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Region

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Supplemental Decision Notice
and Finding of No Significant Impact

CuMo Exploration Project

Boise National Forest
Idaho City Ranger District
Boise County, Idaho

Responsible Official:
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Supplemental Decision Notice and Finding of No Significant Impact
CuMo Exploration Project
USDA Forest Service
Idaho City Ranger District, Boise National Forest
Boise County, Idaho
Introduction

I issued the Decision Notice and Finding of No Significant Impact (DN/FONSI) for the CuMo Exploration Project on February 11, 2011, selecting Alternative B for implementation. On July 27, 2011, a lawsuit was filed against the project: *Idaho Conservation League et al. v. United States Forest Service* (1:11-CV-00341-EJL). On August 29, 2012, the United States District Court of the District of Idaho (Court) issued its Memorandum Decision and Order, mandating that “the Defendant Forest Service’s decisions regarding groundwater made in the Environmental Assessment [be] vacated, and the matter ...remanded to the Forest Service for further proceedings consistent with this opinion...”

In reaching this decision, the Court concluded:

As to the question of whether an EIS should have been prepared, the Court finds in favor of the Forest Service and Mosquito Mining on all but the concerns regarding groundwater... The Court will vacate that portion of the EA as to the finding of no significant impact as it concerns groundwater and remand the matter to the Forest Service to undertake further analysis concerning groundwater and determine whether to issue a supplemental EA or if a full EIS is required. (Court 2012)

To address the analysis deficiencies identified by the Court, I decided to move forward with the preparation of a Supplemental EA to undertake further analysis concerning groundwater and, as needed, address new information since the 2011 DN/FONSI was issued.

Consistent with the approach taken in the Supplemental EA, this supplemental DN/FONSI includes all aspects of my 2011 decision that have not changed (black text), with the components included as part of my supplemental decision to address the above Court Order and other new information/changed circumstances since the 2011 DN/FONSI (red text).

The **Supplemental** Environmental Assessment (**SEA**) for the CuMo Exploration Project was prepared pursuant to the requirements of the National Environmental Policy Act (NEPA, 40 CFR 1500-1508), the National Forest Management Act (NFMA), and the 2003 Boise National Forest (NF) Land and Resource Management Plan as amended in 2010¹ (USDA FS, 2003a; USDA FS, 2010a), and other Federal laws, regulations and policy. The Project Area encompasses about 2,885 acres approximately five miles upstream of Pioneerville, Idaho on

¹ The Forest Plan amendment decision is documented in the “Record of Decision for Forest Plan Amendments to Facilitate Implementation of the 2010 Plan Scale Wildlife Conservation Strategy: Phase 1 Forested Biological Community.” All citations referenced in the DN/FONSI are included in Chapter 6.0, “References,” of the EA.

Grimes Creek and about 14 miles north of Idaho City, in Boise County. Figure 1 displays the project vicinity.

There are four access routes into the Project Area. One is by way of County Road (CR)307 and CR382 north from Idaho City; this route passes through Centerville and Pioneerville along Grimes Creek. The second route is southeastwardly from Garden Valley by way of CR382; this route follows the Banks-Lowman Highway (State Highway 17; Forest Highway 24) along the south bank of South Fork Payette River and Sweet Creek; this route is for emergency access only). The third route is by way of CR307 and CR382 east from Horseshoe Bend. The fourth route is by way of CR615, CR307, and CR382 south from Garden Valley; this route passes through Placerville and Centerville. Figure 2 shows the access routes into the Project Area.

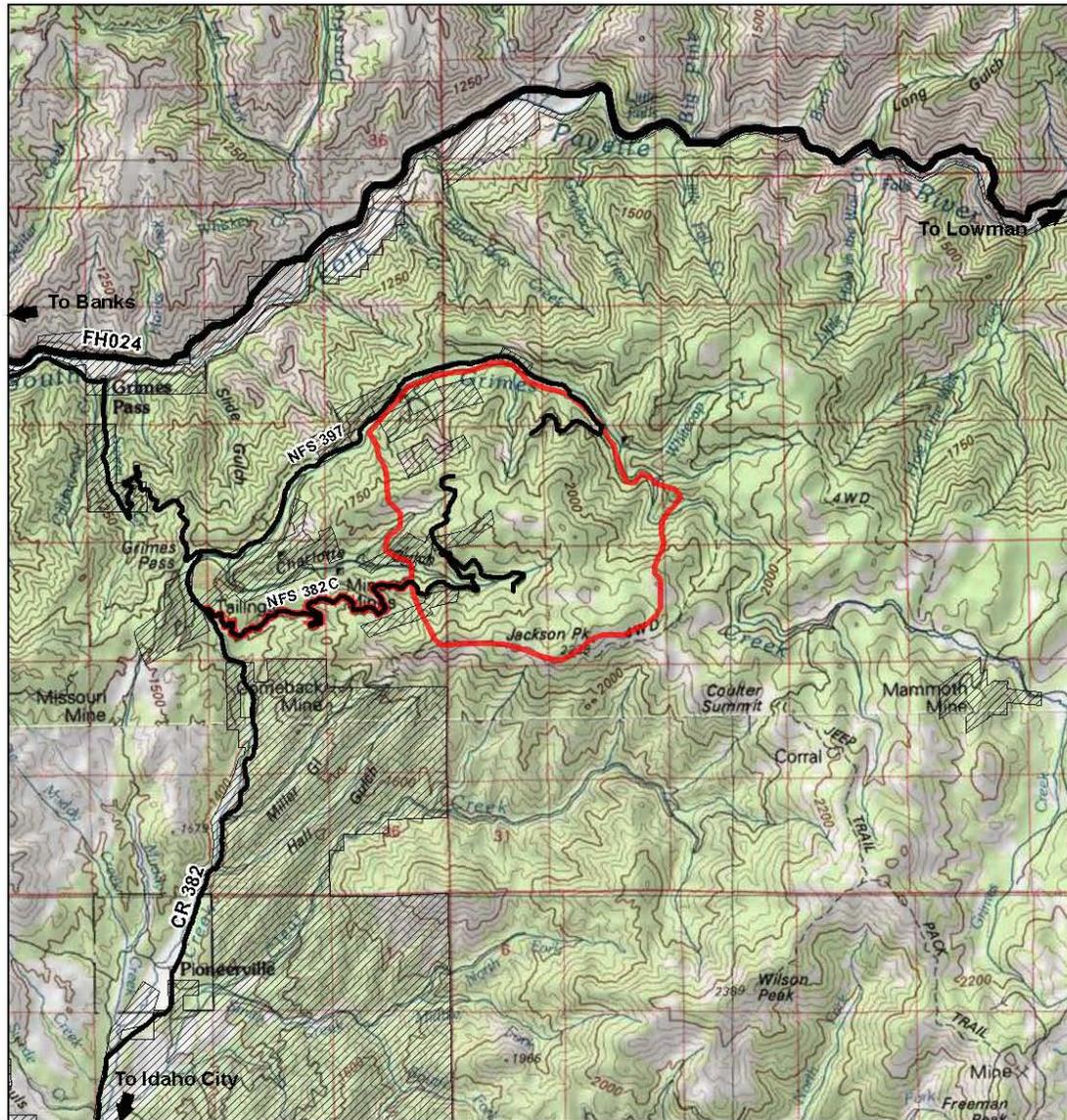
The SEA includes the 2011 analysis (black text) and supplemental analysis (red text) of a proposed action and an additional action alternative considered in detail that were designed to meet the purpose and need of the project. Alternative A (Applicant Proposed Action) is the proposed action (SEA, Section 2.1.1), while Alternative B was developed to address the major issue identified during the original scoping; namely, the extent of proposed temporary roads and resultant concern over potential erosion and sedimentation to Grimes Creek (SEA, Section 2.1.2). Alternative C is the “No Action” alternative, which was developed to provide a baseline from which to evaluate the environmental effects of the action alternatives (SEA, Section 2.1.3).

Background

The CuMo molybdenum prospect (CuMo) was discovered by AMAX Exploration Inc. (AMAX) in 1963. AMAX and their joint venture partners, AMOCO Minerals and Climax Molybdenum, completed multiple stages of exploration beginning in 1968 and continuing through 1982. This exploration included geological mapping, geochemical surveys, geophysical surveys, the drilling of 5 reverse-circulation exploration holes, 4 of which were re-drilled to greater depths as diamond-bit exploration core holes, and the drilling of 21 additional diamond-bit exploration holes. During this period of time AMAX developed a number of exploration access roads. A segment from this developed network became National Forest System (NFS) road 397B, and approximately 4.7 miles of the developed roads remain as unauthorized roads (Hicks, 2011). A timber bridge was constructed on what is now NFS road 397B, where it crosses Grimes Creek; in 2005 the bridge was in very poor condition and was condemned by Forest Service engineers.

In 2005 Kobex Resources Ltd., of Vancouver, British Columbia, approached the Forest Service with a plan to drill 16 exploration holes at the CuMo project site. They developed a Plan of Operations (PoO) that included drilling, using the existing 4.7 mile network of unauthorized roads and replacing the condemned Grimes Creek Bridge with a double culvert crossing. Following environmental analysis, the plan was approved and bonded. Kobex began operations in the summer of 2006, installing the Grimes Creek culvert, using the 4.7 miles of unauthorized roads as permitted roads, and drilling core holes.

Figure 1. General Project Vicinity



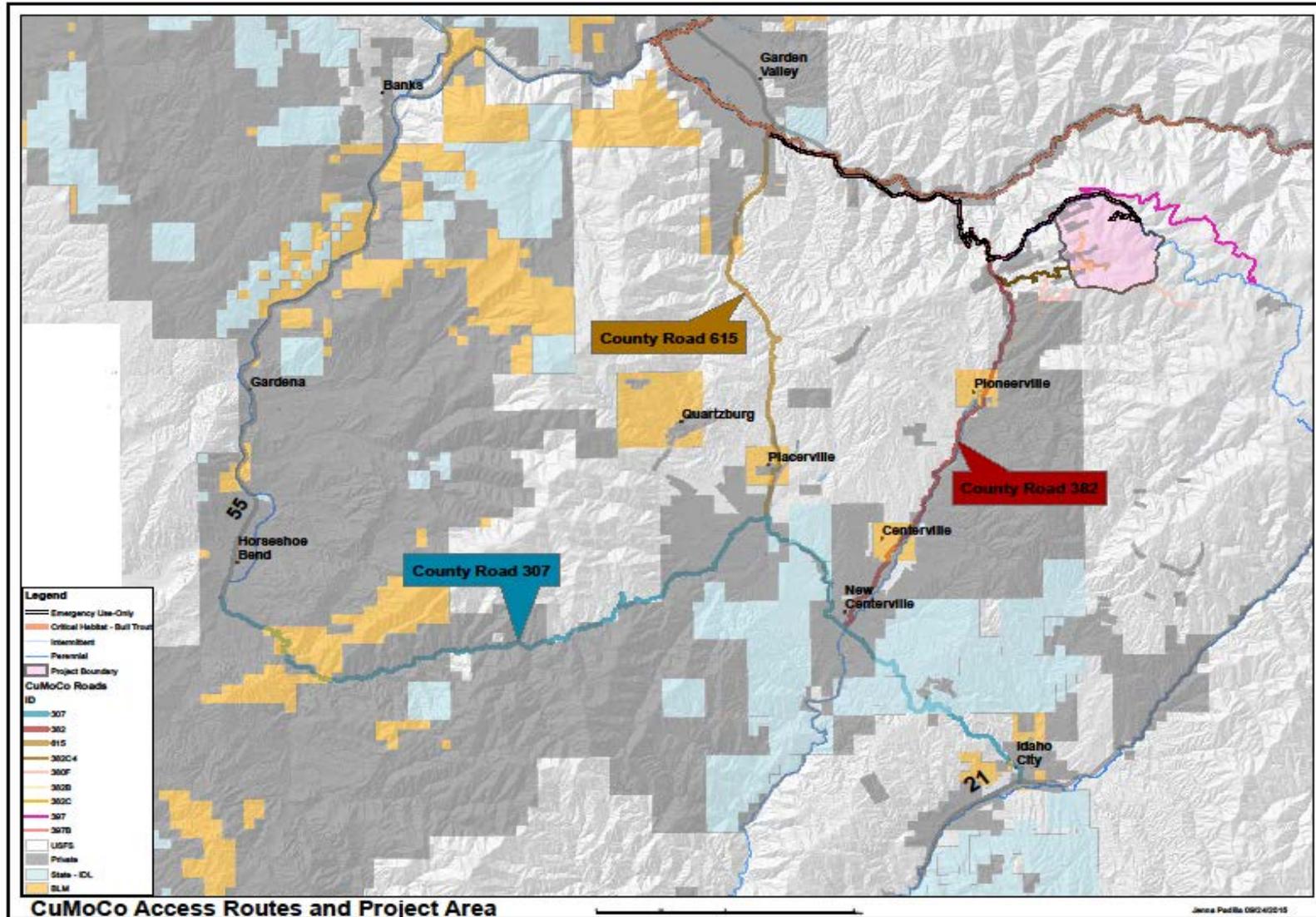
1/4/2011



- 1:75,000
- Cumo Project Area
- Private Land

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Figure 2. Roads Providing Access to the Project Area



In the fall of 2006, Mosquito Consolidated Gold Mines Limited (MCGM), Vancouver, British Columbia, assumed control of the CuMo program and Kobex's bonded 2005 PoO. They continued use of the culvert crossing on Grimes Creek and the 4.7 miles of permitted roads. Exploration drilling began in the summer of 2007. The Idaho City District Ranger on June 22, 2009 signed a decision memo for a request to extend the 2005 PoO through November 2009. Under the extended 2005 PoO the culvert crossing at Grimes Creek would be removed. **CuMoCo removed the culvert in 2011 and replaced it with a gravel/aggregate crossing.**

On February 14, 2007, MCGM submitted a new PoO. MCGM's subsidiary was established as Mosquito Gold Corp. (Mosquito, **now known as Idaho CuMo Mining Corporation [CuMoCo]**) in Reno, Nevada. The new plan was to modify and replace the original and extended 2005 PoO. **CuMoCo's** new plan proposed construction of up to 13.3 miles of new, temporary road; continued use of the 4.7 miles of unauthorized roads; and development of up to 122 drill pads. The plan was accepted as sufficient for processing by the Forest Service in a letter dated March 5, 2007. That letter also stated an EA would be required.

During 2007 and 2008 additional plan details were agreed to by the Forest Service and **CuMoCo**. These details were formalized in a letter dated April 29, 2008 and are as follows:

- Operating season would be approximately April 15th to December 15th of each year.
- **CuMoCo** would avoid cultural sites designated by the FS.
- Main access to the Project Area would be by NFS roads 380F, 382B, 382C, and 382C4 from the southwest. North access by NFS road 397B would be allowed for emergency use only.
- Temporary non-system roads would be gated to control vehicle access.
- Timber cleared, not utilized for the project, would be skidded to a mutually-agreed site.
- A reduced roads alternative would be analyzed in the EA.

In February 2014, CuMoCo subsequently requested that two additional transportation routes be included in the PoO: 1) via CR307 from Horseshoe Bend; and 2) via CR615 from Garden Valley. CuMoCo prepared an addendum, dated February 19, 2015, to the PoO identifying additional mitigation and monitoring measures to be included in its proposed PoO (refer to Appendix A of the SEA).

A total of 68 diamond-bit core holes have been drilled from 1968 until the present (43 by CuMoCo or its corporate predecessor). During implementation of the February 2011 DN/FONSI, 1.53 miles of temporary road were constructed (Connector Road), connecting NFS 382C with the existing 4.7 miles of temporary roads (AMAX roads). CuMoCo reconstructed 5 existing drill pads. From these 5 drill pads, CuMoCo has drilled 7 drill holes. CuMoCo has drilled an additional 4 drill holes on private patented lands. Consistent with my 2011 decision, all required erosion mitigations were installed; topsoil was stockpiled as required, including erosion mitigation installation Best Management Practices (BMPs); four existing Riparian Conservation Area (RCA) crossings along NFS 382C were improved using prescribed BMPs (wattles, aggregate crossings, and interceptor swales at 100 feet beyond the RCAs); and a locking gate was installed at the intersection of NFS 382C and the Connector Road.

Purpose and Need

CuMoCo needs to acquire detailed geologic data within the CuMo molybdenum prospect in order to determine the extent of mineral resources. The purpose of the project is to retrieve core samples from within the projected mineral deposit so that **CuMoCo** can extract geologic data. The operator needs surface access to the proposed drill pad locations so that drill rigs can be set up, maintained, and operated. **CuMoCo** is entitled to conduct operations that are reasonably incident to exploration and development of mineral deposits on its unpatented mining claims pursuant to the United States mining laws. Under regulations of the Secretary of Agriculture, **CuMoCo** must conduct mining operations in accordance with regulations at 36 CFR 228A and with a PoO that has been approved by the FS. The need for the proposed federal action is that the FS is required to respond to a proposed PoO to conduct exploration operations pursuant to the mining laws.

Under 36 CFR 228.5, the FS must determine whether to approve the PoO submitted by **CuMoCo** as it is proposed, or to require changes or additions deemed necessary to meet the requirements of the regulations for environmental protection. The purpose of the proposed action and evaluation of alternatives to the proposed action are to determine if changes or additions to the PoO are needed to meet the requirements of the regulation for environmental protection set forth in 36 CFR 228.8. In addition, a No Action Alternative (Alternative C) is provided as a baseline from which to evaluate the environmental effects of the action alternatives.

Decision

I have reviewed the analysis presented in the **SEA** for the CuMo Exploration Project, considered the comments received on the **SEA** and during scoping, and discussed the project's anticipated effects with both the interdisciplinary team and Forest staff.

In addition, the draft supplemental DN/FONSI was released for the pre-decisional objection process (36 CFR 218) in late May 2015; four objections were filed. The Objection Reviewing Officer (ORO) released responses for two objections on August 28, 2015, and two objections on September 11, 2015. The following instructions were included as part of the ORO's response to the Idaho Conservation League (ICL), Idaho Rivers United (IRU), Golden Eagle Audubon Society, and Sierra Club Objection:

1. I am instructing the Deciding Official to include a discussion in the DN/FONSI section, "Rationale for Making this Decision," which summarizes conclusions reached in the Fuel Transport Memorandum concerning the reasons for the conclusion that there would be a low risk for accidents and associated fuel spill, as needed, to support why no additional restrictions on any of the four access routes were necessary. (Refer to pages 17, 27–28, and 35 of this Supplemental DN/FONSI for updates addressing this instruction.)
2. Table B-1 of the SEA under Wild and Scenic Rivers (WSR) states "Because there are no designated, eligible or suitable WSR segments in the Project Area, the project would have no effects on these resources." While this statement is correct, it does not account for the two access routes described above which include portions of CR 382 that fall within the corridor of a WSR eligible segment of the South Fork of the Payette River. However, the effects of activities on the WSR eligible segment were specifically addressed in response to comment 1500.9. Thus, I am instructing the Responsible

Official to update the response to the FONSI criteria which addresses WSR segments on page 25 of the draft DN/FONSI. This update will summarize conclusions stated in response to comment 1500.9 discussed above. (Refer to page 37 of this Supplemental DN/FONSI for updates addressing this instruction.)

3. I am instructing the Responsible Official include mitigation footnote #9 to the Terrestrial and Avian Wildlife design feature in the Draft DN/FONSI, Attachment A, page 8 into the general discussion of the applicable design feature. The footnote contains the information responsive to the issue raised. The SEA includes this same footnote in Chapter 2, page 37. However, correction of the SEA is not needed because the change in the DN/FONSI will not affect content of the design feature, it is simply a different format to display the same information.

In addition, I am instructing the Responsible Official to update the fourth bullet on page 16 of the DN/FONSI that discusses surveying for raptor presence and nesting activity to clarify, as needed, that the 150' buffer is a no direct or indirect disturbance buffer that will be maintained around identified nest trees year around and specifically state that there would be no intrusion into this buffer at any time during operations in order to protect the microsite integrity of the nest tree area whether it is active during an operating season or not.

Also at this same location, clarify as needed, how this 150' no disturbance nest tree buffer works in sync with the additional disturbance buffer described in footnote in the SEA and draft DN/FONSI identified above that would be applied around active nest sites to minimize disturbance during the nesting period, typically April 1 through August 15th of each year.

(Refer to pages 13, 20, and 24 of this Supplemental DN/FONSI for updates addressing this instruction.)

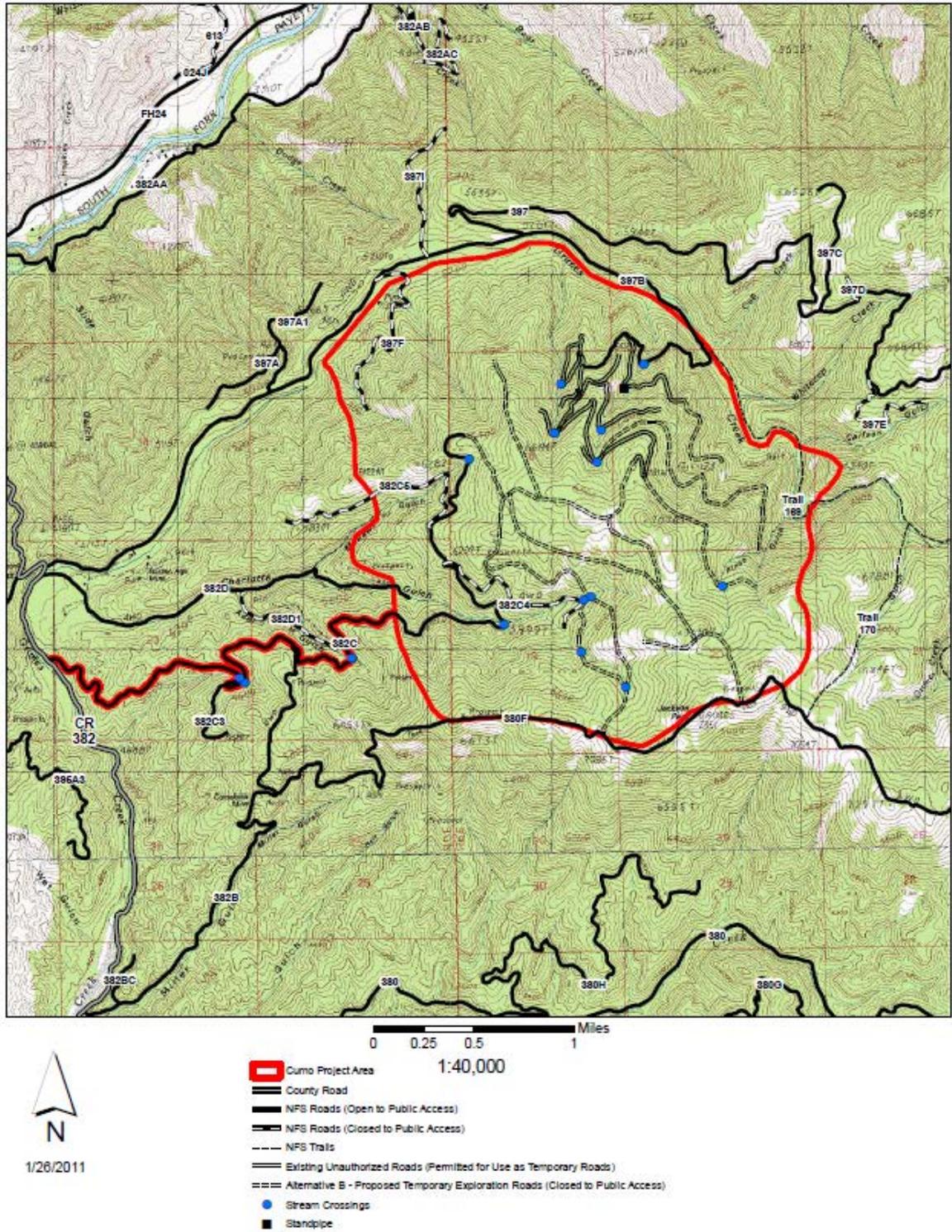
4. I am instructing the Responsible Official to include an errata in the DN/FONSI which corrects the gray wolf determination on page 214 of the 2015 supplemental EA (Project Record #1270) to be consistent with the determination stated on page 71 of the 2015 updated Wildlife Specialist Report and Biological Evaluation (Project Record #589). (Refer to Attachment E of this Supplemental DN/FONSI for errata to the SEA addressing this instruction.)
5. I am instructing the Responsible Official to include an errata, as needed, in the DN/FONSI which clarifies that suction dredging was included as a past, present and foreseeable future activity considered in the cumulative effects analysis as identified in Appendix G of the SEA, "Cumulative Effects: CIAs and Past, Present and Reasonably Foreseeable Future Activities." Specific reference to this Appendix and related water quality effects analyses in the SEA should be made in support of FONSI conclusions related to cumulative impacts on page 24 and 25 of the Draft DN/FONSI. (Refer to Attachment E and page 39 of this Supplemental DN/FONSI for updates addressing this instruction.)
6. I am instructing Responsible Official to provide additional references to applicable sections in the SEA and/or project record, as needed, that provide supporting rationale to

the findings in the FONSI as to why no significant impacts are expected. (Refer to pages 35–41 of this Supplemental DN/FONSI for updates addressing this instruction.)

7. While the alternatives identified in this issue were addressed through mitigation and discussed in response to comments in Attachment C of the draft DN/FONSI (refer to response to Issue 24), the draft DN/FONSI on pages 17 and 18 under "Other Alternative Considered" does not. Thus, I am instructing the Responsible Official to add a subsection in the DN/FONSI on page 17, under the section "Other Alternatives Considered", that specifically explains the rationale as to why the objectors suggested alternatives identified in this issue were not carried forward into detailed analysis. The rationale should pull from discussions already included in Attachment C, response to comments on the 2013 Supplemental EA, and as applicable, include the specific reference to the design features/mitigation included in the action alternatives that address the resource concern that resulted in the objectors suggested alternative. (Refer to pages 22–28 of this Supplemental DN/FONSI for updates addressing this instruction.)
8. I am instructing the Responsible Official to update the bullet on page 16 of the DN/FONSI that discusses surveying for raptor presence and nesting activity to clarify, as needed, that the Mitigation Survey Protocol for Northern Goshawk and Great Gray Owl (monitoring guidance in Document 1268, Draft DN/FONSI, Attachment A, Part 1, pages 7–9) would include adjacent source habitats and conduct surveys for overall presence and nesting activities up to 1/2 mile outside of the original project area boundary when exploration activities are proposed adjacent to the project area boundary that may impact a nesting bird if found adjacent to the project area boundary. (Refer to page 20 of this Supplemental DN/FONSI for updates addressing this instruction.)
9. I am instructing the Responsible Official to consider the feasibility of incorporating both mufflers on equipment and sound-dampening pads around drill rigs. The outcome of this review is summarized in the DN/FONSI. A possible location for this summary would be under the "Rationale for Making this Decision", page 14, bullet 4 and/or page 16, bullet 4. In addition, I am instructing the Responsible Official to include in the subsection in the DN/FONSI on page 17, "Other Alternatives Considered", the rationale as to why the objectors suggested alternatives in the issue remedy identified above were not carried forward into detailed analysis. The rationale should pull from discussions already included in Attachment C, response to comments on the 2013 Supplemental EA (i.e. comment 3000.46), and as applicable, include specific references to design features/mitigation included in the action alternatives that address the concern that resulted from the objectors suggested alternative. (Refer to pages 13, 20, 24, and 28 of this Supplemental DN/FONSI for updates addressing this instruction.)

Below, I have updated the final DN/FONSI to address the ORO's instructions, including the addition of Attachment E which contains errata correcting errors or clarifying disclosures, including instruction #4 above, found in the SEA released for objection in April 2015, and updated in May 2015 to correct an error in Appendix I.

Figure 3. CuMo Mineral Exploration Project Decision



I have decided to implement Alternative B (Reduced Roads Alternative), as displayed in Figure 3. My decision includes the key features described below, along with the design features and monitoring included in Attachment A, B, and D of this Decision Notice and Finding of No Significant Impact (DN/FONSI). Under my decision:

- **CuMoCo** will conduct a five year mineral exploration project on the CuMo claim block (Project Area), under a Plan of Operations, including terms and conditions, approved by the Forest Service. More specifically, the exploratory operation will focus on delineating the extent of a copper/molybdenum mineral deposit that will allow subsequent modeling of the subsurface geology and associated structure and mineralization.

Prior to the Court Order issued on August 29, 2012, CuMoCo had operated approximately one full operating season; the PoO to initiate operations was approved on August 30, 2011, and drilling operations were then subsequently shutdown following the August 29, 2012, Court Order. CuMoCo has not conducted any drilling operations since that time. Thus, as part of the supplemental decision, CuMoCo will be allowed to conduct the remaining 4 years of mineral exploration on the CuMo claim block (Project Area), under an amended PoO that includes changes in terms and conditions resulting from the supplemental decision as identified below.

- The exploration drilling program will be results-driven, so that holes will be drilled to expand and complement the existing geologic database. Consequently, it is difficult to predict the exact sequence of events, exact road locations/alignments, when any particular hole might be drilled, or at what orientation. It is possible that not all of the temporary roads and/or drill pads in the design will be constructed. Additionally, the exploration program may end earlier than anticipated. Nonetheless, my decision captures our best estimate of the sequence and location of actions. To provide greater assurance the appropriate design features/mitigation activities are incorporated, I am requiring the use of a “Plan of Operations and BMP Checklist Supporting Approval of proposed Temporary Road and Drill Pad construction, and other associated operational activities” (see Attachment A, Part 5).

As an outcome of discussions that occurred during the objection resolution process in August and September 2015 with both objectors and the proponent, the objectors clearly identified a primary concern of the results-driven process and use of the BMP checklist process was how access to information supporting these processes would be made readily available. They specifically identify the standard Freedom of Information Act (FOIA) process, which requires a party to submit a request and allows the Agency up to 20 business days to respond to information requests, is not responsive, nor do parties necessarily know what and when applicable information is available.

To address this concern, I am committing to developing an open and transparent information sharing process, which I believe will be reasonable and practicable to support, with interested parties. The objective of this information sharing process will be to regularly provide the necessary level and type of information that will help keep parties informed (e.g., standard monthly posting and/or newsletter) as to (1) the progress of the exploration activities; (2) how the checklist process is used to inform the approval process of proposed temporary road and drill pad construction, and other associated activities; and (3) the results of ongoing implementation and effectiveness monitoring of BMPs. Determinations as to what

information can be made available through this process will be based on document release requirements under FOIA.

- The operating season will be approximately April 15 to December 15. The Forest Service will review special circumstances, such as weather conditions, that may require date adjustments.
- Up to 10.2² miles of new temporary roads will be constructed, and 4.7 miles of unauthorized road will be permitted as temporary road, for a total of 14.9 miles of temporary road. A total of 16 stream crossings will be used, including four new crossings on the new temporary roads to be constructed, five on the 4.7 miles of previously-constructed temporary road, and seven on existing NFS roads. In constructing temporary roads, natural routes and topographic features will be utilized and temporary roads will be located on ridges wherever possible.
- A total of 60-80 percent of the temporary roads will be constructed and operational at any one time. As a result, the total length of the permitted temporary roads in service at any given time will be reduced by 20-40 percent.
- Temporary roads will be gated to control unauthorized vehicle access to the Project Area.
- Up to 137 drill pads³ will be developed. At each drill site a small drill pad and mud pit will be developed so that equipment and vehicles are able to access each site and drill fluids can be retained on site. Appropriate erosion control and Best Management Practices (BMPs) will be installed around drill pads. Drill holes will be either vertical or angled holes designed to best investigate the subsurface geology. Holes will range in length from 1,500 to 3,000 ft.
- Drill pads will generally be located along the temporary roads and will typically be 60 ft long by 25 ft wide with ends contoured back into the roadway. Each drill pad will have a compartmentalized mud pit developed so that equipment and vehicles can access each site and drill fluids can be retained on site. These mud pits will measure 25 ft long, six ft wide, and eight ft deep. Standard practices will include re-circulating the drill fluid to create a closed system for the drill fluid. Immediately upon completion, the mud pits will be covered and compacted with a bulldozer, and the pad contoured. Once the drill pad is no longer needed, the mud pits will be backfilled with native soil material, compacted, and re-contoured. Drill cuttings and non-toxic, biodegradable drilling mud will remain in the backfilled mud pits. See Attachment B, Additional Project Description Details.
- CuMoCo is authorized to obtain water from Drill Hole #12 (standpipe), Charlotte Gulch, and Grimes Creek. Prior water quality testing at these 3 locations demonstrates the water

² As identified on page 5 of this supplemental DN/FONSI, “During implementation of the February 2011 DN/FONSI, 1.53 miles of temporary road [of the 10.2 miles] were constructed (Connector Road), connecting NFS road 382C with the existing 4.7 miles of temporary roads (AMAX roads).” Thus, for the remaining 4 years of exploration, up to an additional 8.67 miles may be constructed.

³ The July 2010 EA released for 30-day notice and comment specified that up to 134, rather than up to 137, drill pads would be constructed. This figure (134) was later determined to be an error and has been corrected in this EA. No change in environmental consequences as a result of this correction would be anticipated.

that would be used for exploration drilling purposes meets State water quality standards, as defined in IDAPA 58.01.02.

- Up to 259 drill holes⁴ with various orientations and inclinations will be drilled from the drill pads, utilizing a truck, wagon, or skid-mounted diamond coring machine. The drilling will be completed in a series of stages, initially with wide spaced drilling followed by infill drilling for reserve definition. Although most of the proposed drill holes will be vertical, geology may dictate angled drilling. Most drill pads will have more than one hole drilled from them. Drilling operations will be conducted on a 24-hour schedule. See Attachment B, Additional Project Description Details.
- Upon completion all holes will be filled with a bentonite-cement mixture designed to effectively seal and stabilize down-hole conditions. Each hole will be topped with a cement plug or similar device. See Attachment B, Additional Project Description Details.
- Drilling operations require water or some type of drilling fluid to cool the bit, to lubricate the advancing hole and to remove cuttings from the bit face to the surface. As previously stated, design features in Attachment A require that water used in the drilling fluids be drawn from sources that meet State water quality standards (IDAPA 58.01.02). All drill fluid additives pumped into the hole are regulated and would meet all State and federal safety and environmental standards. Drilling mud and hole plug products would conform to National Sanitary Foundation (NSF) guidelines for ensuring groundwater integrity. Material Safety Data Sheets (MSDS) for all products will be posted and available onsite with the Spill Prevention Control and Countermeasure Plan (SPCC)⁵.
- As identified earlier, there are four access routes into the Project Area⁶. Three of those routes will be available for regular day-to-day access, including one by way of CR307 and CR382 north from Idaho City (this route passes through Centerville and Pioneerville along Grimes Creek); a second route is by way of CR307 and CR382 east from Horseshoe Bend; and the third route is by way of CR615, CR307, and CR382 south from Garden Valley (this route passes through Placerville and Centerville). Figure 2 shows the access routes into the Project Area.
- The fourth access route into the Project Area via the route proceeding southeastwardly from Garden Valley by way of CR382, which follows the Banks-Lowman Highway (State Highway 17; Forest Highway 24) along the south bank of the South Fork of the

⁴ As identified in the SEA, section 1.2, “CuMoCo reconstructed 5 existing drill pads. From these five drill pads, CuMoCo has drilled seven drill holes. Thus, for the remaining 4 years of exploration, up to an additional 132 drill pads may be constructed/reconstructed and 252 holes may be drilled from these pads.

⁵ Some of these products are in powder form and come in plastic-lined paper bags weighing approximately 50 pounds (lbs) such as bentonite gel which is commonly used for thickening drill mud. Other drill fluid additives are available in liquid in five gallon plastic containers such as Poly Plus 2000 polymer and Rod Ease. Poly Plus 2000 is a biodegradable polymer which forms long chain molecules when mixed with water. Rod Ease is a vegetable oil-based product added to the drill fluid to loosen up the drill string when squeezing conditions are present in the drill hole and to better lubricate the bit and drill string.

⁶ In the SEA released in April 2015 for objection, all four routes are identified as available for day-to-day access. However, as an outcome of the objection process, which included discussions with both the objectors and proponent, I chose to restrict use to emergency use only on the access route that proceeds southeastwardly from Garden Valley by way of CR382 and follows the Banks-Lowman Highway along the south bank of the South Fork of the Payette River and Sweet Creek.

Payette River and Sweet Creek, as well as use of NFS road 397B, will be for emergency use only.

- At any given time there could be up to four drill rigs, each staffed by up to three personnel, operating in the Project Area. Because field operations will be managed by up to two additional staff from CuMoCo, there will be up to 15 staff on site at any one time.
- Housing for staff will be located on nearby private lands in Horseshoe Bend, Centerville or Garden Valley. Travel to the site will be provided by one-ton type service and support vehicles owned and operated by the contracted drilling company. Under these conditions, CuMoCo anticipates up to 30 one-way truck trips per day (combination of water tenders, service trucks, pickups) from either Centerville, via County Road 382, from Horseshoe Bend via CR307 and CR382, or from Garden Valley via CR615, CR 307, and CR382. Of these 30 one-way trips, 4 vehicle trips (one way) would be for fuel transport by vehicles.
- Each drill rig will be mobilized and demobilized once during the season, barring unforeseen events.
- Water will be supplied to the drill rigs by the way of one or two diesel or gas powered high capacity pumps, and high pressure rubber coated woven steel water hose. Mosquito will obtain a temporary approval of water appropriations from the Idaho Department of Water Resources before any activities requiring the water appropriations are implemented. Water will be drawn from either an existing stand pipe with a turn-valve adjacent to a road in the northeast quarter of the northeast quarter of Section 17, T8N R6E, or it would be drawn from Grimes Creek. If water is pumped from Grimes Creek, a screen will be placed around the water intake to prevent fish from entering the pump. As required in the SPCC plan, the pump will be placed within the required fuel containment structure. Water haul trucks may be used to move water from either source to drill pads.
- No permanent structures will be placed or fabricated in the Project Area. An approximately eight ft by eight ft skid-mounted shed will be associated with each drill rig, for a total of up to four temporary storage sheds. Inclement weather (cold, snow or heavy rain) may dictate that some sort of shelter be placed over the water pumps. A portable toilet will be provided for work crews and serviced regularly throughout the project. Lights will be towable (portable) and downward facing. CuMoCo will use lights similar to those used on highway construction projects that include equipment which directs light onto the work area to minimize spillage.

In response to instruction #9 from the ORO identified above, I have reviewed the feasibility of incorporating mufflers on equipment at the drill rigs and generators and using sound-dampening BMPs around drill rigs and/or generators. To meet requirements for fire safety, mufflers with suitable spark arresters are already required. While these mufflers were required to address fire safety, they also have the added benefit of reducing noise generated by equipment.

Consistent with requirements at 36 CFR 228(8)(e), I have also determined that incorporating additional sound-dampening BMPs around drill rigs and/or generators to further minimize environmental impacts to wildlife resources during nesting, denning, calving and fawning periods would be feasible and practicable. Specifically, when the project wildlife specialist identifies concerns relative to a specific pad location and the

likelihood that noise disturbance may disrupt wildlife species known to occupy areas within or adjacent to the project area during nesting, denning, calving, or fawning periods, additional sound-dampening BMPs will be incorporated. Thus, I have updated the Checklist process in Attachment A, Part 5, for the project wildlife biologist to identify whether using additional sound dampening BMPs would be beneficial. If benefits would be derived during the sensitive seasons identified above, the requirement for using additional sound dampening BMPs will be required as part of the approval process for a site-specific pad location.

- Drill machines and newer water pumps will be powered by diesel fuel, while older water pumps will be powered by gasoline. Service trucks, e.g., fuel transport vehicles, would transport drillers, fuel, and daily drilling consumables. Fuel would be purchased from a commercial fuel supplier and pumped directly into portable tanks. The drillers will carry a commercially available storage tank mounted in the service pickups. Fuel spill and containment equipment will be provided to respond to any spills which may occur during equipment fueling. Approximately 100 gallons of diesel will be consumed each day by each drill rig. If fuel storage is required on site, fuel will be stored in a 55-gallon drum or other legal container located in a lined storage area capable of holding 1.5 times the container volume. Fuel spill control kits would be provided for any fuel storage location.
- On-site storage of drill consumables, including drill fluid products, will be held to a minimum. Bagged items will be protected from weather using plastic sheeting. The plastic drum-contained liquids will be stored on wood pallets. All refuse and debris generated by the use of these products will be brought off site on a regular basis and disposed of via the local waste disposal provider.
- A Spill Prevention Control and Countermeasure Plan (SPCC) has been developed for the site. Consistent with Environmental Protection Agency (EPA) requirements, CuMoCo prepared the SPCC in June 2011. The SPCC is considered part of the PoO approved on August 30, 2011. CuMoCo would be responsible for updating the SPCC as the Project moves forward. Drilling crews will take immediate action to contain and collect any spill of hazardous or non-hazardous substances. Upon completion of control and collection efforts, the supervisor of the operating facility will record the date, time, nature and character of the spill along with the actions taken to contain and collect the materials. The report will document whether any material entered surface waters and an estimate of how much of the spilled product was not able to be collected, if any. A hazardous substance spill will be reported in accordance with state and federal reporting requirements.
- CuMoCo obtained a Multi-Sector General Permit (MSGP) and Construction General Permit (CGP) from the EPA under the National Pollutant Discharge Elimination System (NPDES). CuMoCo prepared and submitted its Notice of Intent and Stormwater Pollution Prevention Plan (SWPPP) to the EPA in April 2011. Per the SWPPP, CuMoCo is required to control soil and pollutants that originate from the Project site and prevent them from entering surface waters. The SWPPP serves as a guideline for contractors to implement BMPs in the Project Area (Forsgren 2011b). CuMoCo would be required to maintain the MSGP and CGP for the life of the Project and update the SWPPP, as needed.

- CuMoCo obtained its final §401 Water Quality Certification from the Idaho Department of Environmental Quality (IDEQ) in June 2011. CuMoCo would be required to comply with all monitoring and reporting requirements under the State certification program (IDEQ 2011).
- As identified in a letter dated October 7, 2014, Boise County stated that CuMoCo would be required to obtain a Conditional Use Permit (CUP) and/or Road Maintenance Agreement prior to implementing any ground disturbing activities.

As stated in this letter, specific requirements to be included in the Boise County CUP and/or Road Maintenance Agreement applicable to all activities occurring within the County's right-of-way easement and considered in the effects assessed in this SEA include:

- In addition to screening groundwater intake, the amount of water drafted in a single or multiple pumping operation would be controlled by Water Supply Bank Rental Agreement (No. 63-2338). As stated in this Agreement, "The renter shall install and maintain a measuring device and lockable controlling works of a type approved by the Department [Idaho Department of Water Resources] in a manner that will provide the watermaster suitable control of the diversion." (See Agreement condition #11.)
- CuMoCo would be required to submit an annual road use operating and maintenance plan with the initial CUP application and/or Road Maintenance Agreement. It will be revised annually every February for approval.
- CuMoCo would be required to obtain pre-approval from the Boise County Road and Bridge Department for all water drafting sites on roads maintained by Boise County to ensure applicable Boise County Road standards are met, especially those designed to protect streambanks and prevent unauthorized driveways from Boise County Roads.
- As a further guarantee of performance, Boise County indicated in the letter cited above that a surety bond or other security measure may be required.
- Concurrent reclamation⁷ and interim stabilization will be implemented throughout the project in order to remain within 60-80 percent threshold for permitted temporary roads open at one time.
- All temporary roads will be reclaimed (10.2 miles of newly constructed and 4.7 miles of existing) as close as practical to their original topography, and affected areas will be revegetated to forest standards, by the end of the reclamation period (e.g., up to two years after the five-year exploration period).
- Reclamation or obliteration of the temporary roads and drill pads will consist of earthwork and revegetation of all surface disturbances to stabilize the reclaimed areas and to achieve post-exploration land use pursuant to 36 CFR §294.12(b)(7). As described above, reclamation of the mud pits will include backfilling and recontouring the pits as drilling is completed. Temporary roads constructed on steep slopes will be backfilled and recontoured to the approximate original contour. Temporary roads constructed on

⁷ Concurrent reclamation is defined as final reclamation conducted during exploration operations.

moderate and shallow slopes will be reclaimed using a combination of partial contouring and ripping as site conditions warrant. All disturbed areas will be seeded with a combination of range and reclamation species that are suitable for soil stabilization and reclamation projects in the Boise NF. **Reclamation procedures may be modified within occupied Sacajawea's bitterroot (LESA) habitat to reduce impacts to LESA plants, where such modification will still result in the desired soil and water resource objectives.**

Rationale for Making This Decision

In making this **supplemental** decision, I evaluated the purpose and need for the project, the effects disclosed in the **SEA** for each alternative, and public comments received during **the scoping and the 30-day notice and comment period for both the EA issued in support of my 2011 DN/FONSI, the SEA supporting this 2015 supplemental DN/FONSI, and the ORO's instructions resulting from Objections filed.** The following discussion summarizes the rationale for my decision:

Should I approve the PoO as proposed by CuMo, or should I approve a PoO with terms and conditions as necessary to protect non-mineral resources?

I have decided to approve the PoO with terms and conditions as necessary to protect non-mineral resources. More specifically, I have decided to implement a PoO under which a maximum of 14.9 miles of temporary road, including up to 10.2 miles of newly-constructed temporary road and 4.7 miles of existing road, will be used to facilitate mineral exploration (Alternative B).

My rationale for selecting Alternative B focuses on the reduced effects on water quality (sedimentation) in the short term, as compared to Alternative A. In the short term (i.e., while exploration activities are underway), Alternative B will generate an estimated 114 pounds of sediment annually, compared to Alternative A, which would generate an estimated 366 pounds (**SEA**, Section 3.2.1.1; Table 8). In other words, Alternative B will generate annually an estimated one third of the sediment produced by Alternative A while exploration is underway. Although Alternatives A and B would produce the same amount of annual sediment delivery in the long term, because all temporary roads and drill pads would be reclaimed under either alternative (**SEA**, Section 3.2.2.1), I consider the short-term estimated sediment reduction under Alternative B to be substantial and compelling. In addition, selecting Alternative B will reduce potential impacts to Sacajawea's bitterroot, a **Region 4** sensitive species, compared to Alternative A, because one of Alternative A's roads through potential habitat for this species would not be constructed (**SEA**, Section 3.3.2.1.5; Figures 10b and 10c). **As part of my supplemental decision, I have incorporated revised mitigation measures and monitoring requirements for Sacajawea's bitterroot based on new information/changed circumstances since my 2011 decision concerning this species (refer to Attachment A).**

Moreover, unlike Alternative A, my decision will allow continued access to and use of the Grimes Creek motorized trail (NFS trail 169) during the years in which the exploration project is active. Although this trail is not heavily used, it does provide important access to areas outside the Project Area, including the Jackson Peak and Coulter Summit area.

- **Consistent with the direction identified by the Court (Court 2012), the interdisciplinary team conducted additional groundwater analysis (Sections 3.1 and 3.2.2 of the SEA) and**

my supplemental decision includes updated standard drilling procedures (refer to Attachment B), as well as mitigation and monitoring requirements (refer to Attachment A) consistent with the findings of the updated groundwater analysis. These mitigation and monitoring measures are consistent with the applicable sections: Groundwater Protection and Best Practices for Mineral Exploration, as outlined in Appendix B of the Considerations for Groundwater Evaluation in Mineral Exploration Drilling (USFS 2014).

- As part of my supplemental decision, I am including CuMoCo's agreement with IDEQ to prepare a Quality Assurance Project Plan (QAPP) and Ground Water Sampling Plan consistent with procedures established by IDEQ. The objective of the QAPP will be (1) to increase the knowledge of groundwater chemistry in the Project Area; (2) to provide knowledge of natural variability in groundwater geochemistry as a function of seasonal and meteoric conditions; and (3) to provide knowledge of potential impacts of diamond core drilling activities on groundwater. Samples collected by CuMoCo will be provided to IDEQ on an ongoing basis (refer to Attachment D).
- Fuel storage requirements are included in the SPCC. As identified in the 2011 EA, CuMoCo was required to complete the SPCC consistent with EPA requirements prior to Project implementation. CuMoCo prepared and submitted the SPCC to the FS in June 2011 (Forsgren 2011a). In response to public comments received during scoping for the SEA process in 2013, I decided to include the specific fuel storage requirements contained in the SPCC in Section 2.3.8 of the SEA as part of my supplemental decision rather than providing a general reference to the SPCC. By adding these specific provisions in my supplemental decision, a more comprehensive description exists as to fuel storage and management requirements.
- In response to public comments received following the publication of the Review SEA on August 19, 2013, an assessment was prepared to analyze potential impacts to resources from transporting fuel along the identified transportation routes (see Figure 2). This assessment is included in the Fuel Transport Memorandum in Appendix I of the SEA. Effects disclosures for water quality (surface), aquatics, recreation, and public safety resources were updated in the SEA to clarify the potential impacts to these resources from fuel transport along the identified routes. I also elected to include additional fuel transport and spill response requirements as part of this supplemental decision (refer to Attachment A).
- The project operating season is April 15–December 15 each year. The extent of this operating season allows CuMoCo to operate primarily during the snow-free season; however, there will be periods of time during the shoulder seasons that the company may be operating on snow covered roads. The County provides winter maintenance on all of the access routes to the Project Area with the exception of a portion of the Grimes Pass road, CR382. The segment of CR382 bounded on the north where the road leaves the South Fork Payette River proceeding up Sweet Creek and bounded on the south just south of Grimes Pass near the intersection with NFS road 397, is not currently maintained by the County in the winter. As identified under my decision, this segment of CR382 would only be used as an emergency access route and would not be used to access the

project site on a day-to-day basis. Eliminating this access route, except for emergency use, responds to objectors concerns to resource impacts and public safety.

- Emergency response procedures are required under IDAPA 20.04.01 and 36 CFR 228.9. As identified in the SEA, Section 2.4, “Other Federal, State and Local Approvals Potentially Applicable to Both Action Alternatives,” stipulates that CuMoCo would be required to comply with “Other permits from Idaho Department of Transportation and/or other entities.” However, similar to the fuel transport situation, in response to public comments received during scoping for the SEA process, I elected to include specific emergency response requirements from the cited State or federal regulations in Section 2.3.9 of the SEA rather than rely upon a general reference found in Section 2.4 of the 2011 EA. This should provide an improved description of the fire safety and emergency response procedures that were required by the 2011 DN/FONSI. The SEA effects disclosures have also been updated to provide a more complete disclosure as to the outcome of the required procedures.
- My decision will also result in slight, although measurable, reduction in other potential effects, compared to Alternative A. For example, there would be little risk to changing or decreasing the acres in the large tree size class under either action alternative. Nonetheless, Alternative B reduces impacts of temporary road and drill pad construction on large-tree forests by 18 percent, compared to Alternative A (27 acres compared to 33 acres, respectively) (SEA, Section 3.3.2.1.2; Table 9). Most of the reduction occurs in large tree forests that fall within the low to mid-elevation ponderosa pine forests (i.e., PVG 2, SEA Table 9) which were identified as a priority for conservation in the Forest Plan as amended in 2010 (USDA, 2010a; ROD, pp. 9-10). Minimizing the extent of these roads and drill pads in these stands reduces effects of fragmentation and associated edge effects on the habitat quality and diversity of these forests in the temporary and short-term (SEA, Section 3.3.2.1.2).
- The effects to wildlife would be minor under Alternatives A or B (SEA, Section 3.4). However, Alternative B will result in slightly fewer effects to source habitats for Threatened, Endangered or sensitive species, or Management Indicator Species (SEA, Section 3.4.2) From a visual quality perspective, slightly fewer roads will be visible in the Middleground from the Banks-Lowman Highway (1.5 miles under Alternative B, as compared with two miles under Alternative A) (SEA, Section 3.9.2.1)
- Although I do not have the authority to select Alternative C (“no action”) as my decision, Alternative C was included in the environmental analysis as a baseline from which to evaluate the environmental effects of the action alternatives. As disclosed in the EA, my decision will improve conditions for several resources as compared to the no action alternative, because under the no action alternative, the 4.7 miles of existing, previously-permitted road would not be reclaimed (SEA, Section 2.1.3). Specifically, Alternative B will result in 1.0 percent of Total Soil Resource Commitment (TSRC) in the Activity Area following reclamation, compared with 2.2 percent under the no action alternative (SEA, Section 2.5; Section 3.1.2.1). Alternative B will reduce the total annual sediment delivery in the short-term to 114 pounds and to 39 pounds in the long term, as compared to the 554 pounds of estimated sediment produced in the short- and long terms under Alternative C (SEA, Section 3.2.2.1). Big-game disturbance would occur longer under

the no action alternative, and it would take longer to re-establish herbaceous cover (SEA, Section 3.4.2.4). Moreover, the 22 acres currently overlain by these roads will be put back into vegetative production several decades sooner than allowing natural processes to reclaim them (SEA, Section 3.3.2.1.1). Reclaiming roads that fall within large tree forested area improves the vegetative productivity of these sites, and also reduces the overall fragmentation of these large tree forests in the short- and long-term (SEA, Section 3.3.2.1.2). In addition, reclaiming roads in adjacent stands of smaller size class trees will help increase overall patch size of large tree stands in the Project Area over the long-term (SEA, Section 3.3.2.1.2).

My decision also helps carry out Forest Plan direction for minerals and geology resources, including three Forestwide goals (USDA FS, 2003a, p. III-48; USDA FS, 2010a):

- MIGO01: Facilitate orderly and environmentally sound exploration, development, and production of mineral and energy resources.
- MIGO02: Require appropriate mitigation and reclamation of environmental disturbance for all mineral exploration and development proposals. Reduce environmental effects from past mineral-related activity. Restore disturbed land to a productive condition.
- MIGO04: Integrate mineral and geology project planning and implementation in a manner that is consistent with other resource management direction.

If I approve a PoO with terms and conditions necessary to protect non-mineral resources, what should those terms and conditions be?

Attachments A, B and D describe the mitigation measures and monitoring to protect non-mineral resources that will be included with my decision and incorporated into the terms and conditions for the PoO. Many of these are designed to reduce the risk of: erosion and sedimentation, impacts to groundwater, hazardous material spills, while some will be undertaken to protect wildlife and fish species, cultural resources, rare plants, or public safety. Others will minimize the risk of noxious weeds entering the Project Area. I have included these mitigation measures and monitoring to assure that the environmental effects of the project remain within acceptable limits, and to fulfill my responsibilities for stewardship of the land and resources of the Boise National Forest.

As described earlier, the exploration drilling will be results-driven and road and drill pad locations may vary from those identified in the SEA and in Figure 2 of this supplemental DN/FONSI. However, I believe the effects are adequately disclosed in the SEA because they are within the context of what resource specialists experienced in the resource conditions across the Idaho City Ranger District, including the Project Area, are familiar with, and conclusions were drawn based on the experience of the professionals that analyzed and reviewed the environmental effects.

To ensure implementation of this project stays within the range of the environmental effects described in this EA, I have required that the Forest Service Minerals Administrator and, as needed, qualified resource specialists, monitor implementation during the life of this project (Attachment A). These on-site monitors will draw upon their years of professional experience in applying the project design features and mitigation described in Attachment A to ensure conservation objectives are met during project implementation. As described under my decision, I am requiring use of a “Plan of Operations and BMP Checklist Supporting

Approval of Proposed Temporary Road and Drill Pad Construction, and Other Associated Operational Activities” (see Attachment A). The purpose of this checklist process is to provide greater assurance that proposed operations incorporate the appropriate design features/mitigation developed by resources and used as the basis for effects disclosures in the SEA, before the activity is allowed to be implemented. By using both the pre-activity checklist and implementation monitoring, I am confident that any variance in road or drill pad location approved by these qualified resource specialists during implementation will only be allowed where the resulting effect falls within the range disclosed in this EA.

Attachments A, B and D mitigation and monitoring measures not already discussed above include, but are not limited to:

- Implementing Best Management Practices, including installation of waterbars and slash filter windrows, mulching and seeding. With these and other measures, total annual sediment production will be reduced from the 554 pounds anticipated under the no action alternative (Alternative C), to 114 pounds in the short-term and 39 pounds in long term (SEA, Section 3.2.2.1, Table 8).
- Managing all surface water runoff project wide, under a Storm Water Pollution Prevention Plan regulated by the U.S. Environmental Protection Agency. With this and other measures, the risk of contamination to water bodies from fuel storage, transport, and handling during refueling will be minimized (SEA, Section 3.2.2.1 and 3.5.2.1).
- Retaining legacy trees and large trees to the maximum extent practicable, to avoid direct and indirect impacts to these trees, which are key to retaining habitat for important wildlife species (SEA, Section 3.3.2.1.1).
- Surveying to detect the presence of species, locate nests, and determine reproductive success (Attachment A, Part 1 and Part 4) will occur within and adjacent to the project area, along with implementing protective measures identified in Attachment A, Part 1, to reduce potential disturbances to nesting great gray owls and northern goshawk (SEA, Section 3.4.2.2.3 and 3.4.2.2.5, respectively) from exploration activities. As clarified in Attachment A, Part 1, Terrestrial and Avian Wildlife species design features, if a nest is located, a 150-foot buffer will be maintained around the nest tree year round where no ground disturbing activities will be allowed at any time during operations in order to protect the microsite integrity of the nest tree area, whether it is active during an operating season or not. In addition, if the nest is active, an additional buffer of up to 1,500 feet will be established to minimize disturbance during the nesting period, typically April 1 through August 15 of each year. Finally, I have added additional requirements to the checklist process to also consider whether additional sound dampening BMPs should be applied during the nesting period (Attachment A, Part 5).
- Washing construction equipment before it is used on NFS lands. With this and other measures, the risk of noxious weeds entering the Project Area, which would degrade big-game forage, will be reduced (SEA, Section 3.3.2.1.3 and 3.4.2.4).
- Field monitoring of potential Sacajawea’s bitterroot locations, and avoiding to the extent possible occurrences of this plant, to minimize potential impacts to this sensitive plant (SEA, Section 3.3.2.1.5).

- Surveying and flagging identified cultural resources. With this and other measures, potential effects on cultural resources will be avoided (SEA, Section 3.6.2.1).
- Incorporating pump intake screens, if water is pumped from Grimes Creek, to prevent potential entrapment of fish and other macroinvertebrates (SEA, Section 3.5.2.1).
- Fencing mud (sump) pits, signing roads, and implementing dust abatement on NFS roads and temporary roads within the project area as needed, to minimize risks to public safety (SEA, Section 3.7.2.1).

Other Alternatives Considered

In addition to the selected Alternative B (Reduced Road Alternative), two alternatives were developed and analyzed in the SEA: Alternative A (Applicant Proposed Action) and Alternative C (No Action).

Alternative A (Applicant Proposed Action): Alternative A is the proposed PoO submitted by Mosquito (now CuMoCo) on February 14, 2007, including details and minor modifications agreed to by Mosquito and the Forest Service, as listed in the letter of April 29, 2008 (EA, Section 2.1.1). Under Alternative A, 4.7 miles of existing unauthorized roads would be permitted for use as existing temporary roads, and up to an additional 13.3 miles of temporary roads would be constructed over the next five years. A total of 17 stream crossings would be used, including seven on existing NFS roads, five on the 4.7 miles of existing temporary roads, and five new crossings associated with the new temporary roads to be constructed. Alternative A would also include construction of a 0.62-mile segment of new temporary road within 500 feet of Grimes Creek in the northeastern portion of the Project Area. Other features of Alternative A are the same as those described above for Alternative B. I did not select Alternative A because, although it would meet the project's purpose and need, it would result in greater environmental impacts than Alternative B. In particular, it would result in nearly three times the annual sediment production in the short-term, an effect that I find unacceptable.

Alternative C (No Action): Alternative C is the no action alternative (SEA, Section 2.1.3). Under Alternative C, no additional drilling or temporary road or drill pad construction would occur. I evaluated Alternative C as a baseline from which to evaluate the environmental effects of the action alternatives. However, I do not have the discretion to select Alternative C as my decision, because the Forest Service authority in responding to a PoO is limited to approving a PoO as it is proposed, or requiring changes or additions to the PoO deemed necessary to meet the requirements of the regulations for environmental protection (36 CFR 228.5).

The SEA also includes four alternatives considered but eliminated from detailed study (SEA, Section 2.5):

Use Portable Gas-Powered Drills with Directional Drilling to Reduce Temporary Road: Length An alternative that would use small, human-portable, gas-powered drills (e.g., JKS Winkie Drill), together with directional drilling, to reduce surface impacts and to reduce the length of temporary roads to be constructed, was proposed during scoping. This alternative was eliminated from detailed study because portable drills of this type cannot drill to the depths necessary to adequately describe the extent of mineral resources present within the Project Area and would not meet the purpose and need of the project. In addition, directional

drilling from drill sites (multiple holes from individual drill pads) is already incorporated in Alternatives A and B (SEA, Section 2.1.1 and 2.1.2; Appendix A, Section C, item 4) in order to minimize the number of drill sites, and consequently reduce surface disturbance.

Limit Road Use to Existing Roads with Directional Drilling: An alternative that would limit all operations to work from existing road “prisms,” utilizing directional drilling to access other areas, was proposed during scoping. This alternative was eliminated from detailed study because existing roads, even with directional drilling, are not sufficient to provide the opportunity to access and thereby adequately analyze the mineral resource, and therefore the purpose and need of the project would not be met. In addition, directional drilling from drill sites (multiple holes from individual drill pads) is already incorporated in Alternatives A and B (SEA, Section 2.1.1 and 2.1.2; Appendix A, Section C, item 4) in order to minimize the number of drill sites, and consequently reduce surface disturbance.

Obliterate Existing Unauthorized Roads Prior to Drilling: An alternative that would obliterate all existing unauthorized roads before starting exploration activities was proposed during scoping. As described in Section 1.2, a number of exploration roads were developed in the Project Area between 1968 and 1982. A segment from this developed network became NFS road 397B, and approximately 4.7 miles of the developed roads remain as unauthorized roads. As described in SEA Sections 2.1.1 and 2.1.2, these 4.7 miles of road would be permitted as temporary roads to provide surface access to the proposed drill pad locations under Alternatives A or B. Because these existing unauthorized roads are needed to provide surface access to the proposed drill pad locations, obliterating them before drilling would not meet the purpose and need for the project. Consequently, this alternative was eliminated from detailed study.

Immediately Reclaim Temporary Exploration Roads: An alternative that would require CuMoCo to immediately reclaim temporary roads that are not in use to prevent increasing road density was proposed during scoping. This alternative was eliminated from detailed study because under either action alternative, the exploration drilling program would be result-driven, with future holes drilled to expand and complement the existing database. Consequently, it is difficult to predict the exact sequence of events, including the exact road locations or alignments, or when any particular hole might be drilled (SEA, Sections 2.1.1 and 2.1.2). Immediate reclamation of all unused roads would not be practical, as the necessity to return to specific locations might arise as the resource evaluation progresses. Consequently, this alternative would not meet the purpose and need of the project. Moreover, road density is addressed under the action alternatives: both Alternative A and B call for concurrent reclamation and interim stabilization to be implemented to remain within the 60-80 percent threshold for permitted temporary roads open at one time, and all temporary roads would be reclaimed as close as practical to their original topography within one to two years following the five-year exploration period (SEA, Sections 2.1.1 and 2.1.2). In addition, fewer temporary roads would exist in the long term (e.g., following project reclamation) under Alternative A and B, as compared to Alternative C (SEA, Section 2.2, Table 3).

The following summary is provided to address the ORO’s instructions to update this section of my decision to specifically explain the rationale as to why an objector’s suggested alternatives identified in their objection were not carried forward into detailed analysis.

An alternative that avoids and/or further minimizes impacts to Sacajawea's bitterroot:

Design features and monitoring requirements have been established to avoid, or where avoidance is not practicable, minimize impacts to bitterroot. These requirements are included under both action alternatives, and as a result, the Responsible Official determined the impacts to bitterroot disclosed in Section 3.3 of the SEA were not substantive enough to warrant including an additional alternative.

As stated in Attachment A, Part 1, Footnote 2, "Avoidance of impacts to LESA is the objective where practicable. Where avoidance is not practicable (see next paragraph), then activity impacts to LESA plants will be minimized to the maximum extent practicable (MEP). When impacts cannot be avoided, the botanist shall be required to document, through the checklist process, that the location of the activity and techniques used to minimize impacts were sufficient to NOT change the current effects determination disclosed in the Supplemental EA (i.e., "may impact individuals but is not likely to cause a trend toward federal listing or a loss in viability"). If the botanist determines that the effects determination would change, the Responsible Official will evaluate whether or not the new information or changed circumstances constitute unforeseen significant surface disturbance that would require a modification of the plan of operations in accordance with 36 CFR 228.4(e). If effects would be outside the scope and range of effects considered in the original analysis, correction, supplementation or revision of the SEA may be required in accordance with FSH 1909.15 section 18.4 to support a modification of the plan of operations. Pending a determination of whether or not a modification of the approved plan is required, operation may be suspended, in whole or in part, in accordance with 36 CFR 228.4(e)(3)."

Attachment A, Part 1, goes on to state under monitoring pertaining to bitterroot, *"During the summer of 2011, CuMoCo initiated the monitoring program for LESA identified in the February 2011 Decision Notice/FONSI (refer to Monitoring Plan Report in November 2012 (CSR 2012a)). However, the baseline data established as a result of the 2011 efforts needs to be re-established due to impacts from 2014 wildfires and related suppression activities that affected a portion of the original 2011 bitterroot monitoring area."* Additional surveys were conducted in 2015 and will be finalized in 2016.

In addition, the monitoring program to be conducted through the life of the Project has been updated to include both implementation and effectiveness monitoring elements. These monitoring features will be used to ensure LESA design features and mitigation are being implemented as intended and the effects assumed do not exceed those anticipated."

An example of the effectiveness of this process was demonstrated in the surveys conducted in 2015 identified above. These additional bitterroot surveys were completed during the 2015 flowering period and identified additional areas of occupied habitat within the Plant Consideration Area (PCA) delineated in the SEA released in April 2015. Per the existing design features, identifying these additional areas required an update to delineation of the PCA (see bitterroot figure updates in Attachment E). Rings 1–4 within the PCA were also updated to reflect this change. Thus, the design features and monitoring requirements included in my decision would be applied to this latest delineation which resulted from this ongoing implementation and effectiveness monitoring work. Applying applicable design features and monitoring requirements based on the best information available allows for the effects to bitterroot as disclosed in the SEA to continue to be realized.

An alternative to exclude roads, drill pads, sumps, and other structures or facilities from protected Riparian Conservation Areas (RCAs)

As identified in Section 2.3.10 of the SEA, “*The FS would use the Checklist, “Plan of Operations and BMP Checklist Supporting Approval of Proposed Temporary Road and Drill Pad Construction/Reconstruction included in Appendix C to ensure that CuMoCo is complying with the mitigation and monitoring requirements identified in Sections 2.3.1 to 2.3.9.”* CuMoCo would be required to complete this checklist prior to implementing any ground disturbing activities that have been authorized under the USDA-FS approved PoO.

This checklist includes the following items specific to RCAs:

- Does the proposed temporary road or drill pad construction/reconstruction fall within a RCA?
- If the proposed temporary road or pad construction/reconstruction falls within an RCA, were alternatives to locate the facility outside the RCA considered to the maximum extent practicable?

Consistent with EPA’s definition, the extent practicable means “available and capable of being done after taking into consideration cost, existing technology and logistics in light of the overall project purpose” (40 CFR 230.10(a)(2)). Thus, alternatives to placing facilities within RCAs per the results-driven process are already an inherent component of the action alternatives, including the one I have selected in this supplemental DN/FONSI.

An alternative, or additional project design features, aimed at further reducing impacts to wildlife, specially elk, goshawk, great gray owl and wolverine

In response to instruction #9 from the ORO identified above, I have reviewed the feasibility of incorporating mufflers on equipment at the drill rigs and generators and using sound-dampening pads around drill rigs. Consistent with requirements at 36 CFR 228(8)(e), I have determined that incorporating additional sound-dampening BMPs to further minimize environmental impacts to surface resources on National Forest System lands, including disturbance to wildlife species such as elk, wolverine, goshawks, and great gray owls during nesting, denning, calving, and fawning periods would be feasible and practicable.

As to light shields, CuMoCo is already utilizing these items. As stated under my decision above, “*CuMoCo will use lights similar to those used on highway construction projects that include equipment which directs light onto the work area to minimize spillage.*”

In addition, as identified above, clarification of the annual goshawk and great gray owl nest monitoring requirements have been included. These requirements clearly state that when activities are proposed near the project boundary, surveys will be conducted beyond the project boundary per the District Wildlife biologist’s direction (refer to Attachment A, Part 1, Terrestrial and Avian Wildlife design features). If goshawk and/or great gray owls are identified in locations likely to be disturbed by activities near the project boundary, then the design feature to provide adequate buffers and/or timing restrictions to minimize disturbance to nesting birds during the nesting period would be applied.

Finally, as instructed by the ORO, I updated the fourth bullet on page 20 of the DN/FONSI that discusses surveying for raptor presence and nesting activity to clarify that the 150-foot buffer is a no direct or indirect disturbance buffer that will be maintained around identified

nest trees year round and specifically state that no intrusion would be allowed into this buffer at any time during operations in order to protect the microsite integrity of the nest tree area, whether it is active during an operating season or not. I also clarified how this 150-foot no disturbance nest tree buffer works in conjunction with the additional disturbance buffer described in the footnote to this design feature in Attachment A, Part 1, identified above, that would be applied around active nest sites to minimize disturbance during the nesting period, typically April 1 through August 15 of each year. To try and clarify this connection, I updated the applicable design feature in Attachment A, Part 1.

An alternative that considers alternate water sources that have fewer environmental effects; specifically the concern that diversions from Grimes Creek and Charlotte Gulch will have adverse impacts on local fish populations, potentially including bull trout

By implementing design features and requirements under the IDWR water rental agreement, the SEA does not indicate measurable impacts to local fish populations resulting from using the diversions from Grimes Creek and Charlotte Gulch, thus, an additional action alternative is not warranted.

As identified earlier, CuMoCo entered into a Rental Agreement with IDWR (SEA, Table 4). Per the Rental Agreement, CuMoCo has an annual rented volume of 10 acre-feet. CuMoCo's rental is from June 5, 2012, to November 30, 2012, and March 1 to November 30 beginning in 2013 and ending in 2016. The State permit includes design features or conditions that limit the amount of water removed. With the implementation of design features/conditions, there would not be any adverse effects to fish and aquatic resources within Grimes Creek. The Rental Agreement is included in the project record (PR#238).

Specifically, the Rental Agreement has a maximum diversion rate (0.67 cubic feet per second [cfs]) and includes conditions of water use, including the authority of the Director to terminate the diversion of water if the Director determines there is not sufficient water supply for the priority of the right or portion thereof being rented, and a requirement that CuMoCo install and maintain a measuring device and lockable controlling works that provides the watermaster suitable control of the diversion(s).

As stated in the amended Biological Assessment relative to effects to bull trout, “*Water drafting could affect peak/base flows WCI. This effect directly relates to potential loss in cover and spawning/rearing habitat. Grimes Creek adjacent to Project Area is generally described as Rosgen A and B Channel Types. These channel types typically do not have many side channels or oxbow where stranding fish could potentially occur. Therefore, drafting water at the rate of 0.67 cfs or 6% of the lowest flow measurement would have an insignificant effect to bull trout and their habitat. Change in Peak/Base Flows would likely be maintained.*”

An alternative should be considered that does not allow activities on moderate-to-high risk landslide prone areas, particularly in light of the changed condition resulting from the 2014 wildfire.

Landslide prone areas (LSP) within the CuMo Project Area were analyzed and design features included that were applicable to all action alternatives. Potential LSP areas were field-verified using General Field Verification Procedures for Landslide and LSP Areas Implementation Guide for Management on Landslide and LSP Areas (Forest Plan,

Appendix B). No current or historic landslides were identified within the Activity Area during field verification activities (Figures 8a-8b, also in the Geologic, Hazards, Soil, and Water Resources Technical [GHSWRT] report, Figures 4a–4c, pp. 89–90). Areas of moderate landslide hazard were identified (i.e., the area exhibits a moderate probability of slope failure). The presence of moderate landslide areas does not constitute a risk, as they are far from populated areas and are located sufficiently distant from Grimes Creek that slope failures in these areas are unlikely to impact aquatic ecosystems. (SEA, pp. 83 and 88)

In response to the concern regarding the potential for landslides from road construction activities, field work focused on evaluating risk and hazard potential for LSP areas identified by Forest Service coarse-filter analysis, assessment of soil and geologic condition, and evaluation of erosion conditions. Roads were one of several factors considered (SEA, p. 72). Field work in the area of proposed temporary exploration roads did not reveal evidence of landslide activity or instability. The GHSWRT report (Table 6, p. 39) indicates no temporary roads would be located in LSP areas.

In addition, design features for avoiding and preventing landslides in moderate hazard areas have been included in this decision (Attachment A, Part 1). Specifically, use of the BMP checklist process ensures management actions are designed with review and guidance by the appropriate resource specialists prior to implementation. The Responsible Official would have the authority to deny CuMoCo's requested action (proposed road or proposed drill pad) if, following review of responses to the submitted checklist, it is determined by the applicable resource specialist that the effects fall outside the range of effect analyzed in the SEA.

The Project Area was also reassessed by the Forest Service after the Whiskey Complex Fire of 2014. The BAER report summarizes findings of resource assessments to identify burned conditions posing threats with unacceptable risks to downstream values, and requests funding to mitigate the threats—to the extent possible—to protect the potential values at risk (Whiskey Fire Burned Area Emergency Assessment [BAER] Report: Hydrology Resource Assessment, August 5, 2014, pp. 1–9).

According to the BAER report, overall, soils and vegetation were minimally affected by the fire and soil burn severity was predominantly low with patches of unburned and moderate soil burn severity scattered throughout the burned area. Burn severity analysis using satellite imagery and field verification indicates that 70% of the Grimes Fire burned at low severity, 26% burned at moderate severity, and 4% burned at high severity.

Three intermittent streams occur within the fire perimeter. Modeling of post fire increases in stream flow and sedimentation showed no measureable increase due to the low soil burn severity of the affected area. However, some small increase in erosion and sedimentation for several years after the fire is possible, (2–3yrs) depending on intensity and duration of storms while vegetation recovers.

The SEA recognized that using temporary roads in burned watersheds may increase sedimentation risk. Mapping of the roads and fire (Figure 1) shows that approximately 2.4 miles of proposed temporary roads are located within the Grimes Fire perimeter. The analysis found these roads are of low concern for sedimentation because of their location and/or because burn severities in this area are low and unburned vegetation and ground cover alteration is not sufficient to result in additional sedimentation from what was disclosed in the SEA.

An alternative, or additional design features, should be included that identifies when, where and how the different routes will be used for fuel haul. Reasonable restrictions prohibiting fuel haul when roads are snowy, icy, muddy or at night should be specifically identified. In addition, an alternative should be considered where fuel haul will not occur along the Grimes Pass Road (Forest Road 382) from Garden Valley to the project area.

As to the three routes that would be used for day-to-day access to the project area, pertinent project details for the transport of fuel under my selected alternative, as well as Alternative A described in the SEA, include the following:

- Fuel will be transported to the Project site by 4 four-wheel drive pickup trucks per day
- Based on exploration occurring from April 15 to December 15 each year, trucks would travel up to 244 days per year for the life of the Project (5 years)
- Total fuel delivery trips per year would be approximately 976 (one way, as trucks would leave the Project site with empty fuel sliptanks)
- Each of the pickup trucks would carry a 100-gallon capacity sliptank with diesel fuel in the bed of the truck
- Fuel transport vehicles would not travel by convoy. On occasion, vehicles may depart their point of origin at approximately the same time, however, vehicle travel would not be coordinated or conducted in the manner of a convoy (i.e., with specific procedures)
- Speed limits on access routes range from 25 mph to 35 mph. As required for any person traveling these routes, CuMoCo employees and contractors would be required to obey speed limits and other traffic safety requirements posted along these routes.
- The United States Department of Transportation regulations would be followed for the transport of fuel to the Project
- A spill prevention and cleanup kit consisting of absorbent pads, absorbent booms, shovels, and a fire extinguisher would be carried in vehicles transporting bulk fuel and placed at drill sites or any other areas where fuel and/or petroleum products are present.
- Should a spill occur, CuMoCo would follow the same procedures to address the spill, including cleanup, as is required in the SPCC onsite plan (refer to Attachment A, Part 1, design features under Fuel Transport Requirements).

The Boise County Forest Roads and Trail Act (FRTA) easement on County roads is for using the right-of-way for the purpose of construction, operation, and maintenance of a highway and does not include the grant of any rights for non-highway purposes or facilities. During operations authorized under the 2011 decision, Boise County entered into a maintenance agreement with CuMoCo. Per the maintenance agreement, the parties agreed that CuMoCo would assist with maintenance of these access routes to help mitigate any impacts to Boise County and the general public. The parties also believed the mitigation measures described in the maintenance agreement effectively mitigated CuMoCo's exploratory drilling activities. The maintenance agreement included additional grading cycles, dust abatement, and additional signing to address public safety.

As identified under my decision, the project operating season is April 15–December 15 each year. The extent of this operating season allows CuMoCo to operate primarily during the

snow free season; however, there will be periods of time during the shoulder seasons that the company may be operating on snow-covered roads. The County provides winter maintenance on all of the access routes to the project area with the exception of a portion of the Grimes Pass road, CR382, which, per my decision, would only be used for emergency access. Thus, using this road during shoulder seasons would not occur except for emergency purposes.

As contained in the pertinent project details above, fuel haul will be accomplished using up to 4 four-wheel drive pickup trucks per day with 100 gallon slip tanks. Pickups are a standard type of vehicle that currently uses the winter maintained access roads during all seasons and the non-winter maintained access road during the snow-free season. The access route to be used will depend on the location of CuMoCo's base of operations. The addition of this limited number of fuel haul vehicle trips on roads that are currently operated and maintained for this type of traffic, the additional road maintenance being provided through the Road Maintenance Agreement with Boise County, and the low probability of accidents for this additional traffic as disclosed in the Fuel Transport Assessment (SEA, Appendix I) does not warrant additional vehicle restrictions on those roads that are maintained for all season use.

Public Involvement and Identification of Issues

The proposed action has been listed in the quarterly Boise NF Schedule of Proposed Actions since July 2007. In addition, the Forest Service mailed a project description to 104 individuals, agencies, and organizations on July 15, 2007, inviting public comment. A legal notice describing the project and inviting comment was published in the *Idaho Statesman* on July 23, 2007.

An interdisciplinary (ID) team described in Section 4.0, Consultation and Coordination, used comments received from the public, Tribes, agencies and organizations during the scoping process, to develop major issues and/or the scope of the environmental analysis, as described in Section 1.9.

The EA for the proposed project was released for 30-day notice and comment with publication of legal notices in the *Idaho Statesman*, the newspaper of record, on August 3, 2010. (A courtesy legal notice was also published in the *Idaho World* on July 28, 2010). About 241 individuals, agencies and organizations were mailed notification of the EA's availability and of four open houses to be held to provide more information on the proposed project and the environmental analysis. Open houses were held in Crouch on August 7, 2010; Boise, August 12, 2010; Idaho City, August 13, 2010; and Centerville, August 21, 2010. Approximately 530 public and agency comments were received. Those comments and the Forest Service responses to them are included in Attachment B of this DN/FONSI. Chapter 4 of the EA includes a list of those agencies and organizations consulted during the public involvement conducted for this project. A list of the individuals consulted is included in the project record.

During the 30-day notice and comment period on the EA, respondents expressed a variety of concerns about potential resource effects of the exploration (as well as any mine development proposed at a later date) and opinions in support and opposition to the project. I appreciate the strong and sincere interest in the project, and as described above under "Rationale for the Decision," I carefully considered these concerns, as well as those expressed during the scoping period, in making my decision.

Supplemental EA (SEA) Public Comment

The FS initiated the preparation of the SEA in January 2013. The FS mailed scoping letters on January 31, 2013, and published the legal notice in the *Idaho Statesman* on February 5, 2013. Scoping comments and responses to those comments were completed and are located on the project website: <http://www.fs.fed.us/nepa/fs-usda-pop.php/?project=21302>.

The SEA for the proposed Project was released for a 30-day notice and comment period with publication of legal notices in the *Idaho Statesman*, the newspaper of record, on August 19, 2013. (A courtesy legal notice was also published in the *Idaho World* on August 19, 2013.) Public meetings were held in Idaho City, September 3, 2013; Boise, September 4, 2013; and Garden Valley/Crouch, September 5, 2013. Public and agency specific written comments received at these public meetings were placed on the FS's project website (<http://www.fs.fed.us/nepa/fs-usda-pop.php/?project=21302>). An appendix to the decision document includes all comments received on the SEA during that 30-day notice and comment period.

SEA and Draft Decision Notice/FONSI Objection Filing and Resolution Period

The Objection Reviewing Officer's (ORO's) responses to objections raised during the 2015 objection period are included in the project record. The ORO's instructions and how I responded to those instructions are summarized under my decision above.

Also, during the objection resolution period, an objector, ICL et al., raised the following concern in an email dated 9/3/2015, and follow-up email dated 9/4/2015:

I wanted to follow up on some new information that has become available from the similar Golden Meadows Project. This is an excerpt from the Sept. 1 2015 Golden Meadows Decision Notice and Finding of No Significant Impact:

Out of 26 drilling areas, 8 have been identified as having some risk that drilling fluid could discharge at the ground surface. In 2012, attempts to drill through fractured rock to reach geologic targets beneath the Yellow Pine pit resulted in drilling fluid discharging at the surface and then running into live water six times. As a result MGI developed SOPs designed to mitigate both the risk of surface discharge occurring and the risk of drilling fluid subsequently reaching live water. These SOPs were implemented in 2013 when more holes were drilled underneath the pit. Drilling fluid was discharged at the surface twelve times in 2013, however in every case the detection and response SOPs proved highly effective in preventing any mud from reaching live water. Implementation of all the SOPs described above for the current project would make the probability of drilling fluid reaching live water extremely unlikely (Golden Meadows Decision Notice and Finding of No Significant Impact, page 5.)

The Boise Forest Geologist contacted the Payette Forest Geologist to discuss the applicability of the situation identified above to the CuMo site. The standard operating procedures (SOPs) for the Golden Meadow project used to address the situation above were in response to a site-specific geologic condition at this project site that resulted from past mining activities. Specifically, it pertained to the site-specific condition at this site relative to the relationship

of drill pads, historic mining activity, blast fractured rock, backfilled pit benches, and waste rock stockpiles resulting from open pit mining that occurred before the current Golden Meadows project. Those past activities created fracturing in the rock that, in several instances, provided a conduit for surface expression of drilling fluid. As described in the 9/4/2015 email, site specific SOPs were developed to respond to the situation described above.

The CuMo project is different from the Golden Meadows project since no mining resulting in similar conditions has occurred and different geologic conditions are present. The majority of issues related the SOPs discussed above do not apply to the CuMo project. However, general concerns related to RCAs are similar. The CuMo project has already adopted mitigation measures/monitoring (i.e., SOPs) as well as steps through the Checklist process to address concerns applicable to the CuMo site. For example, as identified in Attachment A, Part 1, the following design features have been included:

- CuMoCo would monitor the amount of water used in each drill hole during the drilling operation to demonstrate a “closed loop” system (see Appendix H)
- A knowledgeable person (i.e., an experienced or licensed driller) would monitor and record the following during drilling operations: drill fluid loss/gain by drill interval; quantity and use of loss circulation materials; and drill mud pump pressures to identify when actions are needed to maintain a “closed loop” drilling fluid system.

By implementing monitoring during drilling activities, the driller would notice fluid loss and take the necessary measures to stop the fluid loss. These procedures, including the use of casing, are further discussed in detail in Attachment B. Additionally, the CuMo project is required to use drilling fluids meeting standards used in drilling domestic water wells. As discussed on page 12 of this supplemental DN/FONSI:

All drill fluid additives pumped into the hole are regulated and would meet all State and federal safety and environmental standards. Water used in the drilling fluids would be drawn from sources that meet State water quality standards (IDAPA 58.01.02). As previously mentioned, BMPs would be evaluated and improved on an ongoing basis. Drilling mud and hole plug products would conform to National Sanitary Foundation (NSF) guidelines for ensuring groundwater integrity. Material Safety and Data Sheets (MSDS) for all products would be posted and available on site with the SPCC plan.

Drilling activity in the RCA is further addressed in the Checklist process identified in Attachment A, Part 5. Specifically, the following questions must be addressed and, where applicable, adequately addressed prior to authorization of a disturbance activity:

9. Does the proposed temporary road or pad construction/reconstruction fall within a riparian conservation area (RCA)?
10. If the proposed temporary road or pad construction/reconstruction falls within an RCA, were alternatives to locate the facility outside the RCA considered to the maximum extent practicable?
11. If the proposed temporary road or pad construction/reconstruction falls within an RCA, does the design sufficiently protect groundwater and surface water resources?

These monitoring and mitigation measures are consistent with the applicable sections of the Groundwater Protection and Best Practices for Mineral Exploration, as outlined in Appendix B of the *Considerations for Groundwater Evaluation in Mineral Exploration Drilling*⁸ that both the Golden Meadow and CuMo project relied upon to develop site specific design features (i.e., SOPs).

Consistency with the Forest Plan and with Laws and Regulations

My decision is consistent with Federal, State, and local laws or requirements imposed for the protection of the environment, as described below. In addition, as described in the EA, Section 2.4, Table 4, **CuMoCo** will obtain permits and/or approvals from other agencies, such as the Idaho Department of Water Resources, the US Army Corps of Engineers, the Idaho Department of Environmental Quality, the US Environmental Protection Agency, and Boise County, as appropriate for specific activities to be undertaken as part of this project.

Clean Water Act

The action alternatives are consistent with the Clean Water Act and its amendments. Effects to water quality and fisheries are disclosed in Sections 3.2 and 3.5, respectively, of the **SEA**.

Endangered Species Act

The Endangered Species Act (ESA, 16 USC 35 § 1531 et seq. 1988) provides for the protection and conservation of threatened and endangered plant and animal species. All action alternatives were assessed to determine their effects on threatened and endangered plant and animal species (**SEA, Chapter 3, Section 3.4**). A Biological Assessment consistent with the requirements of this act was prepared **in support of the 2011 DN/FONSI** and submitted to the US Fish and Wildlife Service (USFWS), and on January 13, 2011, the USFWS concurred on the determinations disclosed in the Forest Service's Biological Assessment for this project. **The 2011 Biological Assessment was revised as part of the SEA analysis process and submitted to USFWS on March 9, 2015. The Agency received concurrence from USFWS on April 24, 2015.**

Forest Service Mining Regulations (36 CFR 228A)

The **proponent's** 2007 PoO was submitted under the authority of the 1872 Mining Law as amended. The Forest Service derives the authority to regulate such activities from the 1897 Organic Act (16 USC 478, 551), the Multiple Use Mining Act of 1955 (30 USC 612), and the Mining and Minerals Policy Act of 1970 as reissued in the 1990s. Forest Service decisions regarding such PoOs must be in accordance with its mining regulations at 36 CFR 228A and are issued after compliance with the requirements of the NEPA.

In accordance with these laws and regulations, and in particular, 36 CFR 228.8, this decision approves **CuMoCo's** PoO as submitted in 2007, with terms and conditions to minimize impacts to surface resources.

⁸ USDA. 2014. *Considerations for Groundwater Evaluation in Mineral Exploration Drilling, Draft Version 3. 1/06/2016.* 36p.

Migratory Bird Treaty Act

All alternatives would comply with the Migratory Bird Treaty Act. This project might however result in an “unintentional take” of individuals during proposed activities. However, the project complies with the USFWS Director’s Order 131 related to the applicability of the Migratory Bird Treaty Act to federal agencies and requirements of permits for “take.” In addition, this project complies with Executive Order 13186 because the analysis meets agency obligations as defined under the January 16, 2001 Memorandum of Understanding between the FS and USFWS designed to complement Executive Order 13186. Migratory bird species are analyzed and discussed in Section 3.4 of this SEA. If new requirements or direction result from subsequent interagency memorandums of understanding pursuant to Executive Order 13186, this project would be evaluated to ensure that it is consistent.

National Forest Management Act

Determination of Forest Plan consistency is based on the recognition that the Forest Service has limited authority to influence activities submitted under the 1872 Mining Law, as amended (USDA FS, 2003a, p. III-4; USDA FS, 2010a). The Forest Service is limited in that it may not deny CuMoCo’s Plan of Operations, provided that the activities proposed are reasonably incident to mining, not needlessly destructive, and otherwise comply with applicable state and federal law. This consistency determination also recognizes that the Forest Service does not have the authority to impose unreasonable requirements that would have the effect of denying the statutory right to explore for mineral resources, provided the plan otherwise meets the intent of applicable laws and regulations (30 USC 612; 36 CFR 228A).

I have determined that the terms and conditions added in this decision represent reasonable requirements that I can impose for managing surface resources on affected NFS lands, and application of these terms and conditions provides consistency with management direction in the 2003 Boise National Forest Plan, as amended in 2010, insofar as my authority allows. Detailed Forest Plan consistency documentation is included in the project record.

National Historic Preservation Act

The National Historic Preservation Act requires federal agencies to consider the effects of their activities and programs on historic properties. Federal activities and programs are defined as “undertakings” by the 36 CFR 800 regulations for implementing Section 106 of this Act. Historic properties are significant cultural resources that are included in or eligible for inclusion in the National Register of Historic Places. The Forest Archeologist anticipates that this project would have no adverse effects to historic properties if implemented with identified conditions for mitigation and monitoring (SEA, Section 2.3.6). The Forest Archeologist prepared a report for the Idaho State Historic Preservation Office (SHPO) documenting the no adverse effect determination, and on October 12, 2010, the SHPO concurred with the finding of effects and mitigation and monitoring stipulations.

Executive Order 13175 – Consultation with Tribal Governments

This order established a requirement for regular and meaningful consultation between federal and tribal government officials on federal policies that have tribal implications.

Three federally recognized Native American tribes have expressed interest in activities proposed on the Boise NF: Nez Perce, Shoshone-Paiute, and Shoshone-Bannock Tribes. A scoping letter was sent to Shoshone-Paiute Tribe on August 30, 2007. Letters inviting tribal consultation were sent to the Shoshone-Bannock Tribe and Nez Perce Tribe on July 29, 2010. The project was presented to the Shoshone-Paiute Tribe at the regularly-scheduled July 8, 2010 Wings and Roots meeting. These meetings are an official part of the consultation process between the Shoshone-Paiute Tribe and the Boise NF. The tribal notification and subsequent consultation processes described above did not result in the identification of any adverse effects to tribal interests or rights specifically associated with this project (SEA, Section 1.8.2).

Letters notifying the Shoshone-Bannock Tribe and Nez Perce Tribe of the supplemental analysis were mailed on February 1, 2013. The Project was presented to the Shoshone-Paiute Tribe at the Wings and Roots meetings held February 14, 2013; May 9, 2013; and June 14, 2013. The Boise NF had a staff-to-staff meeting with the Shoshone-Bannock Tribe on June 19, 2013, and presented the supplemental groundwater analysis. These meetings are an official part of the consultation process between the Shoshone-Paiute Tribe and the Boise NF and the Shoshone-Bannock Tribe and the Boise NF. The tribal notification and subsequent consultation processes described above did not result in the identification of any adverse effects to tribal interests or rights specifically associated with this Project.

Executive Order 12898 – Environmental Justice

In accordance with Executive Order 12898 (59 FR 32, 1994), all action alternatives were assessed to determine whether they would have disproportionately high and adverse human health effects, including social and economic effects, on minority or low-income human populations. No effects have been identified (SEA, Appendix B).

Executive Order 13443 – Facilitation of Hunting Heritage and Wildlife Conservation

On August 16, 2007, President George Bush signed an Executive Order directing appropriate federal agencies to facilitate the expansion and enhancement of hunting opportunities and the management of game species and their habitat. Section 3.4 of the SEA discloses the effects of the alternatives on big game wildlife species. Disturbance impacts, including to calving elk and fawning mule deer, are disclosed for both action alternatives. Although displacement and changes in distribution patterns would be anticipated, the effects and impacts documented would generally be temporary to short-term, and/or small in scope (SEA, Section 3.4.2.2).

Minor Changes to the SEA Following the 30-Day Notice and Comment Period

Minor changes were made to the SEA released for the 30-day notice and comment period in August 2013. Specific changes were in response to public comments received on the SEA. Changes ranged from clarifying the environmental analysis performed to more clearly describing the differences between alternatives, responding to changed circumstances pertaining to comments received, and including the latest information received after August 2013 pertaining to the various topics brought up in comment responses.

- Description of the action alternatives' compliance with laws and regulations (SEA, Section 1.6)

- Update to the Public Involvement discussion (SEA, Section 1.8) to reflect the 30-day notice and comment period
- Update to Alternatives A and B descriptions to include all potential access routes to the Project Area
- Update to mitigation and design features for Sacajawea’s bitterroot, Wildlife Resources, Water Quality, and Fuel Transport in Chapter 2 (section 2.3), Appendix C and Appendix H of the SEA
- Updates to the proponent’s proposed PoO documented in Appendix A of the SEA to include all revisions to design features, mitigation, and monitoring included in Chapter 2, Appendix C, and Appendix H of the SEA
- In response to public comment on the SEA released in August 2013, include a more detailed Fuel Transport assessment in the SEA. This assessment has been included as Appendix I of the SEA.
- Additional updates/clarification of effects disclosure in Chapter 3 in response to public comments have been completed, most of which have been identified under the rationale for my supplemental decision above.
- Following USFWS withdrawal of its proposal to list wolverine as threatened or endangered under ESA, discussions concerning wolverine were repositioned under Region 4 Sensitive species.
- Update effects disclosures to reflect impacts, if any, resulting from the 2014 Grimes Fire.

Minor Changes to 2015 SEA as an outcome of the Objection Process

In the SEA released for Objection in April 2015, four routes were identified as available for day-to-day access. However, as an outcome of the objection process, including discussions with all parties, I chose to restrict use to emergency access only on the access route that proceeds southeastwardly from Garden Valley by way of CR382, which follows the Banks-Lowman Highway along the south bank of the South Fork of the Payette River and Sweet Creek. In my review of the effects analysis disclosed in the SEA, I have determined that removing this route did not result in a change in effects that fell outside the range disclosed. Thus, an update to the SEA effects disclosure is not needed.

In response to the ORO’s instructions, I also added a subsection in my decision under “Other Alternatives Considered” that specifically explains the rationale as to why objectors suggested alternatives identified in their objection issues were not carried forward into detailed analysis. Because these alternatives were addressed through mitigation and discussed in response to comments in Attachment C of the draft DN/FONSI (refer to response to Issue 24), I have determined that this does not constitute new information requiring updates in the SEA.

Updates to 2015 SEA released for Objection resulting from monitoring data collection

In addition, as discussed earlier, an example of the effectiveness of how project area monitoring data is used to inform the pre-activity Checklist process was demonstrated in 2015 following release of the draft DN/FONSI for the objection review period. Additional bitterroot surveys were completed during the 2015 flowering period. These surveys identified

additional areas of occupied habitat within the PCA identified in the SEA released in April 2015. Per the existing design features, discovery of this additional occupied habitat required an update to the delineation of the PCA (see bitterroot figure updates in Attachment E). Rings 1–4 within the PCA were also updated to reflect this change. Thus, the design features and monitoring requirements included in my decision will now be applied to this latest delineation, which resulted from ongoing implementation and effectiveness monitoring. Applying applicable design features and monitoring requirements based on the best information available allows for the effects to bitterroot as disclosed in the SEA to continue to be realized. The updated SEA figures that display the updated PCA and related buffer rings are included in Attachment E of this decision.

In conclusion, these updates, clarifications, and corrections did not substantially alter the analysis summarized in the SEA released for the 30-day notice and comment period in August 2013 or the SEA released for objection in April 2015 (i.e., effects remain within the range of effects disclosed). Because effects did not substantially change, I do not believe any new public concern or issue associated with the Project would be raised. In fact, these updates, clarifications, and corrections were specifically made to address concerns or issues raised.

Finding of No Significant Impact

I have reviewed the Council on Environmental Quality (CEQ) regulations for significance (40 CFR 1508.27) and have determined that this decision is not a major Federal action that will significantly affect the quality of the human environment, either individually or cumulatively. Preparation of an Environmental Impact Statement (EIS) pursuant to Section 102(2)(c) of the NEPA is not required. This determination is based on the following factors, as outlined in 40 CFR 1508.27:

This decision is limited in geographic application (40 CFR 1508.27(a)).

This decision allows mining exploration within a Project Area that encompasses about 2,885 acres (less than one percent) of a Ranger District that is about 470,500 acres in size.

This decision does not cause significant beneficial or adverse impacts (40 CFR 1508.27(b)(1)).

As described above under “Rationale for Decision,” my decision will result in few measurable environmental impacts, and in fact, will improve conditions over those anticipated under the no action alternative **by obliterating the existing, historic, 4.7 miles of roads and associated stream crossing following conclusion of exploration operations (SEA, Table 3 and Table 8, Section 3.2, Water Quality effects).**

This decision does not significantly affect public health or safety (40 CFR 1508.27(b)(2)).

My decision as described above, including Attachment A **and B** of this DN/FONSI, includes several design and mitigation measures to protect public health and safety. For example, **to protect public health from the effects from potential fuel spills to surface and ground water resources**, a Spill Prevention Control and Countermeasure Plan (SPCC) **has been** developed for the site **and will be maintained during the life of the operation**. Drillers will carry a commercially available storage tank mounted in the service pickups. Fuel spill and

containment equipment will be provided to respond to any spills which may occur during equipment fueling and/or transport along access routes. If fuel storage is required on site, fuel will be stored in a 55-gallon drum or other legal container located in a lined storage area capable of holding 1.5 times the container volume, and fuel spill control kits would be provided for any fuel storage location. Drilling crews will take immediate action to contain and collect any spill of hazardous or non-hazardous substances within the Project Area and/or along fuel transport routes (Attachment A, Part 1, Fuel Storage and Fuel Transport mitigation). The effects to surface and groundwater quality disclosed in Section 3.2 and to Aquatic Resources in Section 3.5, support these conclusions.

To address effects to public health and safety that could result from using access routes by personnel supporting exploration activities, signs located near the public access entry points to the Project Area would notify the public of hazards with respect to active truck traffic, and temporary roads will be gated to control vehicle access to the Project Area (Attachment A, Part 1, Traffic and Public Safety mitigation). The Road Maintenance Agreement and/or conditional use permit that Boise County requires the proponent to obtain will include similar requirements for safety signing, for obeying posted speed limits, and for maintaining roads in a condition important to support safe travel (Attachment A, Part 2, Other Federal, State or Local Permits and/or Approvals Potentially Applicable). The effects to public safety disclosed in Section 3.7 of the SEA and Fuel Transport Assessment in Appendix I of the SEA support this conclusion.

To contribute to the protection of groundwater resources, drilling operations will use one or more of several types of synthetic non-toxic, biodegradable polymer mud products and any water used in the drilling fluids would be drawn from sources that meet State water quality standards (IDAPA 58.01.02). After completion, all drilling holes will be filled with a bentonite-cement mixture designed to effectively seal and stabilize down-hole conditions. Each hole will be topped with a cement plug or similar device, (refer to Attachment A, Part 1, Water Quality mitigation).

In addition, consistent with direction identified by the Court (Court 2012), my supplemental decision includes updated standard drilling procedures, mitigation, and monitoring requirements (refer to Attachment B) consistent with the findings of the updated groundwater analysis. These monitoring and mitigation measures are consistent with the Groundwater Protection and Best Practices for Mineral Exploration sections, as outlined in Appendix B of the Considerations for Groundwater Evaluation in Mineral Exploration Drilling (USFS 2014).

CuMoCo has also prepared a Quality Assurance Project Plan (QAPP) and Ground Water Sampling Plan with IDEQ (Attachment D of this decision). The objective of the QAPP is to (1) increase the knowledge of ground water chemistry in the Project Area; (2) provide knowledge of natural variability in ground water geochemistry as to function of seasonal and meteoric conditions; and (3) provide knowledge of the potential impacts of diamond core drilling additives to ground water. As disclosed in the SEA, Section 3.2, following this monitoring protocol will help monitor the effectiveness of mitigation developed to avoid or minimize effects to ground water resources, and as needed, modify mitigation to ensure effects stay within the range of effects disclosed in the SEA.

This decision does not significantly affect any unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas (40 CFR 1508.27(b)(3)), does not adversely affect anything listed or eligible for listing in the National Register of Historic Places, nor does it cause loss or destruction of significant scientific, cultural or historic resources (40 CFR 1508.27(b)(8)).

The Forest Archeologist anticipates that this project would have no adverse effects to historic properties if implemented with identified conditions for mitigation and monitoring (SEA, Section 2.3.6). The Forest Archeologist prepared a report for the Idaho State Historic Preservation Office (SHPO) documenting the no adverse effect determination, and on October 12, 2010, the SHPO concurred with the finding of effects and mitigation and monitoring stipulations. I have included these stipulations as part of my decision, as outlined in Attachment A. My decision will have no effect on wetlands. My decision will not affect parklands, farmlands, or ecologically critical areas or cause the destruction of significant scientific, cultural or historic resources.

Specific concerns were raised during the 2013 comment period on the SEA and in an objection filed in 2015 concerning how the use of access routes would affect the stretch of the South Fork of the Payette River eligible for Wild and Scenic River (WSR) status. The access routes of concern are the second and third routes described under my decision which include portions of CR382 and CR615 that fall within the corridor of the WSR eligible segment of the South Fork of the Payette River (refer to Figure 2a, SEA, page 9). The Forest Plan (Appendix D and Management Area 11), as amended in 2010, identified segments of the South Fork Payette River as a eligible WSR due, in part, to its outstandingly remarkable values (ORVs) for scenic, recreation, and heritage and ecological/botanical qualities.

As identified under my decision, the second access route would only be used for emergency access. This is the route with the longest segment adjacent to the South Fork of the Payette River. Thus, fuel haul, day-to-day project access, and road maintenance activities of concern relative to impacts to WSR ORVs would not regularly occur along this route.

Road maintenance would be required along the short segment of CR615 within the WSR from the intersection of CR382 north to the Banks Lowman Highway via a conditional use permit and/or Road Maintenance Agreement with Boise County, as part of the CuMo Exploration Project (refer to Table 4, Chapter 2, SEA, pages 56–58). No road construction or reconstruction activities of this segment of road that falls within the river corridor of this WSR segment are proposed (Chapter 2, Alternative description, page 22) in support of activities to be authorized under this decision. Thus, no road management related activities are proposed that have not historically been completed annually (e.g., road maintenance) on this segment of CR615 that would affect ORVs (e.g., Scenic or Recreation) that pertain to the WSR classification of the South Fork Payette River segment of concern.

In response to comment 1500.9, Attachment C of the decision, the Forest Service response states, “Forest Plan management direction for this eligible segment is found in Forest wide and Management Area direction. This direction provides protection, pending a suitability determination to 1) Free-flowing values; 2) River-related values-protect outstandingly remarkable values (subject to valid existing rights) and, to the extent practicable, such values are enhanced; and 3) Classification impacts that management and development of the eligible

river and its corridor cannot be modified (subject to valid existing rights) to the degree that the eligibility or classification would be affected.” These Forest Plan requirements were considered as part of this project analysis and the project was determined to be consistent with these requirements; refer to Forest Plan consistency documentation in the project record.

Thus, as identified in the response to comments above, traffic from the CuMo project would not have a disproportionate effect on the WSR ORVs along CR328 or CR617. Potential long-term impacts to the river would not be measurable (CuMo Project Fuel Transport Memorandum). Thus, the long-term eligibility of the segment for future consideration would not be measurably affected by use of access routes identified above.

This decision does not cause effects on the quality of the human environment that are likely to be highly controversial (40 CFR 1508.27(b)(4).

As indicated by the comments received in the preparation of the 2011 EA, subsequently the 2013 supplemental EA and objections received on the draft DN/FONSI released in May 2015, many respondents are opposed to mine development and its associated environmental impacts. However, this SEA has been prepared to address the potential effects of mineral exploration only. The exploratory drilling is part of a data collection operation which will determine the feasibility of any future mining operation; mining feasibility has not yet been determined; and the Forest Service has received no proposal for mine development (SEA, Section 3.0). Of those who have disagreed with the mine exploration, there has been no controversy about the effects disclosed in the analysis. In other words, although some may not support my decision and updates made through this supplemental decision, the public comments did not materially question the effects analysis on scientific grounds, including the ground water analysis summarized in Section 3.2 of the SEA, with supporting documentation in the project record.

This decision does not result in any highly uncertain, unique, or unknown risks (40 CFR 1508.27(b)(5).

There are no unique, highly uncertain or unknown environmental risks associated with the mineral exploration. The effects will be similar to the effect of similar exploration projects that have been completed at a broader scale. As described in Attachment A of this supplemental decision and the SEA, Section 2.3, various mitigation measures and other permitting requirements will avoid or minimize the risk of:

1. landslides in moderate-to-high landslide prone areas during implementation of proposed activities; effects disclosed in Section 3.1 of the SEA support this conclusion;
2. hazardous material spills and other contamination to surface and ground water quality; effects disclosed in Section 3.2 of the SEA support this conclusions;
3. effects to vegetation, including large trees, old forest, and Sacajawea’ bitterroot; effects disclosed in Section 3.3 of the SEA support this conclusions;
4. effects to Terrestrial and Avian wildlife species including elk, great gray owl, goshawk and wolverine; effects disclosed in Section 3.4 of the SEA support this conclusion;

5. effects to Aquatic species, including the listed species bull trout; effects disclosed in Section 3.5 of the SEA support this conclusion;
6. effects to cultural resources; effects disclosed in Section 3.6 of the SEA support this conclusion;
7. effects to public safety as summarized above under a prior criteria; effects disclosed in Section 3.7 of the SEA support this conclusion;
8. effects to visual quality and associated recreational experiences; effects disclosed in Sections 3.8 and 3.9 of the SEA support this conclusion.

This decision does not establish a precedent for future actions with significant effects and does not represent a decision in principle about a future consideration (40 CFR 1508.27(b)(6)), nor is it related to other actions with individually insignificant but cumulative significant impacts (40 CFR 1508.27(b)(7)).

This is a project-level decision. The nature of this decision is not precedent setting, nor does it represent a precedent for any future decision. Should a proposal for mine development in the project vicinity be received at some future point, a separate environmental analysis, along with public involvement, will be conducted for that proposal, and that proposal will be considered on its own merits.

In addition, as identified in the effects disclosures in Chapter 3 of the SEA, this action is not related to other actions with individually insignificant but cumulative significant impacts. This includes specific concerns brought up during the objection process as to the relationship of the cumulative effects of this action with suction dredging activities within Grimes Creek. Permits for suction dredging on Grimes Creek require (1) an Idaho State Stream Channel Alteration permit and (2) an EPA National Pollutant Discharge Elimination System (NPDES)-General Permit, which includes performance standards and BMPs to minimize environmental impacts from dredging (refer to project record documentation). Additionally, the NPDES permit (pg. 11, B. Effluent limitations) requires a cap limit on total dredging hours to ensure the existing conditions are not degraded from the cumulative impact of suction dredging on Grimes Creek.

As documented in Appendix G of the SEA, the relationship of dredging activities was accounted for in the cumulative effects analysis documented in this SEA. As stated in Appendix G of the SEA, “*Information for the Grimes Creek 5th field HUC, which includes the Headwaters Grimes Creek 6th field HUC, indicates that the 5th field HUC has been extensively altered by historic dredge and hydraulic mining (IDEQ, 2009, p. 89, “Hydrology”). However these activities generally occurred downstream of the Project Area (Hardy, 2011). Water quality data for the two AUs, as described in the SEA, indicates the effect of past and present activities have not resulted in exceedance of any water quality beneficial uses, with the exception of salmonid spawning in both AUs, due to stream temperature (IDEQ, 2009, pp. 94-100; p. 100 “Summary of Status of Beneficial Uses”). ... Other beneficial uses assessed in these two AUs were Cold Water Aquatic Life and Secondary Contact Recreation. Both were determined to be “fully supported” (IDEQ 2009).*”

This decision will not adversely affect an endangered or threatened species or its habitat (40 CFR 1508.27(b)(9)).

As described above under “Endangered Species Act,” my decision will not adversely affect any endangered or threatened species or its habitat. The 2011 Biological Assessment that was revised as part of the Supplemental EA analysis process and submitted to USFWS on March 9, 2015 supports this conclusion. The Forest Service received concurrence from the USFWS in April 2015 supporting the determinations made that the actions to be authorized under this decision would not adversely affect an endangered or threatened species or its habitat.

This decision does not threaten a violation of Federal, State or local law or requirements imposed for the protection of the environment (40 CFR 1508.27(b)(10)).

Consistency with laws or requirements imposed for protection of the environment is discussed above under “Consistency with the Forest Plan and with Laws and Regulations,” and in Section 1.6 of the SEA. Attachment A, Part 2, of this decision includes other federal, State, or local permits/approvals that may be applicable to the mineral exploration activity including the following:

- Proponent would continue to obtain a temporary approval of water appropriations from Idaho Department of Water Resources before activities requiring the water appropriations are implemented. CuMoCo has entered into a Water Supply Bank Rental Agreement (Rental Agreement) with the State of Idaho Department of Water Resources. The Rental Agreement is included in the project record, and the term of the Rental Agreement is from June 5, 2012, until November 30, 2016.
- Temporary mineral exploration-related roads may be exempt from permit requirements under Section 404 of the Clean Water Act; however, a permit application to the U.S. Army Corp of Engineers would still be required. If an exemption is not approved, application to the Nationwide Permit would be required.
- Proponent would, as necessary, obtain a Stream Alteration Permit from Idaho Department of Water Resources for impacts to perennial streams prior to crossing perennial streams.
- The proponent may apply for an exemption to IDEQ during the installation and removal of the culverts used for the temporary roads at the stream crossings for activities which could result in a temporary violation of the water quality rules.
- CuMoCo prepared a Stormwater Pollution Prevention Plan (SWPPP) in April 2011 and submitted the Notice of Intent and SWPPP to the EPA. The SWPPP is included in the project record. CuMoCo would be responsible for updating the SWPPP, as required, for the life of the Project. CuMoCo has obtained a MSGP and CGP.
- CuMoCo obtained confirmation of 401 Certification from the State of Idaho in June 2011. CuMoCo would be responsible for updating the 401 Certification as identified in the June 2011 letter issued by the State of Idaho.
- CuMoCo prepared SPCC plan in June 2011 and submitted it to EPA. As needed, CuMoCo is responsible for updating the plan through the EPA.

- As required by the Forest Service Manual, an appropriate bond would be established and required by the Responsible Official before activities subject to the bond are implemented.
- CuMoCo entered into a Road Maintenance Agreement (included in the project record) with Boise County on June 13, 2011. Consistent with a letter received from Boise County, dated October 7, 2014, this agreement must be updated prior to reinitiation of activities because it does not include the additional segments of roads maintained by Boise County identified in the SEA for access and fuel haul (refer to alternative descriptions, Section 2.1). As a further guarantee of performance, Boise County indicated in the letter cited above that a surety bond or other security may be required. In addition, in the letter dated October 7, 2014, Boise County stated that CuMoCo may be required to obtain a Boise County CUP, which would include additional requirements, prior to implementing any ground-disturbing activities.

Implementation

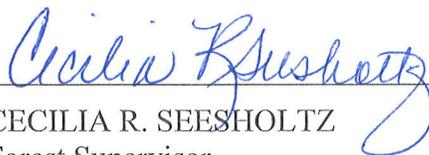
Pursuant to 36 CFR 218.12, I have addressed all of the ORO's concerns and instructions identified in the four Objection Responses issued on August 28, 2015, and September 11, 2015, thus I am proceeding with issuing the final decision. To allow time for distribution of my supplemental decision prior to re-initiation of activities at the CuMo Exploration project, implementation may begin 5 business days following the signature date of this Supplemental DN/FONSI.

For More Information

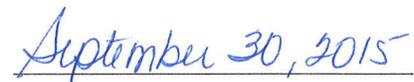
The final SEA and this supplemental DN/FONSI will be posted at:

<http://data.ecosystem-management.org/nepaweb/fs-usda-pop.php?project=21302>

For further information, contact Jeff Alexander, Forest Minerals and Engineering Officer, Boise National Forest, 1249 S. Vinnell Way, Suite 200; Boise, ID 83709; or phone (208) 373-4100.



CECILIA R. SEESHOLTZ
Forest Supervisor



Date

ATTACHMENT A
CUMO EXPLORATION PROJECT

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ATTACHMENT A—PART 1

Mitigation Measures and Monitoring Included as Part of the CuMo Exploration Project Decision

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Mitigation Measures and Monitoring Included as Part of CuMo Exploration Project Decision

As noted in Section 2.1.1 of the SEA and in my decision, the exploration drilling program would be results driven, so that future holes would be drilled to expand and complement the existing database. Consequently, predicting the exact sequence of events, exact road locations/alignments, when any particular hole might be drilled, or at what orientation a hole might be drilled is difficult. It is possible that not all the temporary roads and/or drill pads in the design would be constructed. However, the maximum extent of newly constructed temporary road miles would not exceed the extent of miles identified within the Activity Area during the life of this project. Additionally, the exploration program might end earlier than anticipated.

A FS Minerals Administrator and, as needed, resource specialists, would monitor implementation during the life of the project to ensure that resource effects remain within the ranges disclosed in the environmental analysis, while allowing for the dynamic nature of the exploration program.

Soils and Geology

Mitigation

- **CuMoCo** would be required to maintain NFS road 382C and to also install culverts at all intermittent and perennial stream crossings on newly constructed temporary roads. Under either action alternative, **CuMoCo** would construct temporary roads using the BMPs identified in the Best Management Practices for Mining in Idaho (IDL 1992). **CuMoCo** would use the following BMPs which are designated to help minimize erosion and sediment transport (refer to the specific purpose of each BMP in Sections I through V of the IDL BMPs):
 - I.2 Erosion Control Blanket: temporary treatment for soil stabilization consisting of commercially-made matting used for erosion control and slope stabilization. Made of jute or straw and plastic netting. May be used on and adjacent to roadways and drill pads.
 - I.3 Mulch-Straw: temporary treatment for soil stabilization lasting one to two years. The straw would deteriorate without detrimental effects on plant growth or plant establishment. May be used on and adjacent to roadways and drill pads. If straw is used, it would need to conform with other BMPs pertaining to noxious weed mitigation, appropriate seed mix, etc.
 - I.4 Mulch-Wood Chips: temporary treatment for soil stabilization consisting of a temporary mulch of small-sized wood chips made from the trunks and branches of trees. May be used on and adjacent to roadways and drill pads.
 - I.11 Biotechnical Stabilization: method of controlling erosion minimizing the potential for mass failure of slopes. May be utilized on especially steep cut slopes adjacent to roadways, as appropriate given slope geometry and availability of recommended vegetation species (willow, alder, poplar). May be applicable during certain times of year based on plant dormancy (spring and fall) for effectiveness.

- II.1 Topsoiling: BMP for seeding and revegetation consisting of placement of topsoil over a prepared subsoil for the purpose of enhancing revegetation conditions. Topsoil would be stockpiled adjacent to a drill pad or other suitable location and utilized when road construction occurs.
- II.3 General Planting and Seeding Specifications: BMP applicable to revegetating disturbed lands and would be utilized, as appropriate, in consultation with the FS.
- II.4 Broadcast Seeding: BMP consisting of scattering seed over the surface of the soil. This seeding method is most useful on small sites, for repairing damage, or for very large, low-angle rock areas and would be utilized as appropriate.
- III.1 Diversion Ditch/Dike: a runoff interceptor built to divert surface water away from un-vegetated areas on the adjacent vegetated ground. May be utilized when grades are in excess of 2 percent or where larger drainage flows may be anticipated.
- III.2 Interceptor Trench: a trench built along the contour of a slope to store and/or divert surface runoff. May be utilized to carry surface runoff from slopes at 3:1 or less.
- III.4 Siltation Berm: impermeable barrier placed around a disturbed site to capture and contain surface runoff so the sediment can be filtered prior to discharging the water. May be utilized on the downslope side of disturbed ground.
- III.5 Waterbars: reduce erosion by diverting runoff away from the temporary road surface. Would be utilized as appropriate on all temporary roads.
- III.10 Rolling Dips: have the same intent as waterbars, designed to divert surface runoff from road surfaces. Use would be dictated by the slope of the temporary road. Upgrade approach varies: 85 ft for 6-8 percent, 75 ft for 4-6 percent, and 65 ft for 0-4 percent slopes. Downgrade distances are 15 ft, 25 ft, and 35 ft respectively.
- III.11 Road Sloping: temporary roads would be out-sloped by 1-2 percent from the cut slope. On steep slopes, this BMP would not be utilized due to safety concerns related to vehicular travel. Instead, roads would be in-sloped.
- III.12 Roadway Surface Water Deflectors: a runoff interceptor built of treated wood and conveyor belt. May be utilized on grades in excess of 6 percent.
- V.1 Straw Bale Barriers: used as a temporary berm, diversion, or barrier to help contain sediment on site by catching and filtering runoff. May be used across small swales, in ditches, and at the toe of bare slopes where there may be a temporary, large volume of sediment-laden runoff.
- V.2 Sediment Traps: may be temporary or permanent structures intended to catch and store sediment-laden surface runoff. May be utilized at the outflow of culverts, water bars, and rolling dips.

- V.3 Vegetated Buffer Strip: vegetated ground can serve as a permanent or temporary trap to catch and hold sediment from runoff water flowing across it. May be utilized at construction locations wherever increased protection from stormwater and snow melt are required.
- V.4 Silt Fence/Filter Fence: low fence made of filter fabric, wire, and steel posts used to filter sediment out of runoff water before it is discharged. May be utilized where a potential for sediment laden runoff caused by man-made surface disturbance to be discharged.
- V.5 Brush Sediment Barrier: barrier constructed of brush or brush and filter fabric that serve as a sediment trap if runoff water is diverted through them. Brush sediment traps can be an effective permanent or temporary erosion control structure. May be utilized below any substantial surface disturbance.
- V.7 Slash Filter Windrow: designed to catch and trap sediment coming off unvegetated ground. May be utilized to catch and retain sediment along road fill slopes adjacent to bare ground in steep terrain.

CuMoCo would implement additional FS BMPs in the vicinity of constructed roads for soil stabilization and to minimize erosion. In addition, temporary roads would be constructed to FS standards.

Water Quality

Mitigation

- CuMoCo would implement BMPs in the vicinity of newly constructed temporary roads to prevent sediment delivery to adjacent surface waters, primarily at stream crossings. These BMPs would include the following:
 - All surface water runoff project-wide would be managed under a SWPPP which is regulated by the United States Environmental Protection Agency (EPA). CuMoCo has prepared the SWPPP and obtained a stormwater discharge permit. CuMoCo would be responsible for maintaining the stormwater discharge permit through the life of the Project and updating the SWPPP as necessary.
 - Water bars would be installed within 100 ft of stream crossings on temporary roads to minimize surface water flow and sediment delivery.
 - Crushed native rock would be installed within 50 ft of stream crossings on temporary roads to minimize sediment accumulation on vehicles and transport into surface waters.
 - Culverts would be installed at all intermittent and perennial stream crossings on newly constructed temporary roads. Culverts would be sized based on the 50 year flood recurrence interval flow for intermittent stream crossings and the 100 year flood recurrence interval flow for perennial stream crossings to meet State law and Forest Plan standards. Maintenance on NFS road 382C would be in accordance with previously identified BMPs (Section 2.3.1).

- New temporary road construction would be located at least 500 ft from Grimes Creek with the exception of 0.62 miles of temporary road construction under Alternative A.
- Core drilling systems would operate on a “closed system” concept. (Under a “closed system,” fluids used for sample collection (drilling) are contained at the drill pad and recirculated.)
- All drill fluid additives pumped into the hole are regulated and would meet all State and federal safety and environmental standards. **Water used in the drilling fluids would be drawn from sources that meet State water quality standards (IDAPA 58.01.02).** As previously mentioned, BMPs would be evaluated and improved on an ongoing basis. **Drilling mud and hole plug products would conform to National Sanitary Foundation (NSF) guidelines for ensuring groundwater integrity. Material Safety Data Sheets (MSDS) for all products would be posted and available on site with the Spill Prevention, Control and Countermeasure (SPCC) Plan.**
- **CuMoCo** would maintain all temporary roads in a stable condition and prevent off-site impacts through the use of BMPs. If the drilling is on-going during winter snow conditions, a two-to four inch snow cover would be left on the road to minimize sediment runoff.
- **Should artesian pressures be encountered that result in flows from the drill hole, CuMoCo would increase the drill fluid viscosity to control the pressures. Should the increased viscosity not be effective at controlling the pressures, the drill hole would be abandoned and plugged with neat cement.**
- **Surface seals on drill holes that would be completed on drill pads, which do not require regrading, would be completed below the grade of the drill pad and covered with growth media.**
- **CuMoCo would have a knowledgeable person (i.e., an experienced or licensed driller) recording drilling conditions encountered during drilling operations. A qualified CuMoCo representative (geologist or geological technician) would conduct regular checks of each active drill site to ensure drilling condition documentation is being completed in a timely and accurate manner and standard drilling procedures are being followed to address changes in drill hole conditions as drilling continues (see monitoring item below and Attachment B).**
- **CuMoCo would prepare a Quality Assurance Project Plan (QAPP) and Ground Water Sampling Plan. The objective of the QAPP would be to 1) increase the knowledge of ground water chemistry in the Project Area; 2) provide knowledge of natural variability in ground water geochemistry as a function of seasonal and meteoric conditions; and 3) provide knowledge of potential impacts of diamond core drilling activities to ground water.**

Monitoring

- In accordance with the NPDES MSGP, CuMoCo or qualified personnel contracted by CuMoCo shall conduct the following monitoring:
 - Once each quarter, collect a stormwater sample from each outfall and conduct a visual assessment of each of these samples;
 - Once annually, conduct a comprehensive site inspection; and
 - Conduct site inspections once every 7 days or every 14 days and within 24 hours of a rain event of 0.5 inches or greater.
- CuMoCo would monitor the amount of water used in each drill hole during the drilling operation to demonstrate a “closed loop” system (See Attachment B).
- A knowledgeable person (i.e., an experienced or licensed driller) would monitor and record the following during drilling operations: drill fluid loss/gain by drill interval; quantity and use of loss circulation materials; and drill mud pump pressures to identify when actions are needed to maintain a “closed loop” drilling fluid system.
- CuMoCo would collect ground water samples in accordance with the Ground Water Sampling Plan included with the QAPP.

These monitoring and mitigation measures are consistent with the applicable sections of the Groundwater Protection and Best Practices for Mineral Exploration, as outlined in Appendix B of the Considerations for Groundwater Evaluation in Mineral Exploration Drilling (USFS 2014). Therefore, this level of monitoring and mitigation is sufficient to minimize potential impacts to groundwater quality or identify impacts to groundwater.

CuMoCo has obtained the MSGP, and CuMoCo has performed the required inspections. CuMoCo submitted the 2012 annual report to the EPA, and a copy of the report is included in the Project record. CuMoCo would be responsible for maintaining the MSGP and complying with all inspection and reporting requirements for the life of the Project.

In accordance with Idaho State Water Quality Standards, turbidity below the mixing zone shall not exceed background turbidity by more than 50 nephelometric turbidity units (NTU) instantaneously or more than 25 NTU for more than 10 consecutive days.

Terrestrial and Avian Wildlife

Mitigation

- If, through the monitoring surveys described below, nesting northern goshawk or great gray owls are located, CuMoCo would implement the following protective measures, as needed:
 - The occupied nest tree and all surrounding forest/tree habitat within a minimum of 150 ft of the nest tree would not be disturbed or otherwise altered. This includes trees with diameters greater than or equal to 4 inches diameter at breast height (dbh).
 - To the maximum extent practicable (MEP), new road and drill pad locations shall be modified or relocated to prevent direct disturbance of the nest site

- (i.e., minimum of 150 ft from the nest tree) so as to maintain the integrity of the nest site in the future.
- Should an occupied nest site be identified, a qualified wildlife biologist would work with the FS Minerals Administrator to determine the site and situational specific mitigation needed to avoid/minimize disturbance to the occupied nest during the nesting period to the MEP. The outcome of mitigation design is to minimize ongoing disturbance to the active nest site to the MEP in such a manner that would not “endanger or materially interfere with prospecting, mining, or processing operations or uses reasonable incident thereto” (FSH 2809.15, 36 CFR 228.8; 30 U.S.C. § 601, et seq.).

Mitigation needed to avoid/minimize disturbance to an active nest site to the MEP would be highly variable due to the terrain and protection it can provide depending on the location of the activity, type of activities, and duration of activities. Mitigation could range from the standard 1,500-ft buffer (Jones 1979) around the active nest site from April 1 to August 15 when the disturbance would be ongoing and continuous throughout the nesting period, to something less than this standard buffer for a less-disturbing activity, such as vehicle transport down an existing road once or twice during a 24-hour period.

- CuMoCo would avoid legacy trees (those that survived the previous stand initiating disturbance event in lethal fire regimes, or survived numerous low to moderate intensity disturbance events in the other fire regimes) and large size trees to the maximum extent practicable during project implementation. As road and drill pad alignments and locations are finalized, CuMoCo would work with Idaho City RD staff to adjust road and drill pad locations to avoid removal and/or substantial root damage of legacy and large size trees. On rare occasions avoidance might not be possible, and upon FS approval, a legacy or large size tree might have to be removed.
- In the event that an occupied wolverine natal den is discovered in the Modified Project Area, the District Wildlife Biologist for the Idaho City Ranger District, Boise National Forest, would be immediately notified. Disturbance activities near the den site would be evaluated by the District Wildlife Biologist, and those activities that have been demonstrated to affect denning would be suspended from April 15 to May 15 to ensure the natal den and occupying wolverine are not disturbed. Disturbing activities include, but may not be limited to, actions associated with temporary road construction and maintenance (e.g., snow plowing, blading); temporary drill pad construction and operation; and support traffic.

Monitoring

- Through the period of action proposed and prior to annual implementation of road construction and drilling activities in the spring/early summer, the FS or qualified personnel contracted by CuMoCo would conduct wildlife species monitoring in potential habitat within the project area, and as needed, immediately adjacent to the project area. Species specifically targeted to be monitored include the northern goshawk and the great gray owl, as per protocols adopted by the Boise National Forest (refer to Attachment A, Part 4). Each protocol is designed to detect the presence of species, locate nests, and determine reproductive success when active

nests are located. Refer to Attachment A, Part 4, for more detail and specific timeframes for implementing annual protocols and references to applicable monitoring protocols located in the Project record.

CuMoCo performed the initial monitoring for the great gray owl and northern goshawk in 2012. The monitoring report for the great gray owl was prepared in April 2012 and submitted to the FS in May 2012. The monitoring report for the northern goshawk was prepared in May 2012 and submitted to the FS in May 2012. Both reports are included in the Project record. CuMoCo would be responsible for performing the specified monitoring for the life of the Project.

Aquatics

Mitigation

- **CuMoCo** would assure that all drafting from surface water bodies shall incorporate a pump intake screen. Pump intake screens shall have openings not exceeding 3/32 inch (0.09375 inch) and be sized according to the pump intake capacity (SEA, Appendix F).
- Within RCAs, **CuMoCo** would implement BMPs to ensure that sediment generated by drilling activities would be minimized and liquids used during drilling would be properly stored and distributed.
- **CuMoCo** would not store fuels and other toxicants or refueling within RCAs unless there are no other alternatives. Storage of fuels and other toxicants or refueling sites within RCAs shall be approved by the responsible official and have an approved SPCC commensurate with the amount of fuel.

Vegetation

Bitterroot Mitigation

A Plant Conservation Area (PCA) of 300 meters (m) surrounding occupied *Lewisia sacajawean* (LESA, Sacajawea's bitterroot) habitat has been used to mitigate direct and indirect effects of proposed activities to LESA plants, their pollinators, and their associated habitat.

For purposes of this SEA, the LESA PCA has been defined to include four concentric rings or buffer zones: Ring 1—occupied habitat; Ring 2—outer extent of occupied habitat plus 20 meters; Ring 3—outer extent of occupied habitat plus 100 meters; and Ring 4—outer extent of occupied habitat plus 300 meters. Project-related activities that are permitted within each of the buffer rings are identified below.

Road Use, Maintenance, and Construction/Relocation

- To the MEP¹ no new road construction/relocation will be permitted within buffer rings 1 through 4 of a LESA PCA. Should the proponent determine road building is required in rings 1 through 4, the proponent shall request the road through the checklist process (see Attachment A, Part 3). Through the checklist process, the FS Minerals Administrator, in coordination with the botanical monitor, must designate a location that meets the proponent's exploration objective and avoids or, where avoidance would endanger or materially interfere with exploration operations or uses reasonably incident thereto, minimizes impacts to LESA to the MEP. Construction activities shall not occur during the LESA active growing/flowering period,² thus minimizing impacts to pollinators of LESA plants resulting from ground disturbance and/or dust.³

¹ Use of Maximum Extent Practicable (MEP) and Requirements under 36 CFR 228

The term "maximum extent practicable," or MEP, is embodied as the basic performance standard in numerous State and federal regulations, including the federal Endangered Species Act and Section 404 of the federal Clean Water Act. The MEP standard does not necessarily involve the same criteria in each application; it is intended to address projects or actions on an individual basis considering each of their specific circumstances and purposes.

Under the EPA guidelines, practicable is defined as: "*available and capable of being done after taking into consideration cost, existing technology and logistics in light of overall project purposes* (40 CFR 230.10(a)(2))."

The USFWS/NOAA HCP Handbook (Section 7.B.2) states that a conservation program may be evaluated against the MEP standard by: "*weighing the benefits and costs of implementing additional mitigation, the amount of mitigation provided by other applicants in similar situations, and the abilities of that particular applicant.*"

Avoidance of impacts to LESA is the objective where practicable. Where avoidance is not practicable (see next paragraph), then activity impacts to LESA plants will be minimized to the MEP. When impacts cannot be avoided, the botanist shall be required to document, through the checklist process, that the location of the activity and techniques used to minimize impacts were sufficient to NOT change the current effects determination disclosed in the SEA (i.e., "may impact individuals but is not likely to cause a trend toward federal listing or a loss in viability"). If the botanist determines that the effects determination would change, the Responsible Official will evaluate whether or not the new information or changed circumstances constitute unforeseen significant surface disturbance that would require a modification of the plan of operations in accordance with 36 CFR 228.4(e). If effects would be outside the scope and range of effects considered in the original analysis, correction, supplementation or revision of the SEA may be required in accordance with FSH 1909.15 section 18.4 to support a modification of the plan of operations. Pending a determination of whether or not a modification of the approved plan is required, operation may be suspended, in whole or in part, in accordance with 36 CFR 228.4(e)(3).

Thus, when a mitigation states that an activity will be "avoided" or "minimized" to the MEP, it will be interpreted within the framework of determinations as to whether the avoidance or minimization mitigation can be applied in a manner that will not "endanger or materially interfere with prospecting, mining, or processing operations or uses reasonably incident thereto (FSH 2809.15; 36 CFR 228.8; 30 U.S.C. § 601, et seq.) as documented in a Surface Use Evaluation and Determination (FSH 2809.15 (13)), or equivalent report.

² The active growing/flowering period for LESA can vary from season to season and location to location. The initiation of the flowering period follows snow melt each year. To cover the range of snowmelt across a PCA, the active growing/flowering period occurs between June 1 and July 20 based on typical weather patterns.

³ All proposed activities in rings 1 & 2 and new road construction in rings 3 & 4 will be reviewed by a FS Minerals Administrator and FS Botanist to determine if the proposed activities can be implemented in accordance with purpose of a PCA (i.e., checklist process, Attachment A, Part 5). If it is determined that impacts to LESA plants could occur with the proposed activities, FS and CuMoCo representatives will meet to develop an alternate plan that would avoid impacts to LESA plants in a PCA yet still meet the proponent's objectives. If a resolution cannot be met, a Certified Minerals Examiner (CME) will prepare a formal Surface Use Determination (SUD) to determine if avoidance within a PCA would "endanger or materially interfere with prospecting, mining, or processing operations or uses reasonably incident thereto (FSH 2809.15; 36 CFR 228.8; 30 U.S.C. § 601, et seq.), then additional analysis will be required to determine if disturbance within these

- All roads proposed to be constructed in a PCA must be identified no later than the first week of June of the season construction is proposed so that LESA surveys can be completed by a qualified botanist and appropriate mitigation can be identified.
- In buffer rings 1 and 2, all existing roads, except for main access roads as outlined on Figure 1, shall be closed to use to the MEP, unless authorized by the FS Minerals Administrator in coordination with the onsite botanical monitor (see Implementation of ME-10). Closed roads will be signed or otherwise marked to prohibit vehicular use.
- In buffer rings 1 and 2, road maintenance on existing roads will be restricted to the main access roads to the MEP (refer to Figure 1). LESA surveys will be conducted on these road sections, including cut and fill slopes, during the active flowering season prior to maintenance activities. Road maintenance will be constrained to the width needed to meet soil, water, and safety BMPs while avoiding impacts to LESA plants to the MEP unless authorized by the FS Minerals Administrator in coordination with the onsite botanical monitor (see Implementation Monitoring below).

When the road is no longer needed to support authorized operations, it will be closed. Closed roads will be signed or otherwise marked to prohibit vehicular use unless authorized by the Responsible Official.

- To minimize impacts to pollinator habitat in buffer rings 3 and 4, vehicle use on existing roads, other than the main access roads (see Figure 1), needed to support operations approved through the checklist process (see Attachment A, Part 3) will be minimized to the MEP during the LESA active growing/flowering period.

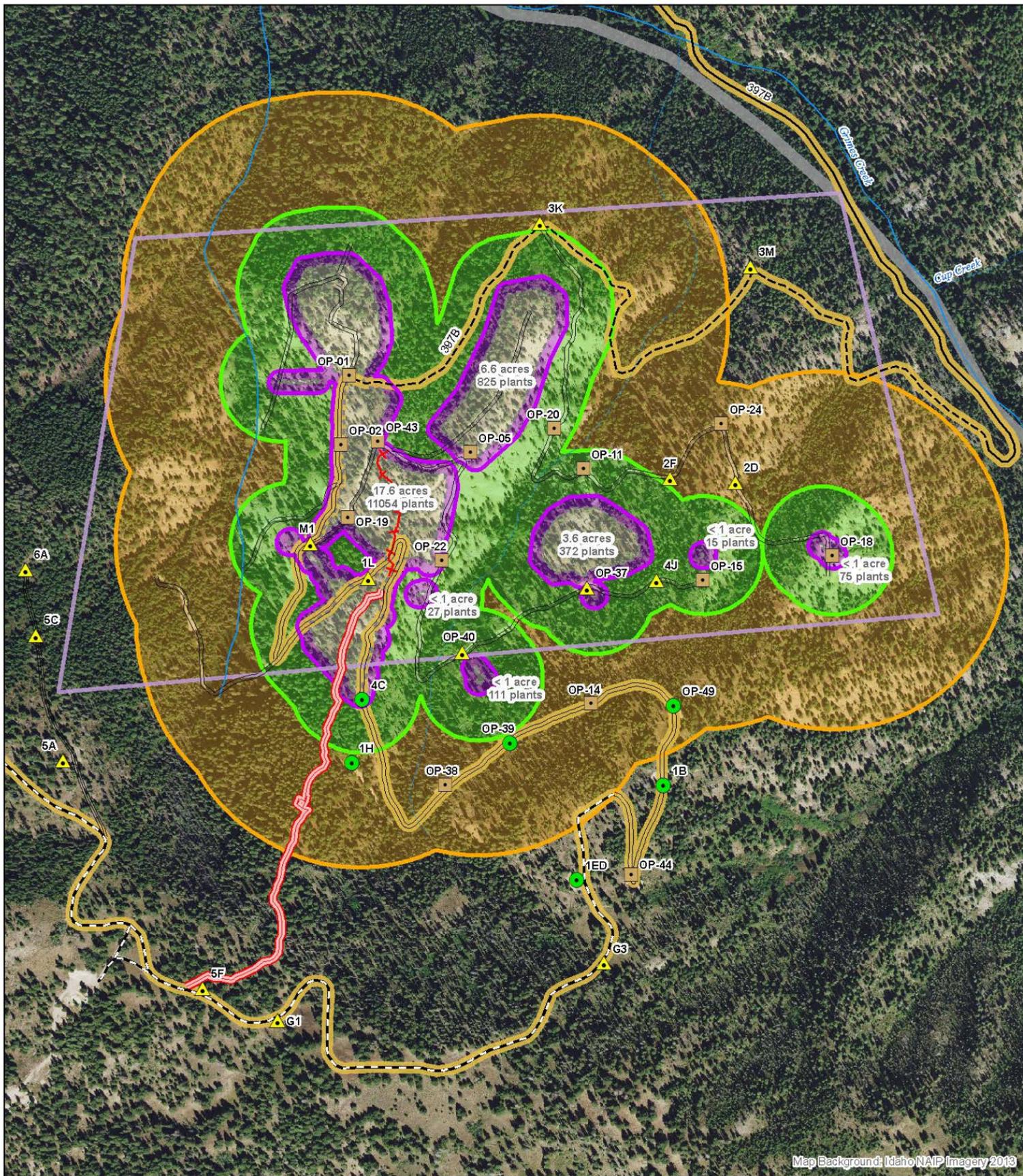
When a road is no longer needed to support authorized operations, it will be closed. Closed roads will be signed or otherwise marked to prohibit vehicular use unless authorized by the Responsible Official.

- Within buffer rings 3 and 4, road maintenance is allowed on all existing roads as needed to meet soil, water, and safety BMP requirements. LESA surveys will be completed on these road sections, including cut and fill slopes, during the active growing season prior to maintenance activities. Should LESA plants be identified during surveys, the FS Minerals Administrator will be notified immediately to determine what course of action is needed, in consultation with the botanist, to avoid impacts to LESA plants to the MEP².

zones can be done in a manner where the effects would not change the species determination contained in the SEA. See also, footnote 1 concerning MEP.

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Figure 1. Sacajawea Bitterroot Plant Conservation Areas



Legend

Plant Conservation Area*

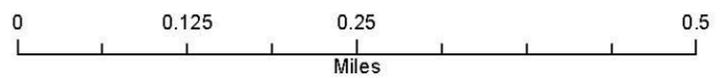
- Ring 1, Lewisia Population, 28.1 acres
- Ring 2, 20 Meter Buffer, 50.2 acres
- Ring 3, 100 Meter Buffer, 150.8 acres
- Ring 4, 300 Meter Buffer, 371.5 acres
- 2011 Lewisia Monitoring Area

CuMo Drill Hole

- Constructed/Improved Post 2011
- Approved but not constructed under 2011 checklist
- Historic drill pad

- NFS Open Road
- NFS Admin Road
- Road Constructed Post 2011
- Existing Unauthorized Road
- Proposed Road, Checklist Submitted
- Main Access Road
- Cumo Project Boundary
- Grimes Fire Line
- Dozer Line
- Hand Line
- Stream Perennial
- Stream Intermittent

Revised
9/11/2015

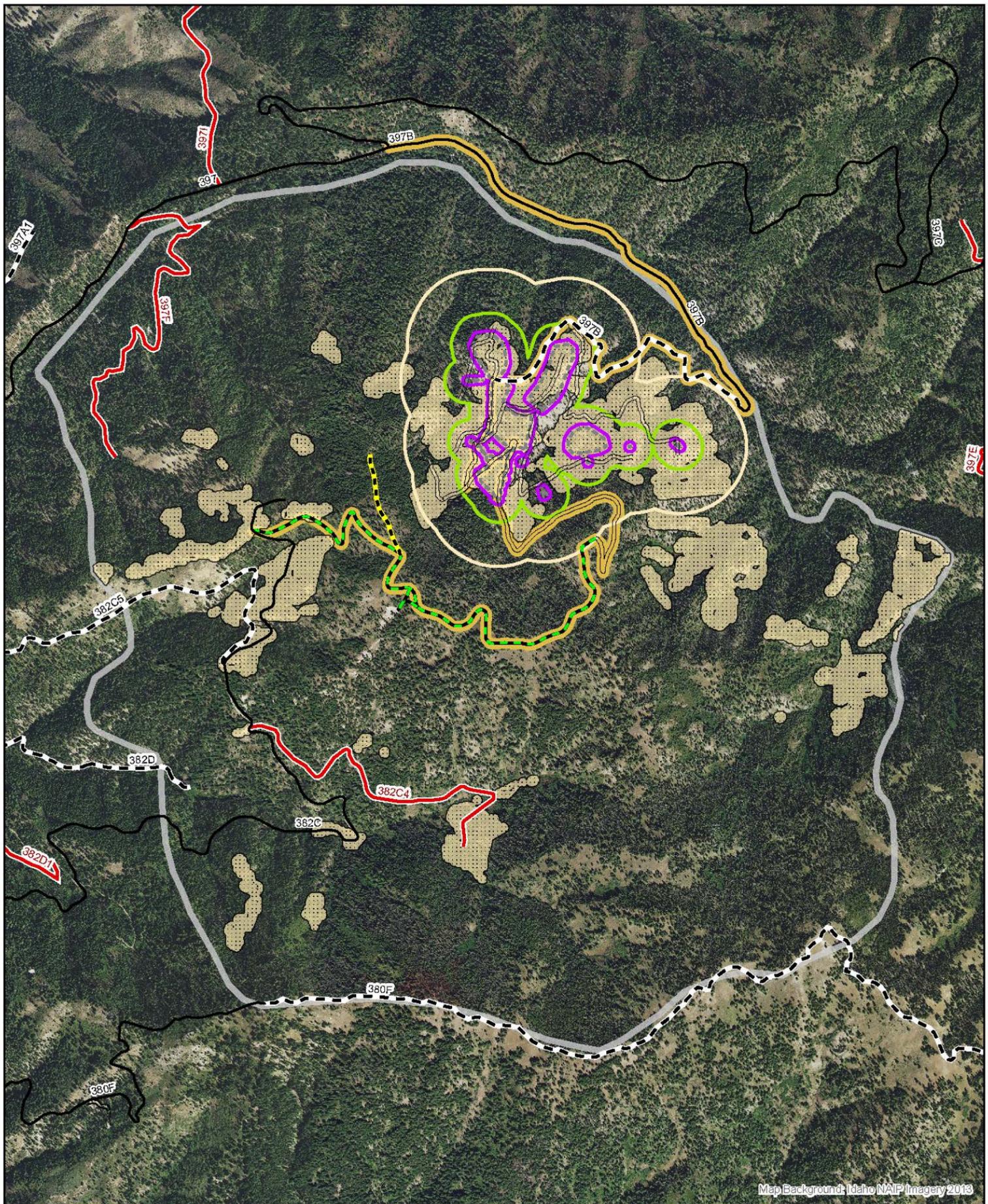


*Revisions to the plant conservation area (PCA), plant numbers, and drill hole location/status are based on new data collected since the publication of the "Lewisia sacajaweanae Addendum to the Biological Evaluation of the Effects on Sensitive Plant Species" on April 3, 2015.

Prepared by the Boise National Forest, Supervisor's Office, Boise, Idaho, 9/11/2015, 1625 hrs, sekormos
Coordinate System: NAD 1983 UTM Zone 11N
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The U.S. Department of Agriculture, Forest Service uses the most current and complete data available. GIS data and product accuracy may vary. They may be developed from sources of differing accuracy, accurate only at certain scales, based on modeling or interpretation, incomplete while being revised or created, etc. Using GIS products for purposes other than those for which they were created, may yield inaccurate or misleading results. The Forest Service reserves the right to correct, modify, or replace GIS products without notification.

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Figure 2. Sacajawea Bitterroot Plant Conservation Areas and Potential Habitat



Legend

Plant Conservation Area (371.5 acres)

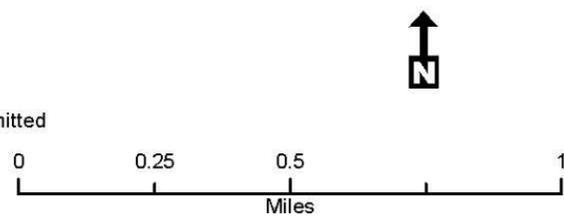
- Ring 1, *Lewisia* Population, 28.1 acres
- Ring 2, 20 Meter Buffer, 50.2 acres
- Ring 3, 100 Meter Buffer, 150.8 acres
- Ring 4, 300 Meter Buffer, 371.5 acres

- Lewisia sacajawea*
Potential Habitat (Modeled) + 20m buffer
172.8 acres inside PCA (Ring 4)
224.5 acres outside PCA (Ring4)
397.3 acres total within CuMo Project Boundary

- NFS Open Road
- NFS Admin Road
- NFS Closed Road
- Road Constructed Post 2011
- Existing Unauthorized Road
- Proposed Road, Checklist Submitted
- Main Access Road

Cummo Project Boundary

Revised
9/14/2015



*Revisions to the plant conservation area (PCA) are based on new data collected since the publication of the "*Lewisia sacajawea* Addendum to the Biological Evaluation of the Effects on Sensitive Plant Species" on April 3, 2015.

Prepared by the Boise National Forest, Supervisor's Office, Boise, Idaho, 9/14/2015, 1704 hrs, sekermos
Coordinate System: NAD 1983 UTM Zone 11 N
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- Dust abatement⁴ is required on all roads used during the operating period within a PCA during the LESA active growing/flowering period to minimize effects to flowering plants and pollinators. Frequency of dust abatement will be based on seasonal conditions and dust palliative mixture used. However, if through photo point monitoring (see monitoring requirement below), it is determined that dust abatement desired to minimize impacts to LESA plants and/or pollinator habitat is not being realized, then the frequency of dust abatement will be increased and/or activity resulting in dust within a PCA will be reduced during the LESA active growing/flowering period until monitoring results in the desired outcome.
- To avoid fragmentation of occupied and potential LESA habitat, place areas to be disturbed by road construction/relocation operations *downslope* of LESA occupied and/or potential habitat within a PCA to the MEP¹.

Drill Pad Construction and Use

- To the MEP, avoid new drill pad construction within buffer rings 1 and 2. Should the proponent determine drill pad construction is required in rings 1 and/or 2, the proponent shall request the drill pads through the checklist process (see Attachment A, Part 3). Through the checklist process, the FS Minerals Administrator, in coordination with the botanical monitor, must designate a location that meets the proponent's exploration objective and avoids or, where avoidance would endanger or materially interfere with exploration operations or uses reasonably incident thereto, minimizes impacts to LESA habitat and plants to the MEP. In addition to the MEP, drill pad construction or reconstruction should be confined to the existing road prism. Construction activities shall not occur during the LESA active growing/flowering period², thus minimizing impacts to pollinators of LESA plants resulting from ground disturbance and/or dust.
- All pads proposed to be constructed in a PCA (i.e., rings 1, 2, 3 and/or 4) must be identified through the checklist process no later than the first week of June of the season construction is proposed so that LESA surveys can be completed by a qualified botanist and appropriate mitigation identified for use.
- To minimize disturbance within rings 3 and 4, new drill pads should be placed within the prism of existing roads to the MEP. If new road construction is needed to access additional drill pad locations within rings 3 and 4 to meet the exploration objective, options that incorporate the existing road system within rings 3 and 4 to the MEP that result in the least amount of direct and indirect effects to occupied or potential LESA habitat outside the existing road system should be used.

Should the proponent determine new road construction is required in rings 3 through 4 to access a drill pad location important to meeting the exploration objective, the proponent shall request the road through the checklist process (see Attachment A, Part 3) at the same time as construction of the associated drill pad is requested. Through the checklist process, the FS Minerals Administrator, in coordination with the botanical monitor, must designate a location of the road and/or pad that meets the proponent's exploration objective and avoids, or where avoidance would endanger or materially interfere with

⁴ Dust abatement may include use of water and/or dust palliative mixtures (e.g., magnesium chloride) to ensure effectiveness.

exploration operations or uses reasonably incident thereto, minimizes impacts to LESA habitat and plants to the MEP. Road and/or pad construction activities in rings 3 and 4 of a PCA shall not occur during the LESA active growing/flowering period², thus minimizing impacts to pollinators of LESA plants resulting from ground disturbance and/or dust.

- Dust abatement is required on all drill pad construction/operations that occur within a PCA during the LESA active growing/flowering period² to minimize effects to flowering plants and pollinators. Frequency of dust abatement will be based on seasonal conditions and dust palliative mixture used. However, if through photo point monitoring (see monitoring requirement below) it is determined that dust abatement desired to minimize impacts to LESA plants and/or pollinator habitat is not being realized, then the frequency of dust abatement will be increased and/or activity resulting in dust within a PCA will be reduced during the LESA active growing/flowering period until monitoring results in the desired outcome.
- To avoid fragmentation of occupied and potential LESA habitat, place areas to be disturbed by drill pad construction/drilling operations *downslope* of LESA occupied and/or potential habitat within a PCA to the MEP¹.
- To minimize the extent of disturbance within a PCA, clearly mark the areas to be disturbed by drilling, pad construction, etc., using flagging or other media so that the potential area where effects resulting from subsequent support operations would be allowed is clearly defined (e.g., effects from trampling and vehicle use).

Other Activities within a PCA

- To the MEP, no off-road vehicle use will be permitted within a LESA PCA. Should the proponent determine off road vehicle use is required to support exploration operations, the proponent will request such use through the checklist process (see Attachment A, Part 3), clearly identifying what aspect of the operation this use is needed to support. Through the checklist process, the FS Minerals Administrator, in coordination with the botanical monitor, must designate locations for off road vehicle use that meets the proponent's exploration objective and avoids, or where avoidance would endanger or materially interfere with exploration operations or uses reasonably incident thereto, minimizes impacts to LESA habitat and plants to the MEP.
- If new plants are found within the PCA identified on Figure 1, then buffer zones (4 concentric rings) will be applied to the new areas. Applicable mitigation for each of the four zones identified above would then be applied consistent with requirements in the existing zones.
- Water transport facility (e.g., hose, pipe) from the water source to the drill rig to support drilling operations:
 - Within rings 1 and 2: Permitted on the main access roads in locations with no known LESA plants only, to the MEP. If water transport facility must be placed in locations off the main access road within a PCA, the proponent shall request this use through the checklist process. Through the checklist process, the FS Minerals Administrator, in coordination with the botanical monitor, must designate locations for the water transport facility off the main access road that meets the

proponent's exploration objective and avoids, or where avoidance would endanger or materially interfere with exploration operations or uses reasonably incident thereto, minimizes impacts to LESA habitat and plants to the MEP.

- Within rings 3 and 4: Use existing roads to the MEP¹. If a water transport facility must be placed in locations off the existing roads within a PCA, the proponent shall request this use through the checklist process. Through the checklist process, the FS Minerals Administrator, in coordination with the botanical monitor, must designate locations for the water transport facility off the existing roads that meets the proponent's exploration objective and avoids, or where avoidance would endanger or materially interfere with exploration operations or uses reasonably incident thereto, minimizes impacts to LESA habitat and plants to the MEP.

Activities outside current PCA

- While the probability of finding additional LESA plants outside the current PCA (Figure 2) is low to very low (refer to SEA Section 3.3.1.5 [Rare Plants]), prior to any new road or drill pad construction, LESA surveys will be conducted for at least one growing season during the LESA flowering period to determine presence or absence of LESA plants (See Checklist in Attachment A, Part 5). If new plants are found outside the PCA identified in Figure 1, then PCA/buffer zones (4 concentric rings) will be applied to the new areas. Applicable mitigation for each of the four zones identified above would then be applied consistent with requirements in the existing zones.

Other Sensitive Plant Mitigation

- As identified in the project Botanical Biological Evaluation, other Region 4 Sensitive Species have not been observed in the Project area, and while some localized habitat areas may exist, the likelihood of occupied habitat occurring is low. However, while the likelihood is low, occupied habitat may still exist. Thus, pre-disturbance surveys will be conducted for the Sensitive species Idaho dwarf primrose (*Douglasia idahoensis*), least phacelia (*Phacelia minutissima*), and whitebark pine (*Pinus albicaulis*) by a qualified botanist prior to any ground-disturbing activities as part of the Checklist process (Attachment A, Part 5). Surveys for these species would be conducted at the same time as those completed for Sacajawea bitterroot discussed above.

If individuals of Idaho dwarf primrose (*Douglasia idahoensis*), least phacelia (*Phacelia minutissima*), or whitebark pine (*Pinus albicaulis*) are located during surveys, to the MEP, occupied habitat shall be avoided by project-related ground disturbing activities (e.g., road construction, road maintenance, and drill pad construction).

Noxious Weed Mitigation

- CuMoCo shall use a high pressure washing system to clean the sides, tops, and undercarriages of all construction equipment to remove seeds, plants, plant fragments, dirt, and debris from the equipment before the equipment is used on NFS lands. Follow guidelines documented in "USDA Forest Service Guide to Noxious Weed Prevention Practices" (FS, 2001), and management direction from the 2003 Forest Plan as amended in 2010 (USDA FS 2010). Washed equipment shall be inspected to ensure that the washing removed the dirt, debris, and seeds from the equipment. Rewash the construction equipment as necessary or as directed by the Minerals Administrator. Construction

equipment does not include cars, pickup trucks, and other vehicles that regularly travel between the construction site and areas outside of NFS lands. The Minerals Administrator shall be provided the opportunity to monitor and inspect the washing activities by receiving notice at least 15 days in advance of moving construction equipment onto NFS lands. **CuMoCo has prepared a Field Procedures Manual (FPM) that provides additional details regarding the washing of vehicles and procedures for monitoring this provision. The FPM is included in the Project record.**

- Approved commercial washing facilities would be acceptable. If washing must occur on NFS lands, **CuMoCo** would use a washing system that traps all wash water and either stores it for removal from NFS lands or recycles the water for continued use. If the equipment recycles the water, **CuMoCo** would provide adequate filters for seed removal. **CuMoCo** would dispose of the filter material and removed seeds in an approved manner. Soaps, detergents, or other chemicals would not be mixed with the wash water. **The FPM identifies the acceptable washing location as Don’s Truck Wash in Boise (Forsgren 2011c).**
- **CuMoCo** shall report findings of undocumented noxious weed populations in the Project Area to the District Weed specialist for inclusion in treatment prescriptions.
- **Treatment of Noxious Weeds within LESA PCA (Figure 1):**
 - **Within ring 1: Hand pulling or bio-control only**
 - **Within ring 2: Hand pulling, bio-control, and/or chemical treatment after the LESA active growing/flowering period**
 - **Within rings 3 and 4: Hand pulling, bio-control, and/or chemical treatment**

Reclamation Mitigation

- In addition to the reclamation information provided in the PoO, **CuMoCo has submitted a Reclamation Plan, which was approved** by the Project Botanist and Biologists. **The Reclamation Plan includes more details regarding** reclamation (roads, drill holes, water crossings, etc.), including **the use of seed/plant propagules, mulch, soil amendments or fertilizer (Forsgren 2011d).** The operation would be conducted within guidelines provided in the Idaho Mining BMPs (IDL, 1992). **CuMoCo would be responsible for maintaining, updating, and implementing the Reclamation Plan for the life of the Project.**
- For all post-disturbance seeding/planting, the **proposed** species mix to be used **is** outlined in the reclamation plan required by the previous measure (Forsgren 2011d). The Forest or District Botanist would **approve the final** seed mix(es) (FSM 2070.3) to ensure that appropriate native species (or native/non-native blends) would be used and that undesirable species would not be introduced into the Project Area (Forsgren 2011d). Any seed or plant propagules to be used in Project Area reclamation would be reviewed and subject to FS approval to verify quality standards and provenance. Reclamation activities must be scheduled to attain maximum seed germination and plant survival.

- **CuMoCo** would work with the District Botanist to incorporate locally collected seed into the seeding plan. Seed collection might occur using a contract and/or FS agreement. Target seed species and amounts to be collected **are** specified in the reclamation plan and **are** based on habitat type and projected acres of disturbance. Seed collection planning and implementation must occur early in the process to ensure collection volume is adequate and allow time for seed cleaning and testing (Forsgren 2011d).

Forested Resource Mitigation

- **CuMoCo** would keep the potential for widespread tree mortality from *Ips* beetle low by appropriate procedures during road and drill pad construction. For example, **CuMoCo** would avoid pushing or placing green ponderosa pine slash under or against live standing ponderosa pine trees during road or drill pad construction. **The FPM, in Section 4.6, identifies this mitigation measure as a standard operating procedure (Forsgren 2011d).**

Monitoring

LESA (i.e. Bitterroot)

During summer 2011, **CuMoCo** initiated the monitoring program for **LESA** identified in the February 2011 Decision Notice/FONSI (refer to Monitoring Plan Report in November 2012 [CSR 2012a]). However, the baseline data established as a result of the 2011 efforts needs to be re-established due to impacts from 2014 wildfires and related suppression activities that affected a portion of the original 2011 bitterroot monitoring area.

In addition, the subsequent monitoring program to be conducted through the life of the Project has been updated to include both implementation and effectiveness monitoring elements. These monitoring features will be used to ensure **LESA** design features and mitigation are being implemented as intended and that the effects assumed do not exceed those anticipated.

Re-Establishment of Monitoring Baseline Dataset

- Inventories within the PCA (Figure 1) needed to re-establish baselines for **LESA** population size (direct census) that accounts for the wildfire and associated suppression effects of 2014, shall be completed the first growing season prior to re-initiation of operations within the PCA (other than use of the main access road) and following completion of the SEA process. Refer to Attachment A, Part 3, for protocols.
- In addition to the direct census inventories, at least three photo points will be established along the bull-dozer and handlines that went through **LESA** occupied habitat during 2014 wildfire suppression activities to determine if **LESA** plants are observed in the disturbed area and to determine the extent of noxious weed establishment⁵. The photo points will be established in June 2016, retaken at the end of the first growing season, and retaken at least once during the active growing season from 2016 through 2018.
- If any unexpected changes to the **LESA** population/occupied habitat resulting from the 2014 wildfire are identified during baseline surveys that were not accounted for in the

⁵ For analysis purposes in the SEA, it was assumed that no plants remained in areas disturbed by suppression dozer or handlines (i.e., worse case) because, by the time suppression activities were complete in fall 2014, flowering plants could no longer be observed because the flowering season had ended.

SEA, adjustments in mitigation would be made, as needed, to ensure impacts to LESA plants within occupied habitat remain within the range of effects described in the SEA, Chapter 3.

- The re-established baseline will be used to compare subsequent inventory results (2016 and later) conducted at least once every 3 years during active operations and within one year of project completion (see Attachment A, Part 3) to validate the effects to a PCA fell within the range of effects anticipated within the SEA, Chapter 3.

Implementation Monitoring

- FS personnel, or a qualified contractor who works under the direction of the FS, will conduct onsite inspections of project activities (construction/operations) at least once during the LESA active growing season or shortly thereafter to document adherence to design features and note any potential changes in habitat quality or quantity within a LESA PCA. The results will then be used to validate design features are being applied correctly.
- Should any surface disturbance (e.g., drill pad construction, road maintenance) be authorized within a LESA PCA, an onsite botanical monitor may be present onsite during construction and road maintenance to ensure LESA plants are not impacted and impacts to associated habitat for pollinators is minimized. This shall be required when activities are allowed within rings 1 and 2; the need for a monitor to address approved activities within rings 3 and 4 would be identified as part of the pre-disturbance checklist approval.

Effectiveness Monitoring

- Document existing site conditions with photo-point monitoring prior to any surface disturbance at approved drilling locations (and roads if permitted following a Surface Use Determination) within a LESA PCA, including potential LESA habitat, retake the same photo points at least once after the new drill pad is constructed, and retake the same photo points at least once within the season the pad is rehabilitated. This photo point series will be used to validate assumptions made in the SEA analysis as to the effectiveness of mitigation applied during each phase of the operation to minimize ground disturbance within the PCA, including constructing new pads within existing road prisms.
- At least two photo-point locations will be established along the main access roads and adjacent to any active drill pad within a LESA PCA (refer to Figure 1) to determine if road-related impacts on adjacent LESA occupied habitat and/or pollinator habitat following application of design features (e.g., dust abatement) resulted in the outcome assumed in the SEA effects analysis. Photos will be retaken at least twice per year during the LESA flowering period (June 1 to July 20) to ensure that no unexpected habitat impacts from road use and/or dust are occurring. If dust abatement measures are not effective (not within the SEA effects analysis outcomes), adjustments in mitigation would be made to ensure impacts to LESA plants and habitat remain within the range of effects described in the SEA, Chapter 3. See dust abatement design feature above for adjustment options.
- At least four photo-point locations will be established by FS/qualified botanists at key sites within a LESA PCA to assess any changes in habitat conditions or threats over time.

The results will then be used to validate assumptions that effects are staying within the range anticipated in the analysis.

- Track number of acres within a LESA PCA that are impacted by disturbance/activities, including construction, operations, vehicle use, and road maintenance on an annual basis. CuMoCo shall provide maps and photo point monitoring results of disturbed areas (per previously identified protocol) to the FS at the end of each field season throughout the life of the project. The results will then be used to validate assumptions that vegetation effects are staying within the range anticipated as to the extent of road and drill pad construction (i.e., acres disturbed).
- The FS or qualified personnel contracted by CuMoCo would implement a monitoring program developed for Sacajawea's bitterroot to assess population changes and impacts relative to project implementation (Attachment A, Part 3). CuMoCo has implemented the monitoring program, and CuMoCo submitted a Monitoring Plan Report in November 2012 (CSR 2012a). CuMoCo would be responsible for continuing the monitoring program through the life of the Project.

Cultural Resources

Mitigation

- If locations of proposed temporary roads change, a qualified archeologist would review and determine the need for an additional cultural resources survey. As final drill pads are located, the archeologist would be consulted to determine the need for additional cultural resource surveys.
- If previously unidentified cultural resources are discovered during the proposed drilling activities, the FS would be notified and work in the area would cease until inspection by a qualified archeologist is completed and a mitigation plan is developed and implemented, if necessary.
- A qualified archeologist would flag the one identified cultural site in the Area of Potential Effect (APE) for avoidance during construction of the temporary road in its vicinity.
- A qualified archeologist would flag the one identified cultural site in the APE for avoidance during rehabilitation of the temporary road. The site would be flagged not less than 30 meters from the site locus closest to the road.

Monitoring

- A qualified archeologist would monitor the one identified cultural site in the APE at least once during the course of the project, after the temporary road has been constructed, and prior to its rehabilitation.
- A qualified archeologist would monitor the one identified cultural site in the APE after the temporary road has been reclaimed. The results of this monitoring will be reported to SHPO. The report would include and update the Archeological Site Inventory (ASI) record for the one identified cultural site.

Traffic and Public Safety Mitigation

Mitigation

- **CuMoCo** would install signs to notify the public of hazards with respect to active truck traffic. Signs would be located near the public access entry points to the Project Area. **CuMoCo has installed the required signs, and CuMoCo would be responsible for maintaining the signs during the life of the Project.**
- **CuMoCo** would implement dust abatement measures for dust control on NFS road 382C and temporary roads within the Project Area as needed, as identified by the Minerals Administrator.
- **CuMoCo** would use a vehicle identified as a pilot vehicle if and when transporting oversized loads on NFS roads within the Project Area.
- **CuMoCo** shall install fencing around the perimeter of each mud pit constructed to support drilling operations. The purpose of this fencing would be to identify mud pits, to increase personnel safety, and to minimize risk to wildlife (i.e., minimizing risk that wildlife falls into the mud pits). Fencing would be a minimum of four feet in height, consisting of a plastic or fabric material, secured to T-type metal fence posts or wooden stakes, and placed within two feet of the mud pit margin. In addition, adequate egress from the mud pit for wildlife (particularly small mammals, birds or amphibians) would be provided. For example, a section or sections of fencing material could be draped into the mud pit, such that it floats or is near the fluid surface, allowing wildlife egress while minimizing the obstruction of drilling operations, pump operation and fluid recirculation. Other fencing materials that meet the safety and wildlife egress objectives might also be used if authorized by the on-site Minerals Administrator.

Fuel Storage Requirements under the SPCC and Fuel Transport Requirements under State and Federal Law

Mitigation

- **United States Department of Transportation (USDOT) regulations would be followed for the transport of fuel to the Project site. Specifically, CuMoCo would comply with 49 CFR 173.150(f), regarding the transportation of fuel in acceptable containers, as identified in 49 CFR 173.203.**
- **CuMoCo would comply with IDAPA 58.01.02.850 in response to a release or spill of fuel while transporting fuel to the Project site.**
- **A standard marine-type fuel containment boom, spill prevention kit, and fire kit would be stored at the refueling site and be readily available during off-loading of fuel from the fuel truck or during refueling operations.**
- **A spill prevention and cleanup kit consisting of absorbent pads, absorbent booms, shovels, and a fire extinguisher would be carried in vehicles transporting fuel and placed at drill sites or any other areas where fuel and/or petroleum products are present.**

- After completing operations, all empty fuel and lubricant containers would be removed from the operations area and transported and disposed of in accordance with local, State, and federal requirements.
- No toxic or hazardous substances would be used onsite, except for standard petroleum fuel and lubricant products (diesel, gasoline, grease and hydraulic oils), and “over-the-counter” retail products. Use of all chemicals would be in accordance with manufacturer label.
- If, during isolated instances, it is deemed necessary to transport and store fuel or oil in 55-gallon containers or larger, drums would be stored within 95-gallon overpack drums or similar containers. Fuel would be managed, tanks would be inspected, and any oil release would be responded to in accordance with the SPCC plan.
- Typically, fuel would be delivered to the drill rig in a 100-gallon USDOT-certified fuel cell mounted to a pick-up truck.
- Fuel containment sites, engines, and other equipment with fuel or lubricants would be periodically checked for leakage or spillage in accordance with the SPCC plan.
- The SPCC plan would be kept at the core shack or office trailer. Staff handling fuel or petroleum products would be trained to successfully implement the SPCC plan. All contractors and CuMoCo staff involved in handling oil and other chemicals would be made aware of the site SPCC plan, spill kit locations, and appropriate emergency response procedures and would be required to abide by all applicable federal, State, and local laws and regulations pertaining to their respective operations. Annual spill awareness/response training would be required for onsite personnel and suppliers/providers.
- Should any oil or chemical discharges or spills occur, the release would be reported to IDEQ and other appropriate agencies as required by applicable federal and State regulations by phone and/or fax immediately (or as soon as possible after onsite containment efforts are implemented, as per the SPCC plan). Spill response would be in accordance with the SPCC plan, which includes a trained onsite emergency response team. Spills or discharges would be documented in writing.
- While the CuMo Exploration Project SPCC Plan does not apply to the transportation of petroleum products or spills of petroleum products off-site of the CuMo Exploration Project, should a spill of petroleum products occur off-site of the Project during transport, procedures in the onsite SPCC Plan would be followed as they apply, pursuant to Idaho law.

Fire Safety and Emergency Response Procedures Required under IDAPA 20.04.01 and 36 CFR 228.9

Mitigation

- Equipment that could potentially come into contact with dry vegetation would be required to have functional spark arrestors. In addition, drill pads would be equipped with fire suppression equipment, including shovels, axes, and fire extinguishers.

- An emergency fire response plan, including emergency notification contacts, would be posted onsite, and staff would be trained in emergency response procedures.
- All activities would be conducted in accordance with State of Idaho fire protection procedures (as outlined in IDAPA 20.04.01), local Boise County Fire District regulations, and FS rules and regulations and 36 CFR 228.11.
- Several fire-response kits would be spaced strategically around the Project Area and at the camp in case of fire.
- Onsite staff would monitor local and onsite fire conditions and maintain contact with local area fire officials to ensure appropriate fire management procedures are followed in the event of implementation of fire restrictions or woodland use restrictions (e.g., “Red Flag Warnings”).

Implementation Monitoring Applicable to all Resources

- The FS would use the checklist, “Plan of Operation and BMP Checklist Supporting Approval of Proposed Temporary Road and Drill Pad Construction/Reconstruction” included in Attachment A, Part 5, to ensure CuMoCo is complying with the mitigation and monitoring requirements identified above in Attachment A, Part 1. CuMoCo would be required to complete a checklist prior to implementing ground disturbing activities (e.g., temporary road construction, drill pad construction) authorized under the approved PoO and submit the checklist to the Responsible Official or his/her authorized representative for approval prior to commencing ground-disturbing activity.

ATTACHMENT A—PART 2

Other Federal, State or Local Approvals Potentially Applicable to the Selected Alternative

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Summary of Other Permits and Approvals that May be Necessary

Approval Type	Status/Comment
Water right from Idaho Department of Water Resources	Proponent would obtain a temporary approval of water appropriations before activities requiring the water appropriations are implemented. CuMoCo has entered into a Water Supply Bank Rental Agreement (Rental Agreement) with the State of Idaho Department of Water Resources. The Rental Agreement is included in the Project record, and the term of the Rental Agreement is from June 5, 2012, until November 30, 2016.
Section 404 Permit from the U.S. Army Corps of Engineers	Temporary mineral exploration-related roads may be exempt from permit requirements under Section 404 of the Clean Water Act; however, a permit application would still be required. If exemption not approved, a Nationwide Permit would be required.
Stream Alteration Permit from the Idaho Department of Water Resources	Not required for impacts to intermittent or ephemeral streams. Proponent would, as necessary, obtain a Stream Alteration Permit for impacts to perennial streams prior to crossing perennial streams.
Water Quality Standards Short Term Activity Exemption from the Idaho Department of Environmental Quality (IDEQ)	The proponent can apply for an exemption during the installation and removal of the culverts used for the temporary roads at the stream crossings, activities which could result in a violation of the water quality rules.
National Pollutant Discharge Elimination System (NPDES) Multi-sector General Permit (MSGP) from the Environmental Protection Agency (EPA)	CuMoCo prepared a Stormwater Pollution Prevention Plan (SWPPP) in April 2011 and submitted the Notice of Intent and SWPPP to the EPA. The SWPPP is included in the Project record. CuMoCo would be responsible for updating the SWPPP, as required, for the life of the Project. CuMoCo has obtained a MSGP and Construction General Permit (CGP).
Idaho State Clean Water Act 401 Certification	CuMoCo obtained a 401 Certification from the State of Idaho in June 2011. CuMoCo would be responsible for updating this certification as identified in the June 2011 letter issued by the State of Idaho.
Spill Prevention, Control and Countermeasure Plan (SPCC) from the Environmental Protection Agency (EPA)	CuMoCo prepared SPCC plan in June 2011. As needed, CuMoCo is responsible for updating the plan.
Endangered Species Act (bull trout, yellow-billed cuckoo, and Canada lynx)	Consultation with concurrence from the U.S. Fish and Wildlife Service occurred while preparing the original 2011 environmental assessment. This concurrence letter is included in the Project record. The Final supplemental BA supporting this Supplemental EA and subsequent supplement DN/FONSI has been submitted to USFWS and their concurrence was received on April 24, 2015.
Bonding	The appropriate bond would be established and required by the Responsible Official before activities subject to the bond are implemented.
Conditional use permit (CUP) and road maintenance agreement from Boise County	CuMoCo entered into a Road Maintenance Agreement (included in the Project record) with Boise County on June 13, 2011. As identified in the letter received from Boise County, dated October 7, 2014, this agreement must be updated prior to reinitiaion of activities because it does not include the additional segments of roads maintained by Boise County identified in the Supplemental EA (SEA) for access and fuel

Approval Type	Status/Comment
	<p>haul (refer to alternative descriptions, Section 2.1). As a further guarantee of performance, Boise County indicated in the letter cited above that a surety bond or other security may be required.</p> <p>In addition, the letter, dated October 7, 2014, stated that CuMoCo would be required to obtain a Boise County CUP prior to implementing any ground-disturbing activities⁹. As stated in this letter, specific requirements to be included in the Boise County CUP and/or Road Maintenance Agreement applicable to all activities occurring within Boise County's right-of-way easement that have been considered in the effects assessed in this SEA include the following:</p> <ul style="list-style-type: none"> • In addition to screening groundwater intake, the amount of water drafted in a single or multiple pumping operation would be controlled by the Water Supply Bank Rental Agreement (No. 63-2338). As stated in this Rental Agreement, "The renter shall install and maintain a measuring device and lockable controlling works of a type approved by the Department [Idaho Department of Water Resources] in a manner that will provide the watermaster suitable control of the diversion." [See Agreement condition #11.] • CuMoCo would be required to submit an annual road use operating and maintenance plan with the initial CUP application and annually revise the same by February of each year for approval. <p>CuMoCo would be required to obtain preapproval from the Boise County Road and Bridge Department for all water drafting sites on roads maintained by Boise County to ensure applicable Boise County road standards, which are important to protecting streambanks and preventing unauthorized driveways from Boise County roads, are adhered to.</p>
Other permits from Idaho Department of Transportation and/or other entities	Proponent (i.e., CuMoCo) would obtain as needed.

ATTACHMENT A—PART 3

***LEWISIA SACAJAVEANA (SACAJAWEA'S BITTERROOT) MONITORING PLAN
CUMO MINERALS EXPLORATION
IDAHO CITY RANGER DISTRICT, BOISE NATIONAL FOREST***

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**LEWISIA SACAJAWEANA (SACAJAWEA’S BITTERROOT) MONITORING PLAN
CUMO MINERALS EXPLORATION
IDAHO CITY RANGER DISTRICT, BOISE NATIONAL FOREST
(rev. 03/03/15)**

Introduction

This *Lewisia sacajawean* (LESA; Sacajawea’s bitterroot) Monitoring Plan (Plan) is part of the 2015 *Lewisia sacajawean* (LESA) Addendum to the Biological Evaluation (BE) for the CuMo Minerals Exploration Project. The determination of effects reached for LESAs depends on successfully implementing this Plan. This Plan covers LESAs-occupied habitat and associated Plant Consideration Areas (PCAs) within the CuMo Project Area, as described in the BE.

CuMoCo initiated the previous monitoring program for LESAs in June 2011. This 2015 Monitoring Plan will replace the previous plan. The update is necessary to correct baseline data due to impacts resulting from 2014 Grimes Wildfire suppression activities that affected occupied LESAs habitat in the CuMo Minerals Exploration Project, and to incorporate implementation and effectiveness monitoring elements identified in the BE. These monitoring elements were considered in the Supplemental Environmental Analysis (SEA) for the CuMo Minerals Exploration Project (2015).

INVENTORY/MONITORING OBJECTIVES

The monitoring program includes the following objectives:

- 1) Reestablish the baseline for LESAs
- 2) Determine how the LESAs population size and PCA habitat conditions have changed within the Project Area as a result of Project activities and wildfire/fire suppression efforts
- 3) Determine if LESAs design features and mitigation are being implemented as intended
- 4) Determine if effects remain within the range of effects disclosed in the SEA and supporting Botanical BE
- 5) If LESAs plants are found during pre-clearance surveys within the Project Area, population data on the newly discovered plants/subpopulations should also be collected per the protocol defined below and incorporated into the revised baseline.

METHODOLOGY

Methodology to accomplish these objectives include monitoring for LESAs baseline populations and establishing photo points at key locations for repeatable photo point monitoring that compares pre- and post-implementation conditions of the LESAs population and habitat. Surveys and monitoring must be conducted during the active growing season (typically June 1 to July 20, depending on weather conditions) to ensure population counts and extent are accurately documented. Multiple field visits are required each season since the peak observation time when most plants are visible varies from year to year. LESAs’s small size and short period of above-ground growth make careful timing and repeated site visits necessary in surveying and monitoring. Reporting requirements will be used to systematically assess if preclearance surveys are being conducted and data on new LESAs populations are incorporated into the baseline.

LESA Baseline Population Monitoring

Sampling Design

The entire LESA population at the CuMo site will be assessed by **direct census** in Year 1 (Year 1 being the first active growing season for LESA following the CuMo Minerals Exploration Project Supplemental Decision Notice/Finding of No Significant Impact [DN/FONSI]). Direct census involves counting all plants that are present (i.e., visible above ground), thus it is not a “sampling” method that uses transects or plots to assess a subset of the population. To perform direct census, a team of botanists or qualified surveyors will walk through the PCA/occupied habitat areas and systematically count all visible plants during the active growing season for the species. For LESA, the active growing season is typically June 1 to July 20 but can vary due to weather conditions. Repeat monitoring helps determine the active growing period each season and appropriately time surveys. Depending on the spatial arrangement of plants, flagging and/or a grid system may be used to ensure all plants are counted and no duplication occurs. No destructive sampling methods (e.g., digging, trampling, or harming plants) will be permitted.

The direct census methodology will be used to assess the entire LESA population within the PCA and to assess any additional LESA plants that may be discovered in the Project Area in the future (i.e., at drill pad or road locations). This information will give the Forest Service (FS) a complete assessment of the LESA population within the CuMo Project Area. It will also help determine how the LESA population/habitat may have changed over time as a result of Project-related or other actions.

Protocol

- 1) **Establishing survey area.** Define entire area of each known subpopulation to conduct baseline surveys. Use current NAIP imagery and 1:18,000 or finer scale topographic maps to depict the PCA and determine the survey area to be covered on the ground. Ring 1 of the existing PCA contains known occupied habitat. However, surveyors must walk through suitable habitat within the entire PCA (i.e., to the outer perimeter of Ring 4 or 300 meters from the outer boundary of Ring 1) to ensure the outer bounds of the known population is defined.
- 2) **Timing of surveys.** Surveys should be conducted during the active growing season for the species. The active growing season must be determined each year through repeat visits to the Project site to establish the onset of emergence of the species as well as the point at which the peak flowering period occurs. For LESA, the active growing season is typically June 1 to July 20 but can vary due to weather conditions. The effectiveness of the survey increases at the peak flowering period. The decline in snow cover at the known site should be used to help gauge when surveys should be initiated.
- 3) **Locating individual plants.** LESA plants shall be counted using the direct census method described above. Any grid system or flagging used during surveys must be removed following completion. Existing flagging from previous surveys should be removed.

- 4) **Observer training, staffing, and safety.** All individuals conducting LESA surveys must be familiar with the species and must have drawings, photographs, and/or a botanical description of the plant available onsite during the survey for reference purposes. Observer variability exists in any monitoring program; therefore, it is critical to recognize and minimize observer differences before data collection. An observer's ability to correctly identify species is a function of an individual's experience, visual acuity, and psychological state (motivation, alertness) (Kepler and Scott 1981). Consequently, it is necessary for an experienced crew leader to calibrate and train observers to achieve an adequate degree of comparability. It is estimated that in Year 1, up to two teams of 4 (8 people total) will be needed to reestablish the baseline and perform the monitoring tasks described above. A typical team shall consist of a mix of experienced botanist (GS-9/11 or contractor equivalent) and less experienced (GS-5/7 or contractor equivalent) field-going personnel with botanical experience suitable to meet survey objectives. It is estimated that these tasks, including reporting and analysis, may take 3 to 4 weeks to complete. (Note: The timeliness of information provided to the FS by CuMoCo regarding specific locations of Project-related activities [including proposed roads and drill pad locations] will also be a factor in the time needed to complete LESA survey and monitoring efforts.) These personnel/staffing estimates may also be influenced by site access, weather conditions, and other variables. The short emergent period for LESA, in combination with the difficulty in detecting this diminutive plant when it is above-ground, is the reason for potentially needing up to 8 people to sufficiently survey the entire PCA in the narrow time period.

A tailgate safety session prior to commencing surveys will be reviewed daily. A Job Hazard Analysis will also be created for the work to be done.

- 5) **Data collection.** Surveyors shall use a GPS unit with a minimum 13-meter accuracy to define the outermost bounds of each LESA subpopulation. Projection—UTM 11 North; Datum—NAD83. All occurrence data shall be collected on the Idaho Rare Plant Observation Form (Exhibit 6). This form must be filled out completely. Data collection will include a map and detailed notes on the proximity and extent of noxious weeds or any other aggressive non-native plant species within the LESA PCA. Notes should include any known information on infestations of areas proposed for disturbance outside road corridors and drill pads (e.g., wash station, employee parking areas, sanitation stations, fuel storage) for LESA occupied and potential habitat

All plants in this Project site are considered one population (i.e., populations are separated by >1 kilometer (km) without the target species). Subpopulations are separated by breaks in habitat or >50 meters (m) without the target species. Each subpopulation must have the subpopulation portion of the form completed.

- 6) **Frequency of surveys.** The first direct census survey shall occur in the first growing season after the CuMo Minerals Exploration Project SEA DN/FONSI, which will be known as Year 1. Data from this survey shall reestablish the baseline and be used to compare subsequent inventory results. Subsequent surveys shall be conducted at least once every 3 years during active operations. A final direct census survey shall be conducted within 1 year of Project completion. Data collected will be used to validate that effects to LESA were within the range of effects anticipated in the 2015 Addendum to the BE.

- 7) **Quality control/quality assurance.** A description of how work is to be accomplished must be reviewed and approved by the FS Lead Project Botanist, including any scope of work documents for use by third-party contract botanists.

8) Products

- a. Use collected GPS data to generate a discrete polygon shapefile in ArcGIS (version 10.2 or newer) for each subpopulation boundary. Complete metadata to Federal Geographic Data Committee (FGDC) standards is required for shapefiles. Point or polygon data must be attributed with the number of plants observed, date of survey, observer name, and survey method. Generate a PDF map (300 DPI) of the LESA population/subpopulations. The minimum map scale must be no less than 1:18,000 (PDF or paper). All data must use: Projection—UTM 11 North; Datum—NAD83.
- b. A written report detailing new inventory and monitoring findings will be completed following Year 1 and every year the Project is active. At Years 1 and 3 during the Project, this report will include integration of prior year(s) monitoring data and discussion of the effectiveness of the design features to avoid or minimize direct impacts to LESA.
- c. Idaho Rare Plant Observation Reports will be completed annually and submitted to the Botany Data Coordinator at Idaho Department of Fish and Game (Idaho Natural Heritage Program), with copies to the FS Lead Project Botanist, Boise National Forest.
- d. A written report shall be completed following the conclusion of all activities in the CuMo Minerals Exploration Project and in Year 3 Post-Project Completion. Reclamation will be complete prior to the Year 3 Post-Project Completion Report so those results can be incorporated. These completion reports must document the following:
 - i. Changes in number of LESA individuals and changes in habitat quality and quantity, including areas where exploration has been completed and/or reclamation has been accomplished.
 - ii. The location of LESA individuals and habitat within a PCA that were directly or indirectly impacted by mining activities or related disturbance. Quantify the amount and type of disturbance and current condition of plants and habitat. In general, areas where soil disturbance or compaction has occurred within a PCA (from activities including foot traffic, vehicle use, road/drill pad construction, and fire suppression efforts) are considered “disturbed”.
 - iii. LESA population “trends” based on changes in numbers of plants detected during the monitoring period. (Since the numbers of plants visible above ground varies from year to year and data collection is limited to a few years only, population trends will be estimated.)

Photo Point Monitoring

Sampling Design

Photo point monitoring is an inexpensive and effective method of monitoring vegetation and ecosystem change. It consists of repeat photography of an area of interest over a period of time, with photographs taken from the same location and same field of view as the original photos. With appropriate site marking and documentation, photos can be precisely replicated by different people over many years (Hall 2002; Hamilton/RSAC n.d.).

Photo point monitoring provides a standardized procedure to compare and evaluate change and rate of change through time. A constraint of this methodology is that only limited quantitative data can be obtained. This limitation should be minimized with the direct census monitoring that will also occur for this Project, which can facilitate analysis of the data.

Photo point monitoring (i.e., establishing photo points, protocols, and documentation) shall generally follow methodology described by Hall (2002) and Hamilton/RSAC (n.d). Several permanent photo points shall be established within the Project Area. Specific photo point locations shall be determined in cooperation with the FS Lead Project Botanist and FS Minerals Administrator.

Protocol

- 1) **Establishment of photo points.** The FS Lead Project Botanist shall be involved in establishing photo points. A field review of the 2014 Grimes Fire bulldozer/hand lines and the two main access roads within the PCA shall be made to select and map the locations of the five photo points. Site maps to document all camera locations and photo points shall be required. All photo points should be recorded by GPS and clearly mapped on forms. Care must be taken to minimize trampling impacts to vegetation, especially within a PCA. Select a “witness site” at each photo point location to use as a reference. (A witness site is an immovable object in the monitoring area that can be easily identified when returning to the area; it also serves as a reference point for the location of the photo and camera points.) Identify each witness site with a permanent marker (i.e., aluminum tag), and determine the direction and measured the distance to camera points and photo point(s). Camera points are the placement of the camera relative to the photo point for the area being photographed. Inscribe direction and distance information for photo point and/or camera points on the identification tag. Record witness site, camera point, and photo point directions on the “Photographic Site Description and Location” form (Exhibit 3). On the form, note the distances between the witness site, camera sites, and photo points on the ground. Permanently mark photo and camera points so they can be relocated in the future either using metal fence posts or steel rebar placed flush to the ground. Assign identification numbers to all photo and camera points. Record coordinates for all permanently marked points with a GPS unit and include, at a minimum, the identification number, date, observer, and location description. Follow these same steps each time a photo point is established for a drill pad.

- 2) **Photo point locations.** Strategically position photo points to help meet the objective—to determine how LESA PCA habitat conditions have changed as a result of Project activities and fire suppression actions. Proper positioning will help determine if LESA Design Features are being implemented as intended.
 - a. In Year 1 (the first active growing season after the CuMo Minerals Exploration Project SEA DN/FONSI) a minimum of 3 photo points shall be established along the 2014 Grimes Fire bulldozer and hand lines that cut through LESA occupied habitat within the Project Area. Photo points shall be selected where the disturbed area bisects occupied habitat. One or more photo points shall be selected to assess the extent of noxious weed establishment within and/or adjacent to fire lines (bulldozer and hand lines).
 - b. In Year 1, a minimum of 2 photo point locations will be established within the PCA along the main access roads (refer to Figure A-1). Selected locations will be used to compare pre- and post-activity conditions at these locations to determine if road-related impacts on adjacent LESA occupied habitat and/or pollinator habitat resulted in the outcome assumed in the 2015 Addendum to the BE effects analysis.
 - c. Photo points shall be established adjacent to each active drill pad within a PCA prior to construction.
 - d. The established photo point locations described in a, b, and c shall be used to evaluate dust deposition on vegetation through a combination of panoramic and close up photos. This information shall be used in combination with visual inspection of plants (leaves and flowering parts) by botanists and/or the FS Minerals Administrator in the field during implementation to assess success of the design feature.
- 3) **Frequency of photo point monitoring.** Photos shall be taken at the time of each newly established photo point to form a baseline by which repeat photography shall be compared. Photo point monitoring shall occur annually during the life of the project as described below.
 - a. Fire Line Photo Points—The 3 photo points will be established in June 2016. Photos will be retaken at the end of the first growing season, and at least once during the active growing season from 2016 through 2018. (Note: These photo points do not replace the noxious weed survey and reporting requirements identified in the SEA.)
 - b. Main Access Road Photo Points—Photos will be taken at least twice per year during the LESA active growing/flowering period at these 2 photo points, while the Project is active, to ensure that no unexpected habitat impacts from road use and/or dust (see “Effectiveness Monitoring” section) are occurring, and to evaluate any change in habitat or the presence of invasive species.
 - c. Drill Pad Photo Points—Photos will be taken at least twice per year during the LESA active growing/flowering period at drill pads constructed within the PCA, including potential LESA habitat. Document existing site conditions prior to any surface disturbance. Retake the same photo points at least once after the new drill pad is constructed, and retake the same photo points at least once the season after the pad is rehabilitated. This photo point series will be used to validate assumptions made in the 2015 Addendum to the BE as to the effectiveness of mitigation applied during each

- phase of the operation to minimize ground disturbance within a PCA, including constructing new pads within existing road prisms.
- 4) **Data collection.** Utilize a photo identification card within the camera's field of view each time a photo point is photographed to embed pertinent information about the site into the picture. The card should contain the site name, photo point number, camera point identification, date, photograph number, time of day, and the photographer's initials. Use blue color paper for the identification card. See Exhibit 4 for a sample identification card. For repeat photography, point the camera toward the photo point and compare the view through the camera to a copy of the original photograph. Adjust the camera until the view through the camera is the same as the original photograph. Record aperture, shutter speed, focal length of the lens, and, if applicable, film speed. For each photograph, describe the scene. Include plant species, ground conditions, disturbances, or any other pertinent information. Meter boards shall be used to help take consistent repeat photographs by orienting the camera on the "1M" of the board. Instructions on how to construct a meter board and take photographs using one are described in Hall (2002).
 - 5) **Create a photo monitoring field notebook.** Utilize a site-locator field notebook to ensure repeat photography is consistent year to year. The field notebook should contain copies of the original photo point photographs and directions from the witness sites to each camera location and orientation of photo point.
 - 6) **Equipment needed.** A checklist of photo point monitoring equipment is found in Exhibit 5. Forms for documenting photo points are available at http://www.fs.fed.us/eng/rsac/invasivespecies/mapping_main.htm and have been included as attachments to this Plan.
 - 7) **Staffing/Safety.** It is estimated that a 2-person team shall be able to conduct the necessary field reconnaissance, establish all photo points, and complete all documentation and reporting in approximately 2 weeks in Year 1. In subsequent years, a 1–2 person crew should be able to accomplish repeat photography and reporting in 3–5 days. One day per photo point should be budgeted to establish new photo points for approved drill pads using a 2-person team. A tailgate safety session prior to commencing surveys will be reviewed daily. A Job Hazard Analysis will also be created for the work to be done.
 - 8) **Quality control/quality assurance.** Any deviations from the methodology set forth in this Plan must be approved by the FS Lead Project Botanist and shall be documented in writing.
 - 9) **Products**
 - a. Copies of all forms for each photo point shall be submitted to the FS at the end of the field season (no later than December 1), including the attached forms (see Camera Point, Photographic Site Description and Location, Camera Location and Photo Points, Photo Points and Close Photos forms) and all digital photos as appropriate for each site.
 - b. A report that summarizes the current (and previous years) photo point results shall be submitted with the forms. The report should include copies of all photos/forms, maps,

and GPS locations. It should also describe any pertinent information about habitat conditions, species composition, soil disturbance, dust deposition, noxious weeds, and/or other threats and impacts observed at the photo point locations. All digital photos should be provided to the FS on a CD, DVD, or thumb drive. Lastly, the report must include an analysis of how PCA habitat conditions have changed within the Project Area as a result of Project (or other) activities and whether the anticipated effects and implemented design features and mitigations effectively minimized or avoided direct and indirect impacts to LESA; what, if any, changes in habitat conditions along the fire line were detected and what that means relative to LESA; and a discussion of the effectiveness of this monitoring sampling design for this Project.

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Design Feature Implementation and Effectiveness Monitoring

Sampling Design

In addition to direct census surveys and photo point monitoring, implementation and effectiveness monitoring elements shall be tracked in this Plan. These monitoring features will be used to assist in determining whether LESA Design Features and mitigation efforts are being implemented as intended, and if those effects remain within the range of effects disclosed in the 2015 Addendum to the BE.

Protocol

- 1) FS personnel, or a qualified contractor who works under the direction of the FS, will conduct onsite inspections of Project activities (construction and operations) at least once during the LESA active growing season or shortly thereafter to document adherence to design features and note any potential changes in occupied and/or potential habitat quality or quantity within a LESA PCA. Documentation of onsite inspections shall be provided to the FS Lead Project Botanist by the end of each field season throughout the life of the Project.
- 2) A botanical monitor may be present onsite during any surface disturbance activity approved through the pre-disturbance checklist process to work with the FS Minerals Administrator and proponent to help ensure LESA plants are not impacted and impacts to associated habitat for pollinators is minimized to the maximum extent practicable (MEP). Typically, a botanical monitor would be required when activities are allowed within rings 1 and 2 of the PCA; the need for a monitor to address approved activities within rings 3 and 4 would be identified as part of the pre-disturbance checklist approval (see Attachment A, Part 5, Checklist). Documentation outlining the number of days a botanical monitor was present onsite shall be provided to the FS Lead Project Botanist by the end of each field season throughout the life of the Project.
- 3) Annually track the number of acres within a PCA that are impacted by disturbance activities, including construction, operations, vehicle use, and road maintenance. CuMoCo shall provide maps and photo point monitoring results (per previously identified protocol) to the FS at the end of each field season throughout the life of the project. The results will then be used to validate assumptions that vegetation/habitat effects remain within the range anticipated as to the extent of road and drill pad construction (i.e., acres disturbed) within a PCA.

- 4) From June 1 through July 20, during project inspections by the FS Minerals Administrator or during Project botanist fieldwork, data on dust accumulation shall be recorded. If visible dust accumulation is noted on vegetation within 20 m of a road or drill pad, the recorder shall walk away from the road until dust deposition on vegetation is no longer detectable. Take photo of dust deposition and note distance that deposition ceases. Record position photo was taken either on map or using GPS. Visible dust deposition on vegetation will be considered a sign of reduced photosynthetic capacity and reproduction, since dust clogging stigmas are likely to restrict successful pollination. If dust abatement measures are not effective (not within the effects analysis outcomes), adjustments in mitigation would be made to ensure impacts to LESA plants and habitat remain within the range of effects described in the 2015 Addendum to the BE. Data on dust accumulation shall be provided to the FS Lead Project Botanist by the end of each field season throughout the life of the Project.

Prepared By: /s/ Edna Rey-Vizgirdas

Edna Rey-Vizgirdas, Forest Botanist, Boise NF

Date: March 30, 2015

Literature

Hall, F.C. 2002. Photo Point Monitoring Handbook. USDA Forest Service, Pacific Northwest Research Station. Gen. Tech. Rep. PNW-GTR-526, 134 p.

Hamilton, R.H. n.d. Photo point monitoring. Salt Lake City, UT: USDA Forest Service Remote Sensing Applications Center (RSAC). 5 p.

Kepler, C.B., and J.M. Scott. 1981. Reducing bird count variability by training observers. *Studies in Avian Biology*, 6:366–371.

Attachment A, Part 3

EXHIBIT INDEX

- 1) Photo Point Camera Location
- 2) Photo Point Close Photo Points
- 3) Photo Point Photo Site Description and Location
- 4) Photo Point Site ID Card
- 5) Photo Point Checklist
- 6) Rare Plant Observation Form, Idaho Department of Fish and Game 2014

Attachment A, Part 3

Exhibit 1

Photo point camera location

CAMERA LOCATION AND PHOTO POINTS

Date _____
Camera Location _____
Area _____ Number of Photo points: _____
Unit _____ Observer _____
Comments _____

Slope _____ Aspect _____ Slope position _____

Photo point A:
Compass bearing: _____
Distance: _____

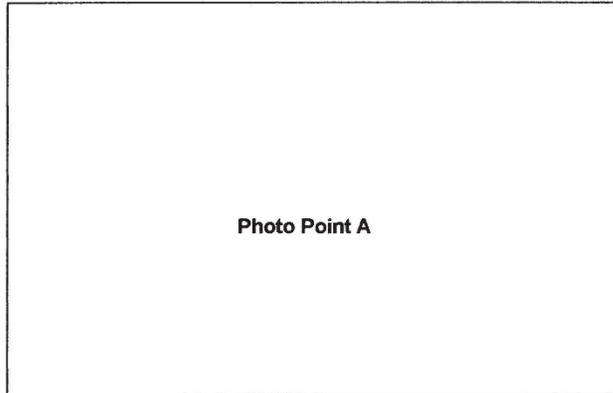
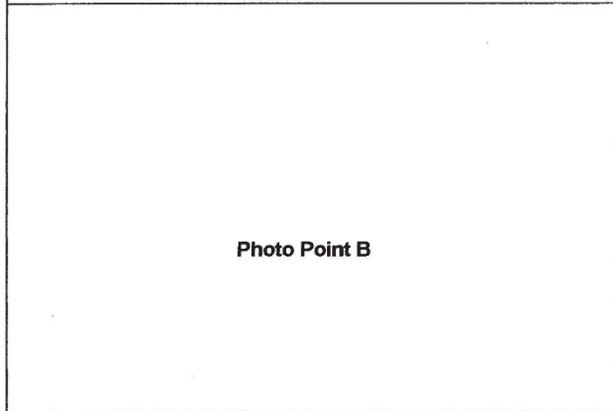


Photo point B:
Compass bearing: _____
Distance: _____



CAMERA LOCATION AND PHOTO POINTS

Date _____ Camera Location _____

PhotoPoint _____
Compass bearing: _____
Distance: _____

Photo point _____

Photo Point _____
Compass bearing: _____
Distance: _____

Photo point _____

Photo Point _____
Compass bearing : _____
Distance: _____

Photo point _____

Attachment A, Part 3

Exhibit 2

Photo point close photo points

PHOTO POINTS AND CLOSE PHOTOS

Date _____ Camera _____

Area _____
Unit _____
Photo point: A
Observer _____
Remarks _____

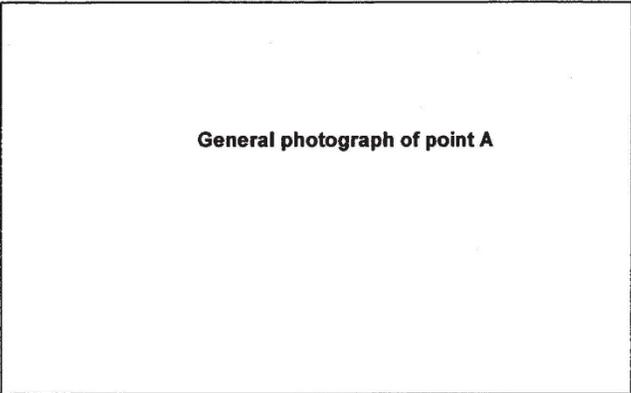
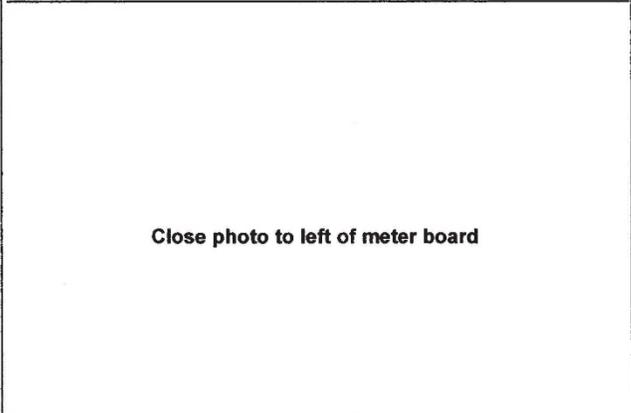
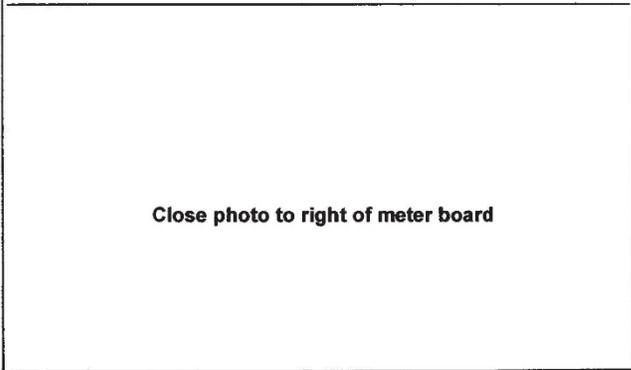


Photo point A:
Left of meter board
Species/cover: _____



Comments: _____

Photo point A:
Right of meter board
Species/cover: _____



Comments: _____

PHOTO POINTS AND CLOSE PHOTOS

Date _____
Area _____
Unit _____
Camera _____
Photo point: _____
Observer _____
Remarks _____

General photograph of point _____

Photo point _____
Left of meter board
Species/cover: _____

Comments: _____

Close photo to left of meter board

Photo point _____
Right of meter board
Species/cover: _____

Comments: _____

Close photo to right of meter board

Attachment A, Part 3

Exhibit 3

Photo point photo site description and location

PHOTOGRAPHIC SITE DESCRIPTION AND LOCATION

Date _____ Area _____

Unit _____ Observer: _____

No. of Camera locations: _____ No. of Photo points: _____

Plant community _____

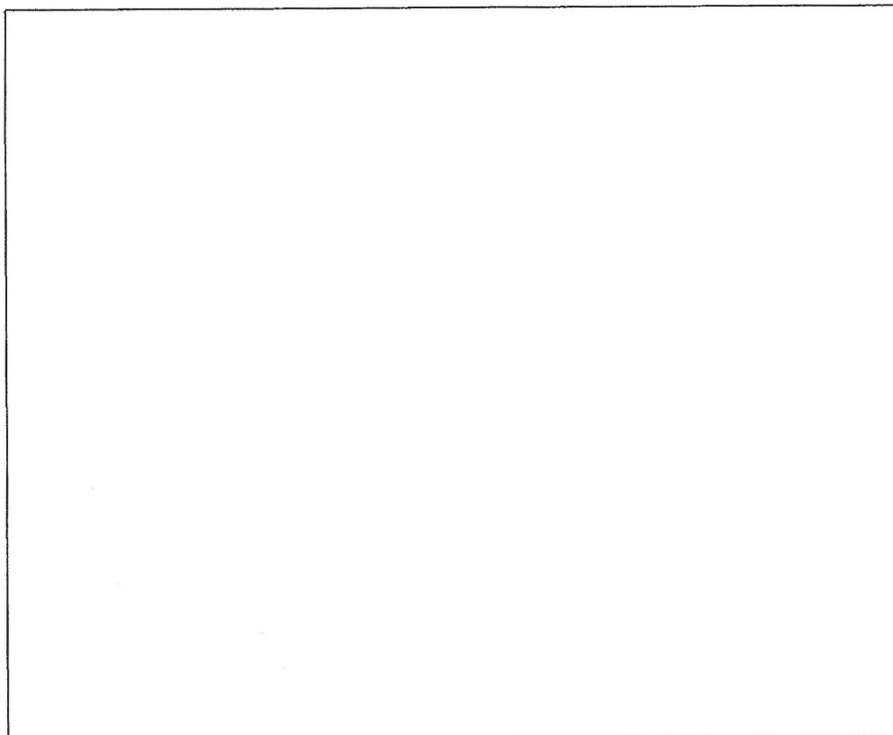
Location: T. _____ R. _____ Sec. _____

Location description _____

Photo purpose: _____

Discussion: _____

MAP



Use back of sheet for additional details.

Attachment A, Part 3

Exhibit 4

Photo point site id card

DATE _____
AREA _____
UNIT _____
CAMERA: 1 2 3 4 5
PHOTO: A B C D
E F G H I J

Attachment A, Part 3

Exhibit 5

Photo point checklist

Photo Point Monitoring Equipment Checklist

- | | |
|---|--|
| <ul style="list-style-type: none"><input type="checkbox"/> Camera<ul style="list-style-type: none"><input type="checkbox"/> Memory cards<input type="checkbox"/> Extra batteries<input type="checkbox"/> Film<input type="checkbox"/> Tripod<input type="checkbox"/> GPS<input type="checkbox"/> Forms<ul style="list-style-type: none"><input type="checkbox"/> Site description and location<input type="checkbox"/> Camera location and photo points<input type="checkbox"/> Photo ID cards<input type="checkbox"/> Clipboard<input type="checkbox"/> Compass<input type="checkbox"/> 100ft measuring tape | <ul style="list-style-type: none"><input type="checkbox"/> Copies of original photos (site locator field book)<input type="checkbox"/> Fenceposts<input type="checkbox"/> Steel stakes<input type="checkbox"/> Hammer<input type="checkbox"/> Meter board<input type="checkbox"/> Metal Detector<input type="checkbox"/> Spray paint<input type="checkbox"/> _____<input type="checkbox"/> _____<input type="checkbox"/> _____<input type="checkbox"/> _____ |
|---|--|

Attachment A, Part 3

Exhibit 6

Rare plant observation form IDFG 2014

IDAHO RARE PLANT OBSERVATION REPORT 2014

Please fill in as many fields as possible, but don't worry if you have to leave blanks. Many fields contain check boxes (double click on box, and click 'checked'). E-mail completed form to plant@idfg.idaho.gov. If you need to mail maps or other materials that can't be sent electronically, send them to Botany Data Coordinator, Idaho Department of Fish and Game, PO Box 25, 600 S. Walnut St., Boise ID 83707-0025. Thanks for contributing to rare plant conservation in Idaho!

Species: _____ Date(s): _____
 Observer(s): _____
 Agency/Organization/Company: _____
 Address: _____
 E-mail: _____ Phone: _____
 Other knowledgeable individuals: _____

Observation was: very thorough fairly thorough cursory or incidental

If this observation is part of a larger study or report, what is the study/report?

Certainty of identification: moderate high verified by:

Specimen collector/Collection #: _____ Herbarium: _____

Photo attached? yes no If photos are located elsewhere, where are they?

Population Information (This is for the entire population; information on subpopulations goes on next page)

Survey site name (e.g., a particular landmark or location): _____

Element occurrence (EO) #, if known: _____ For an existing EO, is this: revisit addition unsure

Population area (extent of all subpopulations): _____

Do you feel you mapped the full extent of the population? yes no unsure

Is there more potential habitat in the area that hasn't been surveyed? yes no unsure

Suggestions for other areas to survey: _____

Monitoring or research needs for this population: _____

Management needs for this population: _____

Additional population comments: _____

Directions (please be specific so population/subpopulations can be relocated years from now by others): _____

Subpopulation information (Copy this page and the next as needed—one for each subpop. If visits to individual subpops aren't made, fill out one for whole population. Subpops are divided by breaks in habitat, or a particular distance set by the observer, e.g., >50 m without the target species. Populations are divided by >1 km without target species.)

Subpopulation #: _____ Date of Observation: _____ Observer(s): _____
 Total number of individuals in subpopulation: _____ This number is: actual minimum estimated
 What was counted? genets ramets N/A (non-vascular etc.) unknown
 Phenology: seedling __ % vegetative __ % flower __ % fruit __ % dormant __ % unknown __ %
 Subpopulation area: _____ Subpopulation vigor: excellent good fair poor unknown
 Do you feel you mapped the full extent of this subpopulation? yes no unsure

Dominant species (existing plant community): _____

Habitat type (potential plant community): _____

Associated native species: _____

Associated non-native species: _____

Look-alike species present: _____

General terrain/habitat (e.g., foothills, wetland, subalpine): _____

Slope: _____ Aspect: _____ Toposition: _____
 Minimum Elevation: _____ m or _____ ft Maximum Elevation: _____ m or _____ ft
 Light regime: _____ Substrate/soil: _____
 Landowner(s): BLM USFS state private other:

If all or part of subpopulation is on private land, has the landowner provided consent for the data to be exported?

Date of consent by private landowner, their contact info, and other pertinent comments: _____

General owner comments: _____

Observed disturbances, such as land use, disease, predation, non-native species. For each, include severity (slight, moderate, serious, or extreme) and scope ($\leq 10\%$, 11-30%, 31-70%, 71-100% of subpopulation affected), if known:

Factors that may be a threat in the future. For each, include severity, scope, and imminency (near or distant future), if known:

Native plant community within the subpopulation is:

- A. intact with zero to low non-native plant cover and/or minimal anthropogenic disturbance
- B. intact with low to moderate non-native plant cover and/or low to moderate anthropogenic disturbance
- C. partially intact with moderate to high non-native plant cover and/or mod. to high anthropogenic disturbance
- D. almost gone with high non-native plant species cover and/or high anthropogenic disturbance

Additional comments to describe subpopulation condition and support rank:

Landscape surrounding the subpopulation is:

- A. unfragmented, with ecological and hydrological processes intact
- B. partially fragmented, with ecological and hydrological processes intact
- C. moderately fragmented, with ecological and hydrological processes intact
- D. highly fragmented, with many ecological and hydrological processes no longer intact

Additional comments to describe landscape setting and support rank:

Additional comments about the subpopulation, in general:

If location data are from a **paper map**:

County: _____ Quad: _____
 Township: _____ Range: _____ 1/4 of _____ 1/4 of Section _____
 Township: _____ Range: _____ 1/4 of _____ 1/4 of Section _____

How accurately do you feel you mapped the subpopulation compared to its actual location on the ground?

Attach a copy of part of a USGS 7.5' quad (or comparable) and delineate the subpopulation.

If location data are **GPS data**:

Format of GPS data: shapefile digital file (.dbf, .xls, .txt, etc.) GPS points filled in below
 Method used to collect GPS data: GPS unit estimated on a paper map other:
 GPS unit was held: directly over the rare plant in the general vicinity of the rare plant
 Do the GPS points mark the boundary of a plant group? yes no unsure
 Accuracy of GPS unit (± m): _____ Datum: NAD27 NAD83 WGS84 unknown
 Coordinate system: UTM zone 11 UTM zone 12 UTM zone unknown Idaho Transverse Mercator
 Decimal degrees, lat/long state plane township/range/section

GPS coordinates (This section has drop-down menus. No need to fill in if submitting shapefiles or digital files.)

Datum	Zone	ID#	Easting (X) or Longitude	Northing (Y) or Latitude	Accuracy
					+/-
					+/-
					+/-

ATTACHMENT A—PART 4

Wildlife Monitoring Plan

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2012 Raptor Monitoring CuMo Exploration Project

CSR will conduct surveys for the overall presence and nesting activities of specific raptor species throughout the period of proposed action and prior to the annual implementation of road construction and drilling activities. As stated in the CuMo Exploration Project Environmental Assessment, Great Gray Owl monitoring consists of two efforts April 10-May 10, plus up to two additional follow-up visits to documented nests May 10-June 10. Additional visits to track occupancy and reproductive status would also be implemented. Northern Goshawk monitoring requires a minimum of three efforts April 1-June 15 with minimum time between efforts of one week. Also, additional visits to track occupancy and reproductive success would also be implemented.

Conducting the inventory and monitoring of the Northern Goshawk will be done following protocols set forth in the *Northern Goshawk Inventory and Monitoring Technical Guide* (2006) published by the USDA. Step-by-step instructions are outlined within the document and appropriate references mentioned within the document will also be examined (i.e. Kennedy and Stahlecker, 1993). Methods for the inventory and monitoring of the Great Gray Owl can be found in the *Survey Protocol for the Great Gray Owl within the Range of the Northwest Forest Plan*; however, these methods have been modified to replicate the past year's night call surveys. Each method is designed to detect the presence of the species, locating nests, and determining reproductive success. Monitoring will only take place when acceptable conditions exist, mainly regarding weather and access. Follow-up visits will occur after monitoring where documented nests will be visited and occupancy and reproduction success will be determined. After each individual monitoring occurrence, a follow-up report will be prepared on behalf of Mosquito, Ltd. and will be submitted at their discretion.

Based on 2007's Plan of Operations, operating season will begin April 15th therefore, early admittance into the Project Area will be required for the purpose of raptor monitoring (see timeline below). CSR will use only trained personnel familiar with the vocalizations of owls, goshawks, and other species likely to be detected during surveys for these monitoring efforts. Detailed data sheets (see attached) will be completed during each survey and annotated maps (see also attached) will be available upon completion of each monitoring season. CSR understands the importance of monitoring these important species and will cooperate with U.S. Forest Service in any way, to achieve the most scientific results.

Northern Goshawk Monitoring

April 2nd – April 5th
April 13th – April 16th
May 7th – May 10th

Follow-up Visits

May 21st – May 23rd
June 4th – June 6th

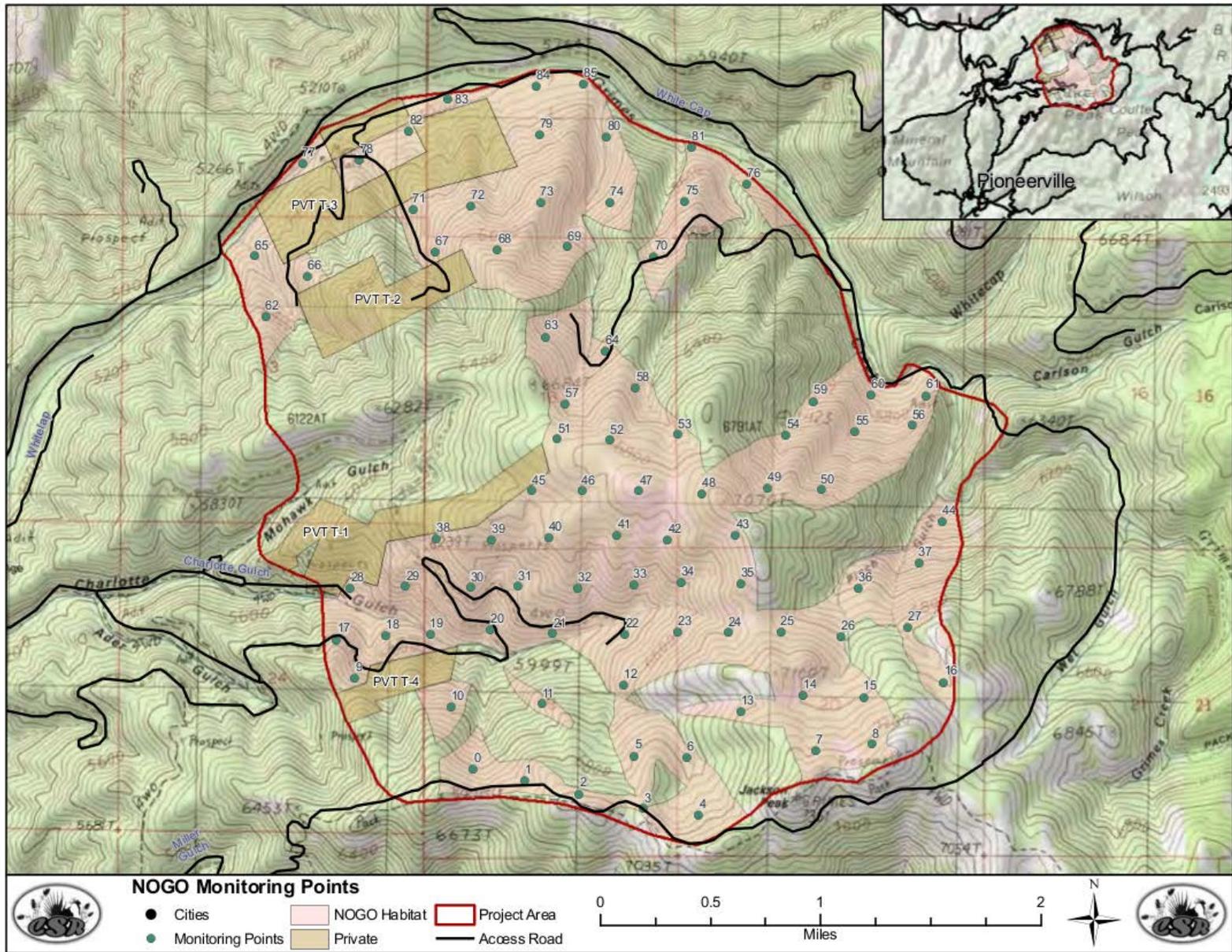
Great Gray Owl Monitoring

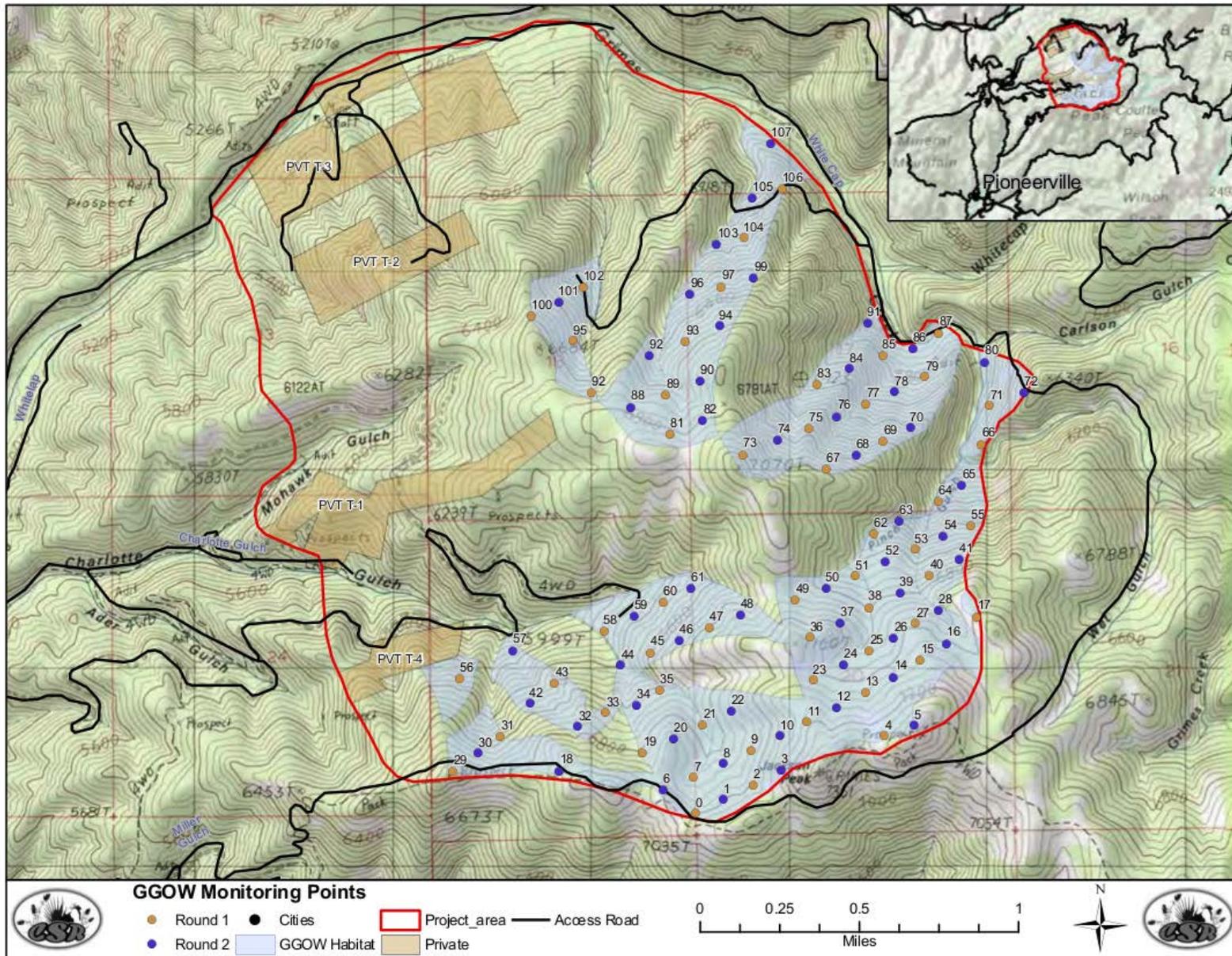
April 10th – April 13th (round 1)
April 20th – April 23rd (round 2)

Follow-up Visits

May 23rd – May 25th
June 6th – June 8th

Revised: March 30, 2012





Raptor Monitoring Sheet

Site Name: _____ Date: _____ Personnel: _____

Survey Method: _____ Start Time: _____ End Time: _____

Wind Speed: _____ Snow Conditions: _____

Cloud Cover: _____ Habitat Type: _____

Temperature: _____ Canopy Conditions: _____

Observation 1

Type (audio or visual): _____
 Time: _____
 Duration: _____
 Call Type: _____
 Direction: _____
 Distance: _____
 Other Observations: _____

Observation 2

Type (audio or visual): _____
 Time: _____
 Duration: _____
 Call Type: _____
 Direction: _____
 Distance: _____
 Other Observations: _____

Observation 3

Type (audio or visual): _____
 Time: _____
 Duration: _____
 Call Type: _____
 Direction: _____
 Distance: _____
 Other Observations: _____

Observation 4

Type (audio or visual): _____
 Time: _____
 Duration: _____
 Call Type: _____
 Direction: _____
 Distance: _____
 Other Observations: _____

Wind Speed

0-1 mph	calm
1-3 mph	light air
4-7 mph	light breeze
8-12 mph	gentle breeze
13-18 mph	moderate breeze

Call Type

Alarm Call (adults & juveniles)
Wailing Call (females)
Begging Call (fledglings)

Habitat Type

Ponderosa Pine	Grassland
Douglas-fir	Shrubland
Subalpine fir	Wetland
Lodgepole pine	Riparian
Aspen	



Raptor Nest Monitoring

Location (dms): _____ Date: _____ Personnel: _____

Species: _____ Time: _____ Elevation: _____

Occupied? (Y/N): _____

Status: _____

Banded: _____ Nest Poled? (Y/N): _____

Dead Eggs: _____ Nest Substrate: _____

Live Eggs: _____ Nest Tree Diameter: _____

Dead Young: _____ Nest Height: _____

Live Young: _____ Exposure: _____

Description of adult activity:

Nest Condition:

Other Observations:

Nest Status	Nest Substrate	
OCCU - Occupied	CLF - cliff	GHS - ground/hillside
OCFA - Occupied Failed (did not fledge young)	CKB - creek bank	MMS - manmade structure
UNOC - Unoccupied	FTL - fir (live)	POL - pine (live)
UNDI - Unoccupied Dilapidated	FTD - fir (dead)	POD - pine (dead)
GONE - Absent	ASL - aspen (live)	ROC - rock outcrop
UNKN - Unknown	ASD - aspen (dead)	



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ATTACHMENT A—PART 5

Checklist Process

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**CuMo Mineral Exploration Project
Plan of Operation and BMP Checklist Supporting Approval of Proposed Temporary Road
and Drill Pad Construction, Road Relocation**

The following checklist must be completed for each temporary road or drill pad proposed to be constructed/reconstructed. Completion and submittal and signoff of this checklist by the CuMoCo and review and approval by the Responsible Official or his/her authorized representative will support the Forest Service Responsible Official’s determination as to whether the proposed activity will result in effects that fall within the range of environmental effects disclosed in the 2015 Supplemental Environmental Assessment and Decision Notice/Finding of No Significant Impact (DN/FONSI).

Road or Pad Identifier: _____

Date Prepared: _____

CuMoCo Representative or designee¹ Validating Content: _____

FS Field Representative Review and Recommendation: _____

¹ Must be a company employee or representative with the delegated authority to make decisions.

General Questions		Yes	No	Not Applicable	Include Comments, Rationale for Conclusion and Needed Follow-up Action, if any
1	Is this a temporary road or pad construction activity that may result in a discharge into navigable waters?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2	If the activity may result in a discharge into navigable waters, is the activity covered by the existing Construction General Permit (CGP) and Multi-Sector General Permits and associated Idaho Department of Environmental Quality 401 certifications?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3	Has the design for the road or pad been reviewed by the proponent's Stormwater Pollution Prevention Plan (SWPPP) compliance officer or SWPPP contact to ensure all measures identified in the SWPPP are accounted for and planned for implementation, including those measures included in section 3 of the SWPPP and CGP?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4	Does the proposed road include a new stream crossing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5	If a new stream crossing is proposed, is a 404 permit required before construction begins?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6	Does the addition of the new stream crossing exceed the 4 allowed under the National Environmental Policy Act (NEPA) decision?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7	Will the proposed temporary road construction result in exceeding the 10.2 miles allowed under the NEPA decision?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
8	Will the proposed pad construction result in exceeding the 137 drill pads allowed under the NEPA decision?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
9	Does the proposed temporary road or pad construction/reconstruction fall within a riparian conservation area (RCA)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
10	If the proposed temporary road or pad construction/reconstruction falls within an RCA, were alternatives to locate the facility outside the RCA considered to the maximum extent practicable ² ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Explain why moving the facility outside the RCA was not practicable

² To the extent possible [practicable] = Under EPA guidelines, “practicable” is defined as “available and capable of being done after taking into consideration cost, existing technology and logistics in light of the overall project purpose” (definition example from 40 CFR 230.10(3)).

General Questions		Yes	No	Not Applicable	Include Comments, Rationale for Conclusion and Needed Follow-up Action, if any
11	If the proposed temporary road or pad construction/reconstruction falls within an RCA, does the design sufficiently protect groundwater and surface water resources?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
12	Does the proposed road or pad construction fall within an area considered as at moderate or high risk to landslides, as determined either through SINMAP or through field verification? If SINMAP, what were results of field verification?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
13	If the proposed road or pad construction falls within an area field-verified as at moderate or high risk to landslides, were alternatives to locate the facility outside these areas considered to the maximum extent practicable? If no other practicable alternative exists, what measures will be undertaken to reduce impacts to slope stability?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Explain why moving the facility outside the landslide prone (LSP) area was not practicable. Provide Best Management Practices (BMPs) to be applied to reduce impacts to slope stability.
14	Will a gate be installed on the new temporary road to control unauthorized access?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Consistency with Best Management Practices (BMP)/Mitigation Measures (Attachment A—February 11, 2011 DN/FONSI)					
Soils and Geology		Yes	No	Not Applicable	Include Comments, Rationale for Conclusion and Needed Follow-up action, if any
14a	BMP I.2: Will erosion control blankets be placed on and adjacent to the roadway and/or drill pad to control erosion and stabilize slopes?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
15	BMP I.3: Will mulch-straw be placed on and adjacent to the roadway and/or drill pad to help temporarily stabilize soils?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
16	BMP I.4: Will mulch-wood chips be placed on and adjacent to the roadway and/or drill pad to help temporarily stabilize soils?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
17	BMP I.11: Will biotechnical stabilization be used to minimize the potential for slope mass failure on especially steep cut slopes adjacent to roadways?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
18	BMP II.1: Will topsoil that has been stockpiled adjacent to a drill pad or other suitable location be used during road construction to enhance revegetation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
19	BMP II.3: Will BMPs applicable to revegetating disturbed lands be used as appropriate, in consultation with the Forest Service?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
20	BMP II.4: Will broadcast seeding be used as appropriate on small sites, for repairing damage, or for very large, low-angle rock areas?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
21	BMP III.1: Where grades exceed 2 percent or where larger drainage flows may be anticipated, will a diversion ditch/dike be constructed for diverting surface water away from unvegetated areas on the adjacent vegetated ground?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
22	BMP III.2: Will an interceptor trench be constructed along a slope contour to carry surface runoff from slopes at 3:1 or less?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
23	BMP III.4: Will a siltation berm be placed on the downslope side of a disturbed site to capture and retain surface runoff so the sediment can be filtered before the water is discharged?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
24	BMP III.5: Will waterbars be used on the temporary road to divert runoff away from the road surface?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Consistency with Best Management Practices (BMP)/Mitigation Measures (Attachment A—February 11, 2011 DN/FONSI)					
Soils and Geology		Yes	No	Not Applicable	Include Comments, Rationale for Conclusion and Needed Follow-up action, if any
25	BMP III.10: Will rolling dips be installed to divert surface runoff from the road temporary surface, as dictated by the slope of the road (see BMP III.10 for details)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
26	BMP III.11: Is the temporary road outsloped by 1–2 percent from the cutslope? (Note: This does not apply on steep slopes due to vehicular traffic safety concerns. Instead, roads may be insloped.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
27	BMP III.12: Will a roadway surface water deflector be used on grades exceeding 6 percent?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
28	BMP V.1: Will straw bale barriers be used to help contain sediment onsite by catching and filtering runoff, across small swales, in ditches, and at the toe of bare slopes where there may be a temporary, large volume of sediment-laden runoff?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
29	BMP V.2: Will sediment traps be used at the outflow of culverts, water bars, and rolling dips?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
30	BMP V.3: Will a vegetated buffer strip be used to temporarily or permanently catch and hold sediment from runoff water at construction locations where increased protection from stormwater and snowmelt are needed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
31	BMP V.4: Will a silt fence/filter fence be used to filter sediment from runoff water before it is discharged, where there is potential discharge for sediment laden runoff caused by man-made surface disturbance?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
32	BMP V.5: Will a brush sediment barrier be used below any substantial surface disturbance?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
33	BMP V.7: Will a slash filter window be used to catch and retain sediment along road fill slopes adjacent to bare ground in steep terrain?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
34	Will additional Forest Service BMPs be implemented near constructed roads to stabilize soils and minimize erosion?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If additional BMPs used, identify which ones.

Consistency with Best Management Practices (BMP)/Mitigation Measures (Attachment A—February 11, 2011 DN/FONSI)					
Soils and Geology		Yes	No	Not Applicable	Include Comments, Rationale for Conclusion and Needed Follow-up action, if any
35	Have temporary roads been designed to Forest Service standards consistent with the Roads and Access Ways direction provided? (Note: The following list is not all inclusive.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	<ul style="list-style-type: none"> Have the design and critical vehicles for this temporary road been determined? Please list vehicles. 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	<ul style="list-style-type: none"> Will the minimum curve radii meet the needs of the limiting design vehicle? 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	<ul style="list-style-type: none"> Does the road gradient fit as closely as possible to the natural terrain and does it meet design vehicle limitations? 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	<ul style="list-style-type: none"> Does the road gradient exceed 8 percent except for pitch grades (300 feet or less in length)? If so, what additional BMPs or road features (e.g., surfacing, increased drainage spacing) will be implemented to ensure adequate erosion control? 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	<ul style="list-style-type: none"> Have adequate turnouts been incorporated into the design? For low standard roads, these are generally naturally occurring, such as additional widths on ridge lines or other available flat terrain 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	<ul style="list-style-type: none"> Has drainage control been ensured over the entire length of road? 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	<ul style="list-style-type: none"> Does the road location contain side slopes >20 percent or other areas of environmental or engineering concern where plan and profile drawings may be required? 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	<ul style="list-style-type: none"> Will all excavated material be used in the embankment and not wasted or sidecast? 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	<ul style="list-style-type: none"> Have road construction notes been included in road package? 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Water Quality		Yes	No	Not Applicable	Include Comments, Rationale for Conclusion and Needed Follow-up action, if any
36	Will water bars be installed within 100 feet of stream crossings on temporary roads to minimize surface water flow and sediment delivery?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
37	Will crushed native rock be installed within 50 feet of stream crossings on temporary roads to minimize sediment accumulation on vehicles and transport into surface waters?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
38	Will culverts be installed on all intermittent and perennial stream crossings on newly constructed temporary roads? (Note: Culverts should be sized based on the 50-year flood recurrence interval flow for intermittent stream crossings and the 100-year flood recurrence interval flow for perennial streams to meet State law and Forest Plan standards.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
39	Will the proposed temporary road be located at least 500 feet from Grimes Creek?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Terrestrial and Avian Wildlife		Yes	No	Not Applicable	Include Comments, Rationale for Conclusion and Needed Follow-up action, if any
40	If nesting northern goshawk or great gray owls have been located through surveys described in Attachment A of the DN/FONSI, will proposed activities avoid disturbance or other alteration of the occupied nest tree and all surrounding forest/tree habitat within 150 feet of the nest tree, including trees ≥ 4 inches dbh?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
41	If nesting northern goshawk or great gray owls have been located through surveys described in Attachment A of the DN/FONSI, will proposed temporary road and/or drill pad locations be modified or relocated to prevent direct disturbance of the nest site?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
42	Will activities avoid legacy and large size trees to the maximum extent practicable, including adjustment of road and drill pad locations to avoid removal and/or substantial root damage of legacy and large size trees?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
43	If avoidance of legacy and large size class trees is not possible, what other measures, if any, will be undertaken to minimize impacts to legacy and large size trees?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
43a	Will noise generated from drilling equipment to be used at a specific pad location result in disruption to wildlife species that are known to occupy areas within and/or immediately adjacent to the project area (up to 1/2 mile) during nesting, denning, calving or fawning seasons? If noise levels are determined to be potentially disruptive, what additional sound dampening BMPs ^a should be used to reduce the potential for disruption during sensitive time periods at a specific drill pad location?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

^a Noise can deter wildlife from using an area. Typical BMPs include: (1) Use of upgraded noise reduction mufflers to comply with noise standards; (2) earthen berms, walls, sheds, or pads around noise generating equipment; and/or (3) increase the distance from important habitats to reduce sound levels that may disrupt species during sensitive seasons.

Aquatics		Yes	No	Not Applicable	Include Comments, Rationale for Conclusion and Needed Follow-up action, if any
44	Within RCAs, will BMPs be implemented to ensure that sediment generated by drilling activities will be minimized and liquids used during drilling will be properly stored and distributed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
45	Within RCAs, will fuels and other toxicants be stored or will refueling occur? If so, please document why no other alternatives are present, and document that this storage or refueling has been approved by the Responsible Official and it has an approved Spill Prevention, Control, and Countermeasure (SPCC) Plan commensurate with the amount of fuel.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Vegetation		Yes	No	Not Applicable	Include Comments, Rationale for Conclusion and Needed Follow-up action, if any
46	Have required predisturbance surveys been completed for LESA and other Sensitive Plant species?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If yes go to #47
47	Are activities within a LESA Plant Conservation Area (PCA)? Will activities impact occupied habitat of other Region 4 sensitive plant species?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If yes, go to Attachment A and identify applicable mitigation and monitoring requirements that will be applied
48	During road and drill pad construction, will appropriate procedures, such as avoiding pushing or placing green ponderosa pine slash under or against live standing ponderosa pine trees, been undertaken to keep the potential for widespread tree mortality from <i>Ips</i> beetle low?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Cultural Resources		Yes	No	Not Applicable	Include Comments, Rationale for Conclusion and Needed Follow-up action, if any
49	If a temporary road location has changed, has a qualified archeologist reviewed and determined the need for an additional cultural resources survey?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
50	As final drill pads are located, has a qualified archeologist been consulted to determine the need for additional cultural resource surveys?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
51	If the temporary road is near the identified cultural site in the Area of Potential Effect, has a qualified archeologist flagged the site for avoidance?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Pre-Disturbance Checklist ATTACHMENT A

Mitigation/Design Features to avoid/minimize impacts to Region 4 Sensitive¹ Sacajawea’s bitterroot plants and plant conservation area (PCA)

Bitterroot Mitigation

A Plant Conservation Area (PCA) of 300 meters (m) surrounding occupied *Lewisia sacajawea* (LESA, Sacajawea’s bitterroot) habitat has been used to mitigate direct and indirect effects of proposed activities to LESA plants, their pollinators and associated habitat.

For purposes of this Supplemental Environmental Assessment (SEA), the LESA PCA has been defined to include four concentric rings or buffer zones: Ring 1—occupied habitat; Ring 2—outer extent of occupied habitat plus 20 meters; Ring 3—outer extent of occupied habitat plus 100 meters; and Ring 4—outer extent of occupied habitat plus 300 meters. Project-related activities that are permitted within each of the buffer rings are identified below, by activity.

Road Use, Maintenance and Construction/Relocation

RP-1. To the maximum extent practicable (MEP)² no new road construction/relocation will be permitted within buffer rings 1 through 4 of a LESA PCA. Should the

¹ Sensitive Species, Agency Policy (FSM 2670.32) includes: The line officer, with project approval authority, makes the decision to allow or disallow impact, **but the decision must not result in loss of species viability or create a significant trend toward federal listing.**

² **Use of Maximum Extent Practicable (MEP) and Requirements under 36 CFR 228**

The term “maximum extent practicable,” or MEP, is embodied as the basic performance standard in numerous state and federal regulations, including the Federal Endangered Species Act and Section 404 of the Federal Clean Water Act. The MEP standard does not necessarily involve the same criteria in each application; it is intended to address projects or actions on an individual basis considering each of their specific circumstances and purpose.

Under the EPA guidelines, practicable is defined as: “*available and capable of being done after taking into consideration cost, existing technology and logistics in light of overall project purposes* (40 CFR 230.10(a)(2)).”

The USFWS/NOAA HCP Handbook (Section 7.B.2) states that a conservation program may be evaluated against the MEP standard by: “*weighing the benefits and costs of implementing additional mitigation, the amount of mitigation provided by other applicants in similar situations, and the abilities of that particular applicant.*”

Avoidance of impacts to LESA is the objective where practicable. Where avoidance is not practicable (see next paragraph), then activity impacts to LESA plants will be minimized to the MEP. When impacts cannot be avoided, the botanist shall be required to document through the checklist process that the location of the activity and techniques used to minimize impacts were sufficient to NOT change in the current effects determination disclosed in the SEA; i.e. “may impact individuals but is not likely to cause a trend toward federal listing or a loss in viability. If the botanist determines that the effects determination would change, the Responsible Official will evaluate whether or not the new information or changed circumstances constitute unforeseen significant surface disturbance that would require a modification of the plan of operations in accordance with 36 CFR 228.4(e). If effects would be outside the scope and range of effects considered in the original analysis, correction, supplementation or revision of the SEA may be required in accordance with FSH 1909.15 section 18.4 to support a modification of the plan of operations. Pending a determination of whether or not a modification of the approved plan is required, operation may be suspended, in whole or in part, in accordance with 36 CFR 228.4(e)(3).

Thus, when a mitigation states that an activity will be “avoided” or “minimized” to the MEP, it will be interpreted within the framework of determinations as to whether the avoidance or minimization mitigation can be applied in a manner that will not “endanger or materially interfere with prospecting, mining or processing operations or uses reasonably incident thereto (FSH 2809.15; 36 CFR 228.8; 30 U.S.C. § 601, et seq.) as documented in a Surface Use Evaluation and Determination (FSH 2809.15 (13)), or equivalent report.

proponent determine road building is required in rings 1 through 4, the proponent shall request the road through the checklist process (see above). Through the checklist process, the Forest Service (FS) Minerals Administrator, in coordination with the botanical monitor, must designate a location that meets the proponent's exploration objective and avoids, or where avoidance would endanger or materially interfere with exploration operations or uses reasonably incident thereto, minimizes impacts to LESA to the MEP². Construction activities shall not occur during the LESA active growing/flowering period³, thus minimizing impacts to pollinators of LESA plants resulting from ground disturbance and/or dust.⁴

- RP-2. All roads proposed to be constructed in a PCA must be identified no later than the first week of June of the season construction is proposed so that LESA surveys can be completed by a qualified botanist and appropriate mitigation identified.
- RP-3. In buffer rings 1 and 2, all existing roads, except for main access roads as outlined on Figure 1, shall be closed to use to the MEP unless authorized by the FS Minerals Administrator in coordination with the onsite botanical monitor (see Implementation of ME-10). Closed roads will be signed or otherwise marked to prohibit vehicular use.
- RP-4. In buffer rings 1 and 2, road maintenance on existing roads will be restricted to the main access roads to the MEP (refer to Figure 1). LESA surveys will be completed on these road sections, including cut and fill slopes, during the active flowering season prior to maintenance activities. Road maintenance will be constrained to the width needed to meet soil, water, and safety Best Management Practices (BMPs) while avoiding impacts to LESA plants to the MEP unless authorized by the FS Minerals Administrator in coordination with the onsite botanical monitor (see "Implementation Monitoring" below).

When the road is no longer needed to support authorized operations, it will be closed. Closed roads will be signed or otherwise marked to prohibit vehicular use unless authorized by the Responsible Official.

- RP-5. To minimize impacts to pollinator habitat in buffer rings 3 and 4, vehicle use on existing roads, other than the main access roads (see Figure 1), needed to support operations approved through the checklist process (see checklist above), will be minimized to the MEP during the LESA active growing/flowering period³.

³ The active growing/flowering period for LESA can vary from season to season and location to location. The initiation of the flowering period follows snow melt each year. To cover the range of snowmelt across a PCA, the active growing/flowering period occurs between June 1 and July 20 based on typical weather patterns.

⁴ All proposed activities in rings 1 and 2 and new road construction in rings 3 and 4 will be reviewed by a FS Minerals Administrator and the FS botanist to determine if the proposed activities can be implemented in accordance with purpose of a PCA (i.e., Attachment A, Part 5, Checklist process). If it is determined that impacts to LESA could occur with the proposed activities, the FS and CUMO representatives will meet to develop an alternate plan that would avoid impacts to LESA plants in a PCA yet meet the proponent's objectives. If a resolution cannot be met, a Certified Minerals Examiner (CME) will prepare a formal Surface Use Determination (SUD) to determine if avoidance within a PCA would "endanger or materially interfere with prospecting, mining, or processing operations or uses reasonably incident thereto (FSH 2809.15; 36 CFR 228.8; 30 U.S.C. § 601, et seq.), then additional analysis will be required to determine if disturbance within these zones can be done in a manner where the effects would not change the species determination contained in the SEA. See also, footnote 2 concerning MEP.

When a road is no longer needed to support authorized operations, it will be closed. Closed roads will be signed or otherwise marked to prohibit vehicular use unless authorized by the Responsible Official.

- RP-6. Within buffer rings 3 and 4, road maintenance is allowed on all existing roads as needed to meet soil, water, and safety BMP requirements. LESA surveys will be completed on these road sections, including cut and fill slopes, during the active growing season prior to maintenance activities. Should LESA plants be identified during surveys, the FS Minerals Administrator will be notified immediately, in consultation with the botanist, to determine what course of action is needed to avoid impacts to LESA plants to the MEP².
- RP-7. Dust abatement⁵ is required on all roads used during the operating period within a PCA during the LESA active growing/flowering period to minimize effects to flowering plants and pollinators. Frequency of dust abatement will be based on seasonal conditions and dust palliative mixture used. However, if through photo point monitoring (see monitoring requirement below), it is determined that dust abatement desired to minimize impacts to LESA plants and/or pollinator habitat is not being realized, then the frequency of dust abatement will be increased and/or activity resulting in dust within a PCA will be reduced during the LESA active growing/flowering period until monitoring results in the desired outcome.
- RP-8. To avoid fragmentation of occupied and potential LESA habitat, place areas to be disturbed by road construction/relocation operations *downslope* of LESA occupied and/or potential habitat within a PCA to the MEP²

Drill Pad Construction and Use

- RP-9. To the MEP², avoid new drill pad construction within buffer rings 1 and 2. Should the proponent determine drill pad construction is required in rings 1 and/or 2, the proponent shall request the drill pads through the checklist process (see checklist above). Through the checklist process, the FS Minerals Administrator, in coordination with the botanical monitor, must designate a location that meets the proponent's exploration objective and avoids, or where avoidance would endanger or materially interfere with exploration operations or uses reasonably incident thereto, minimizes impacts to LESA habitat and plants to the MEP. In addition, to the MEP, drill pad construction or reconstruction should be confined to the existing road prism. Construction activities shall not occur during the LESA active growing/flowering period³, thus minimizing impacts to pollinators of LESA plants resulting from ground disturbance and/or dust.
- RP-10. All pads proposed to be constructed in a PCA (i.e., rings 1, 2, 3 and/or 4) must be identified through the checklist process no later than the first week of June of the season construction is proposed so that LESA surveys can be completed by a qualified botanist and appropriate mitigation identified for use.
- RP-11. To minimize disturbance within rings 3 and 4, new drill pads should be placed within the prism of existing roads to the MEP. If new road construction is needed to

⁵ Dust abatement may include use of water and/or dust palliative mixtures (e.g. magnesium chloride) to ensure effectiveness.

access additional drill pad locations within rings 3 and 4 to meet the exploration objective, options that incorporate the existing road system within rings 3 and 4 to the MEP that result in the least amount of direct and indirect effects to occupied or potential LESA habitat outside the existing road system should be used.

Should the proponent determine new road construction is required in rings 3 and 4 to access a drill pad location important to meeting the exploration objective, the proponent shall request the road through the checklist process (see checklist above) at the same time as construction of the associated drill pad is requested. Through the checklist process, the FS Minerals Administrator, in coordination with the botanical monitor, must designate a location of the road and/or pad that meets the proponent's exploration objective and avoids, or where avoidance would endanger or materially interfere with exploration operations or uses reasonably incident thereto, minimizes impacts to LESA habitat and plants to the MEP. Road and/or pad construction activities in rings 3 and 4 of a PCA shall not occur during the LESA active growing/flowering period³, thus minimizing impacts to pollinators of LESA plants resulting from ground disturbance and/or dust.

- RP-12. Dust abatement is required on all drill pad construction/operations that occur within a PCA during the LESA active growing/flowering period³ to minimize effects to flowering plants and pollinators. Frequency of dust abatement will be based on seasonal conditions and dust palliative mixture used. However, if through photo point monitoring (see monitoring requirement below), it is determined that dust abatement desired to minimize impacts to LESA plants and/or pollinator habitat is not being realized, then the frequency of dust abatement will be increased and/or activity resulting in dust within a PCA will be reduced during the LESA active growing/flowering period until monitoring results in the desired outcome.
- RP-13. To avoid fragmentation of occupied and potential LESA habitat, place areas to be disturbed by drill pad construction/drilling operations *downslope* of LESA occupied and/or potential habitat within a PCA to the MEP².
- RP-14. To minimize the extent of disturbance within a PCA, clearly mark the areas to be disturbed by drilling, pad construction, or other using flagging or other media so that the potential area where effects resulting from subsequent support operations would be allowed is clearly defined (e.g., effects from trampling and vehicle use).

Other Activities within a PCA

- RP-15. To the MEP², no off-road vehicle use will be permitted within a LESA PCA. Should the proponent determine off road vehicle use is required to support exploration operations, the proponent will request such use through the checklist process (see checklist above) clearly identifying what aspect of the operation this use is needed to support. Through the checklist process, the FS Minerals Administrator, in coordination with the botanical monitor, must designate locations for off road vehicle use that meets the proponent's exploration objective and avoids, or where avoidance would endanger or materially interfere with exploration operations or uses reasonably incident thereto, minimizes impacts to LESA habitat and plants to the MEP².

- RP-16. If new plants are found within the PCA identified on Figure 1, then buffer zones (4 concentric rings) will be applied to the new areas. Applicable mitigation for each of the four zones identified above would then be applied consistent with requirements in the existing zones.
- RP-17. Water transport facility (e.g., hose, pipe) from the water source to the drill rig to support drilling operations shall be conducted as follows:
- c. Within Rings 1 and 2—Permitted on the main access roads in locations with no known LESA plants only, to the MEP. If water transport facility must be placed in locations off the main access road within a PCA, the proponent shall request this use through the checklist process. Through the checklist process, the FS Minerals Administrator, in coordination with the botanical monitor, must designate locations for the water transport facility off the main access road that meets the proponent's exploration objective and avoids, or where avoidance would endanger or materially interfere with exploration operations or uses reasonably incident thereto, minimizes impacts to LESA habitat and plants to the MEP².
 - d. Within Rings 3 and 4—Use existing roads to the MEP². If water transport facility must be placed in locations off the existing roads within a PCA, the proponent shall request this use through the checklist process. Through the checklist process, the FS Minerals Administrator, in coordination with the botanical monitor, must designate locations for the water transport facility off the existing roads that meets the proponent's exploration objective and avoids, or where avoidance would endanger or materially interfere with exploration operations or uses reasonably incident thereto, minimizes impacts to LESA habitat and plants to the MEP.

Activities outside current PCA

- RP-18. While the probability of finding additional LESA plants outside the current PCA (Figure 1) is low to very low (refer to SEA Section 3.3.2.1.5 [Rare Plants], Figure 10a), prior to any new road or drill pad construction, LESA surveys will be conducted for at least one growing season during the LESA flowering period to determine presence or absence of LESA plants (see Checklist above). If new plants are found outside the PCA identified in Figure 1, then PCA/buffer zones (4 concentric rings) will be applied to the new areas. Applicable mitigation for each of the four zones identified above would then be applied consistent with requirements in the existing zones.

Other Sensitive Plant Mitigation

- RP-18a. As identified in the project Botanical Biological Evaluation, other Region 4 Sensitive Species have not been observed in the project area, and while some localized habitat areas may exist, the likelihood of occupied habitat occurring is low. However, while the likelihood is low, occupied habitat may still exist. Thus, pre-disturbance surveys will be conducted for the Sensitive species Idaho dwarf primrose (*Douglasia idahoensis*), least phacelia (*Phacelia minutissima*), and whitebark pine (*Pinus albicaulis*) by a qualified botanist prior to any ground

disturbing activities as part of the Checklist process (see checklist above). Surveys for these species would be conducted at the same time as those completed for Sacajawea Bitterroot discussed above.

If individuals of Idaho dwarf primrose (*Douglasia idahoensis*), least phacelia (*Phacelia minutissima*), or whitebark pine (*Pinus albicaulis*) are located during surveys, to the MEP occupied habitat shall be avoided by project related ground disturbing activities (e.g., road construction, road maintenance, and drill pad construction).

Noxious Weed Mitigation

- RP-19. CuMoCo shall use a high pressure washing system to clean the sides, tops, and undercarriages of all construction equipment to remove seeds, plants, plant fragments, dirt, and debris from the equipment before the equipment is used on NFS lands. Follow guidelines documented in [USDA Forest Service Guide to Noxious Weed Prevention Practices](#) (USDA FS, 2001), and management direction from the 2003 Forest Plan as amended in 2010 (USDA FS 2010). Washed equipment shall be inspected to ensure that the washing removed the dirt, debris, and seeds from the equipment. Rewash the construction equipment as necessary or as directed by the FS Minerals Administrator. Construction equipment does not include cars, pickup trucks, and other vehicles that regularly travel between the construction site and areas outside of NFS lands. The FS Minerals Administrator shall be provided the opportunity to monitor and inspect the washing activities by receiving notice at least 15 days in advance of moving construction equipment onto NFS lands. CuMoCo has prepared a Field Procedures Manual (FPM) (project record) that provides additional details regarding the washing of vehicles and procedures for monitoring this provision.
- RP-20. Approved commercial washing facilities is acceptable. If washing must occur on NFS lands, CuMoCo will use a washing system that traps all wash water and either stores it for removal from NFS lands or recycles the water for continued use. If the equipment recycles the water, CuMoCo will provide adequate filters for seed removal. CuMoCo will dispose of the filter material and removed seeds in an approved manner. Soaps, detergents, or other chemicals will not be mixed with the wash water. The FPM identifies the acceptable washing location as Don's Truck Wash in Boise (Forsgren 2011c).
- RP-21. CuMoCo shall report findings of undocumented noxious weed populations in the project area to the District Weed specialist for inclusion in treatment prescriptions.
- RP-22. Treatment of Noxious Weeds within LESA PCA (Figure 1):
- a. Within Ring 1: Hand pulling or bio-control only
 - b. Within Ring 2: Hand pulling, bio-control, and/or chemical treatment after the LESA active growing/flowering period⁸
 - c. Within Rings 3 and 4: Hand pulling, bio-control and/or chemical treatment

Reclamation Mitigation

- RP-23. In addition to the reclamation information provided in the Plan of Operations (PoO), CuMoCo CuMoCo has submitted a Reclamation Plan, which was approved by the Project Botanist and Biologists. The Reclamation Plan includes more details regarding reclamation (e.g., roads, drill holes, water crossings), including the use of seed/plant propagules, mulch, soil amendments, or fertilizer (Forsgren 2011d). The operation would be conducted within guidelines provided in the Idaho Mining BMPs (IDL, 1992). CuMoCo is responsible for maintaining, updating, and implementing the Reclamation Plan for the life of the project.
- RP-24. For all post-disturbance seeding/planting, the proposed species mix to be used is outlined in the Reclamation Plan required by the previous measure (Forsgren 2011d). The Forest or District Botanist will approve the final seed mix(es) (FSM 2070.3) to ensure that appropriate native species (or native/non-native blends) are used and that undesirable species are not introduced into the project area (Forsgren 2011d). Any seed or plant propagules to be used in Project Area reclamation will be reviewed and subject to FS approval to verify quality standards and provenance. Reclamation activities must be scheduled to attain maximum seed germination and plant survival.
- RP-25. CuMoCo will work with the District Botanist to incorporate locally collected seed into the seeding plan. Seed collection might occur using a contract and/or FS agreement. Target seed species and amounts to be collected are specified in the Reclamation Plan and are based on habitat type and projected acres of disturbance. Seed collection planning and implementation must occur early in the process to ensure collection volume is adequate and allow time for seed cleaning and testing (Forsgren 2011d).
- RP-26. Any road segments (e.g., main access roads, temporary roads) that have LESA plants within the road prism will not be reclaimed/restored, unless such measures are deemed necessary for soil and water stabilization. To the MEP, road reclamation will be designed to avoid impacts to LESA plants within occupied habitat.

Monitoring

LESA (i.e. Bitterroot)

During the summer of 2011, CuMoCo initiated the monitoring program for LESA identified in the February 2011 Decision Notice/FONSI (refer to Monitoring Plan Report in November 2012 [CSR 2012a]). However, the baseline data established as a result of the 2011 efforts needs to be re-established due to impacts from 2014 wildfires and related suppression activities that affected a portion of the original 2011 bitterroot monitoring area.

In addition, the subsequent monitoring program to be conducted through the life of the Project has been updated to include both implementation and effectiveness monitoring elements. These monitoring features will be used to ensure LESA Design

Features and mitigation are being implemented as intended and that the effects assumed do not exceed those anticipated.

Implementation Monitoring

NOTE: ME-1 through ME-4 pertain to re-establishment of the baseline and are not included here.

- ME-5. FS personnel, or a qualified contractor who works under the direction of the FS, will conduct onsite inspections of project activities (construction/operations) at least once during the LESA active growing season or shortly thereafter to document adherence to Design Features and note any potential changes in habitat quality or quantity within a LESA PCA. The results will then be used to validate Design Features are being applied correctly.
- ME-6. Should any surface disturbance (e.g., drill pad construction, road maintenance) be authorized within a LESA PCA, an onsite botanical monitor may be present onsite during construction and road maintenance to ensure LESA plants are not impacted and impacts to associated habitat for pollinators is minimized. Onsite monitoring shall be required when activities are allowed within Rings 1 and 2; the need for a monitor to address approved activities within Rings 3 and 4 would be identified as part of the pre-disturbance checklist approval.

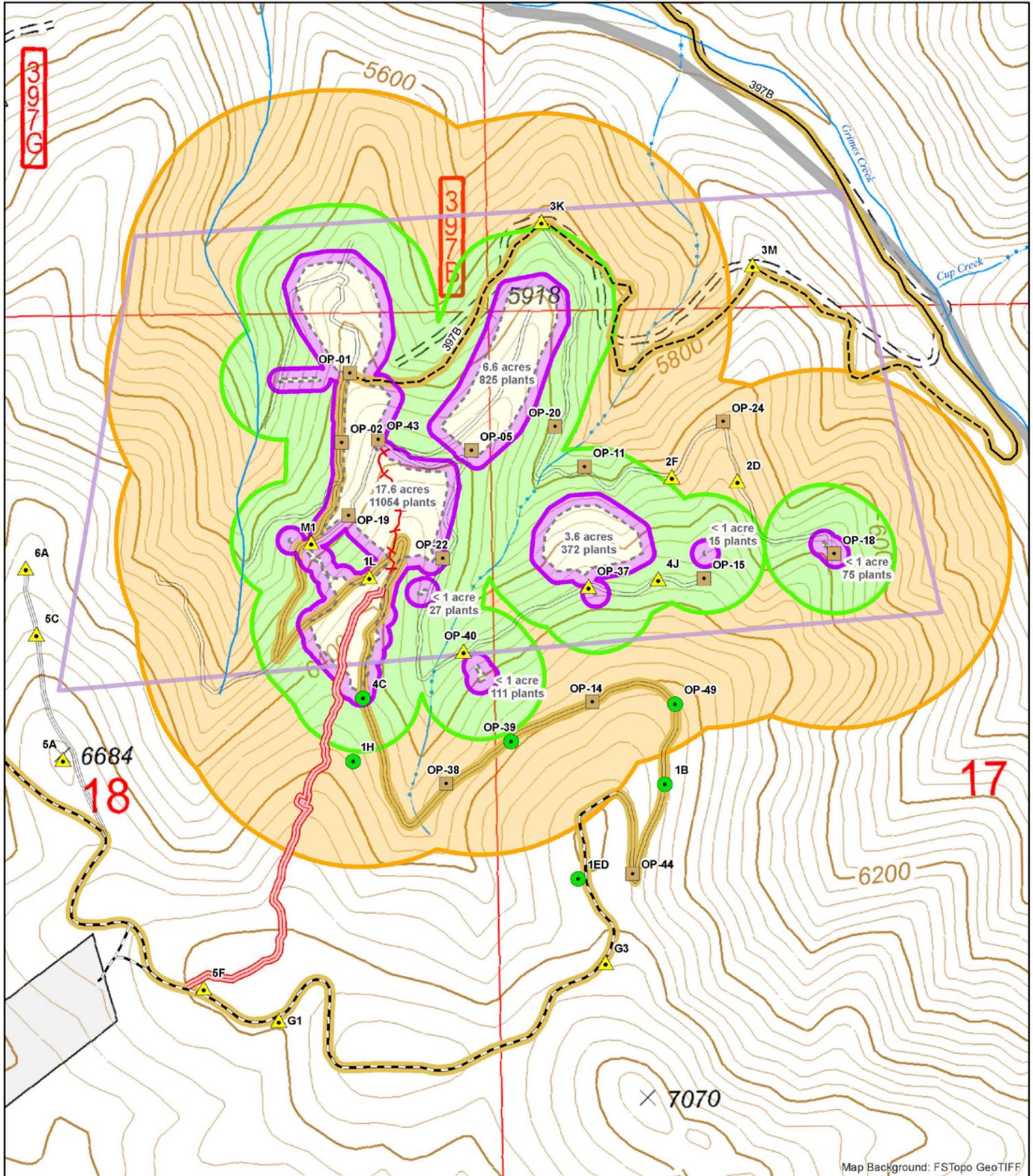
Effectiveness Monitoring

- ME-7. Site conditions will be documented with photo-point monitoring prior to any surface disturbance at approved drilling locations (and roads if permitted following a Surface Use Determination) within a LESA PCA, including potential LESA habitat, the same photo will be retaken at least once after the new drill pad is constructed and at least once within the season the pad is rehabilitated. This photo point series will be used to validate assumptions made in the SEA analysis as to the effectiveness of mitigation applied during each phase of the operation to minimize ground disturbance within the PCA, including constructing new pads within existing road prisms.
- ME-8. At least two photo-point locations will be established along the main access roads and adjacent to any active drill pad within a LESA PCA (refer to Figure 1) to determine if road-related impacts on adjacent LESA occupied habitat and/or pollinator habitat following application of Design Features (i.e., dust abatement) resulted in the outcome assumed in the SEA effects analysis. Photos will be retaken at least twice per year during the LESA flowering period (June 1 to July 20) to ensure that no unexpected habitat impacts from road use and/or dust are occurring. If dust abatement measures are not effective (not within the SEA effects analysis outcomes), adjustments in mitigation will be made to ensure impacts to LESA plants and habitat remain within the range of effects described in the SEA, Chapter 3. See dust abatement Design Feature above for adjustment options.
- ME-9. At least four photo-point locations will be established by FS/qualified botanists at key sites within a LESA PCA to assess any changes in habitat conditions or threats over time. The results will then be used to validate assumptions that effects are staying within the range anticipated in the analysis.

ME-10. The number of acres within a LESA PCA that are impacted by disturbance/activities, including construction, operations, vehicle use, and road maintenance, will be tracked annually. CuMoCo shall provide maps and photo point monitoring results of disturbed areas (per previously identified protocol) to the FS at the end of each field season throughout the life of the project. The results will be used to validate assumptions that vegetation effects are staying within the range anticipated as to the extent of road and drill pad construction (i.e., acres disturbed).

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Figure 1. Topographic Map of Plant Conservation Area (PCA) and CuMo Project Drill Holes



Legend

Plant Conservation Area*

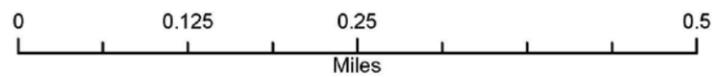
- Ring 1, *Lewisia* Population, 28.1 acres
- Ring 2, 20 Meter Buffer, 50.2 acres
- Ring 3, 100 Meter Buffer, 150.8 acres
- Ring 4, 300 Meter Buffer, 371.5 acres
- 2011 *Lewisia* Monitoring Area

CuMo Drill Hole

- Constructed/Improved Post 2011
- Approved but not constructed under 2011 checklist
- Historic drill pad
- Remnant 397B road that is included in topographic ArcGIS layer. Actual 397B road is shown and labeled above.

- NFS Open Road
- NFS Admin Road
- Road Constructed Post 2011
- Existing Unauthorized Road
- Proposed Road, Checklist Submitted
- Main Access Road
- Cumo Project Boundary
- Grimes Fire Line
- Dozer Line
- Hand Line
- Stream Perennial
- Stream Intermittent

Revised
9/24/2015



*Revisions to the plant conservation area (PCA), plant numbers, and drill hole location/status are based on new data collected since the publication of the "*Lewisia sacajawana* Addendum to the Biological Evaluation of the Effects on Sensitive Plant Species" on April 3, 2015.

Prepared by the Boise National Forest, Supervisor's Office, Boise, Idaho, 9/24/2015, 12:16 hrs, jennapadilla
Coordinate System: NAD 1983 UTM Zone 11N
T:\FS\NFS\Boise\Program\2008\Minerals\Geology\GIS\Workspaces\jennapadilla\CUMO\20150924_CuMo_PCA_DrillHole_11x17_post.mxd
The U.S. Department of Agriculture, Forest Service uses the most current and complete data available. GIS data and product accuracy may vary. They may be developed from sources of differing accuracy, accurate only at certain scales, based on modeling or interpretation, incomplete while being revised or created, etc. Using GIS products for purposes other than those for which they were created, may yield inaccurate or misleading results. The Forest Service reserves the right to correct, modify, or replace GIS products without notification.

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ATTACHMENT A—PART 6

Forest Service Engineering Standards for Temporary Roads Applicable to Project Supplemental Decision

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Attached are standards to be used to ensure temporary roads are located and constructed to Forest Service standards as recognized in section 2.3.1 Soils and Geology of the environmental assessment. These guidelines are to be used in connection with listed BMPs. Also included as exhibit 1 are traffic service levels. Traffic service levels include traffic characteristics that are used in the selection of design criteria and describe road operating conditions. All temp roads for this project will have characteristics of traffic service level D.

Jeffrey P. Alexander
Ally P. Alex 2/10/11
Forest Engineer

Exhibit 1

Traffic Service Levels

	A	B	C	D
Flow	Free flowing with adequate parking facilities.	Congested during heavy traffic such as during peak logging or recreation activities.	Interrupted by limited passing facilities, or slowed by the road condition.	Flow is slow or may be blocked by an activity. Two way traffic is difficult and may require backing to pass.
Volumes	Uncontrolled; will accommodate the expected traffic volumes.	Occasionally controlled during heavy use periods	Erratic; frequently controlled as the capacity is reached.	Intermittent and usually controlled. Volume is limited to that associated with the single purpose.
Vehicle Types	Mixed; includes the critical vehicle and all vehicles normally found on public roads.	Mixed; includes the critical vehicle and all vehicles normally found on public roads.	Controlled mix; accommodates all vehicle types including the critical vehicle. Some use may be controlled to vehicle types.	Single use; not designed for mixed traffic. Some vehicles may not be able to negotiate. Concurrent use traffic is restricted.
Critical Vehicle	Clearances are adequate to allow free travel. Overload permits are required.	Traffic controls needed where clearances are marginal. Overload permits are required	Special provisions may be needed. Some vehicles will have difficulty negotiating some segments.	Some vehicles may not be able to negotiate. Loads may have to be off-loaded and walked in.
Safety	Safety features are a part of the design.	High priority in design. Some protection is accomplished by traffic management.	Most protection is provided by management.	The need for protection is minimized by low speeds and strict traffic controls.
Traffic Management	Normally limited to regulatory, warning, and guide signs and permits	Employed to reduce traffic volume and conflicts.	Traffic controls are frequently needed during periods of high use by the dominant resource activity.	Used to discourage or prohibit traffic other than that associated with the single purpose.
User Costs	Minimize; transportation efficiency is important.	Generally higher than "A" because of slower speeds and increased delays	Not important; efficiency of travel may be traded for lower construction costs.	Not considered.
Alignment	Design speeds is the predominant factor within feasible topographic limitations.	Influenced more strongly by topography than by speed and efficiency.	Generally dictated by topographic features and environmental factors. Design speeds are generally low.	Dictated by topography, environmental factors, and the design and critical vehicle limitations. Speed is not important.
Road Surface	Stable and smooth with little or no dust, considering the normal season of use.	Stable for the predominant traffic for the normal use season. Periodic dust control for heavy use or environmental reasons. Smoothness is commensurate with the design speed.	May not be stable under all traffic or weather conditions during the normal use season. Surface rutting, roughness, and dust may be present, but controlled for environmental or investment protection.	Rough and irregular. Travel with low clearance vehicles is difficult. Stable during dry conditions. Rutting and dusting controlled only for soil and water protection.

Roads and Access Ways

To ensure public safety and the protection of Federal resources, FS roads must be constructed to an appropriate standard no higher than necessary to accommodate the intended use. In many cases, the construction of a lower-class road will meet the operator's access needs, while minimizing the effects on other important resource values.

Roads used to access locations are typically constructed for that primary purpose, are rarely permanent, and exist only as long as necessary to complete exploration operations. They are authorized with an accompanying reclamation plan and are to be reclaimed after exploration operations are completed. In relatively rare cases, the surface management agency or surface owner may assume responsibility for the continued operation and maintenance of roads deemed necessary.

The authorized officer has the option of determining whether professional engineering design and construction oversight is necessary or whether the road can be constructed by the operator consistent with site-specific standards and approved road design templates (Figures 2 and 3).

Roads also have the potential to cause environmental harm through erosion, air pollution, stream degradation, habitat alteration, and increased public use of an area. Careful attention to the proposed road location and design can significantly minimize environmental harm. For example, shorter roads constructed on steep slopes may cost more to construct, maintain, and reclaim and can also result in greater environmental impacts than would longer roads constructed along the contours of the land or constructed in flatter terrain. In areas of high environmental sensitivity, special road location, design, and construction and maintenance techniques may be required, as well as seasonal vehicular closures to the general public.

Road Location

Road location is critical to the long-term maintenance and environmental success of a road construction project. Proper road location can significantly reduce or eliminate impacts to cultural, scenic, biological, and other environmental resources. Operators are strongly encouraged to contact the surface management agency or private surface owner about possible route locations. This early communication between the operator and the surface management agency or private surface owner can minimize changes made at the onsite inspection and reduce project delays.

Existing roads should be considered for use as access routes and may be used when they meet agency standards, transportation and development needs, and environmental objectives. When access involves the use of existing agency roads, operators must obtain agency approval and may be required to upgrade the roads, contribute to road maintenance funds, or participate in road maintenance agreements.

When selecting a location for new roads, consider following topographic contours. While laying out roads in a point-to-point approach minimizes the length of road, it often increases soil erosion, maintenance costs, long-term loss of vegetation, and visual contrast. Following natural topographic contours preserves natural drainage patterns and usually makes it possible to design a more aesthetically pleasing road with lower construction, maintenance, and reclamation costs and less impact on the environment.

Initial steps in road location include:

- Determination of the intended use of the road, planned season of use, type of vehicles to be used, road class, and needs of the surface owner or agency
- Examination of the surface management agency's transportation plan, which may already have identified feasible routes for the area
- Examination of existing data, including maps and aerial photos, land use plan decisions, and biological, physical, and cultural conditions of the area

Once these steps have been taken, an appropriate route can be identified. This process is critical to ensuring that the safest and least intrusive route is chosen.

Geotechnical Factors

In complex terrain or conditions, it is recommended that the operator look at various route alternatives before selecting the preferred route. Field reconnaissance of alternative routes may be necessary in order to provide information on such factors as soil types, construction/reclamation limitations, type of excavation, landslide areas, subgrade conditions indicating the need for surfacing, potential cut slope problems, surface or subsurface water problem areas, suitability of fill material, potential gravel pits or quarries for road aggregate, and potential borrow and waste sites. A good road location analysis may avoid costly problems and identify cost-saving opportunities.

When the road location information is submitted to the surface management agency, the acceptability of the proposed route, and if applicable, alternative routes, can be evaluated. The preferred road location will be identified by the authorized officer at the onsite inspection.

Road Design and Construction

Construction and Reclamation Considerations

New road construction or reconstruction by the operator must be suitable for the intended use and must comply with applicable FS road and safety standards.

Roads should be designed and constructed to allow for successful interim and eventual final reclamation. To ensure successful growth of plants and forbs, topsoil must be salvaged where available during road construction. To ensure the stability of freshly topsoiled slopes during revegetation, the application of mulch or other sediment control measures may be appropriate.

Construction with saturated or frozen soils results in unstable roads and should be avoided. Vehicular travel under wet conditions can produce significant rutting of unsurfaced roads resulting in soil loss and safety concerns. If road use is anticipated during saturated soil conditions, the surface management agency may require road surfacing to provide safe vehicle access, ensure uninterrupted operations, and reduce road damage and sediment loss.

Nonconstructed Roads and Routes

When site conditions are appropriate, the surface management agency may approve the creation or use of "primitive," two-track roads or overland route corridors to meet the operator's access needs. Primitive roads and route corridors may serve as appropriate access to exploration

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drilling locations. The appropriateness of primitive roads or routes is both site-specific and use-specific and is typically based on many factors, such as anticipated dry or frozen soil conditions, seasonal weather conditions, flat terrain, low anticipated traffic, or driller's or operator's access needs. Primitive roads or routes necessitate low vehicle speed and are typically limited to four-wheel drive or high clearance vehicles. They can consist of existing or new roads with minor or moderate grading; two-track roads created by the operator's direct vehicle use with little or no grading; overland routes within a defined travel corridor leaving no defined roadway beyond crushed vegetation; or any combination along the route. Operators should not flat-blade roads. Drainage must be maintained, where appropriate, to avoid erosion or the creation of a muddy, braided road.

These roads and routes must be used and maintained in a safe and environmentally responsible manner and are not intended for use as all-weather access roads. Resource damage must be repaired as soon as possible and the operator must consult with the surface management agency to determine if all or a portion of the road needs to be upgraded to an all-weather access road. When used and maintained appropriately, nonconstructed roads and routes have the advantage of reducing construction, maintenance, and reclamation costs and reducing resource impacts. The use of nonconstructed roads must be approved by the surface management agency.

Constructed Roads

The surface management agency determines the appropriate road type and associated road design standards based on the expected traffic volume and other factors, such as seasonal or year-round use, the design vehicle, soil types, rainfall, topography, construction costs, compatibility with other resource values, and safety. Road types may vary along the same route depending on the operator's or the surface management agency's access or resource protection needs. In some cases, exploration drilling may warrant a lower design standard or primitive road, mentioned previously:

FS Local Roads

FS local roads are low-volume, single-lane roads. They normally have a 12 to 14 foot travelway with "intervisible turnouts," as appropriate, where approaching drivers have a clear view of the section of road between the two turnouts and can pull off to the side to let the approaching driver pass. They are usually used for dry weather, but may be surfaced, drained, and maintained for all-weather use. These roads connect terminal facilities, such as a drill site, to collector, local, arterial, or other higher-class roads. They serve low average daily traffic (ADT) and are located on the basis of the specific resource activity need rather than travel efficiency.

Basic Design Requirements

The surface management agency will provide requirements specific to proposed roads during project planning and/or at the onsite review with consideration of safety, impacts on land and resources, and cost of transportation. Requirements for specific proposals may vary somewhat from the generalized requirements that follow.

- Design speed is generally less than 15 miles per hour.
- Preferred travelway width is 14 feet with turnouts. For the FS, this can vary from two parallel vehicle tracks, bladed 12-foot sections with turnouts, or a broader defined overland corridor

approved by the surface management agency.

- Recommended minimum horizontal curve radii is determined by the design vehicle and design speed. Where terrain will not allow the proper curve radii, curve widening is necessary. Specifications are available from the surface management agency.
- Road gradient has a major effect on the environmental and visual impact of a road, particularly in terms of erosion. The gradient should fit as closely as possible to the natural terrain, considering vehicle operational limitations, soil types, environmental constraints, and traffic service levels. The gradient should not exceed 8 percent except for pitch grades (300 feet or less in length) in order to minimize environmental effects. In mountainous or dissected terrain, grades greater than 8 percent may be permissible with prior approval of the surface management agency.
- The primary purpose of turnouts is for user convenience and safety and to maintain user speed. Turnouts are generally naturally occurring, such as additional widths on ridges or other available areas on flat terrain.
- Drainage control must be ensured over the entire road through the use of drainage dips, insloping, outslowing, crowns, natural rolling topography, ditch turnouts, ditches, or culverts. Ditches and culverts may be required in some situations, depending on grades, soils, and local hydrology. If culverts or drainage crossings are needed, they should be designed for a 25-year or greater storm frequency, without development of a static head at the pipe inlet.
- Gravel or other surfacing is not always required, but may be necessary for "soft" road sections, steep grades, highly erosive soils, clay soils, or where all-weather access is needed.
- At times, a limited number of critical vehicles larger than the design vehicle may make occasional use of the road. The operator should consider these needs in road design.

Field Survey Requirements

Field survey requirements vary with topography, geologic hazard, potential for public and recreational use, or other concerns. The surface management agency should be contacted as early as possible to determine the survey requirements.

The following general requirements are imposed to control work and produce the desired road.

- A flagline is established along the construction route. Flags should be placed approximately every 100 feet, or be intervisible, whichever is less.
- Construction control staking may be required depending on conditions of the site.
- Culvert installations are located and staked.

Design Drawings and Templates

- On side slopes of 0 to 20 percent, where horizontal and vertical alignment can be worked out on the ground, a plan and profile drawing may not be required. Standard templates, drainage dip spacing, culvert locations, and turnout spacing guides would be acceptable.
- A plan and profile view may be required on steeper slopes and in areas of environmental concern.

The drawing should identify grade, alignment, stationing, turnouts, and culvert locations.

- Standard templates of road cross-sections are required for all resource, local, and higher-class roads. Figures 2 and 3 illustrate these sections.
- Additional information may be required in areas of environmental or engineering concern.

Construction

The operator must take all necessary precautions for protection of the work and safety of the public during construction of the road. Warning signs must be posted during blasting operations.

Clearing and Grubbing

Clearing and grubbing will normally be required on all sections of the road. Exceptions would be allowed in areas of sparse, non-woody vegetation.

All clearing and grubbing should be confined to a specified clearing width (Figure 2), which is usually somewhat wider than the limits of actual construction (roadway). Branches of all trees extending over the roadbed should be trimmed to provide a clear height of 14 feet above the roadbed surface. All vegetative debris must be disposed of as specified by the surface management agency.

Excavation

All soil material and fragmented rock removed in excavation is to be used as directed or in the approved plan. Excess cut material shall not be wasted unless specified.

Roadbed Construction

Roadbed material should not be placed when the materials or the surface are frozen or too wet for satisfactory compaction. Equipment should be routed over the layers of roadbed material already in place to help avoid uneven compaction anywhere along the travel route. Borrow material shall not be used until material from roadway excavation has been placed in the embankments, unless otherwise permitted.

Roadside ditches should conform to the slope, grade, and shape of the required cross-section with no projections of roots, stumps, rocks, or similar debris. Side ditches must be excavated to a depth of 1-foot minimum below the finished road surface. Drainage turnout spacing on these ditches should not exceed 500 feet; slopes greater than 5 percent may require closer spacing of turnout furrows (wing ditches or relief ditches).

Drainage and Drainage Structures

The proper design and construction of structures for the drainage of water from or through the roadway often contributes the most to the long-term success of the road and structure and minimizes maintenance and adverse environmental effects, such as erosion and sediment production. It is vitally important to keep the water off the road.

Road Drainage Design

The most economical control measure should be designed to meet resource and road management objectives and constraints. The economic considerations should include both

construction and maintenance costs. The need for drainage structures can be minimized by proper road location. However, adequate drainage is essential for a stable road. A proper drainage system should include the best combination of various design elements, such as ditches, culverts, drainage dips, crown, in-slope or out-slope, low-water crossings, subsurface drains, and bridges.

Surface Drainage

Surface drainage provides for the interception, collection, and removal of water from the surface of roads and slope areas. The design may need to allow for debris passage, mud flows, and water heavily laden with silt, sand, and gravel. Culverts should be designed in accordance with applicable practices adopted by State and Federal water quality regulators under authority of the Federal Clean Water Act (CWA). Culverts should accommodate a 10-year flood without development of a static head and avoid serious velocity damage from a 25-year flood.

Drainage Structures

Proper location and design can provide economical and efficient drainage in many cases. However, structural measures are often required to ensure proper and adequate drainage. Some of the most common structures are drainage dips, ditches, road crowning, culverts, and bridges.

Drainage Dips

The primary purpose of a drainage dip is to intercept and remove surface water from the travelway and shoulders before the combination of water volume and velocity begins to erode the surface materials. Drainage dips should not be confused with water bars, which are normally used for drainage and erosion protection of closed or blocked roads. See Figure 5 for an illustration of a typical drainage dip and construction specifications. Spacing of drainage dips depends upon local conditions such as soil material, grade, and topography. The surface management agency should be consulted for spacing instructions.

Ditches

The geometric design of ditches must consider the resource objectives for soil, water, and visual quality; maintenance capabilities and associated costs; and construction costs. Ditch grades should be no less than 0.5 percent to provide positive drainage and to avoid siltation. The types of ditches normally used are drainage, trap, interception, and outlet.

Road Crowning

Roads that use crowning and ditching are common and can be used with all road classes, except non-constructed roads. This design provides good drainage of water from the surface of the road.

Drainage of the inside ditch and sidehill runoff is essential if the travelway is to be kept dry and passable during wet weather.

Culverts

Culverts are used in two applications: in streams and gullies to allow normal drainage to flow under the travelway and to drain inside road ditches. The latter may not be required if drainage dips are used. The location of culverts should be shown on the plan and profile or similar drawings or maps.

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All culverts should be laid on natural ground or at the original elevation of any drainage crossed, except as noted for ditch relief culverts. See Figures 6 and 7 for installation details.

Culverts should have a minimum diameter of 18 inches. The diameter should be determined by the anticipated amount of water that would flow through the culvert. Factors to be considered include the geographic area being drained, soils and slopes in the drainage area, annual precipitation, and likely storm events.

The outlet of all culverts should extend at least 1 foot beyond the toe of any slope. It may be necessary to install rip-rap or other energy dissipation devices at the outlet end of the culvert to prevent soil erosion or trap sediment (see example in the photograph).

All culverts used in the construction of access roads should be concrete, corrugated metal pipe made of steel, or properly bedded and backfilled corrugated plastic pipe. Only undamaged culverts are to be used, and any culvert should be inspected for damage prior to installation. All spots on the pipes where the zinc coating has been injured should be painted with two coats of zinc-rich paint or otherwise repaired as approved by the surface management agency.

Excavation, bedding, and backfilling of culverts should be conducted according to requirements of the surface management agency and good engineering practices. Compliance with applicable Clean Water Act Best Management Practices and requirements for passage of aquatic species is required.

Ditch Relief Culverts

Ditch relief culverts are installed to periodically relieve the ditch line flow by piping water to the opposite side of the road where the flow can be dispersed away from the roadway. The spacing of ditch relief culverts (Figure 6) is dependent on the road gradient, soil types, and runoff characteristics.

A culvert with an 18-inch diameter is the minimum for ditch relief to prevent failure from debris blockage.

The depth of culvert burial must be sufficient to ensure protection of the culvert barrel for the design life of the culvert. This requires anticipating the amount of material that may be lost due to road use and erosion.

Ditch relief culverts can provide better flow when skewed with an entrance angle of 45 to 60 degrees with the side of the ditch. The culvert gradient should be greater than the approach ditch gradient. This improves the flow hydraulics and reduces siltation and debris plugging the culvert inlet. Culverts placed in natural drainages can also be used for ditch relief.

Wetland Crossings

Wetlands are especially sensitive areas and should be avoided, if possible. Generally, these areas require crossings that prevent unnatural fluctuations in water level. Marshy and swampy terrain may contain bodies of water with no discernible current. The design of culverts for roads crossing these locations requires unique considerations. Construction of some wetland crossings may require a Section 404 Corps of Engineers permit in addition to the approval of the surface management agency.

The culvert should be designed with a flat grade so water can flow either way and maintain its natural water level on both sides. The culvert may become partially blocked by aquatic growth and

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should be installed with the flowline below the standing water level at its lowest elevation. Special attention must be given to the selection of culvert materials that will resist corrosion.

Low-Water Crossings

Roads may cross small drainages and intermittent streams where culverts and bridges are unnecessary. The crossing can be effectively accomplished by dipping the road down to the bed of the drainage. Site-specific designs and the construction of gravel, rip-rap, or concrete bottoms may be required in some situations. In no case should the drainage be filled so that water will be impounded. Low-water crossings that are not surfaced should not be used in wet conditions. Low-water crossings, in combination with culverts, may be utilized if the crossing is designed such that the structure is stable and self cleaning.

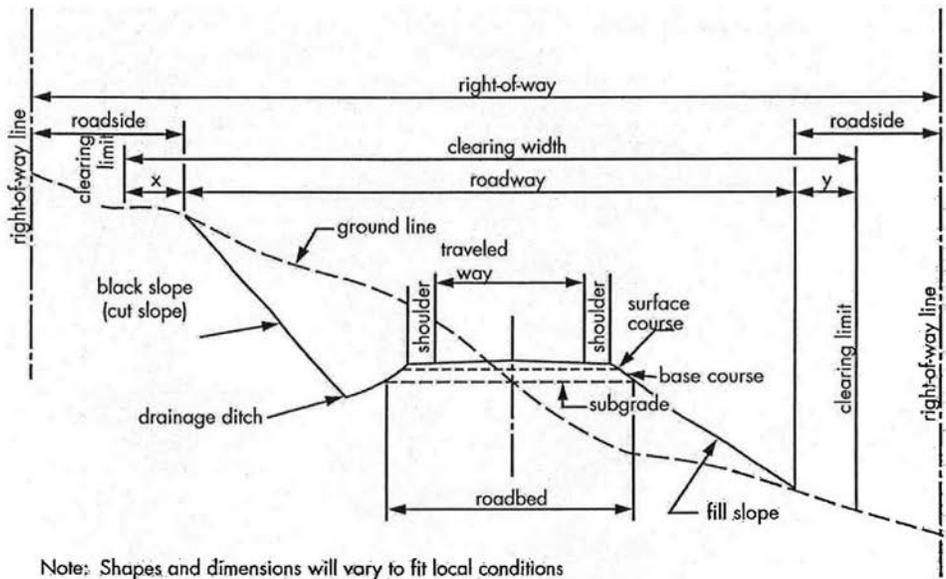
Subdrainage

If water is not removed from the subgrade or pavement structure, it may create instability, reduce load-bearing capacity, increase possible damage from frost action, and create a safety hazard by freezing on the road surface.

Perforated pipe drains and associated filter fabric or aggregate filters may be used when necessary to provide subdrainage. Other methods may be approved by the authorized officer.

Subdrainage systems may effectively reduce final road costs by decreasing the depth of base course needed, thereby reducing subgrade widths. This, in turn, results in less clearing and excavation. Maintenance savings may also be realized as the result of a more stable subgrade.

The solutions to subdrainage problems can be expensive. Road management techniques, such as reducing traffic loads or removing traffic until a subgrade dries out, may be considered as an alternative.



Note: Shapes and dimensions will vary to fit local conditions
See drawings for typical sections
x and y denote clearing outside of roadway

Figure 2.

- Construction Steps**
1. Salvage topsoil
 2. Construct road
 3. Redistribute topsoil
 4. Revegetate slopes

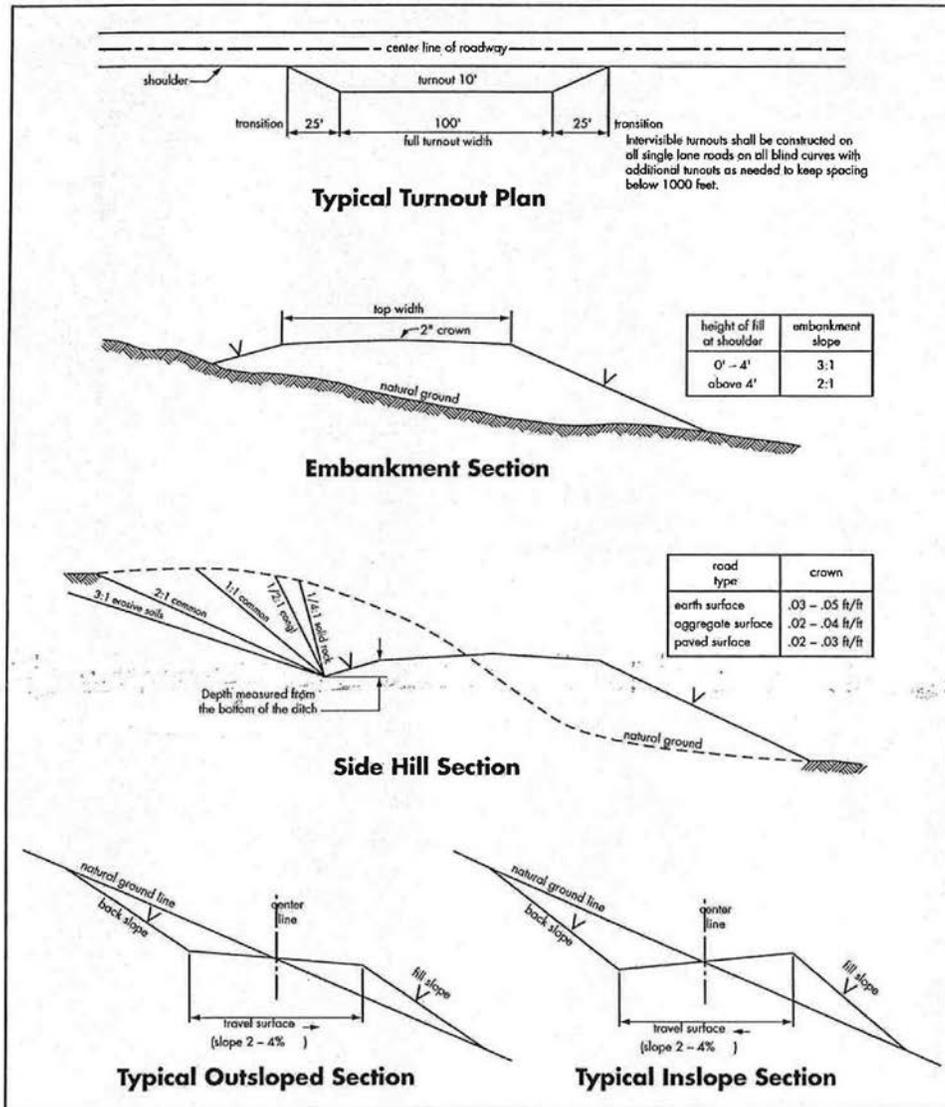


Figure 3.

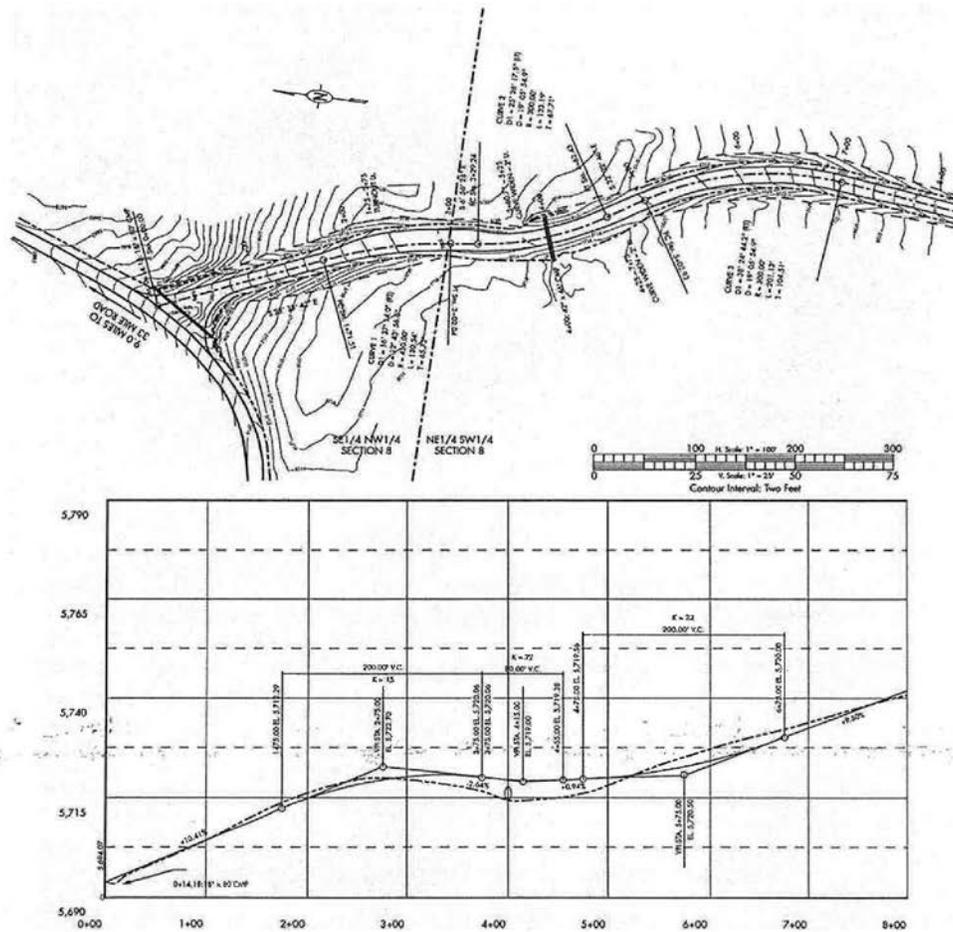


Figure 4.

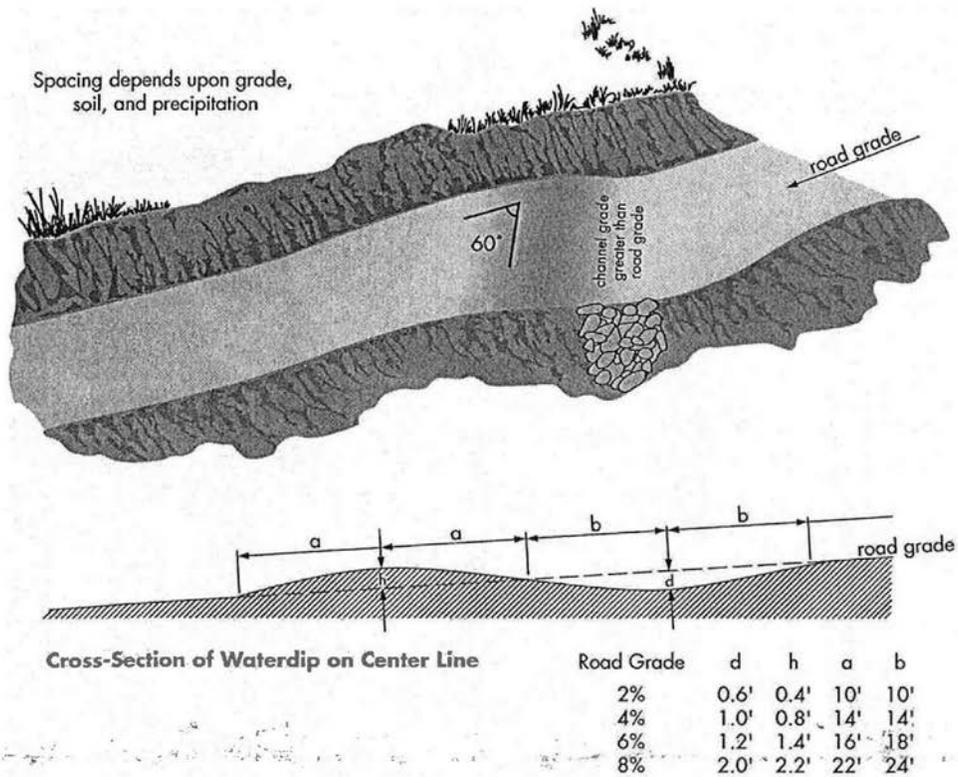
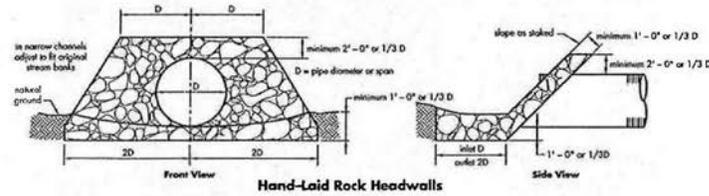
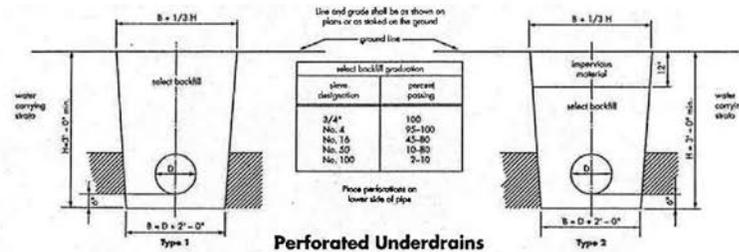


Figure 5.

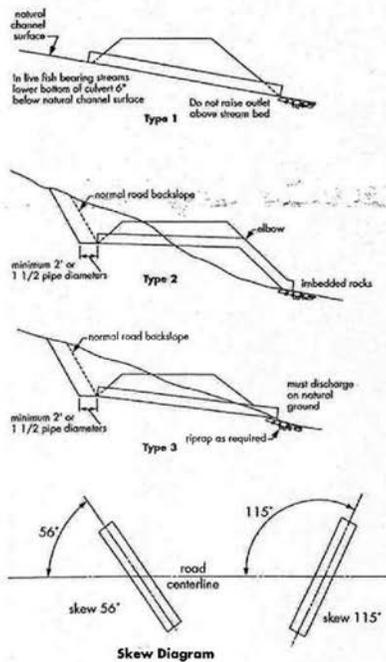
Maximum Recommended Culvert Spacing (ft)

Soil Type	Road Grade 2-4%	Road Grade 5-8%	Road Grade 9-12%
Highly erosive granitic or sandy	240	180	140
Intermediate erosive clay or loam	310	260	200
Low erosive shale or gravel	400	325	250

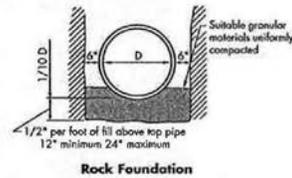
Figure 6.



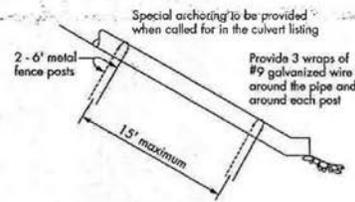
Culvert Construction Details



Typical Bedding Details



Rock Foundation



Special Anchoring Type 2 Downdrains

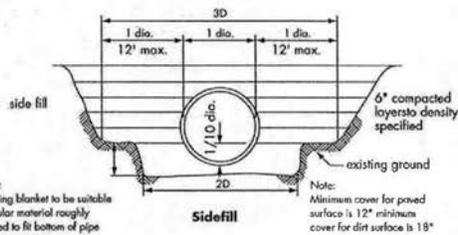


Figure 7.

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ATTACHMENT B
CUMO EXPLORATION PROJECT
ADDITIONAL PROJECT DESCRIPTION DETAILS

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1 Project Description and General Drill Procedures..... 1

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ATTACHMENT B
CUMO EXPLORATION PROJECT
ADDITIONAL PROJECT DESCRIPTION DETAILS

1 PROJECT DESCRIPTION AND GENERAL DRILL PROCEDURES

In preparing this Geologic Hazards, Soil, and Water Resource Supplemental Technical Report (GWSTR), Idaho CuMo Mining Corporation (CuMoCo) provided supplemental information about drilling practices and abandonment. This appendix identifies these additional Project details that support the Project description in the Plan of Operations.

1.1 Project Description

The Project Description can be found on pages 23 and 24 of the February 2011 Environmental Assessment (EA) (Alternative A) and page 28 (Alternative B) of the (EA).

1.2 Road and Drill Pad Construction

A description of road and drill pad construction can be found on page 24 of the February 2011 EA.

1.3 Drilling Operations

Under Alternative A, up to 256 drill holes with various orientations and inclinations would be drilled from up to 122 drill pads, utilizing a truck, wagon, or skid-mounted diamond-bit coring machine. Under Alternative B, up to 259 drill holes would be drilled from up to 137 drill pads. The drilling would be completed in a series of stages, initially with wide spaced drilling, followed by infill drilling for reserve definition (USDA 2011). Although most of the proposed drill holes would be vertical, geologic conditions might dictate angled drilling. Most drill pads would have more than one hole drilled from them. Drill holes would be either vertical or angled, designed to best investigate the subsurface geology. Holes would range in depth from 1,500 to 3,000 feet (Forsgren 2012).

CuMoCo would design and implement the drilling operations in compliance with the Rules of the Department of Environmental Quality, Idaho Administrative Procedures Act (IDAPA) 58.01.02 “Water Quality Standards” and 58.01.11 “Ground Water Quality Rule.” Specifically per the Water Quality Standards, CuMoCo must ensure:

No pollutant shall be discharged from a single source or in combination with pollutants discharged from other sources in concentrations or in a manner that: a) will or can be expected to result in violation of the water quality standards applicable to the receiving water body or downstream waters; or b) will injure designated or existing beneficial uses; or c) is not authorized by the appropriate authorizing agency for those discharges that require authorization (IDAPA 58.01.02.080.01)

For the Groundwater Quality Rule,

No person shall cause or allow the release, spilling, leaking, emission, discharge, escape, leaching, or disposal of a contaminant in the environment in a manner that a) causes a groundwater quality standard to be exceeded; b) injures a beneficial use of groundwater; or c) is not in accordance with a permit, consent order or applicable best management practice, best available method or best practical method.” (IDAPA 58.01.11.01)

1.3.1 Diamond Core Drilling Procedures, Including Implementation and Monitoring, Related to Ground Water Protection

Core drilling is a mineral exploration technique designed to recover subsurface rock samples used to determine the extent and quality of an ore deposit. The method has been in use by the mining industry for over one hundred years. Core drilling has many similarities to water well or oil and gas well drilling, but there are some important differences. Probably the most important difference that is relevant to groundwater protection is the objective of creating the core hole. A successful water, oil, or gas well is primarily designed to allow fluid to be removed for an extended period of time from an underground rock formation. A core hole is simply a conduit to remove a rock sample from beneath the ground surface. It has no long-term use and is plugged shortly after completion (see abandonment section). Core drilling rigs are substantially smaller than oil and gas rigs, and the capacity of their mud pumps is correspondingly smaller.

A core drilling rig uses a cylindrical, diamond-studded bit (Figure 1) to drill through rock. The hole is deepened by adding sections of pipe to the drill string. The resulting cylinder of rock (the “core”) is retrieved from the bottom of the hole periodically by means of a cable and liner tube system. During drilling operations, drilling fluid or “mud” is continuously circulated by means of pumps in a “closed loop” system. The mud is so called because it is a mixture of a naturally occurring clay (sodium bentonite) and water along with minor amounts of additives. Additives are National Sanitary Foundation (NSF)-60 or NSF-61 approved non-toxic, biodegradable products certified for use in domestic water supply wells. The mud travels from the pump down the hollow center of the drill string to the bit, where it exits the drill string through radial slots in the cutting surface of the bit. The mud then travels up the outside of the drill string through the space created by the slightly larger diameter bit relative to the drill string. This space between the drill string and the outside wall of the borehole is called the “annular space,” which for NX core drilling is approximately three millimeters. The mud returns to the surface through the annular space where it runs into a tank that allows the drill cuttings to settle out, and the mud is then recirculated down the borehole.



Figure 1: Diamond core drill bits.

The following is a detailed description of the drilling of a core hole and explains how the standard operational procedures (SOPs) are protective of groundwater. All of the SOPs described are designed to assure compliance with relevant regulatory standards. The primary regulatory standards pertaining to groundwater protection are:

- The Idaho Ground Water Rule (IDAPA 58.01.11);
- Idaho Rules Governing Exploration, Surface Mining Closure of Cyanidation Facilities (IDAPA 20.03.02); and
- The Idaho Well Construction Standards Rule (IDAPA 37.03.09).

The Well Construction Standards Rule is indirectly applicable in that mineral exploration boreholes are not considered to be wells and; therefore, are not subject to the standards of the rule. However, the rule does require that the construction of such boreholes meets the intent of the regulations which is “to protect the groundwater resources of the state against waste and contamination,” implying that the exact letter of the rule need not be strictly followed as long as the intent is met. All of the SOPs meet the intent of the rule and in almost every instance meet or exceed the standards.

The drill pad is prepared prior to and during the moving in of a drill rig. The site is leveled (or a wooden platform is built) and graded to drain surface runoff to a point where the water can be managed. Depending upon the location, a small mud sump may be excavated for recirculation and ultimate disposal of drill cuttings and drilling fluid. Some drill sites (e.g. steep slopes or Riparian Conservation Areas) would utilize multi-compartment, self-contained holding tanks for the drilling mud. Silt fencing, straw bales, and/or sediment traps are used for surface water runoff management and erosion control on the drill pad. Petroleum products are kept in containment, and spill prevention kits are available on site in order to minimize the risk of a surface spill of hazardous materials infiltrating a shallow aquifer. The drill itself is inspected on a daily basis in accordance with 40 CFR 112.7(e).

Once drilling commences, the first formations to be penetrated are usually unconsolidated or semi-consolidated alluvial or colluvial material. In upland locations, this is often a thin layer overlying

bedrock and may not contain any perennially saturated zones that would constitute an aquifer. On lower slopes and valley floors, thickness may increase and alluvial aquifers may be present.

As the drill string passes through the alluvium, it is the mud that serves to prevent inflow or outflow of measureable volumes of fluid to or from the borehole. Mud has a higher density than plain water and contains large quantities of extremely fine clay particles. When drilling through an unconfined aquifer, the pressure exerted by the column of mud in the borehole (the hydrostatic head) always exceeds the water pressure in the unconfined aquifer. Because of this pressure differential, the mud can seep out of the borehole into the formation. The interconnected pores of the alluvial sediments act as a filter that traps the bentonite particles along with the entrained drill cuttings (sand sized particles) to form a coating on the surface of the borehole known as “filter cake”(Figure 2). It is the filter cake that confines most of the drilling mud to the borehole. Seepage of fluid through the filter cake is discussed in the effects section.

Water can also flow into a borehole from the formation if the hydrostatic head in the aquifer exceeds that of the mud column, as could be the case with a confined aquifer. Minor gains in water similar in volume to the seepage losses through the filter cake are not discernible. More substantial inflows to or outflows from the borehole are sealed off (see fluid loss/gain section).

Once the alluvium has been drilled through and the hole has penetrated sufficiently into solid bedrock, surface casing is set. Casing is a steel pipe that has a slightly larger diameter than the core drill string. A casing “shoe” (essentially a hollow diamond impregnated bit) is used on the leading edge of the casing string to advance it by means of rotational drilling. The casing is advanced incrementally down the hole by using the core drill to drill a pilot hole, drilling the casing down to the bottom of the pilot hole, then repeating the process until solid bedrock is reached. This “drill-within-a-drill” method creates an annular space between the outside of the casing and the borehole wall.

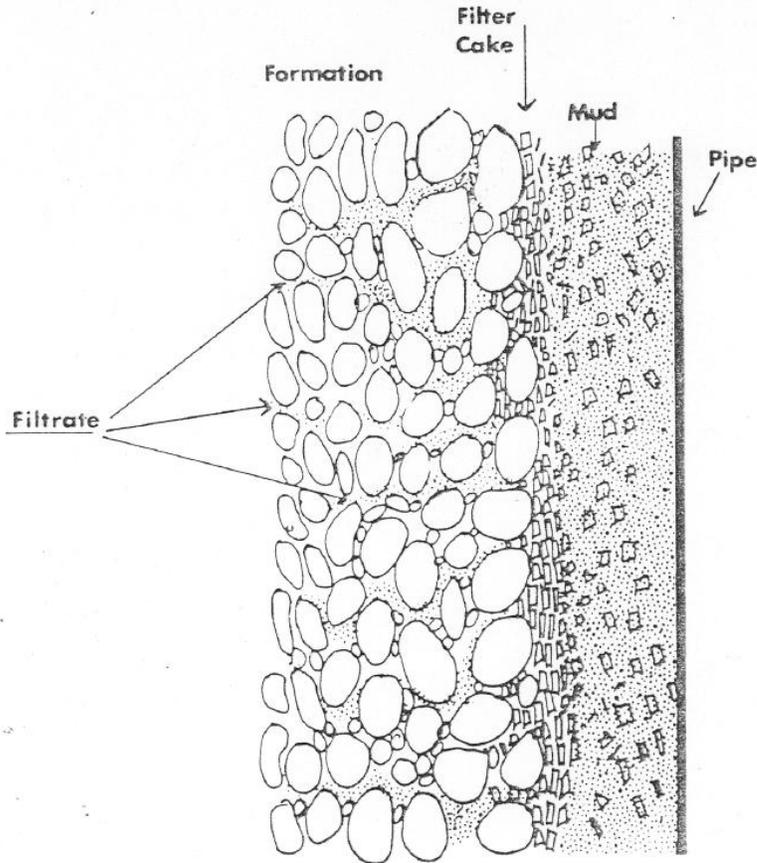


Figure 2: Formation of filter cake (Campbell and Gray 1975)

The casing is then set in place by sealing the annular space. For the CuMo Project, bentonite or neat cement would be used as sealants. Sealing is done by removing the drill string and pumping the grout mix down the inside of the casing. The grout is mixed (using roughly 150 percent of the estimated volume) in a separate tank and pumped down the hole with a rubber plug behind it (between the grout and the regular mud). As the grout rises on the outside of the casing, in the annular space, the casing is rotated to ensure a more even distribution of grout within the annular space and prevent the formation of any linear voids due to preferential flow paths. After the grout begins flowing at the surface from the annular space around the casing, pumping continues until the pressure spikes. This indicates that the rubber plug is on bottom. If bentonite grout is used the top three feet filling the annular space is removed and replaced with neat cement. After the annular grout has set up, the rubber plug is drilled out and drilling continues into bedrock. Any aquifers within the alluvial formations are now completely sealed off from each other, from surface water, and from any aquifers that may be encountered deeper in the bedrock. All mud circulation above the casing bottom takes place within the casing.

Drilling in the bedrock continues in the same manner as in the alluvium. The only difference is that bedrock permeability is controlled primarily by the aperture size and density of interconnected fractures, rather than interconnected pore space as is the case in alluvial formations. Under normal

drilling conditions, filter cake forms on the borehole walls in the same manner as when drilling through alluvial formations. Potentially higher permeability fault zones and fracture zones that would be encountered in some of the proposed holes are the most likely areas to produce drilling fluid losses or gains.

1.3.1.1 Drilling Fluid Loss/Gain

Normally the development of filter cake is quite rapid, however, if a zone of very high permeability and low relative pressure (e.g. a coarse gravel lens, or highly fractured bedrock) is encountered, the drilling fluid flows farther into the formation before a filter cake can form. This is referred to as “lost circulation.” It is necessary to prevent substantial fluid losses to lost circulation zones (LCZs), otherwise there is an increased risk of problems such as binding or pinching of the drill string due to pieces of broken bedrock (or loose aggregate in unconsolidated materials) in the annular space, and an inability to circulate cuttings out of the hole.

Through monitoring the operation, lost circulation can be recognized by the driller who is watching the mud return flow at the top of the hole and the mud pump pressure gauge. If the flow rate drops off and the pressure drops, then lost circulation is occurring. Generally, a gain or loss of ten percent (approximately 25 gallons in a 1,000-foot hole) or more of the drilling fluid alerts the driller to an inflow/outflow condition. The ten percent threshold is used to account for changes in hole conditions that would likely not represent a loss in the “closed loop” system. The speed and duration of mud loss are dependent upon the formation permeability and the pressure differential. If mud flow is still present at the surface, drilling continues and full flow often returns as the lost circulation zone is sealed.

Several mechanisms act to promote sealing in these instances of moderate circulation loss. As the drill cuttings in the mud are carried into the formation, individual particles or aggregates become stuck at points where they form bridges spanning various apertures in the flow paths. These plugs then act to filter out the even smaller bentonite particles to form localized areas of filter cake. Additionally, bentonite muds are thixotropic, which means that they coagulate into a highly viscous gel when not subjected to shear stresses (e.g. pumping) thereby reducing filtrate and reestablishing filter cake performance.

1.3.1.2 Total Loss of Returns

If a LCZ is encountered where the driller monitors and observes a strong pressure loss and a complete cessation of mud flow at the surface (referred to as a “loss of returns”), then a different approach is called for. Drilling stops and mud is circulated in an effort to allow the zone to seal, which is indicated by the resumption of mud flow at the surface. If the flow of mud has not returned in a short amount of time (usually minutes), the driller would stop circulating the mud and would prepare a mixture of lost circulation material (LCM). Depending on the size of the mud tank, the mixture would be approximately 25 to 40 gallons. There are many types of lost circulation material available, but high-solids bentonite grouts (such as Holeplug®, Quik-Grout® or equivalent) would primarily be used for this Project. Unlike standard bentonite drilling mud which has a solids content of ten to 20 percent, the bentonite grouts have a solids content of 70 percent or more,

which produces a highly viscous fluid with the approximate consistency of peanut butter. The LCM is prepared separately and pumped down the hole. Usually, this successfully seals the LCZ.

If the lost circulation material still does not control fluid loss, then a variety of more aggressive methods can be used. The LCZ can be cemented and drilled through, or the existing drill string can be used as casing and cemented in through the LCZ. This is comparable to setting the surface casing; thereby providing an impervious seal. In the latter case, a smaller drill bit and pipe would be used inside the new casing to drill onward. This stepping down of pipe sizes can be done more than once, if necessary.

1.3.1.3 Fluid Gain

If a confined aquifer is encountered where the hydraulic head exceeds that of the mud column in the borehole, water runs into the borehole from the formation. This is referred to as “making water” and can occur in both alluvial and bedrock aquifers. As noted above, minor inflows are not discernible and would not impede drilling progression or present environmental hazards or risks. The total volume, duration, and rate at which water flows into the borehole are governed by a number of hydraulic factors. For example, if the total water volume is small and the pressure differential is low, the water entry may be very short lived and not even noticeable. On the other hand, if there is a large volume and large pressure gradient, this could result in artesian conditions, which might result in flows at the surface. These observations and determinations are obtained through monitoring of the drilling operations, as are the previously discussed possible situations.

As with lost circulation, the measures taken to respond to inflows are commensurate with the severity of the inflow. More substantial inflows are detected and monitored by a pressure spike in the mud system and an increase in mud flow at the surface often accompanied by a visible film of clear water on top of the mud due to incomplete mixing during travel up the hole. If sustained inflow is detected, the first step is to increase the drilling fluid density. This has the effect of increasing the hydrostatic pressure at the inflow zone until it exceeds the inflow pressure. At that point the flow reverses and the inflow zone behaves the same as a LCZ. LCM is also added to the mud along with the barite in order to seal the resultant LCZ. This sealing of the inflow zone is usually effective enough that even if the mud weight is reduced back to what it was initially (with resultant reduction in hydrostatic head), the LCM is emplaced securely enough to retain a higher pressure than formation water. There are many types of lost circulation material available, but high-solids bentonite grouts (such as Holeplug®, Quik-Grout® or equivalent) would primarily be used for this Project.

If a water entry is severe enough to result in artesian conditions with flows at the surface, then the well is promptly abandoned (mitigation) as described below in the drill hole Abandonment Section. During the time it takes to abandon the hole, artesian flow at the surface is routed into the mud sump. Should there be enough flow to exceed the sump capacity; emergency measures would entail: 1) routing any overflow to portable tanks; 2) to the ground surface in a hand dug trench; or 3) to an area with the most available obstructions to flow (e.g. embedded logs, thick grass or brush,

etc.). Emergency mechanical packers are also available on all drill rigs and can be used to stem artesian flow.

1.3.1.4 Drilling Fluid Disposal

Once drilling is completed, the drilling mud is pumped into the on-site sumps for disposal. Sumps are then allowed to dry out prior to capping with the native soil that was excavated to build them. The sump area along with the rest of the drill pad is then reclaimed as described in the EA. Sumps would not be located on steep slopes, in Riparian Conservation Areas (RCAs), or in areas where groundwater levels could rise above the bottom of the sump. Drilling mud from holes in such areas would be contained in portable mud tanks during drilling and then ultimately disposed of in sumps located elsewhere.

1.3.1.5 Drill Hole Abandonment

Holes would be promptly abandoned as required by the Idaho Well Construction Standards Rule (IDAPA 37.03.09), after reaching their total planned depth. Hole abandonment would generally take place within hours of completion prior to moving the drill rig from the hole. If the annular space of the casing has been sealed with cement (as is the case with boreholes if encountering artesian conditions), the casing is left in place. If the annular seal is bentonite, the temporary surface casing is removed before abandonment.

Hole abandonment entails plugging the holes from bottom to top with a low-permeability bentonite-based grout (for example, Benseal® or equivalent), which seals off all water transmission. In order to ensure a continuous seal throughout the hole the grout is pumped down the hollow drill string starting at the bottom of the hole (Figure 3). As the hole is filled, the drill string is withdrawn but never pulled above the surface of the ascending column of grout, as this could produce voids. After the grout has risen to within approximately three feet of the ground surface and has set up, the remainder of the hole is plugged with cement. In the case of abandonment of a flowing artesian drill hole, neat cement grout is used to seal the entire borehole instead of bentonite grout.

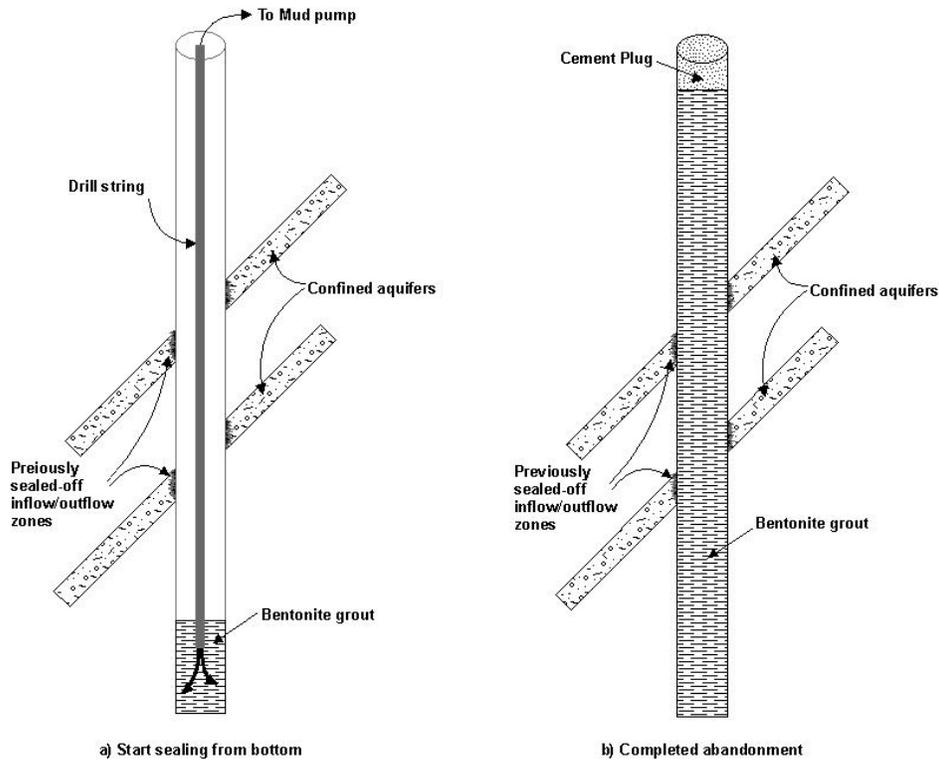


Figure 3: Drill Hole Abandonment

Industry standard grout sealants (Ross 2010) commonly used in the construction of a drill hole includes the following:

- 1) Bentonite-based grouts of very low-permeability that remain flexible indefinitely. They are the consistency of toothpaste when emplaced and later turn into the consistency of pizza dough after setting;
- 2) Bentonite seals, which are comprised of granules of a natural swelling bentonite clay that are poured into the upper portion of the bore (only in reaches above the water table) and would be manually hydrated to form a thick impermeable sealant with the consistency of modeling clay;
- 3) Cement/bentonite grout mixtures that carry the low permeability and swelling properties of bentonite and the hardening rigid qualities of cement; and
- 4) Straight cement grout to cap the top of the core hole.

1.3.1.6 Monitoring of Drill Operations

Because the effective protection of groundwater resources is strongly dependent upon the proper implementation of SOPs, monitoring of these SOPs would be carried out by a Forest Service minerals administrator on a regular basis. The monitoring plan includes the following items:

- Regular review of relevant drilling data gathered by CuMoCo (e.g. drilling fluid losses, water entries, borehole abandonment records, etc.).
- Periodic site inspection by a certified minerals administrator for compliance with the Best Management Practices (BMPs) and SOPs and effectiveness of implementation.

- Review of water chemistry data from annual surface water samples collected and analyzed by CuMoCo at the three 2012 locations shown on Figure 4.

More details are provided in the Water Quality Mitigation Monitoring section of the Supplemental EA (Section 2.3.2).

1.4 Hazardous Materials Management

The description of hazardous materials management can be found on pages 25 and 26 of the February 2011 EA.

1.5 Reclamation

The description of the proposed reclamation for the Project can be found on page 26 of the February 2011 EA.

1.5.1 Best Management Practices

Appropriate erosion control and BMPs would be installed around drill pads and along temporary roads. As identified in Chapter 2.3.1 of the Supplemental EA, CuMoCo would use the specified BMPs from the “Best Management Practices for Mining in Idaho” (BMPs for Mining in Idaho) (IDL 1992) to minimize erosion and sediment transport when constructing and maintaining temporary roads and drill pads.

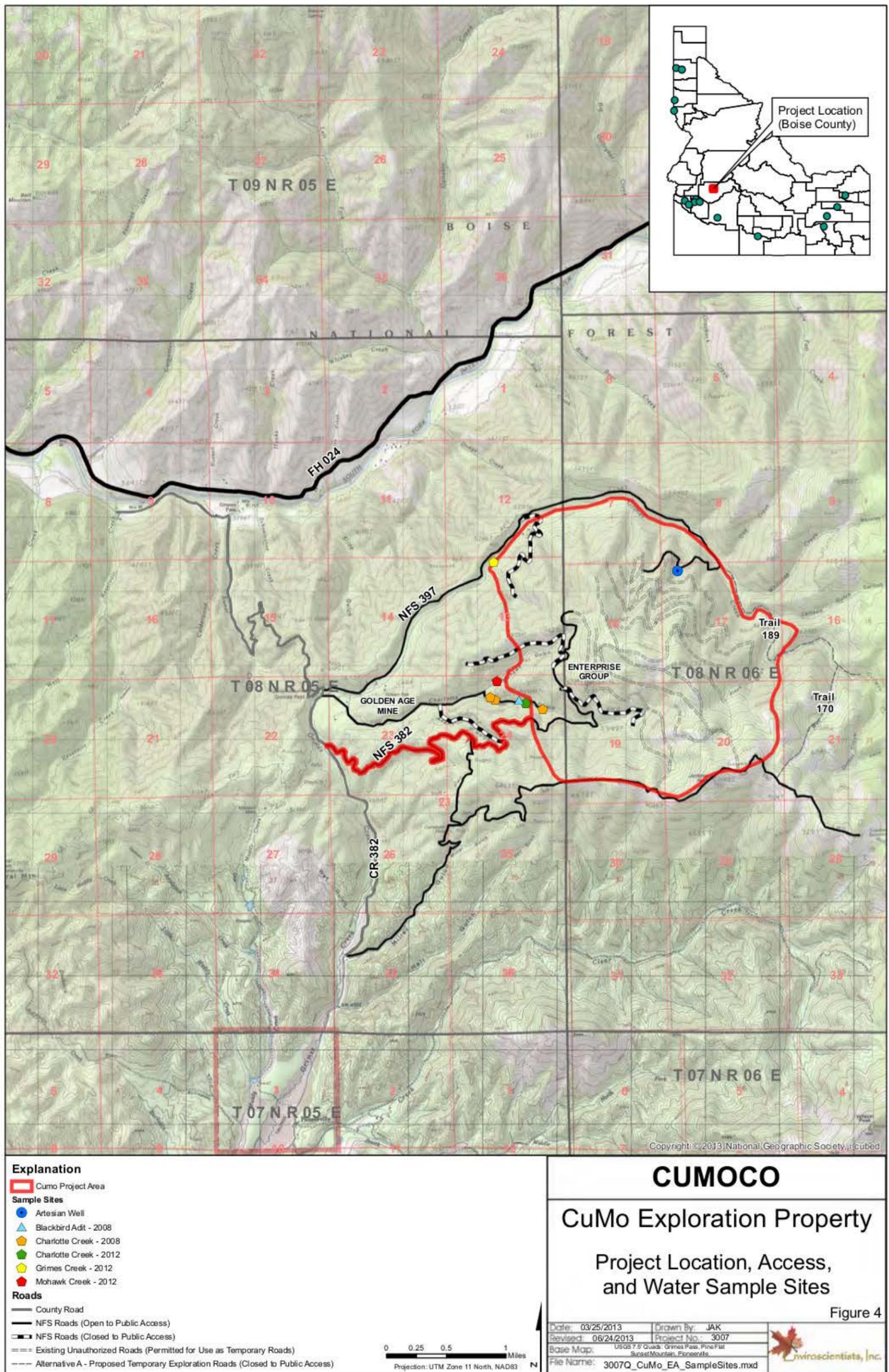


Figure 4. Project Location, Access and Water Sample Sites

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ATTACHMENT D

**Quality Assurance Project Plan and Ground Water Sampling Plan For the
Idaho CuMo Project**

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**Quality Assurance Project Plan
and
Ground Water Sampling Plan
for the Idaho CuMo Project**

Prepared for

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July 2014

RECEIVED

JUL 10 2014

DEPARTMENT OF
ENVIRONMENTAL QUALITY
BOISE REGIONAL OFFICE

Quality Assurance Project Plan and Ground Water Sampling Plan for the Idaho CuMo Project

These plans provide direction for implementing CuMoCo's voluntary ground water sampling for the Idaho CuMo Exploration Project. The Quality Assurance Project Plan (QAPP) describes the objectives and the procedures to be followed to achieve those objectives. Preparation of this QAPP includes contributions from project managers and technical staff from Idaho CuMo Mining Corporation and its environmental engineering and permitting consultant Forsgren Associates, Inc. Therefore, this signature page indicates agreement on the QAPP content among those individuals assigned to implement the study, conduct the field sampling, and perform the analytical analyses.

Signature: 	Date: March 11, 2015
Printed Name: Shaun Dykes	
Title: President and Chief Executive Officer, American CuMo Mining Corporation	
Signature: 	Date: March 13, 2015
Printed Name: Joey Puccinelli	
Title: Project Coordinator	
Signature: 	Date: March 13, 2015
Printed Name: Alan J. Driscoll	
Title: Project Manager	
Signature: 	Date: March 13, 2015
Printed Name: Phillip J. Bandy	
Title: Environmental Compliance Lead	

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1 PROJECT MANAGEMENT

This Quality Assurance Project Plan and Ground Water Sampling Plan (QAPP-GWSP) describes the quality assurance and quality control procedures and voluntary ground water sampling plan for the Idaho CuMo Exploration Project.

1.1 Distribution List

This QAPP-GWSP will be distributed to the following organizations. The roles, responsibilities, key personnel, and contact information of each organization are described in Section 1.2.

- Idaho CuMo Mining Corporation (CuMoCo)
- Forsgren Associates, Inc. (Forsgren)
- Contract Laboratory (TBD)
- Boise National Forest, Idaho City Ranger District (BNF)
- Idaho Department of Environmental Quality, Boise Regional Office (IDEQ)

1.2 Project Organization

Idaho CuMo Mining Corporation (CuMoCo) will implement the voluntary ground water sampling described in this QAPP-GWSP. This QAPP-GWSP provides the quality assurance/quality control (QA/QC) requirements for voluntary ground water sampling. This plan is applicable to field sampling and laboratory chemical analysis and outlines the specifics of field sampling. Forsgren Associates, Inc. (Forsgren) has prepared and will maintain this QAPP-GWSP, which was developed according to corresponding U.S. Environmental Protection Agency (USEPA) guidance (USEPA 2002). Forsgren staff will collect the samples (including QC samples), provide sampling QA/QC management, ship the samples, and transfer custody of the samples to the contract laboratory. The contract laboratory will be responsible for the analytical QA/QC management. Forsgren will select the contract laboratory and will coordinate with the laboratory. Key personnel and their roles are described below in Table 1.

1.3 Project Background and Objectives

1.3.1 Background

IDEQ comments to the August 2013 draft of the Idaho CuMo Exploration Project Supplemental Environmental Assessment (SEA) submitted to BNF on September 17, 2013, stated,

Based on the ground water characterization of the project area presented in the SEA, the majority of ground water in the unconfined near-surface aquifers likely discharges to springs or streams. The collection and laboratory analyses of surface water and/or spring samples from locations upgradient and downgradient of the drilling locations appears to be a sufficient monitoring approach for the proposed drilling activities.

Diamond core drilling has been in use since the late 1800's. Environmental impacts of diamond core drilling activities for mineral exploration are generally regarded as minimal, e.g., the Environmental Protection Agency's (EPA's) October 18, 2013 comments to the SEA:

Overall, we believe that the potential for the drilling project to adversely impact groundwater is very low. The characterization of ground water and hydrogeologic units in the assessment is reasonable and congruent with conditions found in similar geologic settings. The procedures described in Appendix H are designed to minimize the potential for the drilling fluids to move into aquifers during drilling and to prevent creating any new connections among aquifers or between ground water and surface water that would threaten water quality. We agree that the impacts should be minimal provided that:

- the drilling fluids are non-toxic,
- the connection to the aquifer within the drill hole is minimized,
- the holes are properly abandoned according to Idaho rules,
- the monitoring procedures are followed, and
- the environmental conditions are recorded

Table 1 - Summary of Key Personnel and Roles

Key Personnel	Contact Information	Roles
Idaho CuMo Mining Corporation	PO Box 516 125 Mill Road Horseshoe Bend, ID 83629	
Shaun Dykes CEO / Exploration Manager	geologic@telus.net +1 (604) 689-7902	Corporate signatory authority; review and implementation of this QAPP-GWSP.
Joey Puccinelli Project Coordinator	joepooch@live.com (208) 589-3811 (cell)	Onsite coordination of all stages of the project development and implementation of the QAPP- GWSP.
Forsgren Associates, Inc.	415 South 4 th Street Boise, Idaho 83702	
Alan Driscoll Project Manager	ADriscoll@Forsgren.com (916) 638-1119 (office) (916) 638-1022 (cell)	Development and execution of overall project scope, oversight, deliverables and schedule.
Phil Bandy, Senior Scientist Environmental Compliance Lead	PBandy@Forsgren.com (208) 342-3144 (office) (208) 859-3459 (cell)	Manage collection of ground water samples and associated QA/QC protocols; manage QA/QC of laboratory results; review of QAPP and internal QA/QC procedures; and, data and database management.
Contract Laboratory		
TBD		Execute and report laboratory work and associated QA/QC protocols.

However, IDEQ expressed additional concerns in a letter of clarification to BNF on March 5, 2014,

While the [Ground Water Quality Rule] GWQR does not legally require ground water monitoring for the exploratory phase of the CuMo Mine project, DEQ remains concerned about the potential risks the exploratory drilling poses to ground water.

Although voluntary ground water sampling as described in this document is not required for diamond core mineral exploration activities in the State of Idaho, CuMoCo has agreed to voluntarily collect and analyze samples of water from seeps and springs to help alleviate concerns about potential impacts to ground water, and to minimize further delays in finalizing the SEA.

1.3.1.1 Project Location

The Project Area is approximately five miles upstream of Pioneerville, Idaho and about 14 miles north of Idaho City in Boise County, Idaho. The Project Area encompasses approximately 2,885 acres of land located within the BNF in Sections 7, 8, 17, 18, 19 and 20, Township 8 North, Range 6 East.

The Project Area, which is approximately two miles along its east-west axis and 2.4 miles along its north-south axis, lies within the Headwaters Grimes Creek 6th hydrologic unit code (HUC) (170501120502) of the Boise-Mores sub-basin. It is bounded by Grimes Creek to the north and the Jackson Peak ridgeline to the south and County Road (CR) 382 to the west.

1.3.1.2 Project History

The CuMo molybdenum prospect (CuMo) was discovered by AMAX Exploration Inc. (AMAX) in 1963. AMAX and their joint venture partners, AMOCO Minerals and Climax Molybdenum, completed multiple stages of exploration beginning in 1968 and continuing through 1982. This exploration included geological mapping, geochemical surveys, geophysical surveys, drilling five reverse-circulation exploration holes, four of which were re-drilled to greater depths as diamond-bit exploration core holes, and drilling 21 additional diamond-bit exploration holes. A total of 68 diamond-bit core holes have been drilled from 1968 until the present (43 by CuMoCo or its corporate predecessor). Of those 43 holes, 11 holes were drilled between the issuance of a February 2011 Decision Notice/Finding of No Significant Impact (DN/FONSI) and August 2012.

1.3.1.3 Planned Exploration Drilling

Under Alternative B of the February 2011 DN/FONSI, up to 259 drill holes would be drilled from up to 137 drill pads. The drilling would be completed in a series of stages, initially with wide spaced drilling, followed by infill drilling for reserve definition. Although most of the proposed drill holes would be vertical, geologic conditions might dictate angled drilling. Most drill pads would have more than one hole drilled from them. Drill holes would be either vertical or angled, designed to best investigate the subsurface geology. Holes typically would range in depth from 1,500 to 3,000 feet.

CuMoCo will design and implement the drilling operations in compliance with the Rules of the Department of Environmental Quality, Idaho Administrative Procedures Act (IDAPA) 58.01.02 "Water Quality Standards" and 58.01.11 "Ground Water Quality Rule." CuMoCo will have a knowledgeable person, i.e., an experienced or licensed driller, record drilling conditions encountered during drilling operations.

A knowledgeable person will monitor and record the following during drilling operations: drill fluid loss/gain by drill interval; quantity and use of loss circulation materials; and drill mud pump pressures to identify when actions are needed to maintain a “closed loop” drilling fluid system. A qualified CuMoCo representative (geologist or geological technician) will conduct regular checks of each active drill site to assure documentation of drilling conditions is being completed in a timely and accurate manner and standard drilling procedures are being followed to address changes in drill hole conditions as drilling proceeds.

Sampling and analysis of ground water emanating from seeps and springs upgradient and downgradient of drilling activities, as described in this QAPP-GWSP, will provide additional knowledge of ground water geochemistry of the project area, information regarding seasonal and meteoric variability of ground water geochemistry, and may provide knowledge of potential impacts of diamond core drilling activities to ground water.

1.3.2 Recent Ground Water Sampling

Given the location of the Project Area, relative to the surrounding topography and the proximity to the margin of the hydrographic basin, the ground water recharge in the perched aquifer in the near-surface fractured bedrock rock is anticipated to principally occur within the local watershed via the infiltration of precipitation. Discharge from this aquifer primarily feeds the surface drainage system. However, some portion of the water in this aquifer could flow into the more localized structures and faults and thus recharge a deeper aquifer (multiple individual water containing fractures). Recharge and discharge from this deeper aquifer could also occur from or to adjacent areas along the fractures and faults.

Limited ground water data exist from within or adjacent to the Project Area. Drill Hole #12 (Lat. N 44° 02' 05.60"; Long. 115° 46' 53.80"), which was drilled at minus 45 degrees to a total depth of 1,340 feet, encountered flowing artesian conditions. A water sample collected from the “standpipe” in Drill Hole #12 can be characterized as a calcium-bicarbonate water chemistry type with almost all trace constituents below their respective laboratory detection limits. Ground water chemistry data from Drill Hole #12 is provided in Table 2. Only nickel and zinc were detected. Nickel was slightly above the detection limit with a total concentration of 0.03 mg/L and dissolved concentration equal to the laboratory detection limit of 0.02 mg/L. Total zinc concentration was less than its laboratory detection limit of 0.01 mg/L; dissolved zinc concentration was reported to be 0.91 mg/L. Voluntary sampling will increase knowledge of ground water chemistry in the project area.

1.3.3 Project Objectives

Based on the information provided in section 1.3.1 and 1.3.2 of this document, the objectives of this sampling effort will be to:

- increase knowledge of ground water chemistry in the project area,
- provide knowledge of natural variability in ground water geochemistry as a function of seasonal and meteoric conditions, and,
- provide knowledge of potential impacts of diamond core drilling activities to ground water.

Sampling and analysis of ground water from seeps and springs, coupled with extensive information relative to geology, hydrogeology, and standard operating procedures and monitoring to be conducted

during exploration diamond core drilling, should mitigate concerns in regard to potential impacts to ground water.

The number of samples collected during this exploration phase will not be sufficient to “characterize” natural variability. However, collection of samples at different times and weather conditions throughout the field season will allow us to provide knowledge of seasonal or meteoric fluctuations that may affect ground water chemistry. Information obtained through this voluntary sampling effort will help in the design of future baseline studies, should the project move forward, that will facilitate characterization at the appropriate time.

Table 2 - Ground Water Chemistry (Drill Hole #12 Standpipe)

Location (field GPS coordinates)		
Latitude		N 44° 02' 05.60"
Longitude		W 115° 46' 53.80"
	State Ground Water Quality Standard	Artesian Well (9/14/12 14:58)
	mg/L	Laboratory Analysis <i>(in mg/L except where noted)</i>
Alkalinity (as CaCO ₃)		46.5
Aluminum (dissolved)	0.2	<0.10
Aluminum (total)		<0.10
Ammonia (as N)		<0.04
Arsenic (dissolved)		<0.003
Arsenic (total)	0.05	<0.003
Barium (dissolved)		<0.05
Barium (total)	2	<0.05
Cadmium (dissolved)		<0.0005
Cadmium (total)	0.005	<0.0005
Calcium (as CaCO ₃)		47.3
Chloride	250	<1
Chromium (dissolved)		<0.002
Chromium (total)	0.1	<0.002
Cobalt (dissolved)		<0.02
Cobalt (total)		<0.02
Copper (dissolved)		<0.01
Copper (total)	1.3	<0.01
Conductivity (µS)		144
Corrosivity (Langelier)		-0.39
Fluoride	4	0.26
Hardness (as CaCO ₃)		51
Iron (dissolved)		<0.05
Iron (total)	0.3	<0.05
Lead (dissolved)		<0.005
Lead (total)	0.015	<0.005

Magnesium		2
Manganese (dissolved)	0.05	<0.05
Mercury (dissolved)		<0.0002
Mercury (total)	0.002	<0.0002
Nickel (dissolved)		0.02
Nickel (total)		0.03
Nitrate as N	10	<0.2
pH (S.U.)	6.5 - 8.5	8.3
Potassium		0.6
Selenium (dissolved)		<0.005
Selenium (total)	0.05	<0.005
Silica (as SiO ₂)		21.5
Silver (dissolved)		<0.005
Silver (total)	0.1	<0.005
Sodium		7.37
Sulfate	250	18
Sulfide		<0.05
Zinc (dissolved)		0.91
Zinc (total)	5	<0.01
Total Dissolved Solids	500	142
Total Kjeldahl Nitrogen		<0.10
Total Organic Carbon		0.36
Radiology (in pCi/L except Uranium which is pCi/L and (µg/L); Uranium pCi/L = 0.67 x µg/L)		
Gross Alpha (15 pCi/L)		ND ± 2.08
Gross Beta (50 pCi/L)		ND ± 1.44
Uranium pCi/L (30 µg/L)		<1
Adjusted Gross Alpha		ND
Field Measured Parameters		
Field Conductivity (µS)		138.5
Field Dissolved Oxygen		+0.47
Field Odor (describe)		none
Field O.R.P. (mV)		-147.7
Field pH (S.U.)		8.55
Field Temperature (°F)		57.5
Field Visible Gas (describe)		none
Samples collected by Hydro Logic, Inc. (HLI). Analyses by Analytical Laboratories (Analytical), Boise, ID.		
Sampled By		HLI
Analyses By:		Analytical
Total Coliform Bacteria		Present
e. coli		Absent

1.4 Sampling Plan

Ground water sampling locations and selection rationale, constituents for analysis, and sampling frequency are described below. Because this document is a combined QAPP-GWSP, the sampling and analytical methods are described in detail in Section 2 according to standard QAPP organization (i.e., USEPA 2002) to avoid unnecessary duplication.

1.4.1 Sampling Locations

The project objectives will be met by sampling flowing seeps and/or springs in locations believed to be upgradient and downgradient of proposed active drilling activities. Proposed drilling activities may be conducted on drill pads shown in figure 1 or on alternate locations to be determined as exploration activities continue. Although 62 of the up to 137 drill pad locations are identified on the map (fig. 1), because this is an exploration project, final locations and the total number of drill pads to be used have not been finalized and are subject to change during the exploration process.

Based on available data, considerable knowledge and understanding of the geologic structure, arid climate, etc., it can be reasonably inferred that streams in the project area are gaining from ground water baseflow. Because a final decision on the locations and sequence of drilling has not been made, the locations of seeps and springs have not been identified as of this time. The intent is to first determine which drill pads will be used during the field season, and subsequently determine from which springs, seeps, and/or streams it would be appropriate to sample.

Once the EA is complete, CuMoCo will begin preparation for field work including the finalization of drilling locations. Once this is done we will be able to identify the locations of appropriate sampling locations. When seep and/or spring sampling locations are identified and selected, sample locations will be recorded via GPS to assure future collection at the same location.

Whether the sampling location is a seep, spring, or stream will depend upon which, if any, of these hydrologic features exist in the drainage proximal to the drilling activity.

If flowing seeps or springs cannot be readily located in the vicinity of active drilling activities, samples will be collected from flowing surface water from proximal locations believed to be upgradient and downgradient of active drilling activities. Intermittent and perennial streams are identified on the topographic map in Figure 1. As stated on p. 70 of the SEA, “The two main intermittent tributaries [to perennial Grimes Creek] are Charlotte Gulch and Mohawk Gulch.”

Should samples be collected from these perennial or intermittent features, sample locations will be recorded via GPS to assure future collection at the same location.

If flowing seeps and/or springs cannot be readily found in the vicinity of active drilling activities, no samples will be collected in the respective area.

Actual drilling locations have not yet been finalized and will influence locations of water samples. Samples are anticipated to be collected from Grimes Creek, Charlotte Gulch, and Mohawk Gulch drainage basins and other intermittent tributaries as appropriate. Samples will be collected from locations representative of ground water flow believed to be upgradient and downgradient of the proposed drilling

location. Each collection of paired samples upgradient and downgradient of a proposed drilling location will constitute a sampling event.

1.4.2 Analytical Constituents

As further described in Section 1.6.1, water samples will be analyzed for the following constituent classes:

- Dissolved metals
- Major anions and cations
- Physical characteristics: total dissolved solids, hardness
- Physical parameters such as dissolved oxygen, water temperature, conductivity, and pH.

Table 3 - Analytical Parameter List

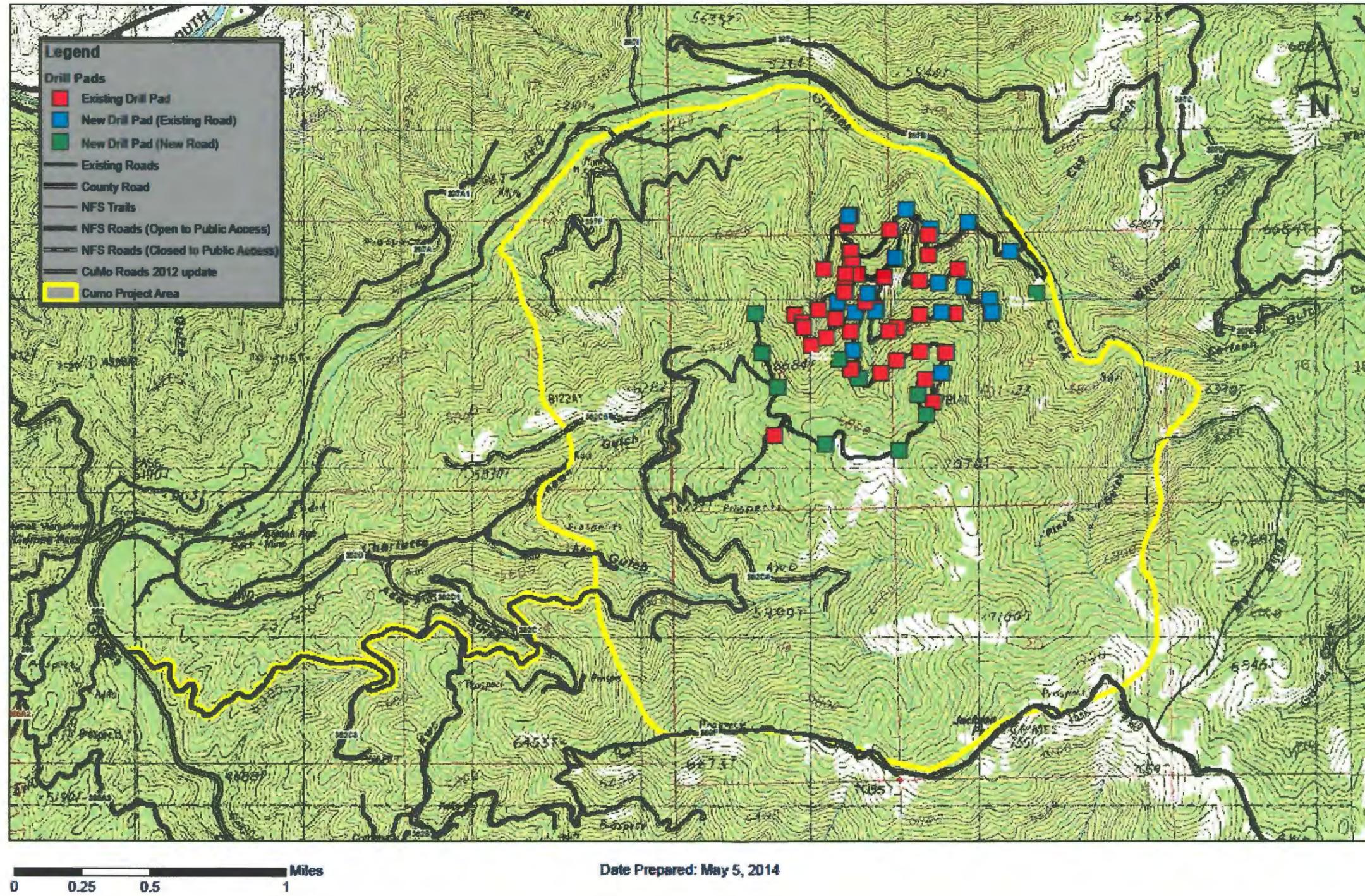
ANALYTICAL PARAMETER LIST

General Chemistry		Trace Metals	
Alkalinity	pH	Arsenic	Manganese
Bicarbonate	Specific Conductance	Cadmium	Mercury
Carbonate	Sulfate	Chromium	Nickel
Chloride	Total Dissolved Solids	Copper	Selenium
Dissolved Oxygen	Temperature	Iron	Silver
Hardness	Sodium	Lead	Zinc

*Trace metals to be analyzed as dissolved with the exception of mercury.

Figure 1 – Drill Pad Location Map

CuMo Exploration Project: Proposed Drill Pad Locations



1.4.3 Sampling Frequency

CuMo Exploration Project field work is prescribed by the Forest Service to be conducted between April 15 and December 15 on Forest Service administered lands. Because the project is exploratory in nature, locations and timing of drilling activities during the field season are subject to change.

Voluntary collection of samples will occur before, during, and after drilling activities. These activities are currently on hold pending the outcome of the Supplemental EA decision to be made by the Boise National Forest Supervisor later this year.

If field activities do occur in 2014, they are not likely to begin prior to September. Follow on field activities would occur between April 15 and December 15 of each year as appropriate and following the constraints within the Supplemental EA.

Three rounds of seep and/or spring sampling will be conducted relative to each drilling location or cluster of drilling locations within a drainage prior to, during, and after drilling activities. Analytical results of each voluntary sampling event will be provided to IDEQ and BNF and data will be retained by CuMoCo to be incorporated into future environmental baseline studies if and when they are initiated. Samples will be collected prior to, during, and after active drilling activities are conducted (assuming water is flowing during each of these intervals).

Table 3 provides the sample quantities for each sampling event, i.e., for each proposed drilling activity, the samples listed in the table will be collected upgradient and downgradient of the proposed drilling location(s). There will be three sampling events for each drill site or drill site cluster, before, during, and after drilling.

Table 4 - Estimated Sample Quantities Associated with Each Sampling Event

Analysis*	Field Samples**	Field Duplicates	Matrix Spike/ Matrix Duplicate	Rinsate	Total
Field Parameters	2	0	NA		2
Dissolved Metals	2	1	1	1	5
Inorganic Constitue	2	1	0	0	3
Physical Constituents	2	1	0	0	3

*Methods and specific quality control protocols will be further developed with the contract laboratory.

**Number of field samples equals number of sampling locations.

1.5 Project Task Description and Schedule

The tasks for implementing this QAPP-GWSP are as follows:

- Field sampling and sample delivery to laboratory
- Laboratory analysis, reporting, and disposal of samples
- Verification and validation of data
- Data entry into storage/database

- Data analysis and reporting

1.6 Quality Objectives and Criteria

The principle objective of QA/QC is to maintain an acceptable level of quality for activities associated with ground water sampling. These activities include field sample collection, sample shipping and handling, laboratory analysis, data management, analysis, and reporting. The quality control requirements set forth in this QAPP-GWSP support the project objectives by ensuring that the correct type, quantity, and quality of data needed are specifically identified, and that appropriate processes and procedures are established to support the collection of this data. Therefore, the quality objectives are to collect data of known and sufficient quality for CuMoCo to rely upon as representative of ground water chemistry of the project area. The quality objectives are described below as data and measurement quality objectives.

1.6.1 Data Quality Objectives

Data Quality Objectives (DQOs) refer to quality objectives to define the type and quality of data required to allow decision makers to make informed decisions. They specify the intended use of the data but do not directly set criteria for the quality of the data or express data quality characteristics. Review and evaluation of the DQOs is needed to determine the number and type of samples that must be taken and analyzed.

Because the water sampling is itself exploratory in nature, and no baseline or standard exists with which to measure the results, the DQOs are necessarily general. Should the project move forward past exploration, comprehensive baseline studies will be conducted allowing for more definitive DQOs.

The DQOs are as follows:

- **DQO #1:** Collect and measure ground water parameters in order to compare natural baseline conditions to ground water quality standards.
- **DQO #2:** Provide knowledge of natural seasonal and meteoric variability for ground water sampled from seeps and springs. Although variability may be apparent in sampled seeps and springs, limited data will preclude extrapolation of analytical results to all seeps and springs in the Project Area.
- **DQO #3:** Within the constraints of variability in ground water chemistry, evaluate changes in ground water parameters to provide knowledge of potential relationships between ground water chemistry and exploration drilling activities.

In order to collect the type of data necessary to meet these DQOs, relevant water quality criteria, based on the State of Idaho Ground Water Quality Rule, were selected. In addition, geochemical parameters were considered that will aid in the interpretation of ground water chemistry in the project area.

1.6.2 Measurement Quality Objectives

Measurement quality objectives (MQOs) describe the expected performance or acceptance criteria for individual data quality indicators, such as precision, bias, and lower reporting limit. MQOs provide the

basis for determining the procedures that should be used for sampling and analysis. Field studies are designed to generate data adequate to reliably estimate the temporal and spatial variability of that parameter. There are several potential sources of error in sampling, laboratory analysis, and data evaluation steps that should be addressed by MQOs. Accuracy in laboratory measurements can be more easily controlled than field sampling variability.

Sampling variability can be controlled somewhat by strictly following standard procedures and collecting quality control samples, but natural spatial and temporal variability can contribute greatly to the overall variability in the parameter value. Resources limit the number of samples that can be taken at one site spatially or over various time intervals.

1.6.2.1 Precision

Precision is the degree of agreement between replicate analyses of a sample under identical conditions. It is a measure of the random error associated with the analysis, usually expressed as relative percent difference (RPD) or standard deviation (SD) (USEPA 2003a). Precision will be determined on both field data and laboratory analysis by analyzing field duplicates, laboratory replicates, and matrix spikes duplicates. Calculation of RPD or SD between these paired measurements will evaluate precision. Duplicate laboratory sample error values include laboratory and field variability. The data quality indicators for precision in field measurements are shown in Table 5.

Table 5 - Field Sampling Methods and Measurement Quality Objectives

Parameter	Units	Method*	Description	Accuracy (deviatlon from true value)	Precision (%SD; except pH)	Standard for Measurement Stabilization**
Temperature	Deg C	170.1	Thermistor	0.2	10	0.1 units
Specific Conductivity	μS/cm	120.1	Conductivity Meter	5	10	3%
pH	units	150.1	Electrometric	0.1	0.1 units	0.1 units
Dissolved Oxygen	mg/L	360.1	Membrane Probe Method	0.2	10	10%***

*USEPA Analytical Test Methods (USEPA 2003b).

**A field measurement is considered stabilized when readings vary by no more than the standard given here.

***For values > 0.5 mg/L. For values ≤ 0.5 mg/L, measurement is stabilized when three consecutive readings are ≤ 0.5 mg/L.

1.6.2.2 Accuracy and bias

Accuracy is the measure of the difference between an analytical result and the true value, usually expressed as percent. The accuracy of a result is affected by both systematic errors (bias) and random errors (imprecision). Bias is a systematic error in one direction. Accuracy and bias will be assessed by using laboratory blanks, matrix spikes, and check standards. Prior to use, instruments will be calibrated per the manufacturer's instructions. Standards for field parameter accuracy are presented in Table 5.

1.6.2.3 Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at the sampling point, or an environmental condition. Samples for analysis will be collected from pre-determined sampling sites; the rationale for the selection of sampling sites is presented in Section 1.4. Sampling sites were selected to detect the potential effect of diamond core drilling activities on ground water sampling parameters.

Standard operating procedures (SOPs) for sample collection will be followed to minimize potential contamination, and other types of degradation in the chemical and physical composition of the water. Laboratory representativeness will be achieved by proper preservation and storage of samples along with appropriate sub-sampling and preparation for analysis.

1.6.2.4 Completeness

Completeness is defined as the total number of samples analyzed for which acceptable analytical data are generated, compared to the total number of samples collected. Sampling at sites with known position coordinates in favorable conditions and at the appropriate time points, along with adherence to standardized sampling and testing protocols set out by the QAPP, will aid in providing a complete data set. The goal for completeness is 90 percent.

1.6.2.5 Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. This goal is achieved through using standardized techniques to collect and analyze representative samples, along with using standardized data validation and reporting procedures. All data will be reported and calculated in units consistent with standard reporting procedures to enable comparison.

1.6.2.6 Sensitivity

Sensitivity is the ability of the method or instrument to detect the target analytes at the level of interest. The laboratory's method reporting limit will be equal to or less than Idaho Ground Water Quality Rule standards where possible.

1.7 Training and Certifications

Field staff will have a minimum of 2 years of experience and appropriate training to ensure that samples are collected and managed according to the approved SOP's. Sampling efforts will be performed under the direction of the Environmental Compliance Lead. The contracted laboratory will maintain appropriate certifications and participate in periodic auditing programs that establish its level of performance.

1.8 Documentation and Records

Quality records will be maintained by Forsgren in its Boise, Idaho office. Records maintained will include the following:

- QAPP-GWSP, including any approved modifications, updates, and addendums
- Project work plans, including any approved modifications, updates and addendums

- Field documentation
- Chain of Custody (COC) records
- Laboratory documentation
- Data validation and usability reports
- Project database
- Final project reports/deliverables

Electronic documents are maintained on a secure Forsgren server with a routine backup schedule.

2 DATA GENERATION AND ACQUISITION

This section of the QAPP-GWSP outlines specific QA/QC procedures related to the generation, compilation, reporting and archiving of data. The consistent use of standard operating procedures in these areas will help achieve the overall project objective of generating data of known and acceptable quality. In addition, as this document represents a combined QAPP-GWSP, a detailed sampling plan is presented in Section 1.4.

2.1 Sampling Methods

Data will be collected in accordance with the requirements of this QAPP and SOPs. These SOPs are summarized in brief below.

2.1.1 Field Measurements

- A. Samples and measurements will be representative of the seep or spring.
- B. Records of sampling information will be retained, including calibration and maintenance records, copies of reports, and records of data.
- C. Records of sampling information will include:
 - a. The date, place, and time of sampling or measurements;
 - b. The individual(s) who performed the sampling or measurements;
 - c. The date(s) analyses were performed
 - d. The individual(s) who performed the analyses;
 - e. The analytical techniques or methods used; and
 - f. The results of such analyses.

Sampling equipment and bottles will be staged before starting each sampling event. Sample bottles will be inventoried and organized for use in the field. The field measurements include water temperature, specific conductivity, pH, dissolved oxygen, and turbidity. Methods are shown in Table 5. A water sample is collected into a clean container. Field parameters are then collected by submerging the meter probes into the sample container. Probes will be decontaminated between samples by rinsing three times with distilled water. Results will be recorded into a field notebook or field form, or appropriate electronic device such as a computer tablet.

2.1.2 Samples

Samples will be labeled and packaged to assure data integrity and validity. Samples that require filtration and/or bottles that contain a preservative will be filled by first collecting water in a larger, clean, sacrificial sample bottle. Two one-liter cubic containers per sample site will be obtained from the contract laboratory for sacrificial use. Aliquots will then be poured from the sacrificial sample bottle in a controlled fashion into the pre-preserved bottles. Filtration will be completed using 0.45 micrometer (μm) membrane filters. Dissolved constituent (e.g., metals, nutrients) samples will be filtered using a disposable filter apparatus. Sample water will be pulled through the filter using a peristaltic pump.

2.2 Sample Handling and Custody

2.2.1 Sample Handling

The contracted laboratory will provide necessary coolers and sample bottles – of appropriate size, number and preservative content – for each sample event. The laboratory will also provide chain-of-custody (COC) forms, custody tape and shipping labels. The laboratory will specify the sample matrix, container, preservative, and holding time appropriate for the requested analyses. Sample preservation will be achieved by using these pre-preserved sample bottles from the laboratory and immediately placing the sample bottles into a cooler(s) with ice to help achieve a holding temperature of approximately 4 degrees Celsius (°C). Samples will be transferred to the laboratory within allowable holding times, and with a laboratory-provided temperature blank to check compliance with holding temperatures. Sample containers will be packed to prevent breakage or contamination via spillage.

Each sample container will have a waterproof label of sufficient size to make each sample easily identifiable. Sample labels will include the following information:

- Project name
- Date and time (24 hour clock)
- Sample identification codes
- Initials of person who collected the sample

Samples to be used for matrix spikes and matrix spike duplicates will be labeled as such by staff in the field. Field duplicates will be noted in the field notes but be labeled with unique sample numbers so that laboratory staff is unable to tell that these samples are duplicates.

2.2.2 Chain of Custody

A COC form will be filled out as the samples are collected, in chronological order. The completed COC form will accompany the sample until delivery to the laboratory. If the samples are left unattended, chain-of-custody protocols will be followed with samples held in a secure location with tamper-proof chain-of-custody tape to secure the lids in place. Field staff and laboratory staff will sign and date the chain-of-custody form provided by the analytical laboratory. Field staff will keep the original and the laboratory will keep a duplicate copy. The collected samples will be shipped to the contracted analytical laboratory and analyzed for the sampling parameters.

2.3 Analytical Methods

The contracted laboratory will document the condition in which samples are received. Such conditions include:

- Cooler temperature
- Condition of sample bottles
- Completeness of COC documentation
- Record of custody seal presence.

Standard laboratory analytical methods, expected ranges of results, and reporting limits are specified in 40 CFR Part 136, Guidelines Establishing Test Procedures for the Analysis of Pollutants. The procedures are

routine, adhere to standard methods for the analysis of water samples, and detect analytes at the level necessary to satisfy regulatory criteria. However, Forsgren will work directly with the contracted laboratory to determine the most appropriate analytical methods and associated method detection limits and data quality indicators.

2.4 Quality Control

Quality control samples will be collected and analyzed to evaluate compliance with the MQOs. These samples provide a means to evaluate the performance of field and laboratory SOPs by measuring the effect of inherent variability. Refer to Table 4 for a summary of the QC samples to be collected.

2.4.1 Field QC Samples

During each sampling event, at least one field duplicate, one matrix spike (MS), and one matrix spike duplicate (MSD) sample will be submitted to assess precision and bias. These field replicates are collected at the same time, following identical SOPs, and provide a means to evaluate field variability (i.e., precision).

2.4.2 Laboratory QC Samples

A matrix spike is prepared by the laboratory (for the samples explicitly collected for this purpose by field staff) by adding a solution of analytes with known concentrations to a field sample. The MS/MSD samples are used to determine the accuracy of analysis for a given matrix. The contract laboratory will split field samples (producing a laboratory duplicate) to determine laboratory precision. The difference between field variability and laboratory variability provides an estimate of the sample field variability. The laboratory will also run deionized water through the entire sample preparation and analysis procedure; this method blank is therefore used to assess laboratory practices. Finally, the laboratory will run one laboratory control sample (LCS), a sample of known concentration, to evaluate laboratory processes. These QC samples comprise the standard USEPA QA/QC protocol consisting of a laboratory blank, one laboratory duplicate, one LCS, and one matrix spike for each applicable analysis. However, the laboratory is ultimately responsible for determining the proper type and frequency of QA/QC samples. The contract laboratory will inform the project manager as soon as possible if any sample is lost, damaged, has a lost tag, or gives an unusual result.

2.5 Instrument and Equipment Testing, Inspection, Maintenance, and Calibration

Field meters (e.g., dissolved oxygen, pH, conductivity, and turbidity sensors) will be calibrated against known standards weekly or per manufacturer's recommendations. Accuracy checks will be conducted as determined appropriate. For example, checks may occur when measurements are outside of expected ranges (refer to Table 5) or when measurements are not stabilizing (refer to Table 5). Calibration events will be documented in field notebooks and/or field forms. Given the remoteness of the field site, equipment will be inspected in full prior to leaving for the field to minimize in-field equipment problems. When possible and practical, backup sensors will be part of the standard field kit.

The contracted laboratory is responsible for laboratory equipment maintenance and calibration decisions and documentation of such. Should an equipment maintenance event or failure affect the analytical

schedule, the laboratory will be responsible for notifying Forsgren of the delay.

2.6 Inspection/Acceptance of Supplies and Consumables

Field staff will obtain and maintain equipment calibration standards of adequate quality for field equipment. Standards are anticipated to be needed for dissolved oxygen, pH, turbidity, and conductivity meters.

The contracted laboratory will be responsible for inspecting and checking supplies and consumables (sample reference materials and reagents) associated with the analytical procedures. This includes deionized water supplied to Forsgren for use in field and any standards needed for laboratory QC (described in Section 2.4.2).

2.7 Data Management

Forsgren will maintain sampling data in its Boise, Idaho office. Hardcopies of field notes, chain-of-custody forms, and laboratory reports will be filed and maintained. Likewise, electronic documents, such as laboratory reports, will be filed in the project directory. The project directory is hosted on a server with regular backup procedures.

2.8.1 Data Collected in the Field

Field staff will collect information in a field notebook at the time of sample collection. This information will include documentation of the sample method (i.e., intermediate equipment used or individual sample containers) and observations of conditions that could affect the quality of the samples (e.g., clarity, weather). Standardized field forms will be utilized to record field parameter measurements (i.e., water level, pH, temperature). Field notebook and datasheet entries will include the following information at a minimum:

- Project name
- Sampling location
- Initials of person who collected the sample
- Date and time of sample collection
- Samples collected
- Field measurements and observations

Field staff will fill out a COC form with duplicate copies for the laboratory while collecting samples in the field. The COC sheet will include the following information at minimum:

- Project name
- Sampling location
- Initials of person who collected the sample
- Date and time of sample collection
- Samples collected

Data recorded in field notebooks, field forms, and on chain-of-custody sheets will be backed up and entered into a database or spreadsheet as soon as practicable upon return from the field.

2.8.2 Laboratory Data

Laboratory data will be delivered in an electronic format to minimize the chances of transcription error. Laboratory sample data will be added to the same records as the corresponding field data. Quality control results will be compiled in a separate table and will be used to evaluate the accuracy of the data and to determine whether the MQOs were met.

2.8.3 Database Development

A database will be developed to manage and analyze data that have been collected over time. Prior to incorporation in the database, all data will be subject to review as described in this QAPP to verify accuracy and completion. Historical data will be subject to quality assurance and quality control requirements as outlined by this plan, and reviewed for quality compliance, before inclusion in the database and use for analysis. Quality control results and regulatory limit metadata results will also be stored in the database so that performance can be tracked over time.

3 ASSESSMENT AND OVERSIGHT

3.1 Assessments and Reports to Management

Field and laboratory systems and performances will be reviewed regularly for quality control. Reviews will be performed by Forsgren, as appropriate. Review procedures will be consistent with those described by the USEPA (2000).

Reviews of field activities, conducted by Forsgren, verify that the procedures established by this QAPP-GWSP are being followed. Field reviews may include evaluation of field and instrument records, sample collection and handling, and documentation procedures. The findings of reviews will be shared with sample collectors to facilitate corrective actions being taken (if needed).

If Forsgren suspects any issues affecting the quality of the laboratory analytical data, Forsgren will request a QA/QC report from the laboratory as conducted by laboratory personnel in accordance with their Quality Assurance Manual regarding laboratory performance. The request will include documentation of the laboratory's review of sample receiving and handling, COC procedures, sample preparation and analysis, and instrument operating records.

Laboratory analysis reports will be provided to the USFS and IDEQ as soon as practicable after the reports are received by Forsgren.

3.2 Corrective Actions

Corrective actions refer to the process of implementing measures to counter QC problems identified through the assessments outlined above. Corrective actions may occur during field or laboratory activities or during data validation and assessment. If quality control results indicate problems with data, the prescribed procedures will be followed to resolve the problems.

- Corrective steps may include the following:
- Modifying sampling or measurement procedures
- Re-calibrating instruments
- Re-analyzing samples (within holding time requirements)
- Modifying analytical procedures

If the samples cannot be re-run, and time and resources allow, additional samples may be collected to meet the same information needs. Should none of these measures be taken, or are impractical within time constraints, then the data will be qualified appropriately in the analysis and report.

4 DATA VALIDATION AND USABILITY

Review, validation, and usability procedures are established to confirm that the data obtained are complete, accurate and of appropriate quality.

4.1 Data Review, Verification, and Validation

4.1.1 Data Review

Raw field data are entered directly into field notebooks/and or sample forms using ball-point pen with indelible ink and not pencil. The field crew will check their field notebooks for missing or improbable measurements before leaving sample location. In addition, spot checks for transcription errors will occur as data are recorded in the field. Any written mistakes will be crossed out once and initialed (not erased), and the correct information will be written in.

Following field activities, recorded field data will be entered into an electronic spreadsheet, labeled DRAFT, until data verification is complete. Data entry will be checked against the field notebook data for errors and omissions. Missing or unusual data will be brought to the attention of the project manager for consultation. Valid data will be moved to a separate file labeled FINAL.

Internal laboratory data review procedures will be according to laboratory SOPs. Upon receipt of lab results by Forsgren, results will be checked for missing and improbable data. Any estimated results will be qualified and their use restricted as appropriate. A standard case narrative of laboratory QA/QC results will be sent to the project manager for each set of samples.

4.1.2 Data Verification and Validation

The handling, preservation and storage of field samples will be continually monitored while in the field, and the contracted laboratory will document and report the condition of samples upon receipt. Problems identified in the storage, handling or shipping of samples will result in appropriate data qualification.

Laboratory results will be checked to assess compliance with project procedures, including analytical methods and hold times. Field precision, accuracy, and bias will be evaluated according to the parameters in Table 5. Specific method and analyte acceptance criteria for laboratory data will be developed in consultation with the contracted laboratory. Data that does not conform to the acceptance criterion will be evaluated and qualified appropriately, using the USEPA National Functional Guidelines (NFG) (2010) as guidance. Accuracy and bias will be assessed by analyzing laboratory blank, spike, calibration, and check standard results. Identified problems will be addressed according to the corrective actions outlined in Section 3.2.

4.2 Reconciliation with User Requirements (Data Usability)

Data and measurement quality objectives will be verified for meeting the standards set forth in this QAPP-GWSP. If the objectives have not been met, then a determination will be made whether to delete non-credible data or how to qualify the data.

The QAPP-GWSP may be reviewed and updated as needed to reflect any changes and to maintain alignment of data collection and QA/QC procedures and the overall project goals.

5 REFERENCES

[USEPA] United States Environmental Protection Agency

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