLAMATION FOLLOWING DECOMMISSIONING

When the transmission line is no longer used or useful, structures, conductors, and ground wires shall be removed, roads recontoured and disturbed areas reclaimed using methods outlined in Appendix N.

APPENDICES

Appendix A: Sensitive Areas for the Montanore Project.

The following sensitive areas have been identified on Figure D-1 of this Appendix where special measures will be taken to reduce impacts during construction and reclamation activities:

- Wetlands
- Riparian areas
- Bull trout critical habitat
- Old growth
- Core grizzly bear habitat
- Bald eagle primary use areas
- Areas with high risk of bird collisions
- Big game winter range
- Visually sensitive and high visibility areas
- Cultural and paleontological resources (not shown on Figure D-1)
- Additional areas for monitoring may be identified following the preconstruction monitoring trip by the INSPECTORS or preconstruction surveys by the OWNER (see Appendix I)

The following special measures will be incorporated into final design for these sensitive areas.

Wetlands and Riparian Areas

- Complete a jurisdictional delineation of waters of the U.S. in accordance with Section 1.4.3; avoid discharge of dredge or fill material into waters of the U.S. where practicable; develop and implement mitigation for all unavoidable impacts in accordance with Section 1.4.3.
- Construct all stream crossings in accordance with Section 2.11.5 and 2.11.6
- Locate structures outside of riparian areas if alternative locations are technically and economically feasible
- Minimize vegetation clearing and heavy equipment use in riparian areas in accordance with Sections 2.9.12 and 2.11.1

Bull Trout Critical Habitat

- Implement the timing restrictions described in Appendix I
- Implement measures for wetlands and riparian areas designed to minimize clearing adjacent to critical habitat

Old Growth

- Implement the vegetation removal procedures described in Appendix F designed to minimize clearing of old growth

Core Grizzly Bear Habitat

The OWNER shall not construct any road or trail that reduces core grizzly bear habitat.

Bald Eagle Primary Use Areas

- Implement the timing restrictions described in Appendix I

Areas with High Risk of Bird Collisions

To prevent avian collisions with the transmission lines, the visibility of conductors or shield wires shall be increased where necessary. This may include installation of marker balls, bird diverters, or other line visibility devices placed in varying configurations, depending on line design and location. Areas of high risk for bird collisions where such devices may be needed, such as major drainage crossings, and recommendations for type of marking device, shall be identified through a study conducted by a qualified biologist and funded by the OWNER.

Big Game Winter Range

- Implement the timing restrictions described in Appendix I

Cultural Resources

- Complete pre-construction surveys accordance with Section 1.4.1
- Conduct activities to prevent damage to significant archaeological, historical, or paleontological resources, in accordance with the requirements of 1.4.1, 2.12, and Appendix E.
- No roads, trails or overland travel is permitted with the boundaries of NRHP eligible or potentially eligible cultural sites unless appropriate mitigation has been applied.

Visually Sensitive and High Visibility Areas

- After completing a more detailed topographic survey, complete a detailed visual assessment of the alignment at three locations near residential properties: near the Fisher River and U.S. 2 crossing north of Hunter Creek (Section 32, T. 27 N., R. 29 W.), along West Fisher Creek (Section 2, T. 26 N., R. 30 W.), and between NFS roads 231 and 4725 southeast of Howard Lake (Section 19, T. 27 N., R. 30 W.)
- Keep the centerline at least 200 feet from private property at these locations, unless it is not technically feasible to do so.
- Based on the assessment, incorporate into the Vegetation Removal and Disposition Plan (Appendix F) measures to minimize vegetation clearing and visibility from residences and Howard Lake through modification of pole height, span length, and vegetation growth factor

- Based on the assessment, modify the quantity and location of poles to be installed by helicopter to minimize visible access roads
- Do not remove any shrub species 10 feet in height or less in the clearing corridor (see Section 2.1.5)

Appendix B: Performance Bond Specifications

The JOINT Transmission Line Construction and Reclamation Bond and the Joint DECOMMISSIONING BOND shall be used to ensure compliance with these specifications. DEQ and the FS will calculate the amount of the joint transmission line construction and reclamation bond and the joint transmission line decommissioning bond within 45 days after DEQ approving amendments to Operating Permit No. 00150 for the Construction, Operation, Closure and Post Closure Phases of the Montanore Project to make Operating Permit No. 00150 consistent with the FSs approval of Alternative 3- Agency Mitigated Poorman Impoundment Alternative. These bonds must be submitted prior to the start of construction of the transmission line. The amount of the bonds will be reviewed and updated every 5 years by DEQ and FS. The FS may review bonds at any time.

Appendix C: Name and Address of Inspectors and Owner's Liaison

STATE INSPECTOR
Environmental Science Specialist
Montana Department of Environmental Quality
P.O. Box 200901, 1520 East Sixth Avenue
Helena, Montana 59620-0901
(406) 444-____

OWNER'S LIAISON
Environmental Specialist
Montanore Minerals Corp.
34524 U.S. Highway 2 West
Libby Montana 59923
(406) 293_____

KNF INSPECTOR
Kootenai National Forest
31374 U.S. Highway 2 West
Libby Montana 59923
(406) 293-_____

Appendix D: Road Management Plan

OWNER shall develop for the lead agencies' review and approval, and implement a final Road Management Plan that describes for all new and reconstructed roads used for the transmission line the following:

- Criteria that govern road operation, maintenance, and management
- Requirements for pre-, during-, and post-storm inspections and maintenance

- Regulation of traffic during wet periods to minimize erosion and sediment delivery and accomplish other objectives
- Implementation and effectiveness monitoring plans for road stability, drainage, and erosion control
- Mitigation plans for road failures

OWNER shall be responsible for implementing one or more of the following measures on newly constructed roads and reconstructed roads on NFSL so they cause little resource risk if maintenance is not performed on them during the operation period and prior to their future need:

- Conducting noxious weed surveys and performing necessary weed treatments prior to storage activities
- Blocking entrance to road prism
- Removing culverts determined by the KNF to be high-risk for blockage or failure; laying back stream banks at a width and angle to allow flows to pass without scouring or ponding so that revegetation has a strong chance of success
- Installing cross drains so the road surface and inside ditch will not route any intercepted flow to ditch-relief or stream-crossing culverts
- Removing and placing unstable material at a stable location where stored material will not present a future risk to watershed function
- Replacing salvaged soil and revegetating with grasses in treated areas and unstable roadway segments to stabilize reduce erosion potential

The OWNER shall decommission new transmission line roads on NFSL after removal of transmission line. OWNER shall be responsible for implementing one or more of the following measures on new roads on NFSL to minimize the effects on other resources:

- Conducting noxious weed surveys and performing necessary weed treatments prior to decommissioning
- Removing any remaining culverts and removing or bypassing relief pipes as necessary
- Stabilizing fill slopes
- Fully obliterating road prism by restoring natural slope and contour; restoring all watercourses to natural channels and floodplains
- Revegetating road prism
- Installing water bars or outsloping the road prism
- Removing unstable fills

On private lands the same measures shall be applied unless the certificate holder contracts with the landowner for revegetation or reclamation as allowed under ARM 17.20.1902.

Appendix E: Cultural Resources Protection and Mitigation Plan

The final Programmatic Agreement (PA) will be incorporated into these specifications.

The FS will contact the Confederated Salish & Kootenai Tribes and the Kootenai Tribe of Idaho (collectively the Tribes) to determine if they are interested in monitoring transmission line construction on Federal, State and private lands. If either or both Tribes express an interest, OWNER shall develop a Tribal Monitoring Plan in cooperation with the FS, DEQ, and the Tribes with for inclusion into this Appendix. This plan will facilitate the presence of tribal monitors from the SCKT and/or KTOI during transmission line construction. The plan will outline the tribal monitor's qualifications, responsibilities and capabilities as well as establish funding, which will be the OWNER's responsibility. The plan will be submitted to FS and DEQ for review at least 90 days prior to the BEGINNING OF CONSTRUCTION. The FS and DEQ will have 30 days to review the plan. The FS and DEQ will invite SHPO and DNRC to comment on the draft plan. The approved plan will be incorporated into these specifications.

Appendix F: Vegetation Removal and Disposition Plan

As part of final design, OWNER shall prepare a Vegetation Removal and Disposition Plan for lead agency review and approval. One of the plan's goals will be to minimize vegetation clearing. The plan will identify areas where clearing will be avoided, such as deep valleys with high line clearance, and measures that will be implemented to minimize clearing. For example, the growth factor used to assess which trees will require clearing could be reduced in sensitive areas, such as Riparian Habitat Conservation Areas, from 15 years to 5 to 8 years. OWNER will evaluate the use of monopoles to reduce clearing in select areas, such as old growth. The plan also will evaluate the potential uses of vegetation removed from disturbed areas, and describe disposition and storage plans during life of the line. The Vegetation Removal and Disposition Plan will be part of and incorporate details of the final design for the transmission line.

Appendix G: Variations in Right-of-Way Width

DEQ does not recommend specific widths for construction easements. In accordance with the specifications, construction activities shall be contained in the minimum area necessary for safe and prudent construction and approved by the FS on NFSL.

DEQ does not recommend specific variations in right-of-way widths beyond those required to meet the National Electric Safety Code for electric transmission line operations and those necessary to meet standards established in ARM 17.20.1607 (2).

Appendix H: Monitoring Plan

The STATE INSPECTOR is responsible for implementing this monitoring plan required by 75-20-303(b) and (c), MCA, and for reporting whether terms of the Certificate and

Environmental Specifications (including but not limited to adequacy of erosion controls, successful seed germination, and areas where weed control is necessary) are being met, along with any conditions in the 404 permit and the MPDES General Permit for Storm Water Discharges Associated with Construction Activity and Authorization associated with the transmission line. Additional mitigating measures may be identified by the STATE INSPECTOR or by the KNF INSPECTOR on NFSL in order to minimize environmental damage due to unique circumstances that arise during construction.

In addition to participating in preconstruction conferences, the INSPECTORS shall conduct on-site inspections during the period of construction. At a minimum the INSPECTORS will be present at the start of construction and during the initiation of construction in sensitive areas. Subsequently INSPECTORS shall strive to conduct on-site reviews of construction activities on at least a weekly schedule. More frequent monitoring may be necessary.

INSPECTORS shall record the dates of inspection, areas inspected, and instances where construction activities are not in conformance with Environmental Specifications or terms and conditions of the Certificate of Compliance for the project. Inspection reports shall be submitted in a timely manner to the OWNER's Liaison who will see that corrections are made or that such measures are implemented in a timely manner.

When violations of the Certificate are identified, the STATE INSPECTOR shall report the violation in writing to the OWNER, who shall immediately take corrective action. If violations continue, civil penalties described in 75-20-408, MCA may be imposed. In the event that the KNF INSPECTOR shows reasonable cause that compliance with the Plan of Operations is not being achieved, FS will implement measures described in 36 CFR 228.7(b).

Upon the completion of construction in an area, the INSPECTORS will determine that Environmental Specifications have been followed, and that activities described in Appendix M have been completed and vegetation is progressing in a satisfactory manner.

In the event the DEQ or FS finds that the OWNER is not correcting damage created during construction in a satisfactory manner or that initial revegetation is not progressing satisfactorily, DEQ may determine the amount and disposition of all or a portion of the reclamation bond to correct any damage that has not been corrected by the certificate holder.

Appendix I: Areas Where Construction Timing Restrictions Apply

All activities on NFSL and state trust lands for both construction seasons of the transmission line shall occur between June 16 and October 14.

Restrictions in the timing of tree removal and other transmission line construction activities are required on all lands between February 1 and August 15 around bald eagle or osprey breeding sites to assure compliance with the Montana Bald Eagle Management Plan, Bald and Golden Eagle Protection Act, Migratory Bird Treaty Act or FS requirements. Surveys for bald eagle or osprey nests shall be completed in appropriate habitat or timing restrictions shall be

implemented in all areas of potential habitat. Surveys shall be conducted between March 15 and April 30, one nesting season immediately prior to transmission line construction.

If surveys conducted one nesting season immediately prior to construction activities did not find nesting of these species, such restrictions shall be rescinded. If an active nest was found, guidelines from the Montana Bald Eagle Management Plan (Montana Bald Eagle Working Group 1994) shall be followed to provide management guidance for the immediate nest site area (Zone 1), the primary use area (Zone 2), and the home range area (Zone 3). This includes delineating a ¼-mile buffer zone for the nest site area, along with a ½-mile buffer zone for the primary use area. High intensity activities, such as heavy equipment use, are not permitted during the nesting season (February 1 to August 15) within these two zones. The Montana Bald Eagle Working Group recommendations apply during the 5-year period following delisting of the bald eagle from the list of threatened and endangered species. If the Montana Bald Eagle Working Group recommendations lapse before the line was constructed, then the timing restrictions shall revert to the National Bald Eagle Management Guidelines issued by the US Fish and Wildlife Service in 2007.

Restrictions in the timing of transmission line construction activities in elk, white-tailed deer, or moose winter range are required between December 1 and April 30. These timing restrictions may be waived in mild winters if it can be demonstrated that snow conditions are not limiting the ability of these species to move freely throughout their range. Grizzly bear mitigations in the agency-mitigated alternatives include restrictions on the timing of transmission line construction and decommissioning. These restrictions shall apply to NFS and state trust lands. This grizzly bear mitigation requires that MMC be restricted to June 16 to October 14 for conducting these activities. No waiver of winter range timing restrictions shall be approved on NFS or state trust lands where the grizzly bear mitigations apply. The OWNER must receive a written waiver of these timing restrictions from the KNF, DEQ, and FWP, before conducting construction activities on elk, white-tailed deer, or moose winter range between December 1 and April 30 on private land. Timing restrictions shall not apply to substation construction.

Culvert or bridge installation is prohibited in areas of important fish spawning beds identified in Appendix A and during specified fish spawning seasons on less sensitive streams or rivers. Riprap or other erosion control activities on NFSL affecting bull trout spawning habitat can only occur during May 15 and September 1.

Other timing restrictions as negotiated by LANDOWNERS in individual easement agreements shall be incorporated into these specifications.

Appendix J: Aeronautical Hazard Markings

DEQ does not recommend aeronautical hazard markings at this time. If a potential hazard is identified during final design, DEQ will consult with the Federal Aviation Administration and Montana Aeronautics Division of MDT to determine appropriate action or aeronautical safety marking.

Appendix K: Weed Control Plan

The final Weed Control Plan will be incorporated into these specifications.

Appendix L: Fire Prevention Plan

The final Fire Prevention Plan will be incorporated into these specifications.

Appendix M: Reclamation and Revegetation Plan

An interim and final Reclamation and Revegetation Plan shall be developed and submitted to DEQ and FS for approval. This plan must, at a minimum, specify seeding mixtures and rates. It must satisfy LANDOWNER wishes, to the extent reasonable, requirements of the MPDES General Permit for Storm Water Discharges Associated with Construction Activity, and ARM 17.20.1902(10).

Because the reclamation of construction activities associated with the transmission line is considered interim and final reclamation will be required at mine closure, the primary objective of the interim reclamation plan is to provide long-term stability and control weed infestation during the operational phase of the project. The standards for interim reclamation used to determine construction bond release or to determine that expenditure of the reclamation bond is necessary to meet the requirements of the certificate for transmission lines will follow these primary objectives. The OWNER shall complete the following activities prior to release of the TRANSMISSION LINE CONSTRUCTION BOND:

- Implementation of the Weed Control Plan (Appendix K)
- Completion of all monitoring and mitigation described in the Cultural Resources Protection and Mitigation Plan and Tribal Monitoring Plan (Appendix E)
- Completion of all interim reclamation activities described in the Reclamation and Revegetation Plan (Appendix M)
- Completion of all activities associated with roads used for transmission line construction described in the Road Management Plan (Appendix D)
- Completion of all activities associated with vegetation removal and disposal for transmission line construction described in the Vegetation Removal and Disposition Plan (Appendix F)
- Revegetation is proceeding satisfactorily.

Appendix N: Abandoning and Decommissioning Plan

Prior to the start of construction, the OWNER shall submit to the lead agencies for their approval an abandonment and decommissioning plan. Based on this plan, the agencies shall then calculate the amount of the final reclamation bond.

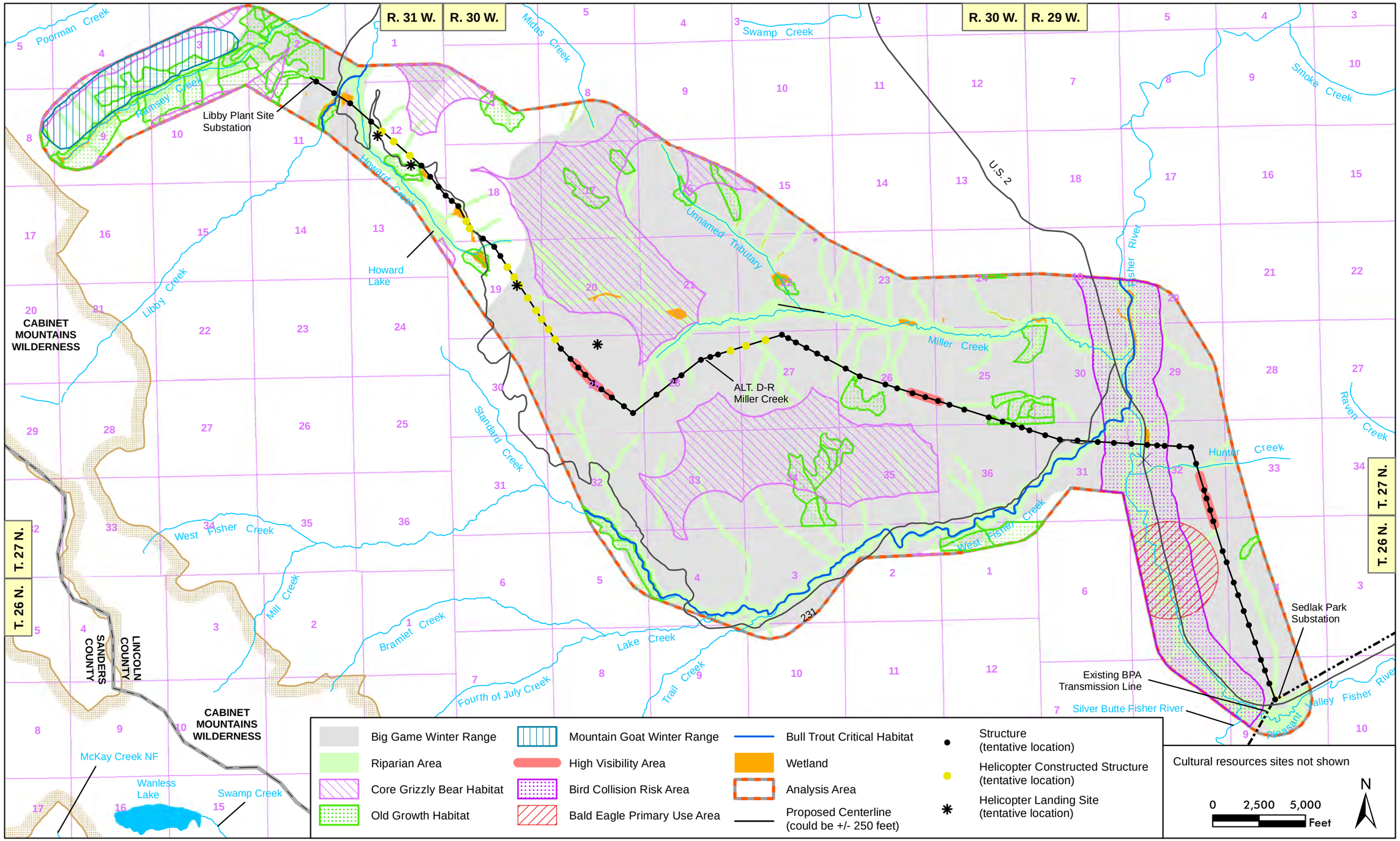

Figure D-1. Sensitive Areas Along
Selected Transmission Line Corridor

Attachment 9 – Effects of the Selected Mine and Transmission Line Alternatives as Modified

The Joint Final EIS discloses the effects of Mine Alternative 3 and Transmission Line Alternative D-R. Section 1.4.1.3 discusses the modifications made to these two alternatives in the ROD. The following sections disclose the effects of the selected mine and transmission line alternatives that as modified disclosed in the Joint Final EIS. Most of the discussion describes the effects of modifying the Joint Final EIS alternatives by requiring the implementation of the USFWS' reasonable and prudent measures. The required term and conditions and reporting requirements from the grizzly bear Biological Opinion are discussed under the Wildlife Threatened and Endangered Species section. Modification 3, changes the primary access and haul route from the Bear Creek Road (NFS road #278) to the Libby Creek Road (NFS road #231) for the life of the mine. Modifications 1, 2, 4, and 5, includes additional requirements related to the grizzly bear mitigation plan. Modification 6 discusses the changes to the bull trout mitigation plan and is discussed in the following Surface Water Quality, Fisheries, and Aquatic Life section.

Air Quality

Use of the Libby Creek Road instead of the Bear Creek Road will substantially reduce fugitive dust emissions from the Libby Creek Road. Most of the Libby Creek Road is unpaved and generates considerable fugitive dust from high forest user travel. In the Selected Mine Alternative, the Libby Creek Road from US 2 to the intersection of NFS road #231 and NFS road #2316 will be paved with hot mix asphalt, and the asphalt road surface will then be chip-sealed. MMC will maintain the road surface throughout the life of the project.

Cultural Resources and American Indian Consultation

Use of the Libby Creek Road instead of the Bear Creek Road is unlikely to significantly change the effect on cultural resources. The area that will be affected by Libby Creek Road improvements has not been inventoried; such an inventory is required by MMC before construction begins. A Programmatic Agreement addresses remaining Section 106 compliance, the mitigation of unavoidable historic properties, and inadvertent cultural resource discoveries. Any mitigation plan will be developed by MMC and approved by both the KNF and State Historic Preservation Office (SHPO) under a Programmatic Agreement, and will include consulting American Indian tribes if affected cultural resources prove to be of cultural significance.

Surface Water Quality, Fisheries, and Aquatic Life

The WEPP Road model was used to quantitatively describe the effect on sediment yield from the using the Libby Creek Road as the main access road and the Bear Creek Road during the Evaluation Phase and the first year of construction. The Libby Creek Road will be paved and widen, where needed, to 26 feet. Mitigation applied to the Bear Creek Road will be to reduce the road length where the road is not paved to 150 feet using drain dips, surface water deflectors or open top box culverts.

The FEIS described the modeled annual sediment increase by paving the Bear Creek Road and indicated the model may overestimate sediment delivery following paving. For the Bear Creek Road, which will not be paved in the Selected Mine Alternative, the model predicted that reducing the contributing road length where the road is not paved will reduce the average annual sediment leaving the buffer by 67 pounds, a 25 percent reduction from existing conditions. Reducing the contributing road length to less than 150 feet will reduce sediment delivery further; the WEPP model indicates a linear relationship between contributing road length and the amount

of sediment leaving a road and buffer. The movement of sediment from all new and reconstructed roads will be minimized through the use of BMPs developed in accordance with the Forest Service's *National Best Management Practices for Water Quality Management on National Forest System Lands* and BMP requirements in the MPDES permit. BMPs that will be used, such as reducing erosion on fillslopes, stabilizing disturbed areas with vegetative cover, replacing buried or damaged culverts, or adding additional gravel to roads, could not be modeled using WEPP, but will reduce sediment leaving the roads and buffers. Various studies have shown that BMPs implemented to reduce sediment movement from roads, cutslopes and fillslopes to drainages are effective in reducing sediment by 70 to 100 percent.

During the Evaluation Phase, MMC will implement the BMPs shown in Table 1 in Attachment 1, such as installing, replacing, or upgrading culverts, to bring the access roads (NFS roads #231 and #2316) up to applicable standards. All ditches on these two roads will be cleaned out to enhance drainage and reduce sedimentation. The Libby Creek Road has four major stream crossings (Libby Creek twice, Hoodoo Creek, and Midas Creek). For the Libby Creek Road, the agencies' modeling predicted that paving and widening the road will reduce the average annual sediment leaving the road overall by 41 pounds, a 32 percent reduction from existing conditions. The model predicted paving and widening the road will increase the average annual sediment leaving the buffer at one location, which is the culvert crossing of Hoodoo Creek. Replacing the culvert at Hoodoo Creek will improve aquatic organism passage. Implementation of other BMPs at this crossing to minimize sediment delivery will be considered during final design. Curve widening may be needed on the Libby Creek Road where it crosses Hoodoo Creek. Curve widening to 38 feet was modeled; the WEPP:Road Batch model predicted that widening to 38 feet will not change the average annual sediment leaving the buffer from that what will occur at 26 feet. The estimated decreases in sediment delivery to streams will be small in comparison to the estimated existing sediment load of 1,621 tons/year and the estimated future sediment load of 1,102 tons/year in the upper Libby Creek watershed, but will assist in achieving the Libby Creek TMDL for sediment.

The effects on fisheries and aquatic life from using the Libby Creek Road will be similar to the effects of using the Bear Creek Road. All point source discharges containing sediment from the Montanore Project via stormwater outfalls will be monitored and reported to the DEQ (see Attachment 3). Any failures of the sediment BMPs detected through monitoring will require MMC to implement corrective measures in accordance with the MPDES permit.

The DEQ and EPA established as a TMDL an average annual sediment load of 4,234 tons for Libby Creek from the US 2 bridge to the confluence with the Kootenai River. As part of this TMDL, the Montanore facility was assigned a sediment wasteload allocation of 24 tons/year. The DEQ and the EPA established water quality restoration goals for sediment in the plan on the basis of fine sediment levels in trout spawning areas and aquatic insect habitat, stream morphology and available instream habitat as it relates to the effects of sediment, and the stability of streambanks. The DEQ believes that once these water quality restoration goals are met, all beneficial uses currently affected by sediment will be restored (DEQ and EPA 2014). MMC's point source and non-point source discharges containing sediment will be a small contribution to the estimated existing and future sediment load in the upper Libby Creek watershed, and will have minor effect on aquatic life in Libby Creek.

The use of the Libby Creek Road will reduce, by 1 acre, effects on Riparian Habitat Conservation Areas. Using the Libby Creek Road will increase effects on other riparian areas on private and State lands will be 8 acres.

MMC will develop and implement a final Road Management Plan consistent with the terms and conditions of the grizzly bear Biological Opinion (Attachment 6). MMC will consider the effect on bull trout from using the Libby Creek Road during the development of the bull trout mitigation feasibility assessments required by the bull trout Biological Opinion (Attachment 7).

The change in access road will not affect metal or nutrient concentrations or stream temperatures. The change will have no effect on the white sturgeon, the western pearlshell, the interior redband trout, or the westslope cutthroat trout.

The changes to the Bull Trout Mitigation Plan (Modification 6) will clarify commitments and timing regarding implementation of measures contributing to minimization of incidental take of bull trout (and other details), focus appropriate monitoring activities to assure the success of projects to minimize take, verify that the specified level of take is not exceeded, and allow changes to mitigation projects as new information is collected. Establishment of a bull trout genetic reserve in Flower Creek could protect an existing “at risk” bull trout population (Libby Creek) by lowering the risk and minimizing potential for take by the Montanore Project.

Recreation

The Libby Creek Road is used more for access to recreational opportunities on the Forest, such as Howard Lake, than is the Bear Creek Road. Because the Libby Creek Road will be plowed in the winter, its use will improve winter recreation access to areas near the road. Similarly, the Bear Creek Road will be plowed in the winter for 2 to 3 years during construction, improving winter recreation access to areas off of the road. Snowmobile and cross country skiing use of the Bear Creek Road during the Construction Phases, and of the Libby Creek Road during the Operations and Closure Phases, will be eliminated.

During reconstruction of the Libby Creek Road, recreational users, such as those traveling to Howard Lake, may experience delays or may have to use the Bear Creek Road, which will increase travel times. One-way traffic on the Libby Creek Road, if required, will increase the congestion in the 8-Mile Hill area during operations, which may increase travel times to Howard Lake and other recreational opportunities. The 8-Mile Hill area is on private property and the property owner will be inconvenienced should congestion occur. Because the Libby Creek Road will be plowed in the winter, snowmobile and cross-country skiing use on the Libby Creek Road during the Operations Phase will be eliminated. The loss of winter recreational opportunity will be somewhat offset by improved winter recreation access to areas near the road. The change in access road use will not change the recreation setting described in the Joint Final EIS.

Sound

Construction truck traffic over a 1-year period to and from the Plant Site and Tailings Impoundment Site will increase noise levels on the Bear Creek Road (NFS road #278) while the Libby Creek Road is reconstructed. Trucks with properly operating mufflers are expected to generate up to an estimated 86 dBA at 50 feet. Trucks using Jake brakes with straight pipe mufflers will produce sound levels of 98 dB(A) at 50 feet, and will be audible at distances of up to 1 mile.

Similar noise levels will occur along the Libby Creek Road during the Operations Phase. The noise levels on the Libby Creek Road will be similar to those of trucks transporting logs from a timber sale. Assuming a worst-case of all mine traffic traveling during the same hour at the maximum speed (45 miles per hour), predicted noise levels at 50 feet from the road will be 61 dBA and will be audible at a level of 20 dBA for up to 1.9 miles from the road. Forest users and private residences within about 1,000 feet of the access roads will perceive a 7 dBA increase in noise levels from ambient levels (30 dBA). The traffic noise will equal the lowest measured existing ambient noise level, 23 dBA, within 1.4 miles of the road. Where the line of sight between the road and a listener is blocked by terrain, the traffic noise levels will be less. The Libby Creek Road crosses more private land than the Bear Creek Road, and more private property owners will experience increased noise levels than along the Bear Creek Road.

Transportation

The effect on transportation of using the Libby Creek Road under Modification 3 will be very similar to the effect of using the Bear Creek Road described in the Joint Final EIS. The Libby Creek Road is a public approach to US 2. MMC will evaluate the approach for the largest design vehicle and modify the intersection if the approach does not meet the design requirements for that vehicle. The approach will be designed to maintain the transportation system level of service and safety along US 2.

MMC will widen those segments of NFS roads #231, #278, and #4781 to be used for access to two 12-foot-wide travel lanes and two 1-foot shoulders, for a total width of 26 feet. The KNF may decide during final design that a narrower width will be sufficient to provide for safe and efficient use. Additional widening will be needed on curves. The two existing bridges across Libby Creek, which currently are 14 feet wide, also will be replaced and widened to a width compatible with a 26-foot wide Libby Creek Road. The roadway will be paved with hot mix asphalt, and the asphalt road surface will then be chip-sealed. Mine Safety and Health Administration regulations (30 CFR 56, Subpart H) require that all mines establish and follow rules governing speed, right-of-way, direction of movement, and the use of headlights to assure appropriate visibility, and that equipment operating speeds be consistent with conditions of roadways, grades, clearance, visibility, traffic, and the type of equipment used. MMC will post warning signs for speed limits and other important road conditions and require all mine-related vehicles to follow all traffic control restrictions, such as speed. The effect of high recreational use, road improvements and higher speeds may lead to a slight increase in accidents on the Libby Creek Road. The Libby Creek Road crosses more private land than the Bear Creek Road, and more private property owners will experience a higher risk of accidents than along the Bear Creek Road.

Annual traffic on Libby Creek Road will increase and will be about two times existing levels throughout the life of the mine (Table 9-1). Because existing traffic volume is greater on the Libby Creek Road than on the Bear Creek Road, the percentage increase is less on the Libby Creek Road than on the Bear Creek Road. When the mill ceases operations in the Closure Phase and the number of employees decrease, traffic volumes will be substantially less than shown in Table 9-1. Traffic on the Libby Creek Road will increase over the long term due to the anticipated improvements. The Libby Creek Road crosses more private land than the Bear Creek Road, and more private property owners will experience the higher traffic volume than along the Bear Creek Road.

Table 9-1. Estimated Traffic on Libby Creek Road (NFS road #231) with Selected Mine Alternative.

Year	Estimated Annual Traffic without Mine (Vehicles per Year)	Estimated Mine Traffic (Vehicles per Year)	Estimated Traffic With Mine (Vehicles per Year)	% Increase
2010	43,637	48,048	93,695	110%
2015	46,319	48,048	96,382	104%
2020	49,166	48,048	99,234	98%
2025	52,188	48,048	102,261	92%
2029	54,738	48,048	104,815	88%

The “8-Mile Hill” area is along the Libby Creek Road at about the 8-mile mark where the road traverses across a steep slope (Figure 4 of the ROD). The “8-Mile Hill” segment is on private property, across which the Forest Service holds an easement. The existing right-of-way width is variable in the 8-Mile Hill area, ranging from 66 to 135 feet. MMC will implement every reasonable mitigation, such as the use of retaining walls, to accommodate two-way traffic if the road cannot be reconstructed within the existing right-of-way width. If two-way traffic cannot be accommodated with reasonable mitigation, MMC will consult with the KNF on a one-way traffic management plan. One-way traffic on the Libby Creek Road will increase the congestion in the 8-Mile Hill area during operations. Congestion will return to pre-mine conditions after mill operations cease.

Wildlife

Threatened and Endangered Species

Grizzly Bear

Effects of Modification 1

Requiring MMC to provide a detailed plan of public outreach (information and education) program for approval by the Forest Service, with advice from the USFWS before the Construction Phase, will help MMC to produce a public outreach program that conveys MMCs support of grizzly bear conservation in the Cabinet-Yaak Ecosystem. MMC will implement specific features of this plan described in Appendix I of the USFWS’ Biological Opinion for the grizzly bear. The plan is designed to address grizzly bear mortality risk by providing information, education and assistance to the public to reduce grizzly bear-human conflicts and ultimately result in fewer human-caused grizzly bear mortalities.

Effects of Modification 2

In Modification 2, MMC will convert the East Fork Rock Creek Trail #935 from motorized to non-motorized (Figure 5 of the ROD) before the Evaluation Phase rather than before the Construction Phase. This change will decrease risk of mortality and displacement to grizzly bears, by increasing availability of secure core habitat, reducing fragmentation, and decreasing the main area of constriction in the Cabinet Mountain north-south corridor before mine-related activity occurs.

Effects of Modification 3

The use of the Libby Creek Road instead of the Bear Creek Road will reduce the physical loss of grizzly bear habitat. The Forest Service holds an easement with non-Federal property owners along the Libby Creek Road for use and maintenance of the road. Non-Federal property owners include the State of Montana, corporate landowners, and private individuals. MMC will reconstruct the Libby Creek Road within the existing right-of-way, or obtain easements from the existing owner for reconstruction outside of the existing right-of-way. Assuming reconstruction of the Libby Creek Road is within existing rights-of-way, the Libby Creek Road will disturb 67 acres, or 23 acres less than use of the Bear Creek Road. The reduction in physical loss will be less than 23 acres if MMC obtains easements from the existing owners for reconstruction outside of the existing right-of-way.

The use of the Libby Creek Road instead of the Bear Creek Road will change the Joint Final EIS analysis regarding displacement effects within BMU 2, BMU 5 and the Cabinet Face BORZ. The effects of not using the Bear Creek Road for the primary access and haul route will be less long-term mine-related displacement from 24-hour motorized traffic within the Bear Creek Road's influence zone. Reduced displacement will likely maintain the existing frequency or probability of a bear using the Bear Creek Road influence zone; reduce the likelihood that traffic levels on the Bear Creek Road will create a fracture zone disrupting grizzly bear movements from den areas west of the road toward spring habitat to the east; and reduce the potential for mortality risk of grizzly bears. Using the Libby Creek Road instead of the Bear Creek Road will result in MMC no longer snow plowing the Bear Creek Road for mine traffic during the Operations Phase. The increase in public/hunter motorized use and the associated increased potential for human/bear encounters and mortality risk (due to road improvements and snowplowing) will shift from the Bear Creek Road to the Libby Creek Road during operations and closure. Increases in mine-related 24-hour traffic volume will occur on the Bear Creek Road during the Construction Phase while the Libby Creek Road is reconstructed for use as the main access and haul route. Not using the Bear Creek Road as the primary access and haul route will maintain existing movement corridors toward the linkage area with the Northern Continental Divide Grizzly Bear Ecosystem.

Using the Libby Creek Road will concentrate mine-related 24-hour motorized traffic displacement effects on grizzly bears and their habitat to BMU 5 and to a smaller area within the Cabinet Face BORZ. According to the USFWS' Biological Opinion, use of the Libby Creek Road will avoid creating new and significantly elevated impacts on grizzly bears across the lower elevations of the eastern mountain slopes and drainages within BMU 2 and also in the Cabinet Face BORZ bisected by the Bear Creek Road. Use of the Libby Creek Road instead of the Bear Creek Road will not change the Joint Final EIS analysis regarding the ability of the Libby Creek Road's influence zone to support grizzly bears either in BMU 5 or the Cabinet Face BORZ as identified in the displacement analysis (ERO Resources Corp. 2015).

The KNF's grizzly bear mitigation plan requires MMC to offset physical habitat loss and long-term mine related displacement effects by conveying title or a conservation easement on acquired private lands. Using the Libby Creek Road and not the Bear Creek Road as the primary access and haul route will not change the amount of habitat compensation required by MMC in order to mitigate for displacement effects. The KNF will coordinate with the USFWS after the issuance of the ROD regarding any reduction in required land acquisition associated resulting from implementing Modification 3, which will reduce physical loss of grizzly habitat.

Compared to the Joint Final EIS analysis, the use of the Libby Creek Road instead of the Bear Creek Road will affect an additional section of State trust land. Road reconstruction and widening of the Libby Creek Road will occur within Section 16, T28N, R30W. Impacts to grizzly bears and their habitat on State trust land will be mitigated for by incorporating similar grizzly bear mitigation measures described for State trust lands crossed by transmission line Alternative D-R in the Joint Final EIS.

Effects of Modification 4

The development and required implementation of access management strategies on acquired mitigation land parcels prior to transfer to the Forest Service will further reduce potential for mortality risk of grizzly bears resulting from bear-human encounters and improve baseline habitat conditions in the Cabinet Mountain north-south corridor before mine-related activity. The additional requirement to not only plan and fund, but to implement all other initial habitat enhancement activities on the mitigation properties, including trail conversion or removal of buildings and debris as well as road access changes, prior to transfer as required by the term and condition, will allow the Forest Service to continue meeting the mitigation plan objectives and will ensure enhancement implementation occurs in a timely and specified manner.

Effects of Modification 5

Earlier establishment of the mandatory reporting system prior to the Evaluation Phase (rather than the Construction Phase) will ensure that the information needed to meet reporting requirements will be available during the Evaluation Phase. Changing the establishment of the mandatory reporting system to prior the Evaluation Phase will allow for pre-emptive management actions, such as hazing or removal of food attractants, to occur during the Evaluation Phase.

The additional annual reporting requirements for MMC in December, and the Forest Service in April will ensure that all sanitation-related incidents and the corrective measures taken in the Cabinet Mountain portion of the Cabinet-Yaak Recovery Zone are documented yearly. The annual reporting requirements will allow for evaluation of monitoring data and the development of adaptive management strategies design to avoid risks of habituation and to reduce grizzly bear.

Canada Lynx

Modifications 1, 2, 4, 5, and 6 will not change the Joint Final EIS analysis for Canada lynx within the LAUs. Compared to the Joint Final EIS analysis, the use of the Libby Creek Road instead of the Bear Creek Road as the primary access and haul route (Modification 3) will reduce the likelihood that traffic volume on the Bear Creek Road will create a fracture zone disrupting potential lynx movement between the main Crazy LAU and the Big Hoodoo Mountain portion of the LAU. Not using the Bear Creek Road will maintain existing movement corridors between the Crazy LAU and LAUs east of US 2. The use of Libby Creek Road will reduce the length of primary access and haul route within the Crazy LAU and the amount of low elevation non-habitat affected by the access haul route. Compared to the Joint Final EIS analysis, the modification will reduce the effect on low elevation non-habitat in the Crazy LAU by 23 acres.

The reconstruction and widening of the Libby Creek Road instead of the Bear Creek Road will affect a section of State land in Section 16, T28N, R30W that would not have been affected by Final EIS Alternative 3. The reconstruction and widening of the Libby Creek Road will increase the loss of state-mapped lynx winter forage by 3 acres based on the existing easement width of 60 feet on State land. If MMC requests and the DNRC grants a wider easement up to 100 feet, effects of Modification 3 on state-mapped lynx winter forage could be up to 7 acres.

Forest Service Sensitive Species

Modifications 1, 2, 3, 4, 5, and 6 will not change the Joint Final EIS analysis on these Forest Service sensitive species: bald eagle, black backed woodpecker, fisher, flammulated owl, gray wolf, North America wolverine, harlequin duck, Townsend's big-eared bat, and western toad. Modifications 1, 2, 4, 5, and 6 will not change the Joint Final EIS analysis on the Coeur d'Alene salamander; the potential effect of Modification 3 (using the Libby Creek instead of the Bear Creek Road for access) on the Coeur d'Alene salamander will be less than described in the Joint Final EIS.

Deer, Elk, and Mountain Goat

Modifications 1, 2, 3, 4, 5, and 6 will not change the Joint Final EIS analysis on elk and mountain goat. Modifications 1, 2, 4, 5, and 6 will not change the Joint Final EIS analysis on deer. Use of the Libby Creek Road instead of the Bear Creek Road will increase the effect on deer winter range by 16 acres from that described in the Joint Final EIS.

Pileated Woodpecker

Modifications 1, 2, 4, 5, and 6 will not change the Joint Final EIS analysis on key habitats. Use of the Libby Creek Road instead of the Bear Creek Road will not result in a meaningful change in the Joint Final EIS analysis regarding access road use on potential population level of snags and down wood because existing conditions were determined by buffering all existing roads (width of 33 feet) open to public use by 200 feet to account for the reduction in cavity habitat and downed wood associated with project road improvements and cumulatively due to potential firewood cutting. Because the Libby Creek Road is shorter than the Bear Creek Road, Modification 3 will reduce the overall amount of loss of cavity habitat and downed wood due to firewood cutting. Compared to the Joint Final EIS analysis, use of the Libby Creek Road instead of the Bear Creek Road will reduce the overall effect on old growth by 7 acres, and will reduce the overall effect on pileated woodpecker habitat by 3 acres.

Moose and State Species of Concern

Modifications 1, 2, 4, 5, and 6 will not change the Joint Final EIS analysis on moose or state species of concern. Using the Libby Creek Road instead of the Bear Creek Road will reduce effects on moose winter range by 11 acres.

Other Resources

None of the modifications will change the Joint Final EIS analysis regarding effects on these resources: geochemistry; groundwater; land use; water rights; noxious weeds; socioeconomics; inventoried roadless areas; wilderness; wild and scenic rivers; environmental justice; important farmlands; or energy use. Surveys for threatened, endangered, and sensitive plant species along the Libby Creek Road have not been completed. MMC will update surveys for threatened, endangered, and Forest and state sensitive plant species before construction begins. If species of concern are identified and adverse effects cannot be avoided, MMC will develop appropriate mitigation plans for the agencies' approval. MMC will implement the mitigation plan and receive agency concurrence of mitigation implementation before any ground-disturbing activities.

The Libby Creek Road is slightly wider and shorter than the Bear Creek Road and improvements to it will disturb 23 acres less soil and vegetation. Although the Libby Creek Road is steeper

overall, it traverses 2 acres less areas with slopes greater than 30 percent, 30 acres less of soils with severe erosion risk, 10 less acres of soils with a potential for high sediment delivery, and 39 less acres with a high potential of slope failure. Sediment and runoff from all roads will be minimized through the use of BMPs developed in accordance with the Forest Service's BMPs. Using the Libby Creek Road instead of the Bear Creek Road will reduce effects on coniferous forest and previously harvested coniferous forest by 23 acres.

Summary of Significance of Changes

Using the Libby Creek Road instead of the Bear Creek Road will reduce effects by a minor amount for most resources. Widening of the Libby Creek Road will disturb 23 acres less than widening of the Bear Creek Road. If MMC obtains easements from one or more non-Federal property owners to widen beyond the existing easement (up to 100 feet), the difference in disturbance will be less than 23 acres. Widening of the Libby Creek Road will disturb 16 more acres of white-tail deer winter range an widening of the Bear Creek Road. The Crazy PSU, the planning area in which the new access road will be developed, contains 3,100 acres of white-tail deer winter range. Overall, the modifications to the selected mine and transmission line alternatives will have less environmental impact and do not significantly change the effects analysis of the agencies' preferred alternative disclosed in the Joint Final EIS.

Attachment 10 – Montanore Project-specific Amendment: NFMA Significance Evaluation

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Montanore Project-specific Amendment
NFMA Significance Evaluation

Introduction

The decision on the Montanore Project documented in the KNF's Record of Decision requires a site-specific amendment to the 2015 Kootenai Forest Plan (KFP) that suspends the following four forestwide guidelines, two forestwide standards, and two Management Area-specific guidelines in order to implement Mine Alternative 3 and Transmission Line Alternative D-R to maintain consistency with the KFP:

FW-GDL-WL-08: Big Game: Management activities should avoid or minimize disturbance to native ungulates on winter range between December 1 and April 30, with exception of routes identified on MVUM as open to motor vehicle use. Management activities that occur on winter range during the winter period should concentrate activities to reduce impacts to native ungulates. (KFP, page 31-32)

FW-GDL-WL-09: Big Game: Management activities should be avoided on native ungulate winter range areas during the critical mid-winter period (January and February) when snow depths most likely influence movement and availability of forage. (KFP, page 32)

FW-GDL-AR-01: Management activities should be consistent with the mapped scenic integrity objective, see Plan set of documents. The scenic integrity objective is High to Very High for scenic travel routes, including Pacific Northwest National Scenic Trail, designated Scenic Byways, and National Recreation Trails. (KFP, page 35)

FW-STD-RIP-01: When RHCAs are intact and functioning at desired condition, then management activities shall maintain or improve that condition. Short-term effects from activities in the RHCAs may be acceptable when those activities support long-term benefits to the RHCAs and aquatic resources. (KFP, page 25)

FW-STD-RIP-02: When RHCAs are not intact and not functioning at desired condition, management activities shall include restoration components that compensate for project effects to promote a trend toward desired conditions. Large-scale restoration plans or projects that address other cumulative effects within the same watershed may be considered as compensatory components and shall be described during site-specific project analyses. (KFP, page 25)

FW-GDL-VEG-02: Road construction (permanent or temporary) or other developments should generally be avoided in old growth stands unless access is needed to implement vegetation management activities for the purpose of increasing the resistance and resilience of the stands to disturbances. (KFP, page 19)

MA5a,b,c-GDL-AR-06. Management activities should be consistent with the Scenic Integrity Objective of Moderate to High. (KFP, page 64)

MA6-GDL-AR-05. Management activities should be consistent with the Scenic Integrity Objective of Low to High. (KFP, page 66)

Background

The Montanore Project is located 18 miles south of Libby within the Kootenai National Forest near the Cabinet Mountains of northwestern Montana. The selected alternatives will consist of eight primary components: the use of an existing evaluation adit, an underground mine, a mill, three additional adits and portals, a tailings impoundment, access roads, a transmission line, and a rail loadout. In the selected alternatives, the operating permit area will be 2,157 acres and the disturbance area will be 1,542 acres. The permit area will encompass 75 acres of private land owned by MMC at the Libby Adit Site and the Rock Lake Ventilation Adit Site. All surface disturbances will be outside the Cabinet Mountains Wilderness (CMW). The operating permit areas for the selected mine facilities will be within Sections 13, 14, 15, 22, 23, 24, 25, 26, 27, 35, and 36, Township 28 North, Range 31 West, Sections 2, 11, 14, 15, and 29, Township 27 North, Range 31 West, and Sections 19 and 30, Township 28 North, Range 30 West, all Principal Meridian, in Lincoln and Sanders counties, Montana.

The Montanore Project will consist initially of a 12,500-tons-per-day underground mining operation that will expand to a 20,000-tons-per-day rate. The surface mill will be on National Forest System lands outside of the CMW in the Ramsey Creek drainage. The ore body will be accessed from two adits adjacent to the mill. Two other adits, an evaluation/ventilation adit and a ventilation adit, both with entrances located on private land, also will be used during the project. The evaluation/ventilation adit will be in the upper Libby Creek drainage; the ventilation adit will be on MMC's private land (patented claim HR 134) in the upper East Fork Rock Creek drainage near Rock Lake.

The mineralized resource associated with the Montanore subdeposit is about 135 million tons. MMC anticipates mining up to 120 million tons. Ore will be crushed underground and conveyed to the surface mill located near the Ramsey Adits. Copper and silver minerals will be removed from the ore by a flotation process. Tailings from the milling process will be transported through a pipeline to a tailings impoundment between the Poorman Creek and Little Cherry Creek, about 4 miles from the proposed plant site.

Access to the mine and all surface facilities will be via US 2 and the existing National Forest System road #231, the Libby Creek Road. South of Little Cherry Creek, MMC will build 0.7 miles of new road west of and parallel to the Bear Creek Road that will connect Bear Creek Road with Ramsey Creek Road. During upgrading of the three mine access roads, MMC will use the Bear Creek Road to access the Libby Adit Site during the summer construction season. MMC will continue to snowplow the Libby Creek Road to provide winter-time access. Public access will be eliminated on the Little Cherry Loop Road (NFS road #6212) during the construction, operation, and closure phases and used exclusively for mine traffic. Silver/copper concentrate from the mill will be transported by truck to a rail siding in Libby, Montana. The concentrate will then be shipped by rail to an out-of-state smelting facility.

The proposed project also will require constructing about 16 miles of high-voltage electric transmission line from a new substation adjacent to Bonneville Power Administration's (BPA) Noxon-Libby 230-kV Transmission Line to the project site. The Noxon-Libby 230-kV Transmission Line will be looped into the new ring bus substation named the Sedlak Park Substation at the tap point. BPA will design, construct, own, operate, and maintain the substation and loop line, and BPA's customer, Flathead Electric Cooperative, will provide power to MMC at that location. MMC will own and operate the 16-mile-long, 230-kV transmission line from the tap point to the project site. MMC's proposed 230-kV transmission line will be routed from the Sedlak Park Substation along US 2, and then up the Miller Creek drainage to the project site

The project will consist of five main phases – evaluation, construction, operations, closure, and post-closure. In general, the Evaluation Phase is estimated at 2 years, Construction Phase at 3 years and potentially up through a fourth year, Operations Phase from 16 to 20 years, and the mine Closure and Post-Closure Phases up to 20 years (or longer if water quality monitoring still indicated a need for treatment). The mill will operate on a three-shifts-per-day, seven-days-per-week, year-long schedule. At full production, an estimated 7 million tons of ore will be produced annually during a 350-day production year. An Operations Phase of 16 to 20 years is predicated on recovering 120 million tons of ore using production rates shown in Table 11 of the Final EIS, which are of up to 20,000 tons per day.

Need for Change

MMC's project purpose is to develop the Rock Lake copper and silver deposit by underground mining methods with the expectation of making a profit. MMC's need is to receive all necessary governmental approvals and authorizations to construct, operate, and reclaim the proposed Montanore Mine, the associated transmission line, and other incidental facilities. MMC proposes to construct, operate, and reclaim the Montanore Project in an environmentally sound manner, subject to reasonable mitigation measures designed to avoid or minimize environmental impacts to the extent practicable (Joint Final EIS Chapter 1 Section 1.5.5).

Forest Service approval of mineral development must comply with applicable forest plan direction and the Forest Service cannot prohibit locatable mineral operations on lands subject to the United States mining laws either directly or by regulation amounting to a prohibition. This means that if the operations would not comply with any applicable forest plan component after all reasonable stipulations to minimize adverse environmental impacts on National Forest surface resources have been included per 36 CFR 228, a forest plan amendment is required. This site-specific KFP amendment for the Montanore Project, suspends the requirement for full consistency with eight KFP guidelines and standards.

Public Notification and Comments Received

The KNF and the DEQ issued a Draft EIS for the Montanore Project on February 27, 2009, for public comment. In response to public comment, the agencies revised the agencies' mine alternatives (Alternatives 3 and 4) and transmission line alignments (Alternatives C-R, D-R, and E-R) and issued a Supplemental Draft EIS on October 7, 2011. Both the Draft EIS and Supplement Draft EIS disclosed the need to amend the then-current 1987 KFP.

On April 1, 2015, the KNF issued a Final EIS, Errata, and a Draft Record of Decision to provide for a pre-decisional objection process in compliance with 36 CFR 218. Section 1.3 of the Draft Record of Decision stated the following:

> I [the Responsible Official] have carefully reviewed this draft decision in light of the 2015 revision of the KFP and have found it fully compliant (see ROD Section 1.6.14). Therefore, no amendments are required. We worked hard throughout both project development and plan revision to align the two planning efforts. However, I recognize that new information could arise through the objection process that could either alter the final decision or otherwise influence this compliance determination. Should that occur, I am providing notice that the final decision might then need to include an amendment to align the project and plan.

The Joint Final EIS includes responses to comments on the Draft EIS and Supplemental Draft EIS regarding KFP amendments (Appendix M) and incorporates changes based on those responses.

Alternatives Considered

MMC's proposal for the Montanore Project and the agencies' alternatives were originally developed under the 1987 KFP. In the Joint Final EIS, each alternative was evaluated in light of the management direction in the 2015 KFP. Three mine alternatives and a No Action Alternative (No Mine) and four transmission line alternatives, plus a No Action Alternative (No Transmission Line), were analyzed in detail as part of the EIS.

To develop a reasonable range of alternatives, the lead agencies separated the proposed Montanore Project into components. *Components* are discrete activities or facilities (*e.g.*, plant site or tailings impoundment) that, when combined with other components, form an alternative. Options were identified for each component. An *option* is an alternative way of completing an activity, or an alternative geographic location for a facility (component), such as alternative geographic locations for a tailings impoundment or transmission line, or an alternative method of tailings disposal, such as thickened tailings. Options generate the differences among alternatives. An alternative is a complete project that has all the components necessary to fulfill the project purpose and need. Options with more favorable environmental characteristics were retained and other options were eliminated from further analysis. Options comprising the Proposed Action were retained regardless of their environmental characteristics. Next, options for each component were combined into potentially viable alternatives. The transmission line was analyzed as a separate component from the mine facilities because any transmission line alternative could be combined with any mine alternative. Each component or alternative was developed to a level that allowed for comparison of significant environmental issues.

Under Mine Alternative 1 and Transmission Line Alterative A, MMC would not develop the Montanore Project and would not build a 230-kV transmission line to provide power to the mine from the Sedlak Park Substation.

As proposed by MMC, for Alternative 2 the Montanore Project would consist initially of a 12,500-tons-per-day underground mining operation that would expand to a 20,000-tons-per-day rate. The surface mill (the Ramsey Plant Site) would be on National Forest System lands outside of the CMW in the Ramsey Creek drainage. The ore body would be accessed from two adits adjacent to the mill. Two other adits, an evaluation/ventilation adit and a ventilation adit, both with entrances located on private land, also would be used during the project. The evaluation/ventilation adit would be located in the upper Libby Creek drainage; the ventilation adit would be located on MMC's private land (patented claim HR 134) in the upper East Fork Rock Creek drainage near Rock Lake. Ore would be crushed underground and conveyed to the surface plant located near the Ramsey Adits. Copper and silver minerals would be removed from the ore by a flotation process. Tailings from the milling process would be transported through a pipeline to a tailings impoundment located in the Little Cherry Creek drainage, about 4 miles from the Ramsey Plant Site. The operating permit area would be 3,628 acres and the disturbance area would be 2,582 acres. The operating permit area would encompass 425 acres of private land owned by MMC at the Little Cherry Creek Tailings Impoundment Site, the Libby Adit Site, and the Rock Lake Ventilation Adit Site. All surface disturbances would be outside the CMW.

Alternative 3 is the selected mine alternative and will incorporate modifications and mitigating measures proposed by the agencies to reduce or eliminate adverse environmental impacts. These

measures are in addition to or instead of the mitigations proposed by MMC. The Libby Adit evaluation program will be the initial phase of the project and will be completed before construction of any other project facility. All other aspects of MMC's mine proposal will remain as described in Alternative 2. In Alternative 3, three major mine facilities will be located in alternative locations. MMC will develop a Poorman Tailings Impoundment Site north of Poorman Creek for tailings disposal, use the Libby Plant Site between Libby and Ramsey creeks, and construct two additional adits in upper Libby Creek. To avoid disturbance in the upper Ramsey Creek drainage, the adits in Alternative 3 will be in the upper Libby Creek drainage. The modification will address the same issues as the alternate Libby Plant Site. The operating permit area will be 2,157 acres and the disturbance area will be 1,565 acres. The operating permit areas will encompass 75 acres of private land owned by MMC at the Libby Adit Site and the Rock Lake Ventilation Adit Site.

Alternative 4 would be similar to Alternative 3, but would have modifications to MMC's proposed Little Cherry Creek Tailings Impoundment as part of the alternative. All other modifications and mitigations described in Alternative 3, other than those associated with the Poorman Tailings Impoundment Site, would be part of Alternative 4. As in Alternative 3, the Libby Adit evaluation program would be the initial phase of the project and would be completed before construction of any other project facility.

In Alternative 4, MMC would use the Libby Plant Site between Libby and Ramsey creeks, construct two additional adits in upper Libby Creek, and modify the proposed Little Cherry Creek Tailings Impoundment Site operating permit and disturbance areas to avoid RHCAs and old growth in the Little Cherry Creek drainage. Borrow areas would be reconfigured to maximize disturbance within the impoundment footprint, and to reduce disturbance of RHCAs, core grizzly bear habitat, and old growth. Waste rock would be stored temporarily within the impoundment footprint to address acid rock drainage and metal leaching and water quality and quantity. The proposed permanent Little Cherry Creek Diversion Channel below the engineered upper section would be modified to convey anticipated flows adequately. At closure, surface water runoff would be directed toward the Little Cherry Creek Diversion Channel, and not Bear Creek, an important bull trout stream. The operating permit area would be 2,979 acres and the disturbance area would be 1,924 acres. The operating permit area would encompass 276 acres of private land owned by MMC at the Little Cherry Creek Tailings Impoundment Site, the Libby Adit Site, and the Rock Lake Ventilation Adit Site. All other aspects of MMC's mine proposal would remain as described in Alternative 2, as modified by Alternative 3.

In Transmission Line Alternative B, the Ramsey Plant Site's electrical service would be 230-kV, 3-phase, and 60-cycle, provided by a new, overhead transmission line. BPA's proposed Sedlak Park Substation Site at the BPA's Noxon-Libby 230-kV transmission line is in an area known locally as Sedlak Park, 30 miles southeast of Libby on US 2. The proposed Sedlak Park Substation and loop line is the same in all alternatives. MMC would be responsible for funding construction of the transmission line, substation, and loop line that would connect the substation to the Noxon-Libby 230-kV transmission line. MMC's proposed transmission line alignment would be in the watersheds of the Fisher River, Miller Creek, a tributary to Miller Creek, Midas Creek, Howard Creek, Libby Creek, and Ramsey Creek. The proposed alignment would head northwest from the substation for about 1 mile east and uphill of US 2 and private homes and cabins, and then follow the Fisher River and US 2 north 3.3 miles. The alignment would then turn west and generally follow the Miller Creek drainage for 2.5 miles, and then turn northwest and traverse up a tributary to Miller Creek. The alignment would then cross into the upper Midas Creek drainage, and then down to Howard and Libby Creek drainages. The alignment would cross the low ridge between Libby Creek and Ramsey Creek, and then would generally follow

Ramsey Creek to the Ramsey Plant Site. Access roads on National Forest System lands would be closed and reseeded after the transmission line was built, and reclaimed after the transmission line was removed at the end of operations. MMC's proposed alignment would end at a substation at the Ramsey Plant Site; the lead agencies' alternatives would end at a substation at the Libby Plant Site, making the lead agencies' alternatives shorter.

Transmission Line Alternative C-R includes modifications to MMC's transmission line proposal described under Alternative B. One modification described in the Draft EIS would route the line on an east-facing ridge immediately north of the Sedlak Park Substation instead of following the Fisher River. The modification would address issues associated with water quality and aquatic life by crossing less area with soils that are highly erosive soils and those with potential for high sediment delivery. The modification also addresses the issue of scenic quality by reducing the visibility of the line from US 2. The other alignment modification was developed following comment on the Draft EIS. The modification, which would use an alignment up and over a ridge between West Fisher Creek and Miller Creek, would increase the use of public land and reduce the length of line on private land. During final design, MMC would submit a final Vegetation Removal and Disposition Plan to minimize vegetation clearing, particularly in riparian areas.

Wooden H-frame structures, which generally allow for longer spans and require fewer structures and access roads, would be used on Alternative C-R. In some locations, a helicopter would be used for vegetation clearing and structure construction so the need to use or construct roads in or adjacent to core grizzly bear habitat would be minimized and effects on lynx habitat would be reduced. No transmission line construction in elk, white-tailed deer, or moose winter range would occur between December 1 and April 30 unless approved by the agencies. Grizzly bear mitigation would require that MMC be restricted to June 16 to October 14 for conducting these activities. To mitigate effects on the grizzly bear, MMC would secure or protect replacement grizzly bear habitat on 26 acres in the Cabinet-Yaak Ecosystem. Transmission line construction and decommissioning on National Forest System and State trust lands would be limited to between June 16 and October 14.

Transmission Line Alternative D-R is the selected transmission line alternative and includes modifications to MMC's transmission line proposal regarding H-frame structures, helicopter use, vegetation clearing, and other modifications described under Alternative C-R. As in the Modified North Miller Creek Alternative (Alternative C-R), this alternative modifies MMC's proposed North Miller Creek alignment by routing the line on an east-facing ridge immediately north of the Sedlak Park Substation and crosses Hunter Creek 2 miles north-northwest of the substation. After crossing Hunter Creek, the alignment will head west, crossing US 2, the Fisher River, West Fisher Creek, and NFS road #231 (Libby Creek Road). The alignment then will head northwest, up and over the ridge between West Fisher Creek and Miller Creek. After the alignment crosses the ridge between West Fisher Creek and Miller Creek, the alignment will follow NFS road #4724 (South Fork Miller Creek Road) to a ridge separating Miller Creek from the Standard Creek drainage. The alignment will traverse the ridge into the Howard Creek drainage. The centerline will be about 500 feet east of the northeast corner of a private land parcel about 0.5 mile south of Howard Lake. North of the private land, the alignment will generally parallel Howard Creek, then cross Libby Creek and end at a substation at the Libby Plant Site selected as a component of Alternative 3. The transmission line will be 13.7 miles long and will cross primarily National Forest System lands and lands owned by Plum Creek Timberlands LLP.

Alternative D-R includes the development of a final Vegetation Removal and Disposition Plan as for Alternative C-R. The modifications will address issues associated with water quality and aquatic life by crossing less area with soils that are highly erosive soils and those with potential for high sediment delivery. The issue of scenic quality was addressed by this modification by

reducing the visibility of the line from US 2. Another modification was to use the same alignment as Alternative C-R into the Miller Creek drainage to increase the use of public land and reduce the use of private land. The issue of effects on threatened or endangered wildlife species was addressed by routing the alignment along Miller Creek and avoiding core grizzly bear and lynx habitat in Miller Creek and the unnamed tributary of Miller Creek. This alternative will use an alignment about 0.5 mile east of Howard Lake using H-frame structures. Water quality, aquatic life, threatened and endangered species, and wildlife mitigation described for Alternative C-R will be implemented for Alternative D-R. MMC will secure or protect replacement grizzly bear habitat on 40 acres in the Cabinet-Yaak Ecosystem.

Transmission Line Alternative E-R includes modifications to MMC's transmission line proposal regarding H-frame structures, helicopter use, vegetation clearing, and other modifications described under Alternative C-R. Some steel monopoles would be used in the steep section 2 miles west of US 2.

As in the Modified North Miller Creek Alternative (Alternative C-R), Alternative E-R modifies MMC's proposed North Miller Creek alignment by routing the line on an east-facing ridge immediately north of the Sedlak Park Substation. The modification would address issues associated with water quality by crossing less area with soils that are highly erosive and subject to high sediment delivery. The issue of scenic integrity was addressed by this modification by reducing the visibility of the line from US 2. Fewer residences would be within 0.5 mile of the line.

Forest Plan Amendment Process and NFMA Significance Evaluation

Under the National Forest Management Act, forest plans may "be amended whatsoever after final adoption and after public notice." Page 3 of the KFP states: "…where a proposed project or activity would not be consistent with Plan direction, the responsible official has the following options:

1. To modify the proposal so that the project or activity will be consistent;
2. To reject the proposal; or
3. To amend the Plan so that the project or activity is consistent with the Plan as amended. The amendment may be limited to apply only to the project or activity and may be adopted at the same time as the approval of the project or activity via project specific environmental analysis and public involvement (36 CFR 219.10(f))."

Current regulations regarding National Forest System Land Management Planning are found in 36 CFR 219. Under 36 CFR 219.17, plan amendments may be initiated under the provisions of the prior planning regulation for 3 years after May 9, 2012, and may be completed and approved under those provisions (except for the optional appeal procedures of the prior planning regulation); or may be initiated, completed, and approved under the requirements of current regulation. Because the proposed KFP amendment was initiated under the prior planning regulation, the significance of the amendments is evaluated under the prior planning regulation.

The prior planning regulation requires that the decision maker (1) determine whether proposed changes to a land management plan are significant or not significant; (2) document the determination of whether the change is significant or not significant in a decision document; and (3) provide appropriate public notification of the decision prior to implementing the changes. The "Forest Service Land and Resource Management Planning Manual" (Forest Service Manual

1926.51) provides a framework for determining whether a proposed change to a forest plan is or is not significant. An amendment is not significant when it involves:

1. Actions that do not significantly alter the multiple-use goals and objectives for long-term land and resource management.
2. Adjustments of management area boundaries or management prescriptions resulting from further on-site analysis when the adjustments do not cause significant changes in the multiple-use goals and objectives for long-term land and resource management.
3. Minor changes in standards and guidelines.
4. Opportunities for additional projects or activities that will contribute to achievement of the management prescription.

Evaluation of the four examples of amendments that are not significant does not conclusively determine whether the proposed amendment is significant. Therefore, the two examples given in FSM 1926.52 as indicative of circumstances that may cause a significant change to a land management plan are also evaluated:

1. Changes that would significantly alter the long-term relationship between levels of multiple- use goods and services originally projected (see section 219.10(e) of the planning regulations in effect before November 9, 2000 (see 36 CFR parts 200 to 299, revised as of July 1, 2000)).
2. Changes that may have an important effect on the entire land management plan or affect land and resources throughout a large portion of the planning area during the planning period.

The selected alternatives require an amendment to the 2015 KFP similar to examples of non-significant changes described above (#1 and #3, specifically). The effects of this decision are not similar to either example of significant plan changes. These findings for this project-specific amendment are discussed specific to each KFP component variance in further detail below.

Moose and Deer Winter Range

Need for Amendment

Within the Montanore Project analysis area, the KFP guidelines FW-GDL-WL-08 and FW-GDL-WL-09 are suspended. These guidelines require that project activities avoid or minimize disturbance to native ungulates on winter range between December 1 and April 30, with exception of routes identified on MVUM as open to motor vehicle use, and should avoid disturbance to native ungulate winter range areas during the critical mid-winter period (January and February). The suspension of these guidelines will apply to National Forest System lands affected by the Montanore Project mine facilities and will not apply to State or private lands. These guidelines will be suspended only during the life of the project, described in the *Background* section.

The suspended guidelines are:

> **FW-GDL-WL-08. Big Game.** Management activities should avoid or minimize disturbance to native ungulates on winter range between December 1 and April 30, with exception of routes identified on MVUM as open to motor vehicle use. Management activities that occur

on winter range during the winter period should concentrate activities to reduce impacts to native ungulates.

FW-GDL-WL-09. Big Game. Management activities should be avoided on native ungulate winter range areas during the critical mid-winter period (January and February) when snow depths most likely influence movement and availability of forage.

Effect of the Selected Alternatives

The agencies' Selected Alternatives will avoid activities on mountain goat winter range during the winter. The impacts on mountain goat winter range during the Operation Phase of the agencies' Selected Alternatives will be monitored. If mine disturbances are found to have a substantial impact on goat populations, MMC will develop, fund, and implement mitigation measures to reduce the impacts of mine disturbance.

The agencies' Selected Alternatives will avoid or minimize disturbance to deer and elk on winter range between December 1 and April 30, with exception of routes identified as open to motor vehicle use. The Bear Creek Road, which is identified on MVUM as open to motor vehicle use, will be snowplowed and used during the first year of Construction. The Libby Creek Road, which is identified on MVUM as open to motor vehicle use, will be snowplowed and used during the life of the project for access. The Selected Transmission Line Alternative will limit winter construction on winter range. During operations, very little activity will occur and will be concentrated along the transmission line alignment. Effects on elk and deer due to human disturbance during winter are not anticipated because none of the facilities for the Selected Transmission Line Alternative will be in winter range for elk and deer.

The Selected Mine Alternative cannot be designed in accordance with guidelines (FW-GDL-WL-08) for moose and deer winter range (Figure 1). In the Selected Mine Alternative, MMC will operate mine facilities year-round and disturb 1,400 acres of moose winter range between December 1 and April 30 and 16 acres of deer winter range. The Selected Mine Alternative cannot not be designed in accordance with the FW-GDL-WL-09 guideline. The Libby Creek Road, which will provide primary access for the mine, passes through moose and deer winter range. Snowplowing and year-round use of the Libby Creek Road will occur during the critical mid-winter period (January and February) when snow depths most likely influence movement and availability of forage in moose and deer winter range.

The amendment, which includes suspension of these two KFP wildlife guidelines, will allow all mine facilities to operate year-round in moose and deer winter range and to use the Bear Creek Road and Libby Creek Road during the critical mid-winter period (January and February) when snow depths most likely influence movement and availability of forage for the life of the project. Effects on moose and deer winter range are unavoidable as design features cannot be applied to the project to achieve compliance with the guidelines.

See Section 3.25.3.2.5 of the FEIS for a full description of the project effects on winter range habitat.

Significance of the Amendment

Per FSM 1926.51, changes to the land management plan that are not significant can result from:

1. **Actions that do not significantly alter the multiple-use goals and objectives for long-term land and resource management.**

The proposed amendment to the KFP will not significantly alter any of the multiple-use goals and objectives for long-term land and resource management. The quantities of goods and services that are expected to be produced during the planning period will not be significantly altered. The amendment will change management direction to address mineral development in the Montanore Project area only. The project-specific amendment will allow achievement of the overall forestwide desired condition for the Forest to continue "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" (FW-DC-MIN-01).

2. **Adjustments of management area boundaries or management prescriptions resulting from further on-site analysis when the adjustments do not cause significant changes in the multiple-use goals and objectives for long-term land and resource management.**

Management areas boundaries will not be adjusted by this amendment.

3. **Minor changes in standards and guidelines.**

The amendment will suspend applicability of two KFP guidelines for big game winter range (moose and deer) in the Crazy Planning Subunit (PSU), the analysis area based on watersheds used for big game winter range. The suspension of two big game winter range guidelines will allow the project to affect 1,400 acres of moose winter range and 16 acres of deer winter range, and to potentially displace moose and deer from winter range adjacent to mine facilities and access roads (Figure 1). The Crazy PSU contains 26,478 acres of moose big game winter range and 3,075 acres of deer winter range. The effect on moose winter range will be minor (5 percent of the available winter range in the Crazy PSU and 0.13 percent forestwide). The effects on deer winter range will be minor also (less than 1 percent of the available winter range in the Crazy PSU and 0.02 percent forestwide). Impacts on moose and deer winter range will be at least partially reduced through land acquisition of 5,427 acres. Acquired parcels will be managed for grizzly bear use in perpetuity, but depending on location, they could also contribute additional moose and deer winter range habitat.

4. **Opportunities for additional projects or activities that will contribute to achievement of the Management Prescription.**

This change will neither preclude nor necessitate additional projects. This change will not alter the ability to achieve the KFP forestwide wildlife goals and desired conditions.

The two examples given in FSM 1926.52 as indicative of circumstances that may cause a significant change to a land management plan are also evaluated.

1. **Changes that would significantly alter the long-term relationship between levels of multiple- use goods and services originally projected (see section 219.10(e) of the planning regulations in effect before November 9, 2000 (see 36 CFR parts 200 to 299, revised as of July 1, 2000)).**

The proposed amendment will not significantly alter the long-term relationship between levels of multiple-use goods and services originally projected in the KFP. Chapter 3 of the Joint Final EIS provides a detailed discussion of the environmental effects of the Selected Alternatives. The effects will take place only within and adjacent to the Montanore Project area (management area 6). When considered in the context of the 2.2 million-acre Kootenai National Forest planning area, the effects will not significantly alter the ability of the Kootenai National Forest to achieve forestwide goals and desired conditions.

2. **Changes that may have an important effect on the entire land management plan or affect land and resources throughout a large portion of the planning area during the planning period.**

The proposed amendment will affect 0.13 percent of available moose winter range habitat and 0.02 percent of available deer winter range habitat in the Kootenai National Forest, which is the planning area for the KFP. As described above, the effects of this amendment will be localized and will not have a significant effect on the entire land management plan, nor will it affect land and resources throughout a large portion of the planning area.

Scenic Integrity Objectives

Need for Amendment

Within the Montanore Project analysis area, the KFP guidelines FW-GDL-AR-01, MA5a,b,c-GDL-AR-06, and MA6-GDL-AR-05 are suspended. These guidelines require that project activities be consistent with mapped scenic integrity objectives. The suspension of these guidelines will apply to National Forest System lands affected by the Montanore Project facilities and will not apply to State or private lands. Except for 434 acres of the impoundment site, the guidelines will be suspended only during the life of the project, described in the *Background* section.

The current forestwide guideline for scenic integrity is:

> **FW-GDL-AR-01.** Management activities should be consistent with the mapped scenic integrity objective, see Plan set of documents. The scenic integrity objective is High to Very High for scenic travel routes, including Pacific Northwest National Scenic Trail, designated Scenic Byways, and National Recreation Trails.

The Montanore Project is within Management Areas (MA) 5a and 6, which have management area-specific guidelines for scenic integrity that overlap and duplicate the forestwide guideline. These guidelines are:

> **MA5a,b,c-GDL-AR-06.** Management activities should be consistent with the Scenic Integrity Objective of Moderate to High.
>
> **MA6-GDL-AR-05.** Management activities should be consistent with the Scenic Integrity Objective of Low to High.

The mapped scenic integrity objectives for the areas affected by the Selected Alternatives' activities are provided in the following table.

Scenic Integrity Objective for Each Project Facility Area.

Facility and Alternative	Scenic Integrity Objective
Adit Sites	
Libby Adit and Rock Lake Ventilation Adit	Private land; does not apply
Upper Libby Adit	High
Libby Plant Site	Moderate
Poorman Impoundment Site	Moderate
Access Road 231	Moderate
Transmission Line	Moderate; high in upper Midas Creek; not applicable on private land
Sedlak Park Substation and Loop Line	Private land; do not apply

Effect of the Selected Alternatives

The construction of the mine facilities, which are in MAs 5b and 6, will alter the vegetation pattern, landform, and land use, which will alter scenic integrity by introducing noticeable contrasts. During the life of the project, 1,595 acres of lands will not meet the scenic quality objectives (Figure 2). About 6 miles of the selected transmission line alignment on National Forest System lands MA 6 (153 acres included in the 1,595 acres) will have a moderate or high visibility; the changes in line, color, texture, and form of the transmission line clearing will not remain visually subordinate to the landscape character being viewed. These segments will not be consistent with the scenic integrity objective of moderate or high. Although the Selected Alternatives will include mitigation measures such as facility paint colors, feathering edges of the transmission line corridor, and using shorter utility poles where visible from Howard Lake, neither will be designed and implemented in full accordance with guidelines FW-GDL-AR-01, MA5a,b,c-GDL-AR-06, and MA6-GDL-AR-05.

The effects on scenery will be loss of vegetation as well as landform changes at all mine facilities and along the transmission line during the life of the mine. Following mine closure, landscape reclamation at all mine facilities, except the tailings impoundment, will create areas similar in appearance to abandoned roads and timber harvest areas. The scenic integrity of all disturbances associated with the transmission line will improve to moderate or high after the line is decommissioned and vegetation re-establishes.

The tailings impoundment will have physical characteristics in substantial contrast to the surrounding landscape. The scenic integrity changes at the impoundment site will be noticeable indefinitely. The permanent effect on scenic integrity at the impoundment site will be to 434 acres of National Forest System lands.

The Upper Libby Adit Site, which is in MA 5b, will have a scenic integrity of very low during construction, operations, and closure because of a 1-acre area of contrasts created by the Upper Libby Adit. Although the disturbed area will remain relatively small in the views from KOPs 2 and 3, the roads, and the CMW, the contrasts will create a slightly greater visual distraction. Following the mine closure, regrading and revegetation will be implemented to match natural vegetation patterns. The Upper Libby Adit Site will return to its existing scenic integrity of high after revegetation is successful.

The amendment, which includes suspension of these three KFP access and recreation guidelines, will allow all mine facilities except the access roads, and segments of the transmission line to vary from the mapped scenic integrity objective for the life of the project and for the tailings impoundment to vary from the mapped scenic integrity objective permanently. Effects on scenic integrity are unavoidable as design features cannot be applied to the project to achieve compliance with the guideline. The amendment will apply to National Forest System lands affected by the Montanore Project facilities and will not apply to State or private lands. No visual regulatory requirements apply to BPA’s Sedlak Park Substation and loop line, which will be on private land.

See Section 3.17.4 of the FEIS for a full description of the project effects to scenic integrity objectives.

Significance of the Amendment

1. **Actions that do not significantly alter the multiple-use goals and objectives for long-term land and resource management.**

The proposed amendment to the KFP will not significantly alter any of the multiple-use goals and objectives for long-term land and resource management. The quantities of goods and services that are expected to be produced during the planning period will not be significantly altered. The amendment will change management direction to address mineral development in the Montanore Project area only. The project-specific amendment will allow achievement of the overall forestwide desired condition for the Forest to continue "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" (FW-DC-MIN-01).

2. **Adjustments of management area boundaries or management prescriptions resulting from further on-site analysis when the adjustments do not cause significant changes in the multiple-use goals and objectives for long-term land and resource management.**

Management areas boundaries will not be adjusted by this amendment.

3. **Minor changes in standards and guidelines.**

The amendment will suspend applicability of three KFP access and recreation guidelines for the Montanore Project area (Figure 2). The suspension of this access and recreation guidelines will allow the project to vary from the mapped scenic integrity objectives on 1,595 acres over the life of the project and 434 acres permanently. As this is less than 1 percent of the 2.2 million-acre Forest, the overall effect on the KNF scenic resources will be minor.

4. **Opportunities for additional projects or activities that will contribute to achievement of the Management Prescription.**

This change will neither preclude nor necessitate additional projects. This change will not alter the ability to achieve the KFP forestwide scenic resource desired conditions.

The two examples given in FSM 1926.51 as indicative of circumstances that may cause a significant change to a land management plan are also evaluated.

1. **Changes that would significantly alter the long-term relationship between levels of multiple- use goods and services originally projected (see section 219.10(e) of the planning regulations in effect before November 9, 2000 (see 36 CFR parts 200 to 299, revised as of July 1, 2000)).**

The proposed amendment will not significantly alter the long-term relationship between levels of multiple-use goods and services originally projected in the KFP. Chapter 3 of the Joint Final EIS provides a detailed discussion of the environmental effects of the Selected Alternatives. The effects will take place only within and adjacent to the Montanore Project area (which is entirely within MA 6, except for 43 acres around and including the Upper Libby Adit Site, which is in MA 5b). When considered in the context of the 2.2 million-acre Kootenai National Forest planning area, the effects will not significantly alter the ability of the Kootenai National Forest to achieve forestwide goals and desired conditions.

2. **Changes that may have an important effect on the entire land management plan or affect land and resources throughout a large portion of the planning area during the planning period.**

The proposed amendment will affect less than 1 percent of the Kootenai National Forest, which is the planning area for the KFP. As described above, the effects of these amendments will be localized and will not have a significant effect on the entire land management plan, nor will they affect land and resources throughout a large portion of the planning area.

Riparian Habitat Conservation Areas

Need for Amendment

On 290 acres within the Montanore Project analysis area, the KFP standards FW-STD-RIP-01 and FW-STD-RIP-02 are suspended. These standards require that project activities maintain or improve intact Riparian Habitat Conservation Areas (RHCAs). The suspension of these standards will apply to National Forest System lands affected by the Montanore Project facilities and will not apply to State or private lands. The standards will be suspended only during the life of the project, described in the *Background* section.

The suspended standards are:

> **FW-STD-RIP-01.** When RHCAs are intact and functioning at desired condition, then management activities shall maintain or improve that condition. Short-term effects from activities in the RHCAs may be acceptable when those activities support long-term benefits to the RHCAs and aquatic resources.
>
> **FW-STD-RIP-02.** When RHCAs are not intact and not functioning at desired condition, management activities shall include restoration components that compensate for project effects to promote a trend toward desired conditions. Large-scale restoration plans or projects that address other cumulative effects within the same watershed may be considered as compensatory components and shall be described during site-specific project analyses.

Effect of the Selected Alternatives

The Selected Alternatives will unavoidably disturb 290 acres of RHCAs on National Forest System lands (Figure 3). The Selected Alternatives were developed to minimize the extent to which RHCAs will be affected. In the Selected Alternatives potential impacts on RHCAs will be mitigated through road status changes, projects implemented for waters of the U.S. mitigation, and acquisition and protection of 5,381 acres of private lands for grizzly bear mitigation.

The amendment, which includes suspension of these two KFP riparian standards, will allow the mine and transmission line alternatives to adversely affect 290 acres of RHCAs. Effects on RHCAs are unavoidable as design features cannot be applied to the project to maintain or improve RHCAs in these areas. The amendment will apply to National Forest System lands affected by the Montanore Project facilities and will not apply to State or private lands. No riparian standards apply to BPA's Sedlak Park Substation and loop line, which will be on private land and avoids effects on riparian areas.

See Sections 3.13.4 and 3.23.4 of the FEIS for a full description of the project effects to RHCAs.

Significance of the Amendment

1. **Actions that do not significantly alter the multiple-use goals and objectives for long-term land and resource management.**

The proposed amendment to the KFP will not significantly alter any of the multiple-use goals and objectives for long-term land and resource management. The quantities of goods and services that

are expected to be produced during the planning period will not be significantly altered. The amendment will change management direction to address mineral development in the Montanore Project area only. The project-specific amendment will allow achievement of the overall forestwide desired condition for the Forest to continue "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" (FW-DC-MIN-01).

2. **Adjustments of management area boundaries or management prescriptions resulting from further on-site analysis when the adjustments do not cause significant changes in the multiple-use goals and objectives for long-term land and resource management.**

Management areas boundaries will not be adjusted by the amendment.

3. **Minor changes in standards and guidelines.**

The amendment will suspend applicability of two KFP riparian standards on 290 acres within the Montanore Project area (Figure 3). Project mitigation will partially offset these effects. The overall effect on RHCAs on the Kootenai National Forest will be minor, as 0.12 percent of KNF RHCAs will be affected.

4. **Opportunities for additional projects or activities that will contribute to achievement of the Management Prescription.**

This change will neither preclude nor necessitate additional projects. This change will not alter the ability to achieve the KFP forestwide riparian habitat goals and desired conditions.

The two examples given in FSM 1926.52 as indicative of circumstances that may cause a significant change to a land management plan are also evaluated.

1. **Changes that would significantly alter the long-term relationship between levels of multiple- use goods and services originally projected (see section 219.10(e) of the planning regulations in effect before November 9, 2000 (see 36 CFR parts 200 to 299, revised as of July 1, 2000)).**

The proposed amendment will not significantly alter the long-term relationship between levels of multiple-use goods and services originally projected in the KFP. Chapter 3 of the Joint Final EIS provides a detailed discussion of the environmental effects of the Selected Alternatives. The effects will take place only within and adjacent to the Montanore Project area (management area 6). When considered in the context of the 2.2 million-acre Kootenai National Forest planning area, the effects on 0.12 percent of the RHCAs will not significantly alter the ability of the Kootenai National Forest to achieve forestwide goals and desired conditions.

2. **Changes that may have an important effect on the entire land management plan or affect land and resources throughout a large portion of the planning area during the planning period.**

The proposed amendment will affect 290 acres of riparian habitat (0.12 percent) on the Kootenai National Forest, which is the planning area for the KFP. As described above, the effects of this amendment will be localized and will not have a significant effect on the entire land management plan, nor will it affect land and resources throughout a large portion of the planning area.

Old Growth

Need for Amendment

Within the Montanore Project analysis area, the KFP guideline FW-GDL-VEG-02 is suspended. This guideline requires that road construction and other developments should avoid old growth stands. The suspension of the guideline will apply to National Forest System lands affected by the Montanore Project mine facilities and will not apply to State or private lands. The guideline will be suspended only during the life of the project, described in the *Background* section.

The suspended guideline is:

> **FW-GDL-VEG-02:** Road construction (permanent or temporary) or other developments should generally be avoided in old growth stands unless access is needed to implement vegetation management activities for the purpose of increasing the resistance and resilience of the stands to disturbances.

Effect of the Selected Alternatives

Although the Selected Alternatives will minimize road construction or other developments in old growth stands, it cannot not be designed in accordance with guideline FW-GDL-VEG-02 for generally avoiding road construction or other developments in old growth. The Selected Alternatives will impact 253 acres of old growth. The tailings impoundment will impact 245 acres and 8 acres of old growth will be impacted due to the construction of the transmission line and associated roads. Impacts on old growth on all lands will be minimized through implementation of the Environmental Specifications (Final EIS Appendix D) and Vegetation Removal and Disposition Plan. Also, the use of monopoles for the transmission line in old growth, if incorporated into the Vegetation Removal and Disposition Plan, will require less clearing. Loss of old growth may be offset by private land acquisition associated with grizzly bear habitat mitigation, if old growth is present on the acquired parcels.

The amendment, which includes suspension of one KFP vegetation guideline, will allow construction of the tailings impoundment and transmission line and associated roads in 253 acres of old growth (Figure 4). Design features cannot be applied to the project to generally avoid old growth for the construction of these facilities. The amendment will apply to National Forest System lands affected by the Montanore Project facilities and will not apply to State or private lands. No old growth regulatory requirements apply to BPA's Sedlak Park Substation and loop line, which will be on private land.

See Section 3.22.2.4 of the FEIS for a full description of the project effects to old growth.

Significance of the Amendment

1. **Actions that do not significantly alter the multiple-use goals and objectives for long-term land and resource management.**

The proposed amendment to the KFP will not significantly alter any of the multiple-use goals and objectives for long-term land and resource management. The quantities of goods and services that are expected to be produced during the planning period will not be significantly altered. The amendment will change management direction to address mineral development in the Montanore Project area only. The project-specific amendment allows achievement of the overall forestwide desired condition for the Forest to continue "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" (FW-DC-MIN-01).

2. **Adjustments of management area boundaries or management prescriptions resulting from further on-site analysis when the adjustments do not cause significant changes in the multiple-use goals and objectives for long-term land and resource management.**

Management areas boundaries will not be adjusted by the amendment.

3. **Minor changes in standards and guidelines.**

The amendment will suspend application of one KFP vegetation guideline on 253 acres of the Montanore Project area. The overall effect on old growth on the Kootenai National Forest will be minor (0.07 percent of old growth forestwide) (Figure 4). The amount of old growth that is predicted to occur across the Forest in the future increases substantially during the next 50 years. In the absence of large-scale dramatic disturbances over the Forest, old growth amounts should increase in the future due to the large number of acres of forest stands on the KNF that currently meet every old growth criteria except age, but that will meet the age criteria relatively soon.

4. **Opportunities for additional projects or activities that will contribute to achievement of the Management Prescription.**

This change will neither preclude nor necessitate additional projects. This change will not alter the ability to achieve the KFP forestwide vegetation goals and desired conditions.

The two examples given in FSM 1926.52 as indicative of circumstances that may cause a significant change to a land management plan are also evaluated.

1. **Changes that would significantly alter the long-term relationship between levels of multiple- use goods and services originally projected (see section 219.10(e) of the planning regulations in effect before November 9, 2000 (see 36 CFR parts 200 to 299, revised as of July 1, 2000)).**

The proposed amendment will not significantly alter the long-term relationship between levels of multiple-use goods and services originally projected in the KFP. Chapter 3 of the Joint Final EIS provides a detailed discussion of the environmental effects of the Selected Alternatives. The effects will take place only within and adjacent to the Montanore Project area (management area 6). When considered in the context of the 2.2 million-acre Kootenai National Forest planning area, the effects will not be significant.

2. **Changes that may have an important effect on the entire land management plan or affect land and resources throughout a large portion of the planning area during the planning period.**

The proposed amendment will affect a small portion (0.07 percent) of old growth on the Kootenai National Forest, which is the planning area for the KFP. As described above, the effects of this amendment will be localized and will not have a significant effect on the entire land management plan, nor will they affect land and resources throughout a large portion of the planning area.

Cumulative Effects

Chapter 3 of the EIS discloses the past, present and reasonably foreseeable future projects in the Montanore Project analysis area. The cumulative effects of the alternatives along with these other actions, in particular the implementation of the project-specific forest plan amendment for the project, are also discussed in the applicable effects analysis sections described previously.

The project-specific amendment described in this document is the first amendment to the 2015 KFP. The Rock Creek Project is the only other project proposing a project-specific amendment

(to suspend two of the same forestwide guidelines). The proposed project-specific amendment for the Rock Creek Project would suspend FW-GDL-WL-09, FW-GDL-AR-01, and MA1a-GDL-AR-01. FW-GDL-WL-09 and FW-GDL-AR-01 are two of the eight 2015 KFP standards and guidelines to be amended for the Montanore Project.

If approved, the Rock Creek Project project-specific amendment to suspend FW-GDL-WL-09 would apply to 57 acres of elk winter range and 57 acres of deer winter range habitat. Preliminary analysis indicates the Rock Creek Project would be consistent with this guideline as it applies to moose. The Rock Creek Project effects related to the suspension of this guideline would contribute cumulatively to the Montanore Project's effects on deer winter range (Figure 5). The effects would be on discreet locations of the KNF and together affect less than 1 percent of the deer winter range habitat available on the Forest.

If approved, the Rock Creek Project project-specific amendment to suspend FW-GDL-AR-01 would apply to 113 acres on the southern portion of the KNF. The effects to scenic integrity from both the Montanore and Rock Creek projects would be in discreet locations of the KNF and together would affect less than 1 percent of the Forest (Figure 5). When considered cumulatively, the two project-specific amendments would not preclude the Forest from achieving forestwide desired condition for the scenic resources of the KNF to "compliment the recreation settings and experiences while reflecting healthy and sustainable ecosystem conditions" (FW-DC-AR-02) over the long term.

Although the Rock Creek Project is proposing to suspend similar guidelines as the Montanore Project, this does not indicate a need for programmatic amendment to the 2015 KFP. As both projects' amendments are limited in scope and located in discrete locations, and neither alter the ability of the Forest to achieve forestwide desired conditions for native ungulate habitat or scenic resources (when considered both individually and cumulatively), project-specific amendments are appropriate.

Conclusion

It is Forest Service policy to support responsible, environmentally sound energy and mineral development and reclamation for all categories of mineral resources on the forest. The Forest Service role in managing such resources is to provide a reasonable protection of surface resources. The 2015 KFP includes the desired condition to provide for the protection of surface resources while continuing to contribute to the economic strength and demands of the nation by supplying mineral and energy resources (FW-DC-MIN-01).

Forest Service approval of mineral development must comply with applicable forest plan direction and the Forest Service cannot prohibit locatable mineral operations on lands subject to the United States mining laws either directly or by regulation amounting to a prohibition. This means that if the operations would not comply with any applicable forest plan component after all reasonable stipulations to minimize adverse environmental impacts on National Forest surface resources have been included per 36 CFR 228, a forest plan amendment is required.

Although the Kootenai National Forest has imposed all reasonable stipulations to minimize the environmental impacts to the big game winter range, scenic resources, riparian areas, and old growth per 36 CFR 228.8, the project cannot be designed in full accordance with the eight KFP guidelines and standards described here. The Kootenai National Forest will suspend application of four forestwide KFP guidelines (FW-GDL-WL-08 for moose and deer winter range, FW-GDL-WL-09 for moose and deer winter range, FW-GDL-AR-01, FW-GDL-VEG-02), two forestwide standards (FW-STD-RIP-01, FW-STD-RIP-02), and two MA-specific guidelines (MA5a,b,c-

GDL-AR-06 and MA6-GDL-AR-05) within the Montanore Project area as described above in order to implement Mine Alternative 3 and Transmission Line Alternative D-R, while still maintaining consistency with KFP goals and desired conditions. The amendment, which site-specifically suspends these standards and guidelines, brings the Montanore Project in full compliance with the 2015 KFP.

Based on a review of the factors described in the Forest Service Land Management Planning Handbook at 1926.51 and 1926.52, and considering the Forest Plan in its entirety, I have determined that 1) this project-specific amendment is not a significant amendment to the 2015 KFP, 2) the determination of whether the change is significant or not significant has been appropriately documented in a decision document, and 3) appropriate public notification of this decision prior to implementing the changes has been provided.

Recommended by:

2/11/2016

TIMORY KELLY PEEL — Date
Forest Planner

Approved by:

2/12/2016

CHRISTOPHER S. SAVAGE — Date
Forest Supervisor

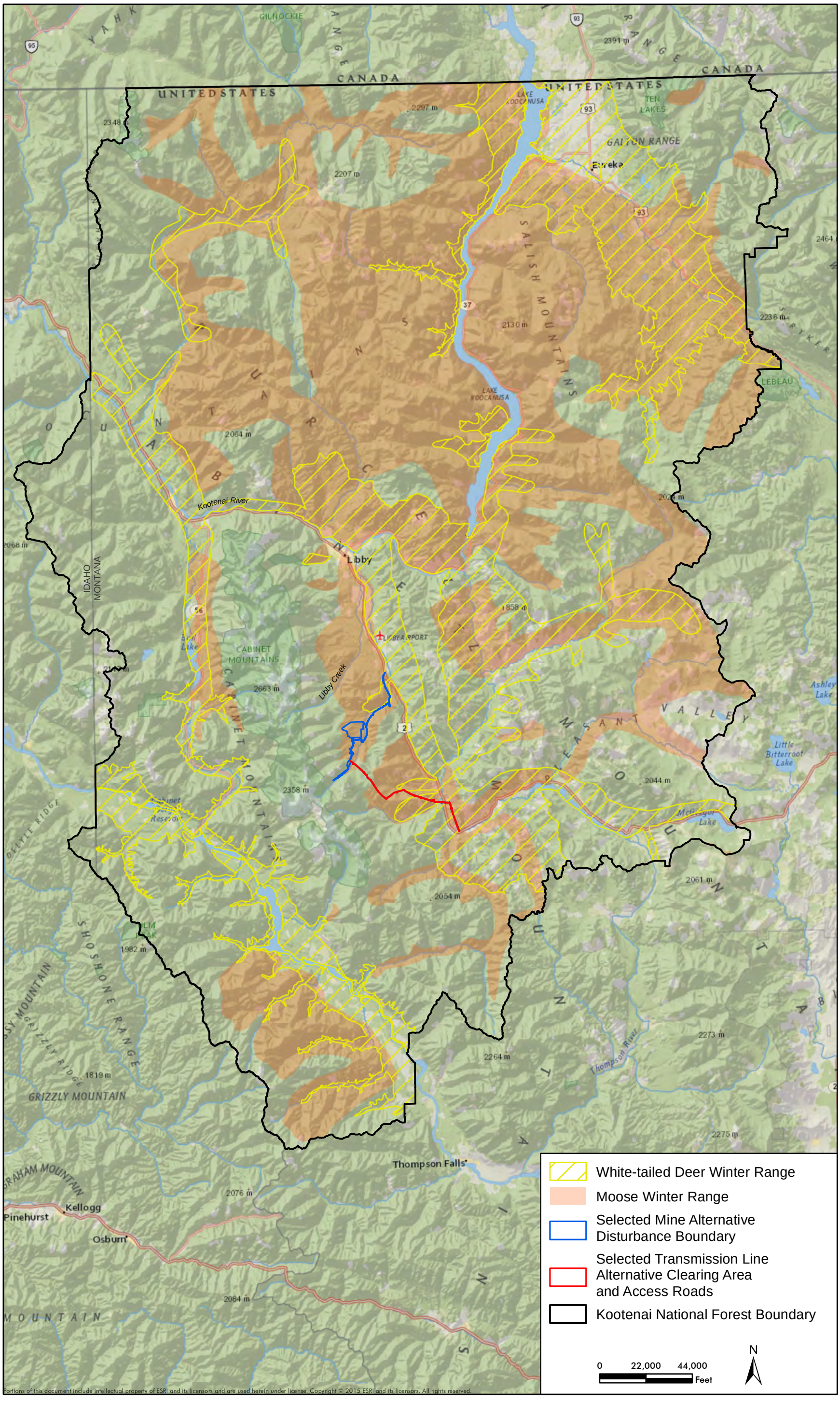

Figure 1. White-tailed Deer and Moose Winter Range (FW-GDL-WL-08 and FW-GDL-WL-09)

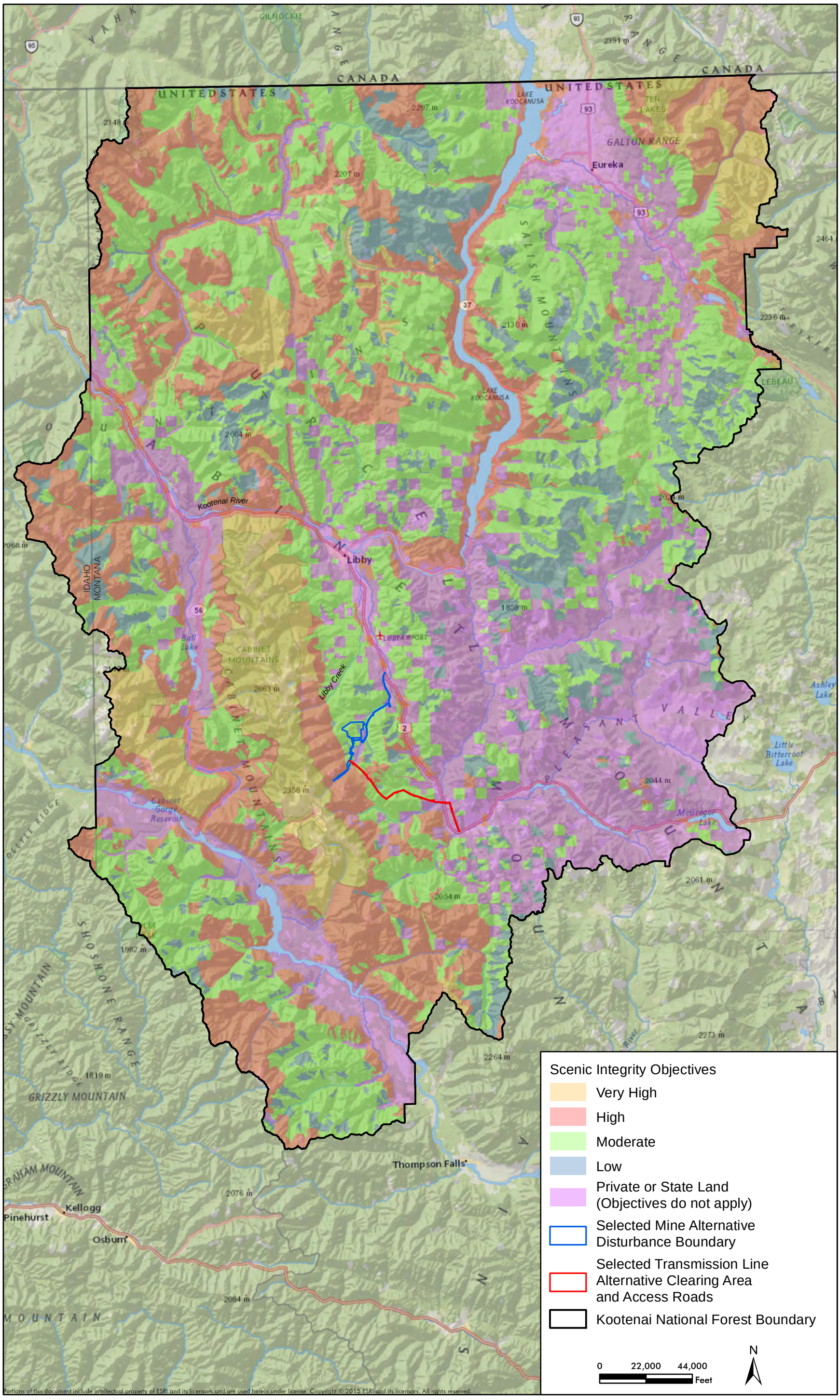

Figure 2. Scenic Integrity Objectives (FW-GDL-AR-01)

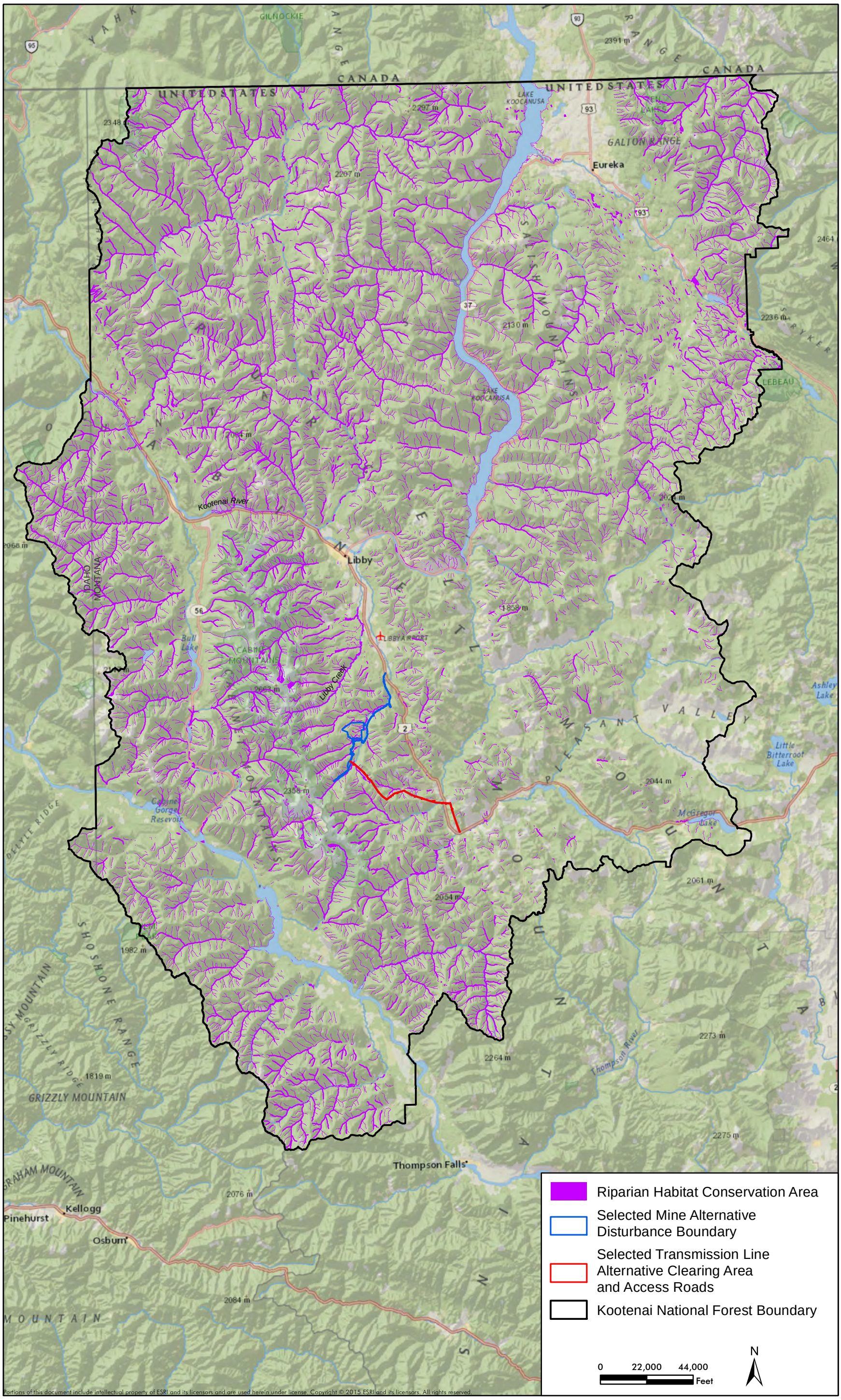

Figure 3. Riparian Habitat Conservation Areas (FW-STD-RIP-01 and FW-STD-RIP-02)

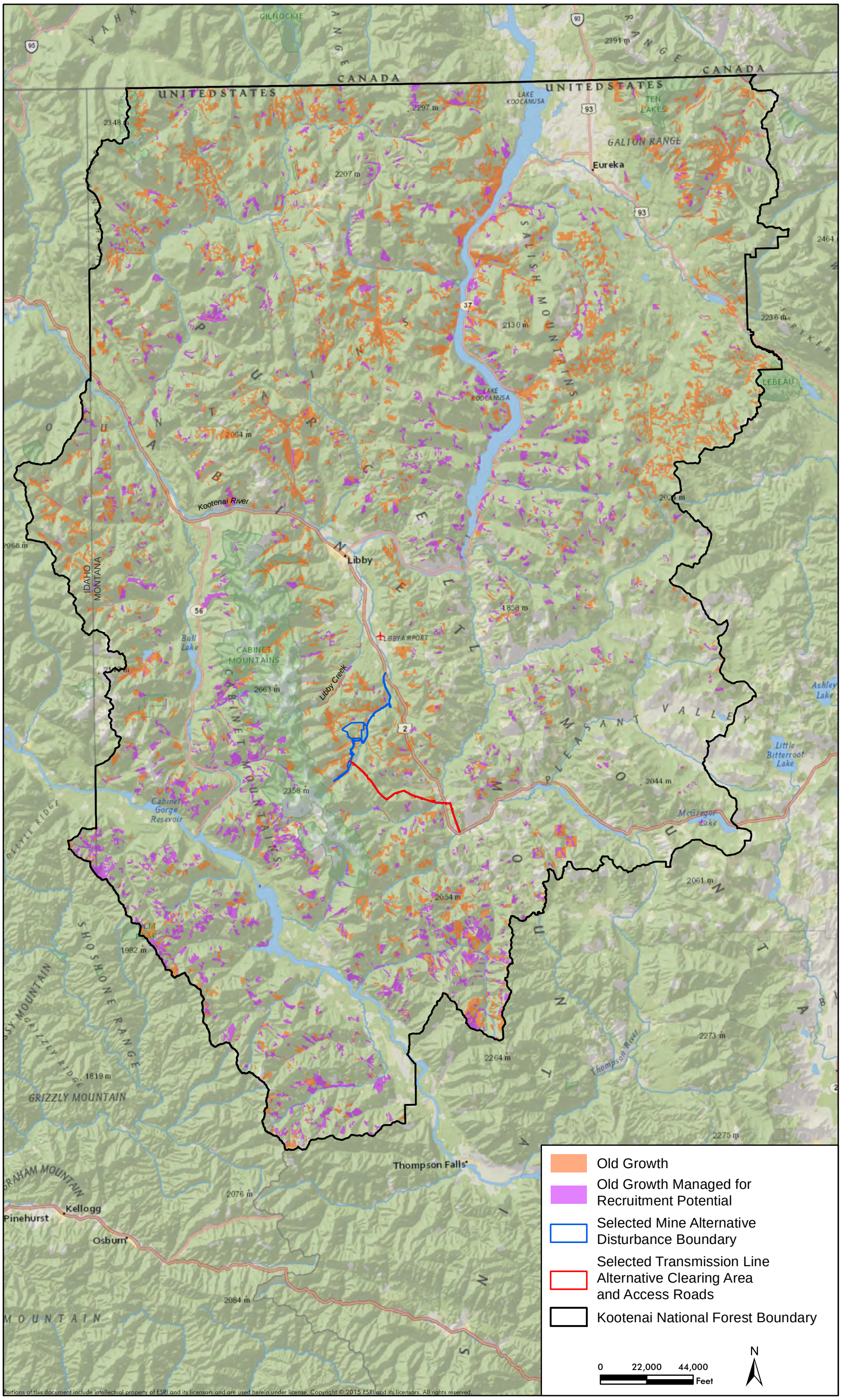

Figure 4. Old Growth (FW-GDL-VEG-02)

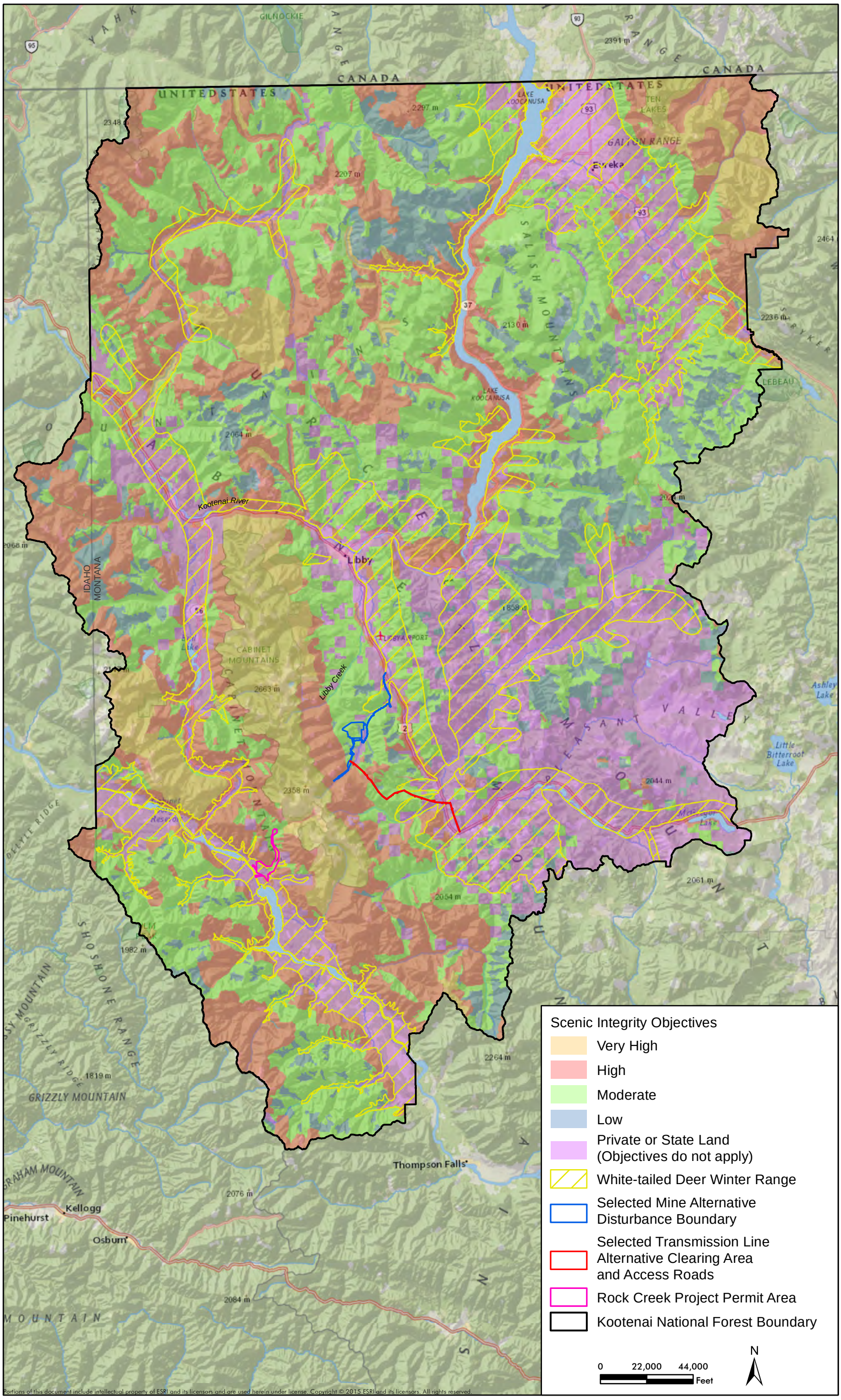

Figure 5. Cumulative Effects of Rock Creek Project and Montanore Project Forest Plan Amendments.

Attachment 11 – Correction to the December 2015 Joint Final EIS

In the Joint Final EIS that was issued in December 2015, Table 185 did not accurately show the impacts on old growth from combined mine and transmission line alternatives. The following table has been corrected and replaces Table 185.

Table 185. Summary of Impacts on Old Growth from Combined Mine and Transmission Line Alternatives (revised in ROD).

Measurement Criteria	No Mine	MMC's Proposed Mine	Agency Mitigated Poorman Impoundment Alternative			Agency Mitigated Little Cherry Creek Impoundment Area		
		TL-B	TL-C-R	TL-D-R	TL-E-R	TL-C-R	TL-D-R	TL-E-R
Crazy PSU								
Effective Old Growth								
Cleared old growth (acres)	0	387	245	245	245	216	216	216
Change in edge influence (acres)	0	+334	+241	+245	+245	+220	+224	+224
Change in interior habitat (acres)	0	-721	-486	-490	-490	-437	-441	-441
Recruitment Old Growth								
Cleared old growth (acres)	0	54	11	11	11	61	61	61
Change in edge influence (acres)	0	-15	+35	+35	+35	-7	-7	-7
Change in interior habitat (acres)	0	-39	-46	-46	-46	-54	-54	-54
Silverfish PSU								
Effective Old Growth								
Cleared old growth (acres)	0	0	10	8	0	10	8	0

Measurement Criteria	No Mine	MMC's Proposed Mine	Agency Mitigated Poorman Impoundment Alternative			Agency Mitigated Little Cherry Creek Impoundment Area		
		TL-B	TL-C-R	TL-D-R	TL-E-R	TL-C-R	TL-D-R	TL-E-R
Change in edge influence (acres)	0	3	-3	-4	0	-3	-4	0
Change in interior habitat (acres)	0	-3	-8	-5	0	-8	-5	0
Recruitment Old Growth								
Cleared old growth (acres)	0	7	11	0	0	11	0	0
Change in edge influence (acres)	0	+20	+20	0	+2	+20	0	+2
Change in interior habitat (acres)	0	-25	-31	0	-2	-31	0	-2
State and Private Land								
Old Growth								
Cleared old growth (acres)	0	4	0	0	7	0	0	7

Totals may vary due to rounding
Source: Clearing and road GIS analysis by ERO Resources Corp. using KNF data; edge and interior GIS analysis by KNF.