Final Environmental Impact Statement for the Husky 1 North Dry Ridge Phosphate Mine

Governor's Office of Energy and Minerals

DOI-BLM-ID-I000-2021-0001-EIS
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USDA Forest Service
Caribou-Targhee National Forest
http://www.fs.fed.us/r4/caribou-targhee

1405 Hollipark Drive
Idaho Falls, Idaho 83401
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USDI Bureau of Land Management
Idaho Falls District
http://www.Id.blm.gov

Dear Reader:

This is to notify you that the Final Environmental Impact Statement (EIS) for the proposed Husky 1 North Dry Ridge Phosphate Mine is available for your review. The Final EIS was prepared under the National Environmental Policy Act (NEPA) and analyzes impacts on the human environment from an open pit phosphate mine in southeastern Idaho that has been proposed by Itafos Conda LLC (Itafos).

The Final EIS analyzes a range of management options to address environmental and social issues that resulted from the proposal to mine that were identified by the public, Shoshone-Bannock Tribes, and agencies during an earlier scoping period. The Final EIS was prepared by the Bureau of Land Management (BLM, lead agency), Idaho Falls District; and the U.S. Forest Service, Caribou-Targhee National Forest (USFS, joint lead agency); with cooperation from the Idaho Department of Environmental Quality, Idaho Governor's Office of Energy and Mineral Resources, Idaho Department of Lands, and the U.S. Army Corps of Engineers. The Final EIS includes modifications made to address public comment. Important changes are listed in Section 1.2.

Itafos' proposed project is located approximately 16 miles northeast of Soda Springs, Idaho and includes: 1) development of four federal mineral leases for mining and reclamation of an open pit phosphate mine; 2) modification (enlargement) of an existing lease; 3) construction of a truck-to-rail ore transfer facility; and 4) off-lease facilities supporting mine development. The proposed mine is a surface mine similar to Itafos' existing Rasmussen Valley Mine which is located three miles to the north of Husky 1 North Dry Ridge. Operations at the proposed mine are planned to begin in time to allow for a smooth transition and continuous ore production.

Alternatives to the Proposed Action were developed to address issues brought forth through the scoping process or because the Proponent requested it. The Proposed Action, five action alternatives and the No Action Alternative were analyzed. The action alternatives consist of the (1) Alternative Cover, (2) Alternative Stream Routing, (3) Alternative Access 1, (4) Alternative Access 2, and (5) Alternative Sequencing. These last two alternatives were added after the Draft EIS comment period. BLM and Itafos developed Alternative Access 2 in response to comments and Itafos proposed Alternative Sequencing.

The Final EIS identifies the agency Preferred Alternative as the Alternative Cover along with the Alternative Stream Routing, Alternative Access 2, and Alternative Sequencing. The Alternative Cover reduces percolation of precipitation water into backfill material resulting in a higher level of groundwater and surface water protection. The Alternative Stream Routing modifies the MRP for the post reclamation stream route of Stewart Creek by eliminating the permanent diversion routing and returning the creek to its approximate original channel. The Alternative Access 2 minimizes the temporary closure of NFS Road 134. It gives the public continued access to the forest during and after mining activities and moves the road out of riparian habitat.

Concurrent with the distribution of the Final EIS, the USFS is releasing its Draft ROD. The U.S. Environmental Protection Agency (EPA) published a Notice of Availability (NOA) of the Final EIS in the Federal Register, commencing a 30-day availability period. In addition to the EPA's NOA, the BLM and USFS published a separate NOA with additional information in the Federal Register and in local newspapers.

The Final EIS is a completed document. The Final EIS and USFS Draft ROD are both available at the following locations:

- BLM Web site: https://go.usa.gov/x7HSJ
- USFS Web site: https://www.fs.usda.gov/project/?project=37878

If you have information for agency consideration in making our decisions, it can be sent to the following addresses and must be received by the end of the 30-day availability period:

- Email: BLM_ID_Husky1NDR_EIS@blm.gov, or
- Mail: Husky 1 North Dry Ridge Phosphate Mine Final EIS, c/o Tetra Tech, 2525 Palmer Street, Suite 2, Missoula, MT 59808 (Please reference “Husky 1 North Dry Ridge Phosphate Mine Final EIS” on all correspondence).

Information provided for agency consideration, including names and street addresses of respondents, will be available for public review at the BLM Pocatello Field Office and subject to disclosure under the Freedom of Information Act (FOIA). If you wish to withhold your name and/or address from public review or disclosure under the FOIA, you must state this prominently at the beginning of your written comment. The BLM will honor such requests to the extent allowable by law. All submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, are available for public inspection in their entirety.

The BLM and USFS will each issue separate RODs for decisions regarding their respective jurisdictions. USFS special use authorizations for off-lease activities are subject to the objection process pursuant to 36 CFR 218 Subparts A and B. The USFS Draft ROD is available for review concurrent with the Final EIS. An opportunity to object to the Draft ROD within the 45-day objection period is described in the Draft ROD and in a legal notice in the newspaper. The USFS Draft ROD is being made available via the internet. The USFS will issue its ROD for activities under its authority following the close of the objection period (and a resolution period if needed).

If no objection is filed on the USFS Draft ROD, the USFS may implement its decision five business days following the end of the objection period. If objections are received and resolution to any objections on the USFS Draft ROD are completed, the USFS may implement its decision immediately.

The BLM will issue a ROD for activities under its jurisdiction no sooner than the close of the 30-day availability period on the Final EIS. After publication of the BLM ROD, there will be a 30-day appeal period before the BLM’s decision becomes effective. The ROD will contain the appropriate instructions for appeal. Each final ROD will be made available via the internet. BLM appeal procedures found in 43 CFR 4 apply to the portion of the Project related to the federal mineral lease(s).

Questions can be directed to Wes Gilmer, BLM Project Manager, (208) 478-6369.

Sincerely,

Mary D'Aversa

Mary D'Aversa
District Manager
BLM Idaho Falls District

Mel Bolling

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Husky 1 North Dry Ridge Phosphate Mine

Final Environmental Impact Statement

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Abstract

This Final Environmental Impact Statement (FEIS) analyzes impacts expected from approving the Husky 1 North Dry Ridge (H1NDR) Mine and Reclamation Plan submitted by Itafos Conda, LLC to mine phosphate ore in Caribou County, Idaho, including modifying federal phosphate leases to add approximately 559 acres needed to maximize recovery of currently un-leased adjacent ore that would otherwise be bypassed and rendered unrecoverable in the future. The Proposed Action consists of developing two new open mine pits, construction of haul and access roads, water management features, permanently rerouting a portion of Stewart Creek, closing the National Forest System (NFS) Road 134 (Stewart Canyon Road) to public access, environmental protection measures, and reclamation. Ore would be hauled via truck to an existing railroad and then by rail to a processing plant in Soda Springs, Idaho. Mine overburden (waste rock) would be placed as backfill in the mined-out North Maybe Mine and South Maybe Canyon Mine pits, an overburden storage area, and then into mined areas of H1NDR as mining progresses. Backfill would be graded and then covered with growth media and revegetated. In total, mining and the support facilities would cause disturbance of approximately 1,146 acres of National Forest. Approximately 255 acres of those were previously disturbed by historic mining activities. The expected mine life would be 13 years, more or less, followed by an expected 2 years of reclamation. In addition to the No Action Alternative, which is to not approve the Mine and Reclamation Plan, an alternative is evaluated to install a cover with more flexible membrane liner over strategic areas of the pit backfill to reduce water percolation through the backfill, resulting in a reduction of contaminants leaching into groundwater and, subsequently, surface water. Another alternative is considered to return Stewart Creek to its natural channel at reclamation. As the Proposed Action would only provide public access between Dry Valley and Diamond Valley via the Blackfoot River Road, two alternatives considered would provide motorized access between Dry Valley and Diamond Valley more directly through the lease areas. The final alternative would modify the mining sequence, Itafos notified BLM about the change in sequence after the publishing of the DEIS.

Public comments on the DEIS were accepted for 45 days, beginning on October 22, 2021, the day the Environmental Protection Agency published a Notice of Availability in the Federal Register.

Summary

Introduction

Itafos Conda, LLC (Itafos) submitted a phosphate mine and reclamation plan (MRP) for the Husky 1 North Dry Ridge (H1NDR) project to the Bureau of Land Management (BLM) on April 13, 2020. The BLM reviewed the MRP to determine if it and other application materials complied with requirements in the Code of Federal Regulations (CFR) (43 CFR 3592.1) and were complete, and informed Itafos that additional information was needed. Itafos submitted a revised MRP on June 19, 2020 (Itafos, 2020a).

The mine would be located about 16 miles (26 road miles) northeast of Soda Springs in Caribou County, Idaho on existing and proposed modifications (enlargement) to federal mineral (phosphate) leases, mostly on federal lands within the Caribou National Forest. Leases issued under the Mineral Leasing Act of 1920 grant exclusive rights to mine and dispose of the federal phosphate deposit.

The BLM and United States (U.S.) Forest Service (USFS) are joint lead agencies for this Environmental Impact Statement (EIS) because most activities would occur on National Forest System (NFS) lands on leases administered by BLM, while some would occur off-lease and require issuance of several special use authorizations from the USFS Caribou-Targhee National Forest. The U.S. Army Corps of Engineers (USACE), the Idaho Department of Environmental Quality (IDEQ), the Idaho Department of Lands (IDL), and the Idaho Office of Energy and Mineral Resources are cooperating agencies.

Before the BLM and USFS approve the MRP, modify the lease(s), and issue special use authorizations, the BLM and USFS must comply with the National Environmental Policy Act (NEPA) by analyzing the environmental impacts of mining and reclamation operations along with reasonable alternatives. As H1NDR is likely to have significant impacts, an EIS is appropriate to document this analysis.

Preliminary groundwater fate and transport modeling indicated that the backfill cover in the MRP would not meet regulatory requirements for surface water quality. Itafos developed several alternative covers in response. The Proposed Action analyzed in this EIS is the June 19, 2020 version of the MRP with the Modified Proposed Action cap and cover, which was refined in a technical memo in October 2020 (Itafos, 2020b).

Location

Operations would occur on leases IDI-008289 (NDR), IDI-0005549 (H1), IDI-04 (Maybe Canyon), and IDI-0678 (Dry Valley Pit D). Itafos is also requesting modifications to lease boundaries for the IDI-0005549 (H1) Lease (559 acres). The project is in portions of Township 7 South, Range 44 East, Sections 17, 20, 21, 28, 33, and 34; Township 8 South, Range 44 East, Sections 3, 4, 10, 14, 15, 21, 22, 23, 24, and 25; and Township 8 South, Range 45 East, Sections 30, 31, and 32; Boise Meridian.

Purpose and Need for Action

Itafos has submitted a detailed MRP for developing existing mineral leases that were previously obtained from the United States at H1NDR. The purpose of the joint federal undertaking is for BLM and USFS to evaluate and respond to the MRP application including the proposals to enlarge (modify) the existing leases and to construct off-lease facilities on NFS lands.

As the agency authorized to approve mine and reclamation plans for lease development, BLM's need is to identify and incorporate measures to promote orderly and efficient mining, to encourage utilization of all known phosphate resources, and to promote practices that avoid or minimize damage from this proposal to the environment and hazards to public health and safety. In addition, the BLM needs to analyze and document anticipated impacts and their predicted compliance with established requirements, including lease terms, Land Use Plans, and applicable Federal and state laws, regulations, and rule.

As the surface management agency, the USFS's need is to provide the BLM with recommendations for lease modifications, surface protection, and reclamation. USFS also needs to evaluate special use authorization proposals for phosphate mining support facilities and activities that occur on NFS lands outside lease boundaries. As such, BLM and USFS have jointly prepared this EIS in accordance with FLPMA, NEPA, the Administrative Procedure Act, and the CEQ regulations as revised in 2022.

The proponent's purpose is to exercise development rights by submitting and implementing an approved MRP that allows them to economically mine the deposit as long as established requirements are met.

The USACE, IDEQ, and IDL will use this document to inform their respective decisions associated with this proposal.

Decisions to be Made

Itafos must acquire all permits mandated by law. The BLM is responsible for activities on leased lands and would make decisions regarding approval of the proposed MRP, proposed lease modification, and uses on leased lands. The BLM will prepare and sign a Record of Decision and decide whether to:

- Approve the MRP as proposed or an alternative,
- Recommend the lease modifications,
- Approve modifications of current mine plans on leases IDI-04 and IDI-0678 to accommodate mining and facilities as proposed on those leases,
- Approve a permanent or temporary stream rerouting, and
- Approve a road closure, new road, or all-terrain vehicle (ATV) trail for access from Dry Valley to Diamond Creek.

The USFS is responsible for off-lease operations on NFS lands, including whether and how to authorize these operations or an access route alternative providing continuous public access. USFS will decide whether to:

- Approve an amendment to Simplot's existing slurry pipeline special use authorizations,
- Approve an amendment to the 2003 Caribou National Forest Revised Forest Plan (2003 RFP) (USFS, 2003a) for relocation of the pipeline,
- Approve special use authorizations for off-lease facilities, and
- Authorize the adjustment of term grazing permits due to impacts on grazing.

If the Alternative Access alignment is selected, additional decisions would include whether to:

- Approve a public road open to all motor vehicles or a 50-inch trail open to off-highway vehicles (OHVs) or smaller.

Public Scoping

Scoping

A notice of intent to prepare an EIS was published in the Federal Register on December 23, 2020, followed by a 30-day scoping period. A virtual public meeting was held on January 11, 2021, to provide information. A press release was posted on BLM's website announcing the scoping period and the virtual public meeting. Media outlets were included in the scoping mailing, and the project is on BLM's ePlanning and USFS's project websites. Written comments were accepted by mail, email, or hard copy. During the scoping period, approximately 1,000 documents were submitted in the form of letters or emails before the close of the 30-day scoping period on January 22, 2021.

BLM Land Use Plan Conformance

To be approved, the MRP must comply with agency regulations, policies, plans, and programs. The H1NDR Mine must comply with applicable land use plan direction developed under the Federal Land Policy and Management Act. Although the mine is located within the NFS, BLM has authority for issuing federal phosphate leases and administering associated resource use and development. Because of this, those portions of the mine that would occur within leases must also meet the phosphate mining planning and development criteria set forth in the BLM Pocatello Field Office Approved Resource Management Plan (ARMP) (BLM, 2012), as amended.

The Proposed Action and alternatives have been reviewed and are consistent with management direction in the ARMP. No amendments to the ARMP would be necessary.

Mining and reclamation practices would also meet BLM's requirements for mining operations and reclamation of leases at 43 CFR 3592.1.

USFS Revised Land and Resource Management Plan Conformance

The Caribou National Forest Revised Land and Resource Management Plan (2003 RFP) also applies because the mine is located within this portion of the Caribou-Targhee National Forest, and the 2003 RFP is incorporated by reference by the BLM ARMP. Management of the National Forest is directed by the 2003 RFP, which applies to all NFS lands and post-reclamation activities.

The 2003 RFP provides overall management direction for each resource and the prescriptions provide specific direction based on the resources and conditions within each prescription area.

A review of the standards and guidelines and the activities in the Proposed Action, No Action, and other action alternatives are consistent with the Forest-Wide and Management Prescription direction provided in the 2003 RFP, including Open Motorized Route Density. However, an amendment would be needed to re-route Simplot's existing slurry pipeline through the mine area. The amendment would be to change the designation on the new route from Prescription 6.2b to 8.1b for 6 acres where the pipeline would be located, and to change 6 acres from Prescription 8.2b to 6.2b for the area from where the pipeline would be relocated.

Proposed Action

The Proposed Action includes modification of an existing lease, mining, reclamation, and special use authorizations, summarized below. The MRP is viewable in its entirety online at https://go.usa.gov/x7HSJ. The Proposed Action reclamation cap and cover were modified from the MRP based on the *H1NDR Mine and Reclamation Plan Addendum* (Itafos, 2020d). This modified Proposed Action is called the Proposed Action in the EIS.

Leases and Lease Modifications

Surface owners or management agencies of current leases are the USFS and Idaho Department of Fish and Game (IDFG). Portions of the IDI-0005549 (H1) lease mining area extends beyond the current lease boundaries. Itafos is requesting modification(s) under 43 CFR 3510 to expand the existing IDI-0005549 (H1) lease boundaries (559 acres) to recover adjacent, un-leased phosphate resource that would otherwise be bypassed and rendered unrecoverable in the future. This would assist with achieving ultimate maximum recovery of the non-renewable mineral resource per 43 CFR 3590. **Table S-1** provides the legal description, surface owners, and lease holders of H1NDR mineral leases and mineral lease modifications.

Table S-1. Legal Descriptions, Surface Management Agency, and Lease Holders of H1NDR Project Mineral Leases and Proposed Lease Modifications

Mineral Leases	Township, Range, Section	Subdivision	Surface/ Subsurface Owner
H1NDR Mineral Leases			
Lease IDI-0005549	8S, 44E, 24	SE¼SW¼, SW¼SE¼	NFS/Federal
H1	8S, 44E, 25	NE¼, NE¼NW¼, NE¼SE¼	NFS/Federal
(864.35 acres)	8S, 45E, 30	SW¼NW¼, SW¼, SW¼SE¼	NFS/Federal
Current Lessee - Itafos	8S, 45E, 31	NE¼, NE¼NW¼, N½SE¼	NFS/Federal
	8S, 45E, 32	NW¼SW¼	NFS/Federal
Lease IDI-008289	7S, 44E, 17	SE¼SE¼	IDFG/Federal
NDR	7S, 44E, 20	E½NE¼	NFS/Federal
(640 acres)	7S, 44E, 21	W½NW¼, SE¼NW¼, SW¼	NFS/Federal
Current Lessee - Itafos	7S, 44E, 28	W½NE¼, E½NW¼, NE¼SW¼, NW¼SE¼	NFS/Federal
Lease IDI-04	8S, 44E, 3	NW¼NW¼, S½NW¼, SW¼, SW¼SE¼	NFS/Federal
Maybe Canyon Mine	8S, 44E, 4	E½NE¼	NFS/Federal
(1,522.24 acres)	8S, 44E, 10	NE¼NW¼, W½NE¼, SE¼NE¼, SE¼	NFS/Federal
Current Lessee - Nu-West	8S, 44E, 14	W½NW¼, SE¼NW¼, E½SW¼, NW¼SW¼, W½SE¼	NFS/Federal
	8S, 44E, 15	E½NE¼	NFS/Federal
	7S, 44E, 28	SW¼SE¼	NFS/Federal
	7S, 44E, 33	E½SE¼, NW¼SE¼, NE¼	NFS/Federal
	7S, 44E, 34	W½SW¼	NFS/Federal
Lease IDI-0678	8S, 44E, 15	W½NW¼, SW¼	NFS/Federal
Dry Valley Mine Pit D	8S, 44E, 21	NE¼, NE¼	NFS/Federal
(440 acres) Current Lessee - Nu-West	8S, 44E, 22	NW¼	NFS/Federal

Mineral Leases	Township, Range, Section	Subdivision	Surface/ Subsurface Owner
Proposed Mineral Lease Modifications			
Modification 1 (359 acres)	8S, 44E, 14	SE¼SE¼	NFS/Federal
	8S, 44E, 23	NE¼NE¼, NW¼NE¼, SE¼NE¼	NFS/Federal
	8S, 44E, 24	NW¼NW¼, S½NW¼, N½SW¼	NFS/Federal
Modification 2 (40 acres)	8S, 45E, 30	SE¼SE¼	NFS/Federal
Modification 3 (40 acres)	8S, 45E, 30	NW¼SE¼	NFS/Federal
Modification 4 (40 acres)	8S, 45E, 31	SE¼NW¼	NFS/Federal
Modification 5* (80 acres)	8S, 45E, 32	W½NW¼	NFS/Federal

Source: BLM Case Recordation Serial Register Page https://reports.blm.gov/reports/LR2000/ and (Itafos, 2020a, pp. Table 6-1)

Notes: S = South, E = East, W = West, and N = North

* Modification 5 in the MRP was eliminated due to acquisition of leasing rights instead of a modification. Modification 6 in the MRP is now called Modification 5 in the EIS.

Disturbance Summary

The approximate acres of new disturbance in H1NDR are provided in **Table S-2.** An operational zone around the pits is included in the disturbance estimate to accommodate other mine facilities, as well as potential changes to pit design including highwall laybacks that may be necessary due to unstable rock that could be encountered during mining. Mining-associated impacts within the lease boundaries would occur within the operational zone, which includes re-disturbance of 148 acres previously disturbed at the Maybe Canyon Mine. Approximately 126 acres would be disturbed on the lease modification areas.

Mine facilities include growth media stockpiles, temporary and permanent overburden (waste rock) storage areas (OSA), water management features, and dust suppression and water supply wells with water fill stands. Existing offices and shop facilities at the nearby Dry Valley Mine on private lands would be used. The Dry Valley yard area including the fuel storage tanks, an equipment parking/hot start line, and a lay-down yard would be used. The tipple (train loading) area includes an ore stockpile, train loading facility, and haul road ramp near the Dry Valley Mine Pit D, on IDI-0678 (Dry Valley Mine Pit D) Lease.

Table S-2. Mine Surface Disturbance

Mine Component	NFS Acres	Private Acres	Total Acres
H1NDR New Surface Disturbance			
H1 Operational Zone	126	0	126
NDR Operational Zone	38	0	38
H1 Mine Pits	355	0	355
NDR Mine Pit	138	0	138
H1 Historical South Maybe Canyon Mine Pits*	77	0	77
NDR Historical North Maybe Canyon Mine Pits*	71	0	71
Permanent OSA*	55	0	55
Temporary OSA	49	0	49

Mine Component	NFS Acres	Private Acres	Total Acres
H1 Water Management Ponds, Sediment Control Ponds, Runoff Containment Ponds and Ditches	36	0	36
NDR Water Management Ponds, Sediment Control Ponds, Runoff Containment Ponds and Ditches	15	0	15
H1 Growth Media Stockpile	8	0	8
NDR Growth Media Stockpile	4	0	4
Stream Realignment	20	0	20
H1 Haul Roads*	32	0	32
NDR Haul Roads*	31	16	47
Ore Stockpile and Tipple Area*	61	0	61
H1 Ready Line	2	0	2
NDR Ready Line	9	0	9
Simplot Slurry Pipeline Re-route	3	0	3
Total	1,130	16	1,146

Source: (Itafos, 2020a)

Notes: Rounding may cause numbers to total differently than the table.

* Previously disturbed areas

Ore Removal, Backfill, and Overburden Storage

Two primary areas would be mined: H1 and NDR. H1 would have a series of adjacent pits and occupy portions of leases IDI-04 (Maybe Mine), IDI-0005549 (H1), and proposed IDI-0005549 (H1) Lease modifications. NDR has one open pit on a portion of the IDI-008289 (NDR) Lease.

Mining would include 30 feet of benches for every 90 feet of depth. Mining would occur year-round, up to 24 hours per day, with overlapping shifts, for 13 years, more or less. The mining sequence would mine H1 and NDR consecutively. Ore production may fluctuate over time, depending on technical factors and market conditions, increasing or decreasing the mine life.

The total volume of phosphate ore to be recovered is estimated and would not be known for certain until mining is complete. The total material that is removed every month would be calculated by modeling and mine planning software based on baseline topography compared to post-mining topography. One ton will be estimated using an ore density of 1.6875 tons per loose cubic yard, which has been verified from recent mining operations, including from the Dry Valley Mine. Actual volume of the ore mined will be gained from calibrated scales at the mine tipple.

The entire tipple area would be lined. The 60 mils high-density polyethylene (HDPE) liner would be placed over a minimum of 6 inches of 3/8-inch minus material. At least 2 feet of limestone would be placed on top of the HDPE liner to provide a visual indicator showing the bottom of stockpiled ore and the tipple pad, thereby protecting the liner during operations. Water management would be in accordance with the Storm Water Pollution Prevention Plan (SWPPP) and runoff would be managed as contact water. To accommodate railcar loading requirements, the public access road would be safely relocated around and away from the tipple area.

The pits would be sequenced through several phases outlined in **Table S-3.** As ore is mined from H1, overburden would be placed as backfill in existing pits and newly mined pits except in Phases 4 and 5, where approximately five million cubic yards would be placed in a permanent external OSA.

Table S-3. Open Pit Mine Sequence

Phase	Production Years	Pit(s) Mined	Backfill Destination
H1			
1	1 through 3	H1-N	South Maybe Canyon Mine-N, South Maybe Canyon Mine-S
2	2 through 4	H1-N	South Maybe Canyon Mine-N, H1-N
3	3 through 5	H1-N	H1-N
4	4 through 6	H1-N, H1-X, H1-L	H1-N, H1-X, H1-X OSA, H1-L
5	5 through 7	H1-L	H1-L
6	6 through 8	H1-L, H1-E	Temp OSA, H1-L, H1-E
7	7 through 9	H1-E, H1-S	Temp OSA, H1-E, H1-S
8	8 through 10	H1-S	Temp OSA, H1-S
9	9 through 11	H1-S	Temp OSA, H1-S
NDR			
10	10 through 12	NDR	North Maybe Mine, NDR
11	11 through 13	NDR	NDR
12	12 through 13	NDR	NDR

Source: (Itafos, 2020a, pp. 4-3, 4-4, 5-1, 5-2, 5-4, and 5-6).Source: (Itafos, 2020a, pp. pp. 4-3, 4-4, 5-1, 5-2, 5-4, and 5-6).

A temporary external OSA would hold approximately 12.6 million cubic yards until room is available in the H1-E pit and H1-S pit.

NDR would be mined in 3 phases over approximately 3 years. Overburden would be placed in the existing North Maybe Mine pit, then into the NDR pit as room is available. Backfill would be shaped to maximum slopes of three horizontal to one vertical (3H:1V) for covering and final reclamation.

One permanent OSA would be needed to store approximately 5 million cubic yards of backfill and serve as a buttress on the west band of the Maybe Creek realignment. Water infiltrating through the permanent OSA would drain into the H1-N pit.

Stream Realignment for Overburden Handling

Approximately 2,557 feet of Stewart Creek and 7,757 feet of Maybe Creek would be realigned adjacent to backfilled pits or re-established over backfilled pits around the H1-N pit, H1-X pits, and the H1-X Overburden Stockpile Area. Following final reclamation, a portion of the drainage would remain permanently realigned across the backfill. Limestone would be placed along the boundary of the H1-X OSA to serve as a buttress for the drainage. Conceptual channel designs for the realignments are in the MRP in Section 4.6 and in the Water Management Plan (Appendix D of the MRP). The realigned channels would be designed to convey the stream flow from a 100-year, 24-hour storm event plus a 6-inch freeboard. The portions of the realigned channel that cross over backfill would have an impervious liner (60 mils HDPE) and other engineering controls to limit infiltration into the underlying fill. The OSA would provide a buttress to increase stability for the Maybe Creek realignment.

Backfill Cover

To limit infiltration into the overburden and limit the volume of leachate generated, various covers would be placed on the mine backfill, depending on the location **(Table S-4)**.

Table S-4. Acres of Cover Materials in the Proposed Action

Location	Earthen Store and Release	Low Permeability Clay	Flexible Membrane	Lateral Drain	Total Acres
NDR Pit 1	28	-	-	-	28
NDR Pit 2	16	8	-	-	24
NDR Pit 3	26	56	-	-	82
North Maybe Mine Pit	-	71	-	-	71
South Maybe Canyon Mine Pit 1	-	55	-	-	55
South Maybe Canyon Mine Pit 2	-	-	-	22	22
H1-N	80	7			87
H1-X, Permanent OSA	5	56			61
H1-L Pit 1	46				46
H1 L Pit 2	29	-	-	-	29
H1 L Pit 3	-	31	-	-	31
H1 L Pit 4	-	-	22	-	22
H1 East Pit	53	12	-	-	65
H1 South Pit	55	26	-	-	81
Total	338	322	22	22	705

Source: (Itafos, 2020d, pp. 5, Table 1).

* Previously disturbed area

Itafos refined the original cover proposed in the MRP and provided a summary in a memo *H1NDR Mine and Reclamation Plan Addendum* (Itafos, 2020d), which is available on the BLM's ePlanning website. The addendum was to document changes to the MRP because of comments from the BLM, USFS, and IDEQ prior to public scoping.

The permanent OSA would be covered with a low-permeability clay cover, with a minimum 20 inches of chert/limestone, then growth media.

Water Management

Approximately 3,030 feet of Stewart Creek crosses an area to be mined. This section of the stream would be relocated uphill into a constructed channel.

Water that accumulates in the pits would be managed per a SWPPP[1] and the Surface Water Management Plan, which is Appendix D in the MRP.

- Lined ponds would be sized to control the volume of runoff produced by either the 10-year, 24-hour storm event plus the average calculated weekly snowmelt volume, or the 100-year, 24-hour storm event, whichever is larger.
- Unlined stormwater ponds would be sized to control the volume of runoff produced by the 2-year, 24-hour storm event with an emergency spillway that would safely discharge the peak flow from the 25-year, 24-hour storm event.
- Long-term drainage channels and associated structures would be designed to control stormwater runoff produced by the 100-year, 24-hour storm event.

1 The SWPPP would be developed per the requirements of the Idaho Pollutant Discharge Elimination System IDAPA 58.01.25. https://www.deq.idaho.gov/water-quality/ipdes/ and approved by the IDEQ.

- Diversion ditches, energy dissipators, outlet protection, and culverts associated with ditches that are expected to have a lifespan between 2 and 25 years or across multiple mining phases would be designed to control stormwater runoff produced by the 50-year, 24-hour storm event.

Contact water, including drainage from haul roads, would be managed for zero discharge from the mine site to any surface waters. Contact runoff would be collected in basins lined with an impervious liner. Contact water collected in basins would be disposed of through evaporation, dust suppression in zero-release areas, or moved to areas of un-reclaimed backfill for infiltration.

Non-contact water would also be managed under the SWPPP. Non-contact runoff would be intercepted and diverted around disturbed areas through diversion ditches. Non-contact runoff water would enter unlined basins to collect sediment, then released slowly by evaporation, percolation, and spillways.

The small amount of perched groundwater that may be encountered would drain into the pit and be managed as contact water. If necessary, water would be moved to areas of un-reclaimed backfill for infiltration, used as dust suppression in zero-release areas, or placed in the contact water basins. All drainage features would be designed to prevent erosion.

No long-term water treatment is anticipated after reclamation is complete. Stewart Creek would remain in the realigned channel.

Service and Haul Roads

The existing historical Maybe Canyon haul roads would be improved to a width of 80 feet. A new haul road ramp would be constructed from the first (lower) switchback of the Maybe Canyon haul road to the tipple. Haul roads total 7.2 miles, with 3.2 miles of new construction and 4.0 miles of existing road. Using NFS Road 134 (Stewart Canyon Road) to haul ore would require closing the road to the public during mining until reclamation is complete, approximately 15 years.

Due to the steep, narrow topography and the pit sequence, mining the IDI-0005549 (H1) Lease would require three temporary staging areas. One staging area would be required for the IDI-008289 (NDR) Lease mining. This staging area would require construction of a 50-foot-wide access road. The other staging areas would be developed in the existing disturbance/backfill footprint as the mine progresses.

Relocation of Simplot Slurry Pipeline

An active phosphate ore slurry pipeline crosses one of the off-lease areas proposed for mining. An agreement with the pipeline owner has been made on a relocation site of the pipeline before mining occurs in that area. Re-routing the pipeline would disturb approximately 3 acres (the other 3 acres of disturbance for the reroute is already disturbed by the former North Maybe Mine) and requires an amendment to the 2003 RFP and an amendment to Special Use Authorization SSC51.

Environment Protection Measures and Best Management Practices

A broad array of measures has been included to minimize or eliminate environmental impacts and to meet ARMP and 2003 RFP.

Alternatives

In addition to the No Action Alternative, action alternatives were developed to address the significant issues identified.

Alternative Cover

This alternative was developed to reduce potential impacts from the Proposed Action on surface water and groundwater quality by reducing percolation of rain and snow. Itafos designed the Alternative Cover and submitted designs to the agencies (Itafos, 2020c).

Each of the four cover types have a different effectiveness or predicted infiltration rate. This alternative would increase the use of the more effective designs where necessary and slightly decrease the footprint of the backfill. Based on a preliminary groundwater modeling analysis, Itafos would reconfigure placement of overburden and re-arrange and optimize the placement of the four types of covers. The reconfiguration would reduce the area needing a cover from 705 to 611 acres. In addition, based on the agency groundwater model, the most effective cover design would be deployed where it would decrease impacts to the greatest degree. The area of flexible liner cover would increase from 22 to 315 acres. This alternative would increase the acreage of unreclaimed highwall from 19 to 68 acres of Grandeur Tongue or Wells Formation limestone. This alternative would also modify the backfill placement, but not the total amount of backfill to be managed. Approximately 2.9 million more cubic yards would be placed in the OSA than the Proposed Action, which increases the size of the permanent OSA from 55 to 60 acres. The Alternative Cover has 94 fewer acres needing cover due to backfill placement. Overall, the alternative would meet the following performance criteria (Arcadis, 2020j):

- Prevent contact of surface water runoff with run-of-mine overburden.
- Prevent water that infiltrates through the cover system and run-of-mine overburden from subsequently expressing at the ground surface as a result of elevated pit backfill water levels.
- Prevent subsurface transport of constituents of potential concern (COPCs) in downgradient groundwater from resulting in additional loading to 303(d)-listed surface waters or concentrations exceeding surface water quality standards in non-303(d)-listed waters.
- Limit impacts to groundwater and the extent of impacted groundwater beyond the mining area so there is no injury to current or projected future beneficial uses of groundwater.

Construction materials may change slightly, but all performance criteria would be met.

Alternative Stream Routing

To reduce long-term and permanent impacts to Stewart Creek, an alternative is considered that temporarily reroutes Stewart Creek into an open channel uphill from its current location during operations, and then returns it permanently to its natural channel except where it would cross the backfill area. Where the stream crosses the backfill, the channel would be lined to minimize water contacting the backfill cover. This alternative would not create additional disturbance beyond the Proposed Action.

Alternative Access 1

Either alternative access would establish motorized access through the mined area between Dry Valley and Diamond Creek during mining and would remain permanently. Each of the options could be added to either the Proposed Action or the Alternative Cover.

This alternative was developed to address the significant issue of the loss of public access caused by the mine's use of the existing NFS Road 134 for a haul road. The alternative includes a 12-foot-wide new road from existing NFS Road 134 approximately 1.5 miles west of Diamond Creek Road, following the Simplot Slurry Pipeline Right-of-Way then heading north on the east side of Dry Ridge then through the Maybe Mine area, crossing Dry Ridge where the road would cross NFS Road 354 then down the west side near Maybe Creek, merging with NFS Road 611 approximately 1 mile east of the Dry Valley Road. The Alternative Access would be 7.6 miles, of which 5.8 miles would be new construction and 1.8 miles would be constructed adjacent to the existing slurry pipeline corridor. The new route would entail 6.1 miles of new road construction between Dry Valley and Diamond Creek, and approximately 1.5 miles of new disturbance adjacent to the slurry pipeline from Diamond Creek to where the new road would begin. Approximately 18 acres of new disturbance and 4 acres of previously disturbed areas would be included in the road construction area for the road. NFS roads 134 and 193 would be obliterated in disturbance footprint (mining area).

An option for this road would use the same alignment but construct a 50-inch-wide ATV trail (ATV Option). Instead of constructing a new road adjacent to the slurry pipeline road, the ATV trail would be the slurry pipeline right-of-way. Gates would be installed at two locations where larger vehicle access would end and a small parking area would be developed near each gate. The gates would restrict access of the trail to ATVs and pedestrians/equestrian only (but would retain access for maintenance vehicles, when needed). This option would result in an overall disturbance area of approximately 3 acres of new construction and 2 acres of previously disturbed area. The ATV trail would become a permanent public route on the Caribou National Forest Travel Plan.

Alternative Access 2

Based on public comment on the DEIS, Alternative Access 2 was also developed to address the significant issue of the loss of public access caused by the use of the existing NFS Road 134 for a haul road and concerns that the Alternative Access on the Cross-Valley Fill Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site and Simplot's concern about the potential risk to the slurry pipeline. The alternative includes a 16-foot-wide new road from NFS Road 134 near the slurry pipeline, along the east side of Dry Ridge then through the Maybe Mine area, crossing Dry Ridge where the road would cross NFS Road 354 then down the west side near Maybe Creek merging to NFS Road 610 and tying with the Dry Valley Road.

Alternative Access 2 would avoid the Cross Valley Fill and would be further from the Simplot slurry pipeline. This route would be entirely new construction comprising 7.3 miles and 55 acres of new disturbance.

Alternative Sequence

Itafos notified BLM that they would like to modify the mining sequence after the DEIS was published. BLM added an alternative to evaluate the impacts of changing the mining sequence from that specified in the MRP and described in **Table 5** of the FEIS (Arcadis, 2022).

This alternative would meet the purpose and need as stated in Section 1.4. The Alternative Sequence would modify the sequence of operations to begin mining the NDR first then H1 second. The change would be that phases 10, 11, and 12 would be mined first in production years 1, 2, and 3, respectively, followed by phases 1, through 9, whose production years would be each initiated 3 years later. Other features of the phases listed would not change, such as the tons of ore mined. The total number of acres affected, handling and placement of overburden and the schedule for development of the other mine facilities including Alternative Access and the slurry pipeline relocation would not change. The permits including the Special Use Authorization would not change. The Environmental Protection

Measures and Best Management Practices would not change. Mitigation would not change. The total time needed to mine and reclaim under this alternative would be the same as the other alternatives.

Summary Comparison of Alternatives

Table S-5 shows the differences in effects between alternatives. For more explanation on how these effects were determined and what they mean, please see Chapter 3. The No Action Alternative would have no effects on any of the resources analyzed except Social and Economic Conditions and remediation, so it is not included in the table. The No Action Alternative could reduce the employment, income, revenue, and contributions to the community from Itafos, their operations, and their employees approximately 15 years earlier than the action alternatives if the Conda Plant closes. These changes would occur with any alternative after mining H1NDR is complete if other ore reserves are not found and mined and the mining and production facilities end and close.

Investigation and remediation of the Maybe Mine CERCLA site would be ongoing, as would contamination until remediation is complete. Because the Proposed Action and Alternative Cover reduce contaminant loading from the CERCLA site by the addition of covers on backfill, this benefit would not be realized in the No Action Alternative.

Table S-5. Comparison of Environmental Impacts by Alternative

Resource/Issue	Proposed Action	Alternative Sequence	Alternative Cover	Alternative Access 1	Alternative Access 2	Alternative Stream Routing
Groundwater						
Groundwater Quality - Trace metals, including selenium, leaching into groundwater.	Groundwater modeling shows potential for selenium, manganese and sulfate to enter shallow groundwater and discharging to seeps and surface water.	Same as the Proposed Action	Groundwater modeling shows limited discharge of COPCs to shallow groundwater would not affect seeps and surface water.	No additional effect on groundwater quality.	No additional effect on groundwater quality.	Reroute would be lined where it crosses the backfill, there is little potential for water to infiltrate through the backfill and contribute concentrations of COPCs to groundwater. There is no additional effect on groundwater quality.
New mining operations effect on the timing and effectiveness of the CERCLA remediation.	No impacts to the investigation schedule are anticipated. Groundwater modeling shows that the percolation of water into the backfill would be reduced, reduce future contaminant loading from the CERCLA site.	Same as the Proposed Action	Same as the Proposed Action.	No additional effects.	No additional effects.	No additional effects.
Surface Water						
Reduction in surface water flows of streams, seeps, creeks or impacts to water rights downstream from the drawdown of groundwater.	Groundwater flow modeling shows no adverse impacts to surface water baseflows in streams. 7 Stock water rights would be lost (1 permanently) and would be replaced (Section 2.2.9.17)	Same as the Proposed Action	Same as the Proposed Action.	No additional effects.	No additional effects.	An additional short-term loss of access to the Stewart Creek stock water right.
Surface water quality effects from discharged groundwater and contaminant trace elements, including selenium, compliance with water quality standards, and relocation of the NFS Road 134.	Minor loading of selenium and other COPCs 40 years after closure in the headwaters of South Stewart Creek, East Mill Creek, and Maybe Creek. No detectible impacts to water quality would be expected in Diamond Creek or the Blackfoot River.	Same as the Proposed Action	Impacts to surface water quality would be reduced from the Proposed Action, negligible or eliminated.	Same as the Proposed Action.	Same as the Proposed Action.	Same as the Proposed Action.
Soil erosion causing sedimentation.	Negligible to minor impacts due to BMPs. Closure of NFS Road 134 could reduce sedimentation to Stewart Creek in the mine area.	Same as the Proposed Action	Same as the Proposed Action.	Reduced or eliminated sedimentation impacts from the current NFS Road 134 by eliminating close proximity to the creek.	Same as Access 1	No additional impacts.
Wetlands, Non-wetland Waters, and Riparian Vegetation						
Acres of wetlands permanently lost.	0.16	Same as the Proposed Action	Same as the Proposed Action.	No additional impacts.	No additional impacts.	No additional impacts.
Linear feet of streams (non-wetland waters) impacted and riparian vegetation permanently lost.	1,439 linear feet of perennial stream. 8,666 linear feet of intermittent stream. Permanent loss of riparian vegetation along perennial and intermittent	Same as the Proposed Action	Same as the Proposed Action.	Alternative Access 1 – additional 159 linear feet of disturbance or 27 linear feet for the ATV trail.	No additional impacts.	4,443 linear feet of new channel to reroute Stewart Creek during mine operations (Operational Realignment). Reclamation

Resource/Issue	Proposed Action	Alternative Sequence	Alternative Cover	Alternative Access 1	Alternative Access 2	Alternative Stream Routing
	segments. 5,289 linear feet of ephemeral channel segments with no riparian vegetation lost.					would return the alignment of Stewart Creek to its original location as a channel. Effects similar to the Proposed Action but the channel locations differ.
Stormwater runoff to contact wetlands and streams.	Minimal degradation of wetlands and riparian habitat from erosion and sedimentation due to design features and BMPs.	Same as the Proposed Action	Same as the Proposed Action.	Same as the Proposed Action.	Same as the Proposed Action.	Same as the Proposed Action.
Fish and Amphibians						
Miles of fish and amphibian habitat modified or removed. Miles restored by reclamation to current conditions.	0 miles of fish-bearing streams. 2.1 miles of fishless streams. 1.5 miles of Maybe Creek. 0.5 mile of upper Stewart. Creek (sections of Maybe Creek occupied by tiger salamanders). 2 ponds permanently removed (one occupied by breeding tiger salamanders). 0.17 acre of wetlands permanently removed (mitigated off site).	Same as the Proposed Action	Same as Proposed Action.	No additional impacts.	No additional impacts.	No additional impacts.
Reduction in the quantity of water in streams, and ponds.	Effects to fish habitat downstream from changes to base flow in streams would be negligible. Amphibian habitat could be reduced by the loss of water volume at the seeps.	Same as the Proposed Action	The reduction in volumes discharged from seeps to surface water would have a negligible effect on the volume of water in fish-bearing streams.	No additional impacts.	No additional impacts.	No additional impacts.
Alteration of surface water quality to a degree that fish and amphibians would be affected, including in the Blackfoot River.	Negligible increase in sedimentation with implementation of BMPs and EPMs in Surface Water Management Plan. Negligible discharge to the headwaters of Stewart Creek, East Mill Creek, and Maybe Creek downstream. Increase in selenium loading in streams above baseline conditions is expected to result in a negligible, long-term toxicity impact to aquatic life. Closing NFS Road 134 would improve water quality in downstream fish and amphibian habitat in the long term because sedimentation in Stewart Creek from the current road would be reduced once the road is reclaimed outside of AIZs.	Same as the Proposed Action	Impacts to surface water quality would be reduced compared to the Proposed Action and would be negligible. Effects to aquatic life would be negligible.	The Alternative Access 1 road would cause an additional 2.6 acres of AIZ disturbance. The Alternative Access 1 ATV trail would cause an additional 0.9 acre of AIZ disturbance.	An additional 3.4 acres of AIZ disturbance.	1.6 additional acres of AIZ disturbance.
Sensitive Fish						
Yellowstone cutthroat trout or their habitat.	May affect individuals or their habitat but	Same as the Proposed	No impact to individuals.	No additional impacts.	No additional impacts.	No additional impacts.

Resource/Issue	Proposed Action	Alternative Sequence	Alternative Cover	Alternative Access 1	Alternative Access 2	Alternative Stream Routing
	would not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species	Action	Not likely to contribute to a trend toward federal listing or cause a loss of viability to the population or species.			
Vegetation						
Acres by type of vegetation impacted by disturbance.	891 acres of vegetation. 823 forested acres. Less than 20% of the total forested acres in these watersheds. 98% of the total disturbance would be reclaimed.	Same as the Proposed Action	Same as the Proposed Action, except 91% of the total disturbance would be reclaimed.	42 additional acres of vegetation removed for the Alternative Access 1, 55 acres for Alternative Access 2.	55 additional acres of vegetation removed	14 acres of vegetation in addition to vegetation removed under the Proposed Action.
Suitable timber acres. designated in the 2003 RFP.	294 acres of suitable timberlands resulting in a 0.35% reduction in forest wide suitable timber acres and allowable sale quantity.	Same as the Proposed Action	Same as the Proposed Action	22 additional acres of suitable timberlands,	2 additional acres of suitable timberlands.	No additional impact.
Acres of change by vegetation type and forest community structure change following reclamation.	823 acres of forest permanently changed to grassland/shrubland (72% of the analysis area). 285 previously disturbed acres would be converted to a grassland or grassland/shrubland mix, an improvement over existing condition.	Same as the Proposed Action	Same as the Proposed Action.	22 acres of forested vegetation type permanently changed to grassland/shrubland in addition to the Proposed Action (75% of the analysis area) for the Alternative Access 1, 34 acres for Alternative Access 2. Acres of previously disturbed acres converted to a grassland or grassland/shrubland mix would be the same as the Proposed Action.	34 acres of forested vegetation type permanently changed to grassland/shrubland in addition to the Proposed Action (75% of the analysis area). Acres of previously disturbed acres converted to a grassland or grassland/shrubland mix would be the same as the Proposed Action.	5 additional acres of forest changed to grassland/shrubland.
Acres of old-growth forest removed, and long-term change in old-growth characteristics.	2.4 acres of Stand D would result in the stand no longer meeting the R4 definition of the minimum area to be identified as old-growth (10 acres). The impact to old-growth is considered minor, though the extent of the Douglas-fir stand would be reduced, but the entire stand would not be removed.	Same as the Proposed Action	Same as the Proposed Action	Effects on forest stand structure and old-growth forest would be similar to those of the Proposed Action. The additional acres of forested type removed would not result in a detectible difference from effects under the Proposed Action.	Same as Access 1	Effects on forest stand structure and old-growth forest would be similar to those of the Proposed Action. The additional acres of forested type removed would not result in a detectible difference from effects under the Proposed Action.
Acres susceptible to the invasion or spread of noxious weeds and timeframe for a higher risk of invasion or spread and effects on native plant communities.	All areas of disturbance would be susceptible to weed invasion and spread. The potential for spread and invasion would be minimized with proposed control efforts through reclamation.	Same as the Proposed Action	Same as the Proposed Action	Same as the Proposed Action.	Same as the Proposed Action.	Same as the Proposed Action.

Resource/Issue	Proposed Action	Alternative Sequence	Alternative Cover	Alternative Access 1	Alternative Access 2	Alternative Stream Routing
Wildlife, Including Threatened, Endangered, and Sensitive						
Wildlife habitat that would be lost or permanently altered, including loss of mature forest habitat.	890 acres of wildlife habitat removed, 98% would be reclaimed to the existing use of wildlife habitat. Species that use grasslands and grass-shrub mix may benefit from the additional habitat that would exist post-reclamation. Some pit walls would remain and may be beneficial if it is suitable roosting habitat for bats and nesting habitat for cliff-nesting birds. 823 acres of mature forest habitat would be permanently lost (72% of the analysis area) and therefore would permanently reduce the number and diversity of forest wildlife species that can inhabit the analysis area.	Same as the Proposed Action	Habitat types removed and reclaimed would be similar under the Alternative Cover, but with 49 additional acres (total of 68 acres) of pit highwalls left exposed. 92% would be reclaimed. Additional highwalls could provide more habitat for species that use cliff habitat (certain raptor and bat species). The acres of habitat reclaimed would be reduced to 611 acres from the 705 acres in the Proposed Action. Effects on wildlife from changes to habitat would be similar to the Proposed Action.	An additional 42 acres of wildlife habitat, including coniferous forest, aspen forest, mixed aspen-forest, mountain brush, and grass/forb permanently removed in addition to the Proposed Action or 14 for the ATV trail. Construction of the new Alternative Access would permanently shift this disturbance to a different location as the old road (portions of NFS Road 134) would be removed by mining.	An additional 55 acres of wildlife habitat, including coniferous forest, aspen forest, mixed aspen-forest, mountain brush, and grass/forb permanently removed in addition to the Proposed Action. Construction of the new Alternative Access would permanently shift this disturbance to a different location as the old road (portions of NFS Road 134) would be removed by mining.	An additional 5 acres of habitat (coniferous forest and mixed aspen-conifer forest) in addition to the Proposed Action would be temporarily removed. The post-reclamation condition of wildlife habitat and riparian function would be the same as that expected under the Proposed Action. However, the stream restoration would occur at a different location (i.e., back to Stewart Creek's original location) compared to the Proposed Action.
Risk to wildlife from selenium toxicity, due to reclaimed vegetation selenium uptake or selenium contamination of wildlife water sources.	Wildlife exposure to selenium in overburden or fugitive dust during mining would be limited through use of BMPs. The risk of selenium toxicity in wildlife foraging in reclaimed areas would be negligible because an agency-approved seed mix (low selenium accumulating and shallow rooted species) would be used, and vegetation monitoring would ensure selenium concentrations are below BLM performance standards. The greatest potential for wildlife selenium exposure is from water sources. Selenium levels in wildlife could increase above current levels but are not expected to have measurable effects to survival or reproduction.	Same as the Proposed Action	Surface water would not be contaminated by selenium because groundwater daylighting downstream of the pits would be reduced to negligible amounts (within the measure of error in the groundwater flow model) and therefore selenium concentrations released into streams would be none to negligible (below the limits of detection), and never above IDEQ aquatic life criteria. The risk of wildlife selenium toxicity would be negligible.	No additional impact.	No additional impact.	No additional impact.
Threatened and Endangered Species	May affect individual Canada lynx but not populations or critical habitat.		Same as the Proposed Action.	Additional habitat loss as summarized above.	Additional habitat loss as summarized above.	No additional impact.
Sensitive Species	May affect individuals and habitat but would not likely contribute to a trend towards federal listing or cause a loss of viability in the population or species.	Same as the Proposed Action	Same as the Proposed Action.	Additional habitat loss as summarized above.	Additional habitat loss as summarized above.	No additional impact.

Resource/Issue	Proposed Action	Alternative Sequence	Alternative Cover	Alternative Access 1	Alternative Access 2	Alternative Stream Routing
Mule deer and elk that would be affected by habitat loss or alteration and from mining noise/disturbance/human activities.	890 acres of big game habitat removed, of which 1.48 acres is Prescription 2.7.2(d) areas (Elk and Deer Winter Range). Reclamation would return some shrub habitat over the long term, mining noise/disturbance would be temporary, and substantial areas of aspen and mountain shrub would remain intact on the west slopes of Dry Ridge; the effect would be moderate and localized to Dry Ridge. Given that mule deer numbers in game management unit 76 are currently declining, adding effects from H1NDR would have a moderate adverse effect to the overall mule deer population. The elk numbers are stable to increasing and therefore more resilient but given the level and long-term nature of the impact, H1NDR would have a moderate adverse effect on the elk population in game management unit 76.	Same as the Proposed Action	Same as the Proposed Action.	Additional habitat loss as summarized above and would remove 7.5 acres of Prescription 2.7.2(d) (Elk Deer Winter Range)	Additional habitat loss as summarized above and would remove 15.4 acres of Prescription 2.7.2(d) (Elk Deer Winter Range)	Same as the Proposed Action.
Migratory birds that would be affected by habitat loss or alteration, and mining noise/disturbance/human activities.	Overall, due to minor effects from disturbance and selenium, measures to reduce the likelihood of mortality, and the permanent removal of mature forest habitat in a small area, the Proposed Action would have a moderate effect on birds.	Same as the Proposed Action	Same as the Proposed Action.	Additional habitat loss as summarized above.	Additional habitat loss as summarized above.	No additional impacts.
Soils						
Acres of soil disturbed.	1,076	Same as the Proposed Action	Same as the Proposed Action.	42 additional acres of soil disturbance for the Alternative Access 1 road and 14 additional acres for the Alternative Access 1 ATV trail	55 additional acres for Alternative Access 2	5 additional acres of soil disturbance.
Potential for trace elements to be mobilized from stockpiles to contaminate on-site or adjacent soil resources.	Soil trace element total concentrations would be unaffected by soil handling operations. Trace element mobility would also be unaffected as the existing near-surface soil is currently subjected to the same atmospheric weathering processes as the resulting growth media placed for reclamation. Excavation would not cause a change in the oxidation state of trace element-containing minerals and subsequent increases in trace element mobility.	Same as the Proposed Action	Same as the Proposed Action.	No additional potential.	No additional potential.	No additional potential.

Resource/Issue	Proposed Action	Alternative Sequence	Alternative Cover	Alternative Access 1	Alternative Access 2	Alternative Stream Routing
Soil available to meet reclamation requirements.	Soil available is sufficient to meet reclamation requirements.	Same as the Proposed Action	Same as the Proposed Action.	Same as the Proposed Action with an additional 150,549 cubic yards of soil available for salvage from areas of soil mapped within the 42 acres of new disturbance within Alternative Access 1 road.	Same as the Proposed Action with an additional 21,086 cubic yards of additional soil would be available from the 55 acres of disturbance for Alternative Access 2.	Same as the Proposed Action with an additional 8,357 cubic yards of soil available for salvage from areas of soil mapped within the Alternative Stream Routing.
Grazing						
Acres of change in suitable rangeland.	Kendall Canyon: 101 acres lost in Phase 10-12 Maybe Canyon in Phase 1: 109 acres lost Stewart Canyon in Phase 6 - Phase 9: 105 acres lost Dry Valley Unit 11 - 39 acres lost Dry Valley Unit 12: 191 acres lost	Same as the Proposed Action Note that Phase 10-12 would occur at the beginning of mining in the Alternative Sequence, compared to the end of mining in the Proposed Action. Phases 1 through 9 would occur later in the Alternative Sequence than the Proposed Action.	Kendall Canyon: Same as the Proposed Action. Maybe Canyon: Same as the Proposed Action. Stewart Canyon: Same as the Proposed Action. Dry Valley Unit 11 and Unit 12: Same as the Proposed Action.	Kendall Canyon: Same as the Proposed Action. Maybe Canyon: 25 acres, Stewart Canyon: Alternative Access 1 road – 0.4 acre Dry Valley Unit 11 and Unit 12: Same as the Proposed Action.	Kendall Canyon: Same as the Proposed Action. Maybe Canyon: 13 acres Stewart Canyon: – 0.4 acre Dry Valley Unit 11 and Unit 12: Same as the Proposed Action.	Kendall Canyon: Same as the Proposed Action. Maybe Canyon: 4 acres lost. Stewart Canyon: 0.1 acre lost short-term. Dry Valley Unit 11 and Unit 12: Same as the Proposed Action.
Estimated reduction in head months.						
Kendall Canyon	187 head months (4.0%)	Same as the Proposed Action	Same as the Proposed Action.	No additional impacts.	No additional impacts.	No additional impacts.
Maybe Canyon	187 head months (1.8%)	Same as the Proposed Action	Same as the Proposed Action.	Alternative Access 1 road – 43 additional head months Alternative Access 1 ATV trail - 0 head months	Alternative Access 2 road - 22 additional head months	8 additional head months
Stewart Canyon	985 head months (20.8%)	Same as the Proposed Action	Same as the Proposed Action.	Alternative Access 1 road or ATV trail – 0 additional head months	Alternative Access 2 road - 1 addition head month	0 additional head months
Dry Valley Unit 11 Dry Valley Unit 12	14 head months (1.6%) 75 head months (11.2%)	Same as the Proposed Action	Same as the Proposed Action.	No additional impacts.		No additional impacts.
Areas where the mining activities split an allotment or reduce movement to or between feed or water.	Kendall Canyon allotment split from north to south. The west side of the allotment would be accessible to grazing with prior authorization to cross mine areas granted by Itafos. Ample access to feed and water on each side. Maybe Canyon allotment from northwest to southeast. Lower Maybe Pond and	Same as the Proposed Action	Same as the Proposed Action.	Although the Alternative Access 1would permanently split the Maybe Canyon allotment, it would allow uninhibited access to the eastern portion of the allotment and sheep would be afforded	Same as Alternative Access 1	The re-routing of Stewart Creek may result in a short-term loss of access to the Stewart Creek stock water right place of use within the Maybe Canyon Allotment during the construction of the

Resource/Issue	Proposed Action	Alternative Sequence	Alternative Cover	Alternative Access 1	Alternative Access 2	Alternative Stream Routing
	Schmid Ridge Trough range improvements would be lost to livestock. Very little access to water sources on the west side and ample access to water sources on the east side, ample access to feed during mining and reclamation. The Stewart Canyon allotment would not be completely bisected by the disturbance; therefore, livestock rotation may not be as difficult as for Maybe Canyon and Kendall Canyon. Ample access to feed and water Dry Valley Unit 12 split from east to west. Tipple site would isolate the northern most portion of Unit 12 and a small portion of Unit 11 east of the proposed Dry Valley Road Realignment, this area would likely become unusable during the life of the Proposed Action. With the unit split, livestock would have very little access to water sources on the north end and ample access to water sources on the southern side. Livestock would still have ample access to feed during mining and reclamation.			the same crossing privileges they currently have on NFS Road 134. Although a small portion of the Alternative Access would permanently occupy the Stewart Canyon allotment, it would allow uninhibited access to the allotment and sheep would be afforded the same crossing privileges they currently have on NFS Road 134. Therefore, the effects on the livestock rotation and access to feed and water would be the same as the Proposed Action.		operational stream bed. During construction of the alternative reclamation realignment, livestock would have access to the Stewart Creek operational realignment. The alternative reclamation realignment of Stewart Creek may result in a short-term loss of access to the Stewart Creek stock water right place of use within the Stewart Canyon Allotment during the construction of the reclaimed stream bed. Itafos would supply a supplemental water source to livestock if access to surface water sources is inhibited. Therefore, the effects on the livestock rotation and access to feed and water would be the same as the Proposed Action.
Recreation Changes in acreage available for dispersed (both motorized and non-motorized) recreation activities particularly hunting.	Acres available to the public for dispersed non-motorized recreation including hunting and winter motorized recreation (snowmobiling) would decrease by 1,130 acres. There would be no change in developed recreation acreage. NDR lease extends onto the Blackfoot River Wildlife Management Area.	Same as the Proposed Action	Same as the Proposed Action.	No additional impacts.	No additional impacts.	No additional impacts.
Access Acres of public lands closed to public use during mining and reclamation.	1,130	Same as the Proposed Action	Same as the Proposed Action.	No additional impacts.	No additional impacts.	No additional impacts.
Miles of primary access roads (NFS Road 134) closed to public use by mining and reclamation activities for about 1 year.	4.6	Same as the Proposed Action	Same as the Proposed Action.	Same as the Proposed Action, except 6.1 miles of new road constructed for the Alternative Access 1. The Alternative Access 1 ATV trail option would	Same as the Proposed Action, except and 7.6 miles of new road constructed for the Alternative Access 2	No additional impacts.

Resource/Issue	Proposed Action	Alternative Sequence	Alternative Cover	Alternative Access 1	Alternative Access 2	Alternative Stream Routing
				allow small vehicles, not large.		
Changes in the number of miles of NFS roads and trails open to motorized travel.	Miles of NFS roads and trails open to motorized travel would not change long-term. 1.2 miles of ATV Trail #138 would be closed during mining in the area and then reopened.	Same as the Proposed Action	Same as the Proposed Action.	NFS road miles would increase by 1.1 miles for the Alternative Access 1, except for the 50-inch Alternative Access 1 ATV trail option which would result in no change to NFS road mileage and an increase in motorized trail mileage of 6.1 miles.	NFS road miles would increase by 3.0 miles for the Alternative Access 2	No additional impacts.
Inventoried Roadless Area Acres of disturbance including roads and other infrastructure within a designated Inventoried Roadless Area.	Approximately 19 acres, including 18 acres for a permanent overburden stockpile, would be used within the Dry Ridge Inventoried Roadless Area.	Same as the Proposed Action	Same as the Proposed Action.	Under Alternative Access 1, road or ATV trail construction would result in 0.45 acres or 0.29 acres of disturbance, respectively, within the Schmid Peak Inventoried Roadless Area.	No additional impacts under Alternative Access 2.	No additional impacts.
Tribal Treaty Rights and Interests The Shoshone-Bannock Tribes ability to access unoccupied lands of the U.S. where they may exercise treaty-reserved rights in accordance with the terms of the Fort Bridger Treaty of 1868.						
Acres of unoccupied lands available or unavailable during mining activities and the Shoshone-Bannock Tribes ability to access these acres.	Short-term, temporary loss of access during active mine years. Permanent long-term loss of 124 acres (unreclaimed highwall and partially reclaimed haul roads) after reclamation. Minor impacts to tribal access of unoccupied lands.	Same as the Proposed Action	Same as the Same as Proposed Action but an increase in unreclaimed acres.	Short-term Alternative Access construction would guarantee there would be no loss of access for tribal members to exercise their treaty rights to hunt, fish, and gather resources within unoccupied lands outside the mine area. Long-term same as the Proposed Action.	No additional impacts.	No additional impacts.
Effects on fisheries, water, grazing rights, vegetation, wildlife, and cultural resources that are important to the Shoshone-Bannock Tribes and those effects on traditional practices. Changes in the quality and quantity of						

Resource/Issue	Proposed Action	Alternative Sequence	Alternative Cover	Alternative Access 1	Alternative Access 2	Alternative Stream Routing
valued resources on unoccupied public land including:						
Water and fish	No impacts.	Same as the Proposed Action	Same as the Proposed Action.	No additional impacts.	No additional impacts.	No additional impacts.
Grazing rights, vegetation, and wildlife	Grazing rights would not be affected. Increased acres of grassland and shrubland after reclamation and no permanent impacts to plants and animals. Alternatively, the loss of 823 acres of forest types represents a major impact on plants and animals in forested environment.	Same as the Proposed Action	Same as the Proposed Action.	No additional impacts.	No additional impacts.	No additional impacts.
Cultural resources	No impact on significant cultural resources.		Same as the Proposed Action.	No additional impacts.	No additional impacts.	No additional impacts.
Effect of these changes on the Shoshone-Bannock Tribes.	No Traditional Cultural Properties have been identified; therefore, no impacts would occur.	Same as the Proposed Action	Same as the Proposed Action.	No additional impacts.	No additional impacts.	No additional impacts.
Social and Economic Conditions						
Number of employees and wages, short-term and long-term.	239 miners	Same as the Proposed Action	Same as the Proposed Action.	No additional impacts.	No additional impacts.	No additional impacts.
Federal payments	$3.6 million in annual royalty payments	Same as the Proposed Action	Same as the Proposed Action.	No additional impacts.	No additional impacts.	No additional impacts.

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Acronyms

µg/L	microgram per liter
AIZ	Aquatic Influence Zone
ARMP	Approved Resource Management Plan
ATV	all-terrain vehicle
AUM	Animal Unit Month
BLM	Bureau of Land Management
BMP	Best Management Practice
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
COPC	Contaminants of Potential Concern
DEIS	Draft Environmental Impact Statement
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EPM	Environmental Protection Measure
FEIS	Final Environmental Impact Statement
GIS	Geographic Information System
H1NDR	Husky 1 North Dry Ridge
HDPE	high-density polyethylene
HEA	Habitat Equivalency Assessment
HUC	Hydrologic Unit Code
IDAPA	Idaho Administrative Procedures Act
IDEQ	Idaho Department of Environmental Quality
IDFG	Idaho Department of Fish and Game
IDL	Idaho Department of Lands
2003 RFP	2003 Caribou National Forest Revised Forest Plan
MCL	maximum contaminant level
mg/L	milligram per liter
MRP	Mine and Reclamation Plan
NEPA	National Environmental Policy Act

NFS	National Forest System
NRHP	National Register of Historic Places
OHV	off -highway vehicle
OSA	overburden storage area
RCRA	Resource Conservation and Recovery Act
SWPPP	Storm Water Pollution Prevention Plan
TMDL	Total Maximum Daily Load
U.S.	United States
U.S.C.	United States Code
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFS	United States Forest Service

Chapter 1
Purpose and Need

1.1 Introduction

Itafos Conda, LLC (Itafos) submitted a phosphate mine and reclamation plan (MRP) for the Husky 1 North Dry Ridge (H1NDR) project to the Bureau of Land Management (BLM) on April 13, 2020. The BLM reviewed the MRP to determine if it and other application materials complied with requirements in the Code of Federal Regulations (CFR) (43 CFR 3592.1) and were complete, and informed Itafos that information was needed. Itafos submitted a revised MRP on June 19, 2020 (Itafos, 2020a).

The mine would be located about 16 miles (26 road miles) northeast of Soda Springs in Caribou County, Idaho on existing and proposed modifications (enlargement) to federal mineral (phosphate) leases (**Figure 1**), mostly on federal lands within the Caribou National Forest. Leases issued under the Mineral Leasing Act of 1920 grant exclusive rights to mine and dispose of the federal phosphate deposit.

The BLM and U.S. Forest Service (USFS) are joint lead agencies for this Environmental Impact Statement (EIS) because most activities would occur on National Forest System (NFS) lands on leases administered by BLM. BLM is required to coordinate these actions with the USFS. Some activities would occur off-lease and require issuance of several special use authorizations from the Caribou-Targhee National Forest. The U.S. Army Corps of Engineers (USACE), the Idaho Department of Environmental Quality (IDEQ), the Idaho Department of Lands (IDL), and the Idaho Office of Energy and Mineral Resources are cooperating agencies.

Before the BLM and USFS approve the MRP, modify the lease(s), and issue special use authorizations, the BLM and USFS must comply with the National Environmental Policy Act (NEPA) by analyzing the environmental impacts of mining and reclamation operations along with reasonable alternatives. As H1NDR is likely to have significant impacts, an EIS is appropriate to document this analysis.

Preliminary groundwater fate and transport modeling indicated that the backfill cover in the MRP would not meet regulatory requirements for surface water quality. Itafos developed several alternative covers in response. The Proposed Action analyzed in this EIS is the June 19, 2020, version of the MRP (Itafos, 2020c) with the Modified Proposed Action cap and cover configuration (Arcadis, 2020j).

1.2 Important Changes Between Draft EIS and Final EIS

1) Changes to create the final EIS (FEIS) were made in response to public comment on the draft EIS (DEIS), cooperating agency input, proponent input, and internal BLM and USFS reviews. The reasons for changes in the FEIS from the DEIS are mostly described in the Responses to Comments (Appendix C). The following list identifies the key changes made to the FEIS. The CEQ implementing regulations provide the authority for making modifications in the FEIS. Information was added to Chapter 1 to describe the relationship between CERCLA decision-making and project level NEPA. This information provides background, but does not bear on the Proposed Action, alternatives or environmental consequences.
2) Two new alternatives were included in the FEIS.
    a. Commenters noted that the Alternative Access alternative (described in section 2.5.1 of the DEIS) was located adjacent to the Cross-Valley Fill CERCLA site and along the slurry

pipeline. The additional Access Alternative option addresses the same issue addressed by the alternative in the DEIS, but avoids potential pitfalls identified in public comments and has largely similar impacts.

b. On September 7, 2022, Itafos submitted a request to modify the order of their mining operations. The Alternative Sequence was added to the FEIS which considers mining NDR first and H1 second.

3) The affected environment for groundwater analysis has been supplemented with additional data from the project record related to current impacts from past mining operations. The analysis was completed for the DEIS to provide more information describing why the model was constructed the way that it was and how past actions and impacts were considered. The additional information included in Chapter 3 was already considered in preparation of the groundwater modeling analysis, as such including this information in the document did not change the groundwater modeling results or the overall impacts described in Chapter 3.

4) The description of the project impacts to Tribal Treaty Rights has been supplemented to provide greater detail on how those impacts were minimized. The overall degree of impacts did not change from those in the DEIS, but rather are more clearly described.

5) Impacts on air quality and environmental justice were brought forward for detailed analysis. These two resources were considered in the DEIS, but not analyzed in detail. These resources were removed from the table summarizing why no additional impacts would occur. The overall impacts did not change.

6) Calculations used to define the impacts of the alternatives on livestock grazing were corrected. While the numbers changed, the overall impacts stated did not change significantly.

7) The mitigation framework included in the DEIS has been replaced with the proposed mitigation plan provided by the Proponent. The impacts of the Proposed Action and alternatives do not change: this plan provides more specificity to the proposed compensatory mitigation.

8) A draft environmental monitoring plan has been included. The monitoring plan was mentioned in the DEIS but was not available for publication. The plan has been included. It does not affect the predicted impacts but provides additional information as to what media would be monitored and the monitoring methodology used.

BLM and USFS have not prepared a supplemental draft EIS due to the changes described above because they do not rise to any of the levels described in the CEQ regulations at 40 CFR 1502.9 (d) addressing when a supplemental EIS is required or the CEQ's 40 Most Asked Questions (CEQ, 1986), as quoted below.

> *40 CFR 1502.9 (d) Agencies: (1) Shall prepare supplements to either draft or final environmental impact statements if a major Federal action remains to occur, and: (i) The agency makes substantial changes to the proposed action that are relevant to environmental concerns; or (ii) There are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts. (2) May also prepare supplements when the agency determines that the purposes of the Act will be furthered by doing so.*

CEQ 40 most asked questions: "29b. How must an agency respond to a comment on a draft EIS that raises a new alternative not previously considered in the draft EIS…a comment on a draft EIS will raise an alternative which is a minor variation of one of the alternatives discussed in the draft EIS, but this variation was not given any consideration by the agency. In such a case, the agency should develop and evaluate the new alternative, if it is reasonable, in the final EIS. If it is qualitatively within the spectrum of alternatives that were discussed in the draft, a supplemental draft will not be needed."

The changes identified are a part of the NEPA process. As will be detailed below, they do not constitute a substantial change in the proposed action relevant to environmental concerns. They also do not represent significant new circumstances or information relevant to environmental concerns and bearing on the impacts disclosed. BLM and USFS did not determine that a supplemental DEIS would further the purposes of NEPA. The additional alternatives are fully within the spectrum of alternatives that were discussed in the DEIS.

1.3 Location

Operations would occur on leases IDI-008289 (NDR), IDI-0005549 (H1), IDI-04 (Maybe Canyon), and IDI-0678 (Dry Valley Pit D) (**Figure 1**). Itafos is also requesting modifications to lease boundaries for the IDI-0005549 (H1) Lease (559 acres). The project is in portions of Township 7 South, Range 44 East, Sections 17, 20, 21, 28, 33, and 34; Township 8 South, Range 44 East, Sections 3, 4, 10, 14, 15, 21, 22, 23, 24, and 25; and Township 8 South, Range 45 East, Sections 30, 31, and 32; Boise Meridian.

1.4 Purpose and Need for Action

Itafos has submitted a detailed MRP for developing existing mineral leases that were previously obtained from the United States at H1NDR. The purpose of the joint federal undertaking is for BLM and USFS to evaluate and respond to the MRP application including the proposals to enlarge (modify) the existing leases and to construct off-lease facilities on NFS lands.

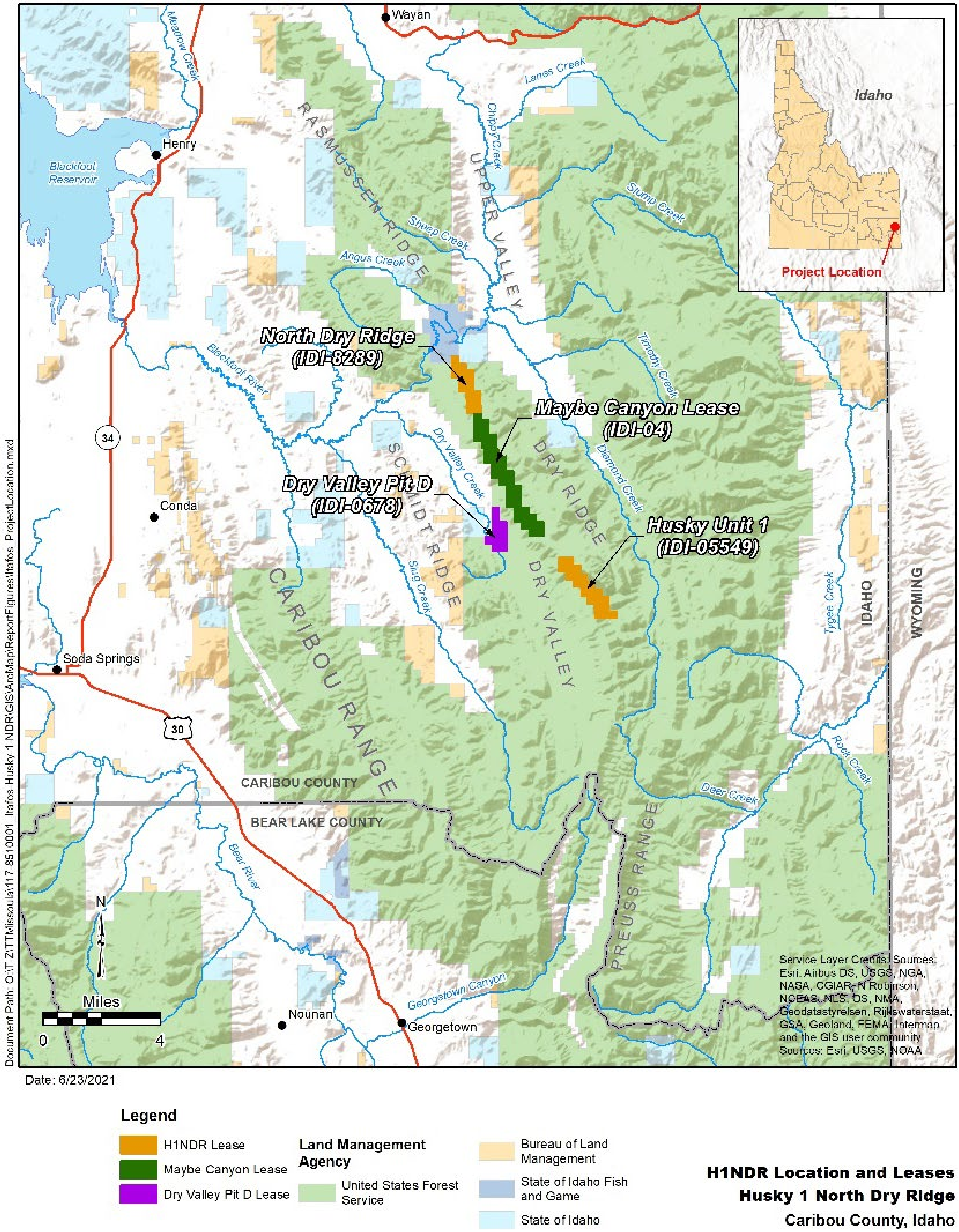
As the agency authorized to approve mine and reclamation plans for lease development, BLM's need is to identify and incorporate measures to promote orderly and efficient mining, encourage utilization of all known phosphate resources, and promote practices that avoid or minimize damage, from this proposal, to the environment and hazards to public health and safety. In addition, the BLM needs to analyze and document anticipated impacts and their predicted compliance with established requirements, including lease terms, Land Use Plans, and applicable Federal and state laws, regulations, and rules.

As the surface management agency, the USFS's need is to provide the BLM with recommendations for lease modifications, surface protection, and reclamation. USFS also needs to evaluate special use authorization proposals for phosphate mining support facilities and activities that occur on NFS lands outside lease boundaries. As such, BLM and USFS have jointly prepared this EIS in accordance with FLPMA, NEPA, the Administrative Procedure Act, and the CEQ regulations as revised in 2022.

The proponent's purpose is to exercise development rights by submitting and implementing an approved MRP that allows them to economically mine the deposit as long as established requirements are met.

The USACE, IDEQ, and IDL will use this document to inform their respective decisions associated with this proposal.

Figure 1. H1NDR Location and Federal Phosphate Leases



1.5 Decisions to be Made

Itafos must acquire all permits mandated by law. The BLM is responsible for activities on leased lands and would make decisions regarding approval of the proposed MRP, proposed lease modification, and appropriate land uses on leased lands. The BLM will prepare and sign a Record of Decision and decide whether to:

- Approve the MRP as proposed or an alternative,
- Recommend the lease modifications,
- Approve modifications of current mine plans on Lease I-04 and Lease I-0678 to accommodate mining and facilities as proposed on those leases,
- Approve a permanent or temporary stream rerouting, and
- Approve a road closure, new road, or all-terrain vehicle (ATV) trail for access from Dry Valley to Diamond Creek.

The USFS is responsible for off-lease operations on NFS lands, including whether and how to authorize these operations or an access route alternative providing continuous public access. USFS will decide whether to:

- Approve a special use authorization amendment to relocate a portion of Simplot's existing pipeline that transports ore slurry from the Smoky Canyon Mine (**Table 2**),
- Approve an amendment to the 2003 Caribou National Forest Revised Forest Plan (2003 RFP) (USFS, 2003a) for relocation of the pipeline,
- Approve special use authorizations for off-lease mine support facilities, and
- Authorize the adjustment of term grazing permits due to impacts on grazing.

If the Alternative Access is selected, additional decisions would include whether to:

- Approve a public road open to all motor vehicles or restrict use to a 50-inch trail open to off-highway vehicles (OHVs) or smaller.

1.5.1 Federal Permits, Licenses, and Other Authorizations

Approval of the MRP is one of several approvals and permits required before mining operations begin. **Table 1** identifies those known to be needed at the time this EIS was published.

Table 1. Anticipated Permits and Authorizations Needed

Permit/Authorization	Authority	Agency
MRP approval or approval of modified MRP	43 CFR 3590.2(a), 3592.1(a)	BLM
Lease Modification	43 CFR 3510	BLM
Record of Decision	42 U.S.C. 4321 et seq.; 40 CFR 1505	BLM and USFS
Special Use Authorizations[1]	36 CFR 251	USFS
High Explosives Permit	18 U.S.C. 40; 27 CFR 555	Bureau of Alcohol, Tobacco, Firearms, and Explosives
Point of Compliance under the Idaho	IDAPA 58.01.11.401	IDEQ

Groundwater Quality Rule		
Water Quality Certification (Clean Water Act, Section 401)	IDAPA 39-101 et seq.; Idaho Code Parts 39-3601 et seq.	IDEQ
Water Rights	Idaho Code Parts 42-201 et seq.; IDAPA 37.03.08, Water Appropriation Rules and 37.03.11 Conjunctive Management of Surface and Ground Water.	Idaho Department of Water Resources
Multi-Sector General Permit for storm water discharges, National Pollutant Discharge Elimination System	Clean Water Act (Title 33 U.S.C. 1251 et seq.)	IDEQ
Section 404 Clean Water Act Permit	Clean Water Act (Title 33 U.S.C. 1344, Section 404(b)(1)).	USACE
Stream Channel Alteration Permit	IDAPA 42-3801	Idaho Department of Water Resources
Air Quality Permit to Construct	IDAPA 58.01.01	IDEQ
Reclamation Plan approval and modification of approved Reclamation Plan and state mineral lease	IDAPA 20.03.02.010, 20.03.02.120, and 20.03.02.140	IDL
Conditional Use Permit for facilities within an approved land use	Caribou County Zoning Ordinance, Chapter 13	Caribou County
Use of the county roads	County Road Permit	Caribou County

1 See Table 2.; U.S.C. = U.S. Code, IDAPA = Idaho Administrative Procedure Act

Special use authorizations will be needed for mine support activities that are located on NFS lands outside of the lease boundary. Authorizations for new and existing haul roads, stormwater ponds, growth media stockpiles, and a ready line (haul truck parking and fueling area) are shown in (**Table 2**). Itafos will also need to acquire appropriate lease holder authorization to access leases IDI-04 and IDI-0678 prior to implementation of any operations on those leases.

Table 2. New Special Use Authorizations Requested

Description	Type	Acres	Linear Feet/ Corridor Width	Legal Description
NDR Growth Media Stockpile	Non-linear Feature	6	NA	SE 1/4, SW 1/4, Section 28, Township 7S, Range 44E NE 1/4, NW 1/4, Section 33, Township 7S, Range 44E
NDR Ready Line	Non-linear Feature	10	NA	NE 1/4, NW 1/4, Section 33, Township 7S, Range 44E
NDR Haul Road	Linear Feature	5	2,053 feet/ 100 feet	W 1/2, NE 1/4, Section 4, Township 8S, Range 44E SE 1/4, SW 1/4, Section 28, Township 7S, Range 44E
Main Haul Road to Tipple	Linear Feature	29	12,220 feet/ 100 feet	S 1/2, NW 1/4, Section 10, Township 8S, Range 44E SW 1/4, Section 10, Township 8S, Range 44E E 1/2, NW 1/4, Section 15, Township 8S, Range 44E
H1 Haul Road	Linear Feature	1	587feet/ 100 feet	NW 1/4, NE 1/4, Section 15, Township 8S, Range 44E
Tipple Rail Line	Linear Feature	0.2	79 feet/ 72 feet	SW 1/4, SE 1/4, NW ¼, Section 15, Township 8S, Range 44E
Total		51.2		

NA = not applicable; N = North, S = South, E = East, W = West

1.6 Public Scoping

1.6.1 Scoping

A notice of intent to prepare an EIS was published in the Federal Register (Federal Register, 2020) on December 23, 2020, followed by a 30-day scoping period. A virtual public meeting was held on January 11, 2021, to provide information. A press release was posted on BLM's website announcing the scoping period and the virtual public meeting. Media outlets were included in the scoping mailing, and the project is on BLM's ePlanning and USFS's project websites. Written comments were accepted by mail, email, or hard copy. The virtual public meeting was attended by 32 people in addition to 8 presenters (Tetra Tech, Inc., 2021a). During the scoping period, approximately 1,000 documents were submitted in the form of letters or emails before the close of the scoping period on January 22, 2021.

1.7 BLM Land Use Plan Conformance

To be approved, the MRP must comply with agency regulations, policies, plans, and programs. The H1NDR mine must comply with applicable land use plan direction developed under the Federal Land Policy and Management Act. Although the mine is located within the NFS, BLM has authority for issuing federal phosphate leases and administering associated resource use and development. Because of this, those portions of the mine that would occur within federal phosphate leases must also meet the phosphate mining planning and development criteria set forth in the BLM Pocatello Field Office Approved Resource Management Plan (ARMP) (BLM, 2012), as amended. For instance, Objective ME-2.3 in the ARMP states that the BLM will "regulate mineral development activities to prevent or control sediment and the release of contaminants such as selenium and metals into the environment".

Other related ARMP direction includes:

- Action ME-1.2.3. Leasable mineral resources will be available for development according to related laws and regulations and at the discretion of the BLM after full coordination with the surface management agency.
- Action ME-1.2.4. Leasable minerals on the Caribou National Forest will be managed consistent with the Caribou National Forest Plan.
- Action ME-1.2.5. Reclamation requirements for mineral development operations will be developed consistent with surface management agencies' recommendations.
- Action ME-2.3.8. To meet reclamation vegetation release criteria, Itafos may need to modify their caps to prevent vegetation uptake of selenium if the cap is not proving to be effective.

The Proposed Action and alternatives have been reviewed and are consistent with management direction in the ARMP. No amendments to the ARMP would need to be considered.

Mining and reclamation practices would also meet BLM's requirements for mining operations and reclamation of federal mineral leases at 43 CFR 3592.1.

1.8 Revised Forest Plan Conformance

The 2003 Caribou National Forest Revised Forest Plan (2003 RFP) (USFS, 2003a) also applies because the mine is located within Caribou-Targhee National Forest, and the 2003 RFP is incorporated by reference by the ARMP. Management of the National Forest is directed by the 2003 RFP, which applies to all NFS lands and post-reclamation activities. The 2003 RFP allocated NFS lands into prescription areas. Prescriptions that apply to H1NDR Proposed Action are:

- Prescription 2.7.2(d) – (1.5 acres – haul road) Elk and Deer Winter Range
- Prescription 2.8.3 – (57 acres) Aquatic Influence Zone (AIZ)
- Prescription 5.2 (b) – (530 acres) Forest Vegetation Management places emphasis on scheduled wood-fiber production, timber growth, and yield while maintaining or restoring forested ecosystem processes and functions to more closely resemble historical ranges of variability with consideration for long-term forest resilience.
- Prescription 6.2 (b) – (313 acres) Rangeland Vegetation Management emphasizes the maintenance of healthy rangelands for livestock and to support favorable watershed conditions. This prescription focuses on sustainable resource conditions.
- Prescription 8.1(b) – (17.5 acres) Concentrated Development, Utility Corridor, which is occupied by the Simplot slurry pipeline.
- Prescription 8.2.2 (g) – (269 acres) Phosphate Mine Areas

The 2003 RFP provides overall management direction for each resource, and the prescriptions provide specific direction based on the resources and conditions within each prescription area.

A review of the 2003 RFP standards and guidelines and the activities in the Proposed Action, No Action, and other action alternatives described in Chapter 2 are consistent with the Forest-Wide and Management Prescription direction provided in the 2003 RFP (Tetra Tech, Inc., 2021b). Where roads would be modified by Action Alternatives, which would occur in prescriptions 3.2 (b)[2], 5.2 (b), and 6.2 (b), the allowed Open Motorized Route Density standards per square mile are 0.5, 2.0 and 2.0, respectively. The Open Motorized Route Density would be less than the standard under any of the alternatives.

However, an amendment would be needed to re-route Simplot's slurry pipeline through the mine area. The amendment would be to change the designation on the new route from Prescription 6.2b to 8.1b for 6 acres where the pipeline would be located, and to change 6 acres from Prescription 8.2b to 6.2b for the area from where the pipeline would be relocated. The impacts of this amendment are discussed as part of the environmental consequences for the alternatives in each resource section in Chapter 3.

1.9 CERCLA Conformance

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (also known as Superfund) was enacted to address releases, or threats of a release, of hazardous substances, pollutants, or contaminants that pose a risk to human health. The NEPA requires federal agencies to analyze and disclose environmental impacts of projects prior to approval. The USFS is the lead agency for implementing and selecting the CERCLA investigations and response actions at the legacy North Maybe Mine and South Maybe Canyon Mine sites. BLM is the lease administrator and the designated agency for approval of mine operations. BLM and USFS are co-lead agencies for the EIS.

The CERCLA process assesses existing releases or threats of a release, sources, fate and transport of contaminants or pollutants, and human health and ecological exposure pathways and impacts at a site.

[2] The Proposed Action would not modify prescription 3.2 (b) but the Alternative Access 1 and Alternative Access 2 would.

Based on site investigations, alternatives are identified to address the contamination or threat. NEPA requires characterization of the affected environment and analysis of potential impacts of a proposed action so that an informed decision can be made. Both processes are actively taking place in some of the same areas at the same time, through a coordinated effort. Data collected under both processes are shared. For this EIS, the CERCLA Project Manager participated in the NEPA process and informed the analysis. The USFS decision makers are highly involved in both the NEPA and CERCLA actions.

Approval of H1NDR would affect the existing mine pits currently under CERCLA investigation. The USFS has approved the *Baseline Ecological Risk Assessment for the North Maybe Open Pit Sub-Operable Unit and South Maybe Canyon Open Pit Operable Unit* (Arcadis, 2020). Based on the information discussed in Section 3.4.2 and 3.4.3, it is not anticipated that backfill and reclamation of the existing pits will interfere with any future CERCLA remedial decisions. The environmental risks identified for the existing pits are generally very low; the USFS is currently planning remedial actions at other portions of the North Maybe Mine, versus remediation of the existing pits, because those other portions of the North Maybe Mine pose a greater environmental risk. The backfill and reclamation that has been proposed has been reviewed by USFS CERCLA staff. It is anticipated that backfill and reclamation will reduce the exposure pathways at the open pits. Although reclamation under a BLM-approved MRP may reduce adverse environmental impacts at the existing pits, it would not be considered a CERCLA remedy. If the MRP is not approved, the USFS can still address the pits as needed under CERCLA. Additionally, during operations or following reclamation, the USFS can address the pits through CERCLA actions.

The USFS selected a synthetic liner for source control on the Cross-Valley Fill as a Non-Time-Critical Removal Action under CERCLA. Construction was completed in 2017 approved in the South Maybe Canyon Mine Cross-Valley Fill Action Memorandum (USFS, 2012a)) . The Proposed Action analyzed was specifically designed not to interfere with this site, the remedial cover system, or future operations and maintenance of the remedy.

Similarly, the USFS has approved the *Final Remedial Investigation/Focused Feasibility Study Report, North Maybe Mine East Mill Dump Sub-operable Unit* (Arcadis, 2021f), at the East Mill Dump. A synthetic cover system was proposed as a source control measure. The USFS is drafting a Record of Decision to select a remedy at the East Mill Dump. The proposed action or alternatives would not disturb or interfere with this site, the remedial cover system, or future operations and maintenance of the remedy (Itafos, 2020a)(FEIS Section 2.4).

Chapter 2
Alternatives

2.1 Introduction

This chapter describes and compares alternatives considered in detail and alternatives considered but not studied in detail, along with a brief rationale.

2.2 Proposed Action

The Proposed Action includes modification of an existing lease, mining, reclamation, and special use authorizations, as summarized below. The MRP is viewable in its entirety online at https://go.usa.gov/x7HSJ. The Proposed Action reclamation cap and cover were modified from the MRP based on the *H1NDR Mine and Reclamation Plan Addendum* (Itafos, 2020d). "Cap" refers to material placed over the top of overburden (waste rock) but does not include a layer of growth media for revegetation. "Cover" refers to growth media placed over a cap or other area as a substrate to support revegetation as part of reclamation.

This modified Proposed Action is called the Proposed Action in the EIS.

The Proposed Action has been developed over several years. Agrium, doing business as Nu-West Industries, Inc., originally proposed the H1NDR Mine in 2010. After the baseline data collection was largely complete a corporate decision was made to terminate the project in December 2014. In 2018, Itafos acquired Agrium's mining operations and processing facilities. Nu-West retained the phosphate leases in the area that had already been mined, including the Maybe Canyon (IDI-04) and Dry Valley Panel D (IDI-0678) leases. Itafos re-initiated the baseline studies including the geochemistry testing and developed a new MRP, which was submitted to the BLM in 2020 (Itafos, 2020a). Additional details on the cover were also submitted (Itafos, 2020b). The agencies had developed a groundwater fate and transport model to assist with evaluating impacts on groundwater and surface water (Tetra Tech, Inc., 2022a), which indicated that the original cover would allow too much water to infiltrate into the backfilled mine pits, predicting impacts to surface water. Itafos designed a modified cover and submitted designs to the agencies (Itafos, 2020c). This modified Proposed Action cover design is a combination of four types of covers to achieve specific design criteria set to ensure compliance with clean water requirements. Proposed Action backfill cover components are discussed in Section 2.5.4.

2.2.1 Leases and Lease Modifications

Surface owners or management agencies of current leases are the USFS and Idaho Department of Fish and Game (IDFG). Portions of the IDI-0005549 (H1) Lease mining area extends beyond the current lease boundaries (**Table 3** and **Figure 2**). Itafos is requesting modification(s) under 43 CFR 3510 to expand the existing IDI-0005549 (H1) Lease boundaries (559 acres) to recover adjacent, un-leased phosphate resource that would otherwise be bypassed and rendered unrecoverable in the future. This would assist with achieving ultimate maximum recovery of the non-renewable mineral resource per 43 CFR 3590. **Table 3** provides the legal description, surface owners, and lease holders of IDI-0005549 (H1) and IDI-008289 (NDR) leases and proposed IDI-0005549 (H1) lease modifications.

Table 3. Legal Descriptions, Surface Management Agency, and Lease Holders of H1NDR Project Mineral Leases and Proposed Lease Modifications

Mineral Leases	Township, Range, Section	Subdivision	Surface/ Subsurface Owner
H1NDR Mineral Leases			
Lease IDI-0005549	8S, 44E, 24	SE¼SW¼, SW¼SE¼	NFS/Federal
H1	8S, 44E, 25	NE¼, NE¼NW¼, NE¼SE¼	NFS/Federal
(864.35 acres)	8S, 45E, 30	SW¼NW¼, SW¼, SW¼SE¼	NFS/Federal
Current Lessee - Itafos	8S, 45E, 31	NE¼, NE¼NW¼, N½SE¼	NFS/Federal
	8S, 45E, 32	NW¼SW¼	NFS/Federal
Lease IDI-008289	7S, 44E, 17	SE¼SE¼	IDFG/Federal
NDR	7S, 44E, 20	E½NE¼	NFS/Federal
(640 acres)	7S, 44E, 21	W½NW¼, SE¼NW¼, SW¼	NFS/Federal
Current Lessee - Itafos	7S, 44E, 28	W½NE¼, E½NW¼, NE¼SW¼, NW¼SE¼	NFS/Federal
Lease IDI-04	8S, 44E, 3	NW¼NW¼, S½NW¼, SW¼, SW¼SE¼	NFS/Federal
Maybe Canyon	8S, 44E, 4	E½NE¼	NFS/Federal
(1522.24 acres)	8S, 44E, 10	NE¼NW¼, W½NE¼, SE¼NE¼, SE¼	NFS/Federal
Current Lessee - Nu-West	8S, 44E, 14	W½NW¼, SE¼NW¼, E½SW¼, NW¼SW¼, W½SE¼	NFS/Federal
	8S, 44E, 15	E½NE¼	NFS/Federal
	7S, 44E, 28	SW¼SE¼	NFS/Federal
	7S, 44E, 33	E½SE¼, NW¼SE¼, NE¼	NFS/Federal
	7S, 44E, 34	W½SW¼	NFS/Federal
Lease IDI-0678 Dry Valley Mine Pit D	8S, 44E, 15	W½NW¼, SW¼	NFS/Federal
(440 acres)	8S, 44E, 21	NE¼, NE¼	NFS/Federal
Current Lessee - Nu-West	8S, 44E, 22	NW¼	NFS/Federal
Proposed Mineral Lease Modifications			
Modification 1	8S, 44E, 14	SE¼SE¼	NFS/Federal
(359 acres)	8S, 44E, 23	NE¼NE¼, NW¼NE¼, SE¼NE¼	NFS/Federal
	8S, 44E, 24	NW¼NW¼, S½NW¼, N½SW¼	NFS/Federal
Modification 2 (40 acres)	8S, 45E, 30	SE¼SE¼	NFS/Federal
Modification 3 (40 acres)	8S, 45E, 30	NW¼SE¼	NFS/Federal
Modification 4 (40 acres)	8S, 45E, 31	SE¼NW¼	NFS/Federal
Modification 5* (80 acres)	8S, 45E, 32	W½NW¼	NFS/Federal

Source: BLM Case Recordation Serial Register Page https://reports.blm.gov/reports/LR2000/ and (Itafos, 2020a, pp. Table 6-1)

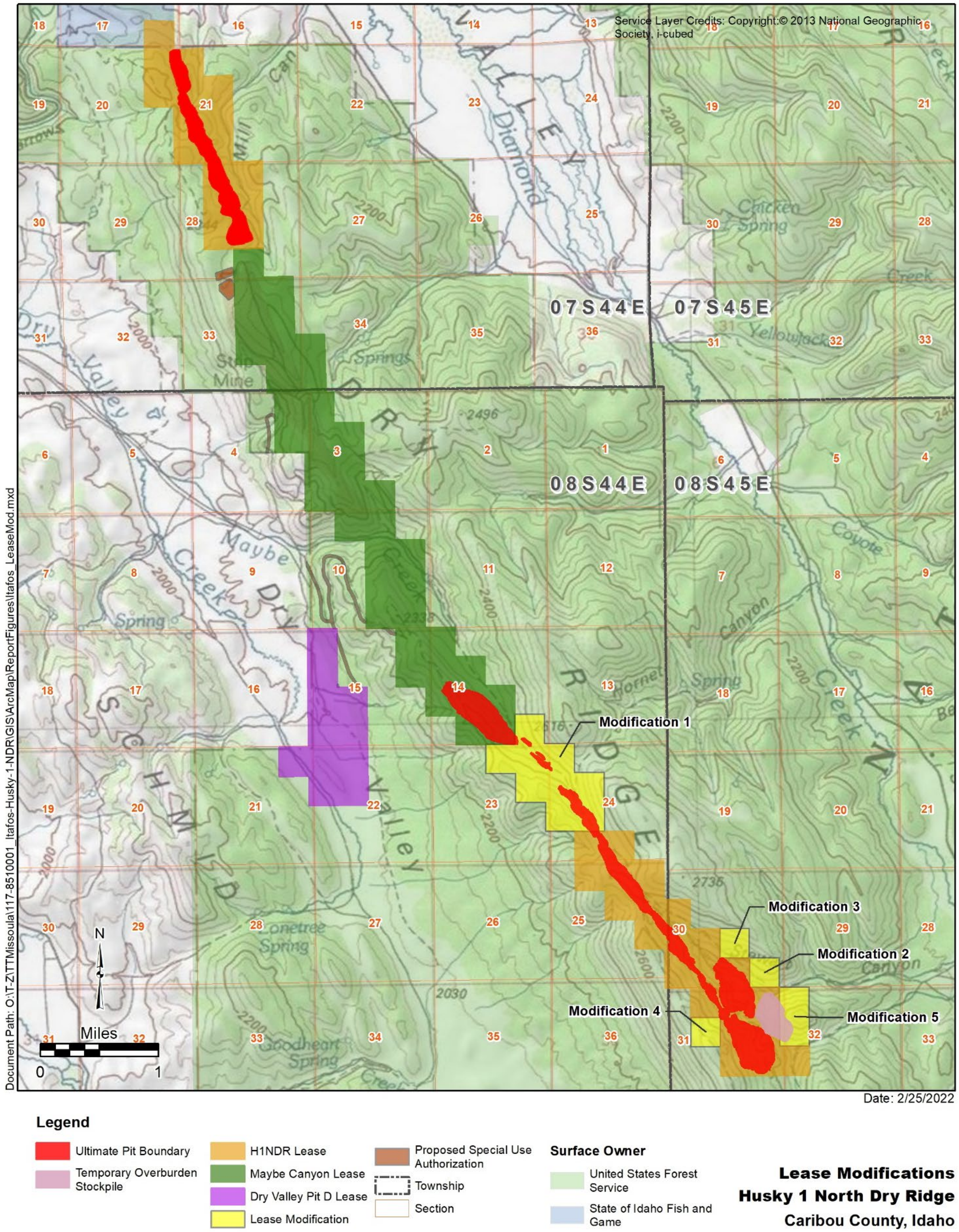
* Modification 5 in the MRP was eliminated due to acquisition of leasing rights instead of a modification. Modification 6 in the MRP is now called Modification 5 in the EIS.

** Current lease holders will need to submit a revised MRP in accordance with the H1NDR Records of Decision.

2.2.2 Disturbance Summary

The approximate acres of new disturbance in H1NDR are provided in **Table 4** and depicted in **Figure 3**. An operational zone around the pits is included in the disturbance estimate to accommodate other mine facilities, as well as potential changes to pit design including highwall laybacks that may be

Figure 2. Proposed Lease Modifications



necessary due to unstable rock that could be encountered during mining. Mining-associated impacts within the lease boundaries would occur within the operational zone. **Table 4** includes re-disturbance of 148 acres previously disturbed at the Maybe Canyon Mine. About 126 acres would be disturbed on the IDI-0005549 (H1) lease modification areas.

Table 4. Mine Surface Disturbance

Mine Component	NFS Acres	Private Acres	Total Acres
H1NDR New Surface Disturbance			
H1 Operational Zone	126	0	126
NDR Operational Zone	38	0	38
H1 Mine Pits	355	0	355
NDR Mine Pit	138	0	138
H1 Historical South Maybe Canyon Mine Pits*	77	0	77
NDR Historical North Maybe Mine Pits*	71	0	71
Permanent OSA*	55	0	55
Temporary OSA	49	0	49
H1 Water Management Ponds, Sediment Control Ponds, Runoff Containment Ponds and Ditches	36	0	36
NDR Water Management Ponds, Sediment Control Ponds, Runoff Containment Ponds and Ditches	15	0	15
H1 Growth Media Stockpile	8	0	8
NDR Growth Media Stockpile	4	0	4
Stream Realignment	20	0	20
H1 Haul Roads*	32	0	32
NDR Haul Roads*	31	16	47
Ore Stockpile and Tipple Area*	61	0	61
H1 Ready Line	2	0	2
NDR Ready Line	9	0	9
Simplot Slurry Pipeline Re-route	3	0	3
Total	1,130	16	1,146

Source: (Itafos, 2020a)

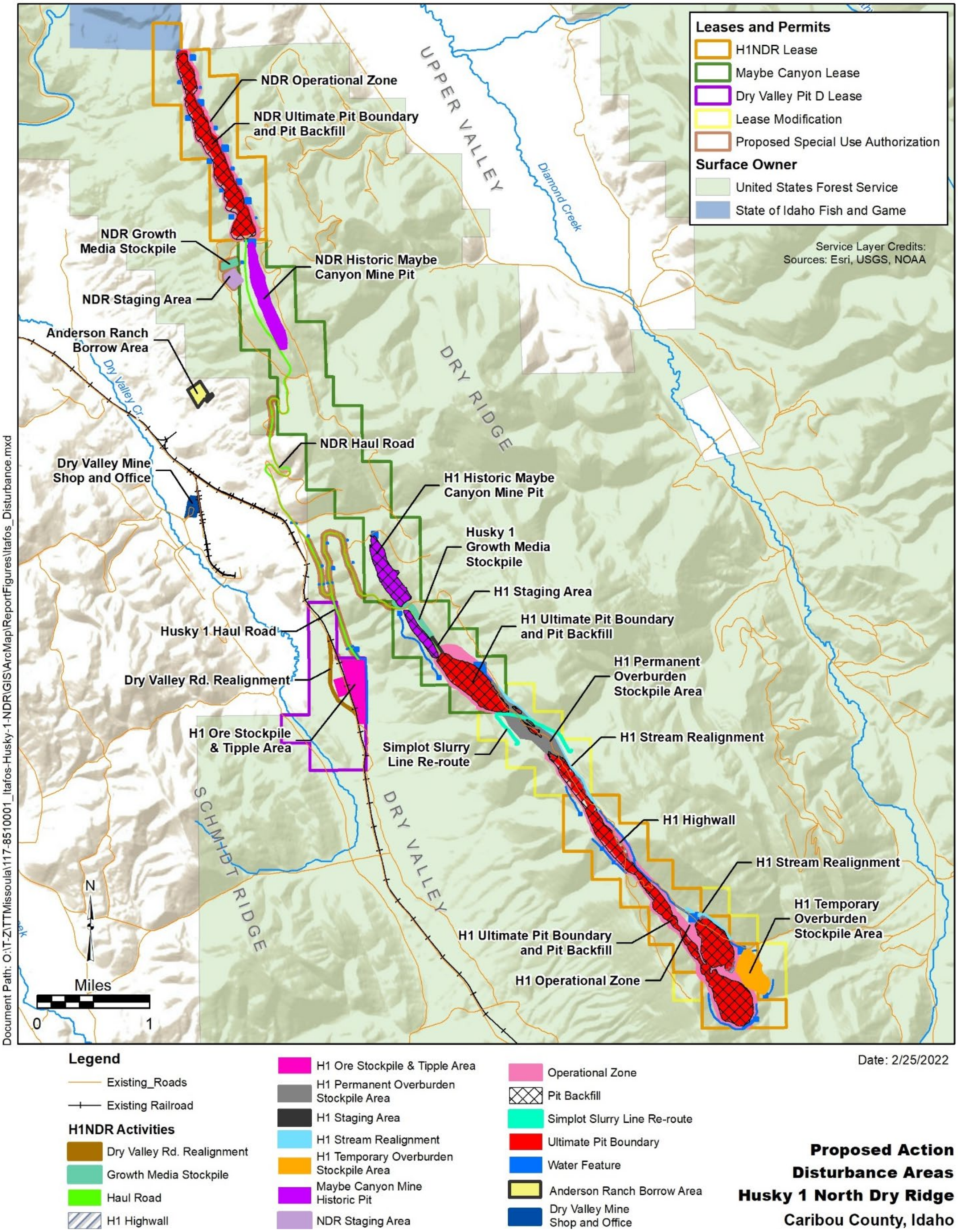
* Previously disturbed areas

Mine facilities include growth media stockpiles, temporary and permanent OSAs, water management features, and dust suppression and water supply wells with water fill stands. Existing offices and shop facilities at the nearby Dry Valley Mine on private lands would be used. The Dry Valley Mine yard area would be used including the fuel storage tanks, an equipment parking/hot start line, and a lay-down yard. The tipple (train loading) area includes an ore stockpile, train loading facility, and haul road ramp near the Dry Valley Mine Pit D, on IDI-0678 (Dry Valley Mine Pit D) Lease.

2.2.3 Ore Removal, Backfill, and Overburden Storage

Two primary areas would be mined: H1 and NDR. H1 would have a series of adjacent pits and occupy portions of the Maybe Canyon lease (IDI-04), Husky 1 lease (IDI-05549), and Husky 1 lease modifications. NDR has one open pit on a portion of the lease (IDI-8289).

Figure 3. Proposed Action Disturbance Areas

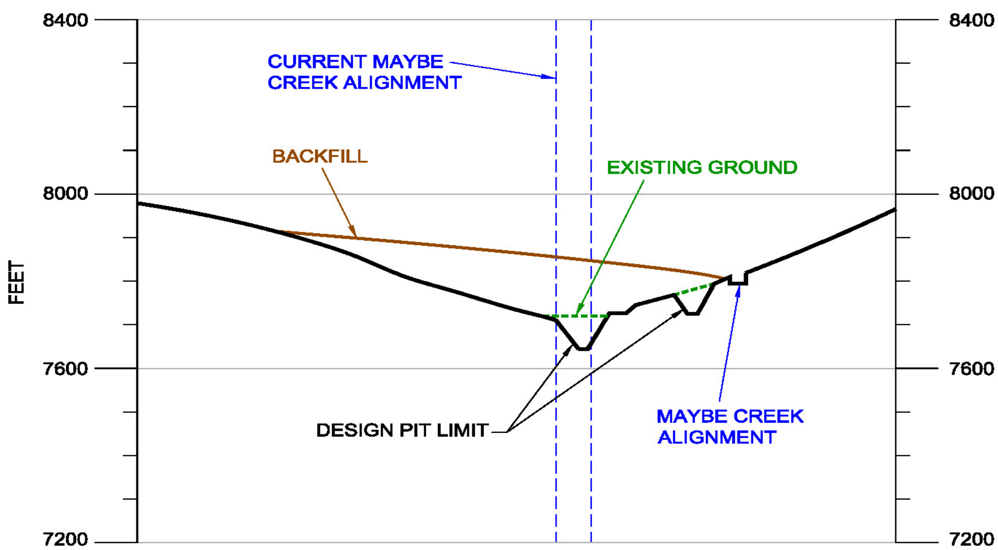


Mining would include 30 feet of benches for every 90 feet of depth. Mining would occur year-round, up to 24 hours per day, with overlapping shifts, for about 13 years. The mining sequence would mine H1 and NDR consecutively. Ore production may fluctuate over time, depending on technical factors and market conditions, increasing or decreasing the mine life.

The total volume of phosphate ore to be recovered is estimated and would not be known for certain until mining is complete. The total material that is removed every month would be calculated by modeling and mine planning software based on baseline topography compared to post-mining topography. One ton will be estimated using an ore density of 1.6875 tons per loose cubic yard, which has been verified from recent mining operations, including from the Dry Valley Mine. Actual volume of the ore mined will be gained from calibrated scales at the mine tipple.

Ore would be hauled by truck to the tipple. From there the ore would likely be hauled by existing rail to the existing Conda Plant in Soda Springs, Idaho. Overburden would be ripped or blasted, excavated, and hauled to a temporary or permanent OSA (see cross-section **Figure 4**) or backfill location. The train loading facility (tipple) and ore stockpiles would be constructed south of the first (lower) switchback of the North Maybe Mine haul road (NFS Road 134). The proposed tipple area is east of the existing rail line and within the eastern portion of the Dry Valley Mine Pit D Lease. A haul road ramp would be constructed from the switchback to the tipple.

Figure 4. Cross-Section of Permanent OSA in Relation to Maybe Creek Realignment



Source: (Itafos, 2020a, p. Appendix C3)

The entire tipple area (**Figure 3**) would be lined. The 60 mils high-density polyethylene (HDPE) liner would be placed over a minimum of 6 inches of 3/8-inch minus material. At least 2 feet of limestone would be placed on top of the HDPE liner to provide a visual indicator showing the bottom of stockpiled ore and the tipple pad, thereby protecting the liner during operations. Water management would be in accordance with the Storm Water Pollution Prevention Plan (SWPPP) and runoff would be managed as contact water. To accommodate railcar loading requirements, the public access road would be safely relocated around and away from the tipple area.

The pits would be sequenced through several phases, as outlined in **Table 5** and **Figure 5**. As ore is mined from H1, overburden would be placed as backfill in existing pits and newly mined pits except in

Phases 4 and 5. During these phases, approximately 5 million cubic yards would be placed in a permanent external OSA.

Table 5. Open Pit Mine Sequence

Phase	Production Years	Pit(s) Mined	Backfill Destination	Ore Removed (wet tons)[1]
H1				
1	1 through 3	H1-N	South Maybe Canyon Mine-N, South Maybe Canyon Mine-S	2,314,990
2	2 through 4	H1-N	South Maybe Canyon Mine-N, H1-N	2,420,998
3	3 through 5	H1-N	H1-N	2,379,884
4	4 through 6	H1-N, H1-X, H1-L	H1-N, H1-X, H1-X OSA, H1-L	2,429,292
5	5 through 7	H1-L	H1-L	2,412,919
6	6 through 8	H1-L, H1-E	Temp OSA, H1-L, H1-E	2,354,187
7	7 through 9	H1-E, H1-S	Temp OSA, H1-E, H1-S	2,357,813
8	8 through 10	H1-S	Temp OSA, H1-S	2,348,210
9	9 through 11	H1-S	Temp OSA, H1-S	2,330,949
NDR				
10	10 through 12	NDR	North Maybe Mine, NDR	2,458,649
11	11 through 13	NDR	NDR	2,320,380
12	12 through 13	NDR	NDR	1,372,880
Total				27,5012,071

Source: (Itafos, 2020a, pp. 4-3, 4-4, 5-1, 5-2, 5-4, and 5-6).

1 These are estimated tons and do not establish a regulatory minimum or maximum that would result in the need for a change in the MRP if the volume was exceeded or not met.

A temporary external OSA would hold approximately 12.6 million cubic yards until room is available in the H1-E pit and H1-S pit.

NDR would be mined in 3 phases over approximately 3 years. Overburden would be placed in the existing North Maybe Mine pit, then into the NDR pit as room is available. Backfill would be shaped to maximum slopes of three horizontal to one vertical (3H:1V) for covering and final reclamation.

One permanent OSA would be needed to store approximately 5 million cubic yards of backfill and serve as a buttress on the west bank of the Maybe Creek realignment. Water infiltrating through the permanent OSA would drain into the H1-N pit (**Figure 6**). Backfilling approximately 5,000 linear feet or 71 acres of the historic North Maybe Mine and approximately 6,500 linear feet or 77 acres of the historic South Maybe Canyon Mine open pit and exposed highwall that have remained open for almost 30 years, would be stabilized, then capped and covered, and revegetated.

Beyond backfill and reclamation of portions of existing pits, the Proposed Action would have little effect on the existing facilities being addressed under CERCLA. It would not disturb or add any new waste rock to the historic East Mill dump at the North Maybe Mine. It also would not disturb or add any new waste rock material to the Cross-Valley Fill at the South Maybe Canyon Mine. Part of the existing access road to NDR crosses the waste rock facilities on the west side of Dry Ridge. This road would be widened. The staging area for NDR will be on the reclaimed West Ridge waste rock facility, but like the Tipple, will be constructed as a lined facility to limit any affects.

Figure 5. Open Pit Mine Sequence

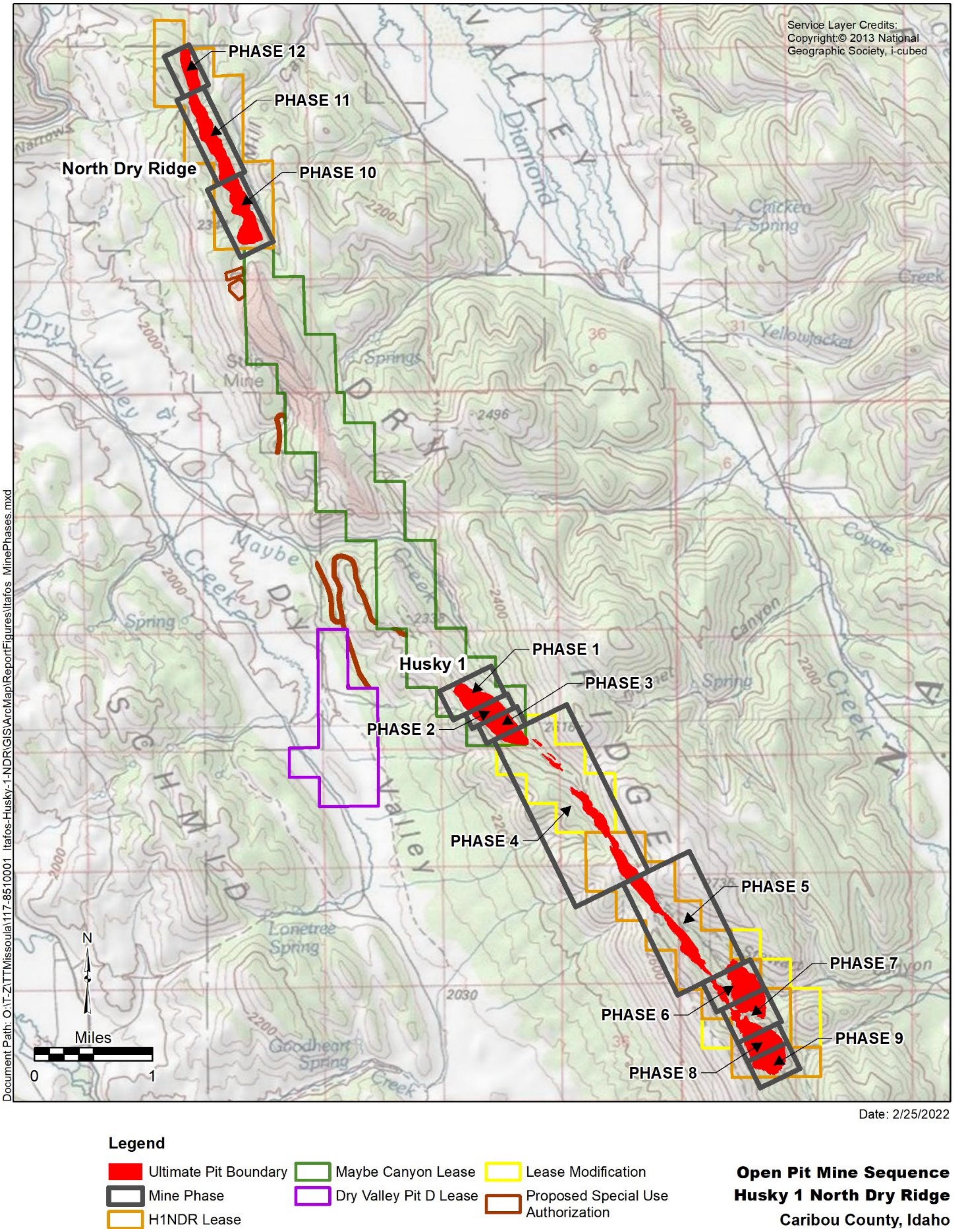
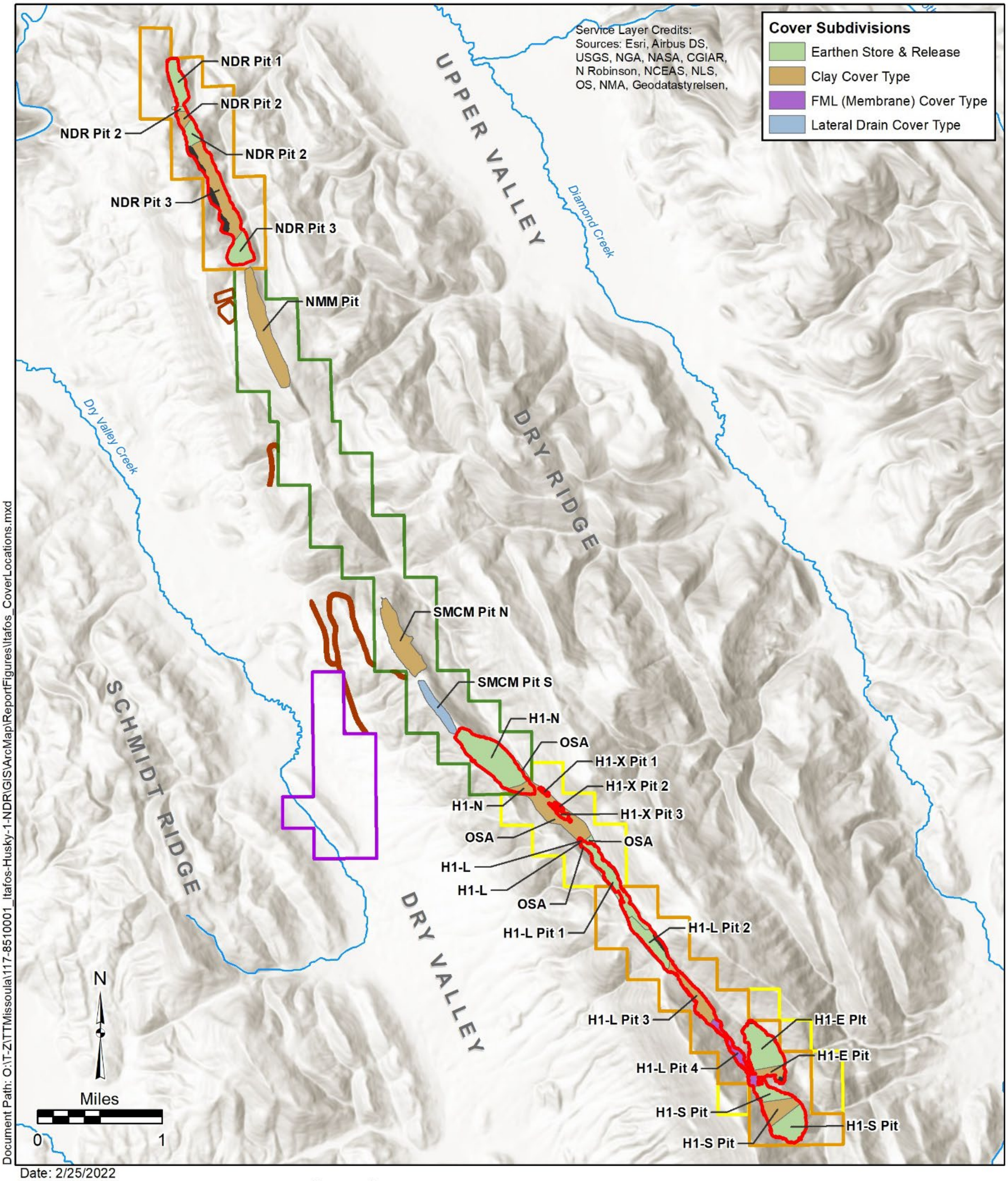


Figure 6. Proposed Action Cover Locations



Legend

- Ultimate Pit Boundary
- Unreclaimed Highwall
- H1NDR Lease
- Maybe Canyon Lease
- Dry Valley Pit D Lease
- Lease Modification
- Proposed Special Use Authorization

H1_Husky 1
NDR-North Dry Ridge
NMM-North Maybe Mine
OSA-Overburden Storage Area
SMCM-South Maybe Canyon Mine

Proposed Action
Cover Locations
Husky 1 North Dry Ridge
Caribou County, Idaho

2.2.3.1 Stream Realignment for Overburden Handling

Approximately 2,557 feet of Stewart Creek and 7,757 feet of Maybe Creek would be realigned adjacent to backfilled pits or re-established over backfilled pits around the H1-N pit, H1-X pits, and the H1-X Overburden Stockpile Area (**Figure 6**). Following final reclamation, a portion of the drainage would remain permanently realigned across the backfill. Limestone would be placed along the boundary of the H1-X OSA to serve as a buttress for the drainage. Conceptual channel designs for the realignments are provided in the MRP in Section 4.6 and in the Water Management Plan (Appendix D of the MRP). The realigned channels would be designed to convey the stream flow from a 100-year, 24-hour storm event plus a 6-inch freeboard. The portions of the realigned channel that cross over backfill would have an impervious liner (60 mils HDPE) and other engineering controls to limit infiltration into the underlying fill. The OSA would provide a buttress for the Maybe Creek realignment to increase stability.

2.2.4 Backfill Cover

To limit infiltration into the overburden and the volume of leachate generated and to ensure that vegetation does not take up selenium and minimize risks to wildlife or livestock, various covers would be placed on the mine backfill. The different cover types have different permeability characteristics and therefore are placed strategically to regulate the amount of precipitation water infiltrating into the backfill material. For reclamation, the type of cover used over backfill would depend on the location (**Table 6** and **Figure 6**).

Table 6. Acres of Cover Materials in the Proposed Action

Location	Earthen Store and Release	Low Permeability Clay	Flexible Membrane	Lateral Drain	Total Acres
NDR Pit 1	28	-	-	-	28
NDR Pit 2	16	8	-	-	24
NDR Pit 3	26	56	-	-	82
North Maybe Mine Pit	-	71	-	-	71
South Maybe Canyon Mine Pit 1	-	55	-	-	55
South Maybe Canyon Mine Pit 2	-	-	-	22	22
H1-N	80	7			87
H1-X, Permanent OSA	5	56			61
H1-L Pit 1	46				46
H1 L Pit 2	29	-	-	-	29
H1 L Pit 3	-	31	-	-	31
H1 L Pit 4	-	-	22	-	22
H1 East Pit	53	12	-	-	65
H1 South Pit	55	26	-	-	81
Total	338	322	22	22	705

Source: (Itafos, 2020d, pp. 5, Table 1)

* Previously disturbed area

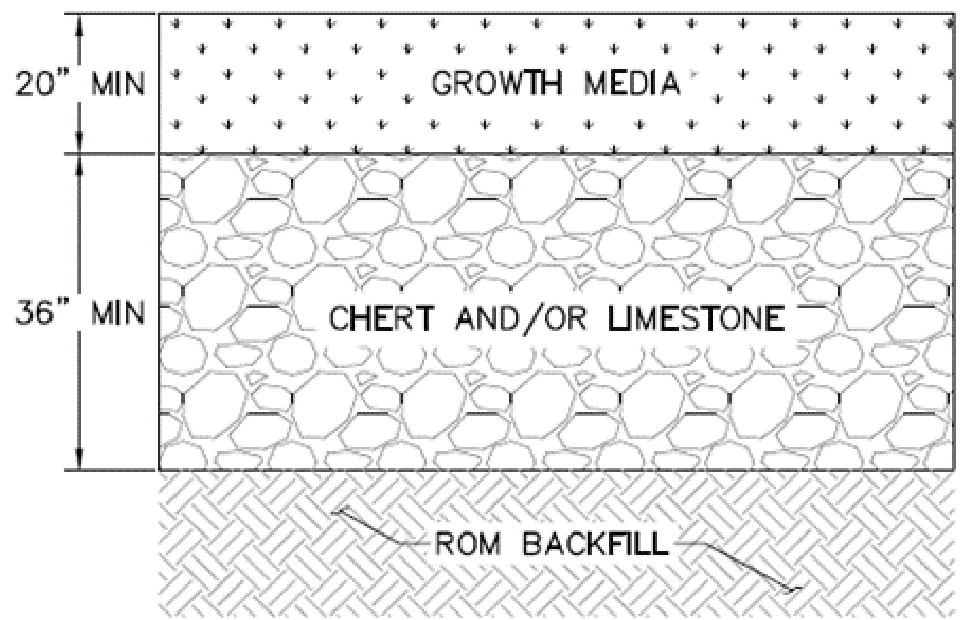
Itafos refined the original cover proposed in the MRP and provided a summary in a memo *H1NDR Mine and Reclamation Plan Addendum* (Itafos, 2020d). The addendum documented changes to the MRP from BLM, USFS, and IDEQ comments prior to public scoping. The configuration of the caps used in the cover was to cost-effectively reduce infiltration to meet water quality standards. Combined, they would include an earthen store-and-release cover, a low-permeability clay cover, a flexible membrane liner (60 mils HDPE) cover, and a lateral drain cover.

The permanent OSA would be covered with a low-permeability clay cover, with a minimum 20 inches of chert/limestone, then growth media (while the MRP indicated 12 inches of growth media, an environmental protection measure has been included in Section 2.2.9 increasing the depth to a minimum 20 inches). Each configuration is described below.

2.2.4.1 Earthen Store-and-Release Cover

The earthen store-and-release soil cap and cover over the backfill would consist of a minimum of 36 inches of chert and limestone, covered by growth media (**Figure 7**). The earthen cover is designed to store infiltrated rainwater and snowmelt then release it to the atmosphere through evapotranspiration. The Rex Chert/limestone layer is used to provide a thick layer of material to separate reclamation vegetation roots from the potentially seleniferous backfill below. Rex Chert and limestone leach the least amount of contaminants of potential concern (COPCs) and are most likely to be exposed to leaching conditions with direct impact to surface water.

Figure 7. Store-and-Release Cover Configuration

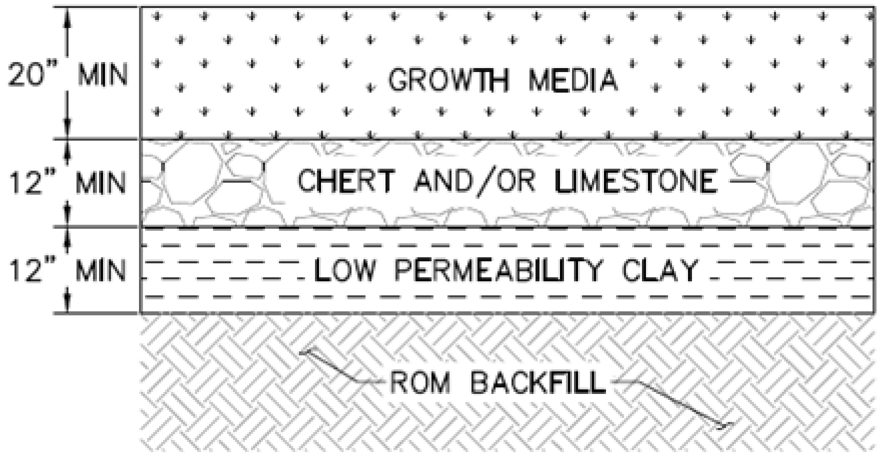


Source: (Arcadis, 2021a, p. 2/4 Figured 1).

2.2.4.2 Low-Permeability Clay Cover

Infiltration would be reduced in some areas with a layer of low-permeability clay. This cover would have 12 inches of low-permeability clay on top of the backfill, cover the clay with at least 12 inches of chert/limestone, and cover that with growth media (**Figure 8**). Clay would be obtained from the Anderson Ranch (**Figure 3**). Low-permeability clay materials are clays with an average hydraulic conductivity of less than or equal to 1×10^{-6} centimeters per second and may be used as a barrier layer to limit net percolation by hydraulic resistance. These materials may also be used in combination with other potential cover materials to reduce the overall net percolation of a cover area.

Figure 8. Low-Permeability Clay Cover Configuration

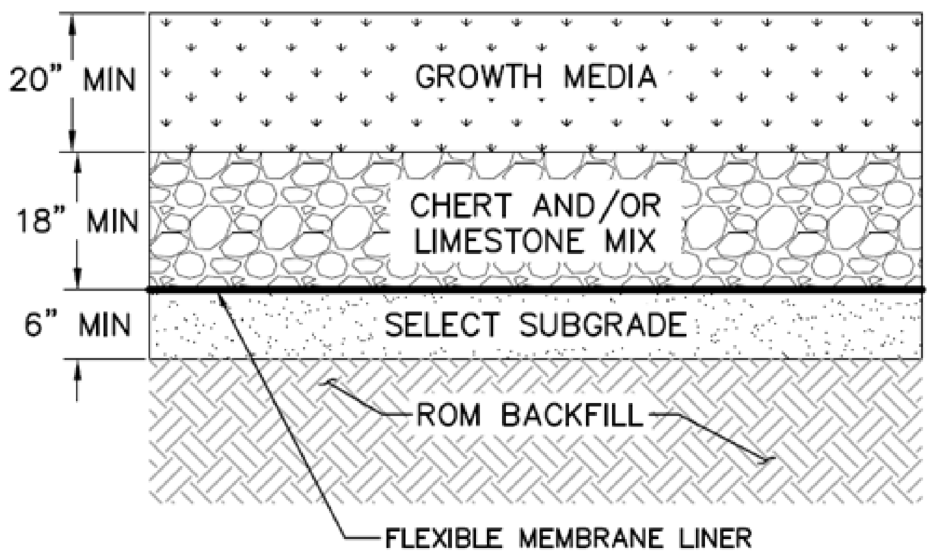


Source: (Arcadis, 2021a, p. 2/4 Figured 2).

2.2.4.3 Flexible Membrane Liner

This cover, including the flexible membrane (60 mils HDPE), is designed to greatly reduce infiltrated rainwater and snowmelt into and through the backfill with 6 inches of a select subgrade, covered with a flexible membrane line (plastic) then growth media and chert/limestone (**Figure 9**). The growth media would support revegetation efforts.

Figure 9. Cap and Cover with Flexible Membrane Liner

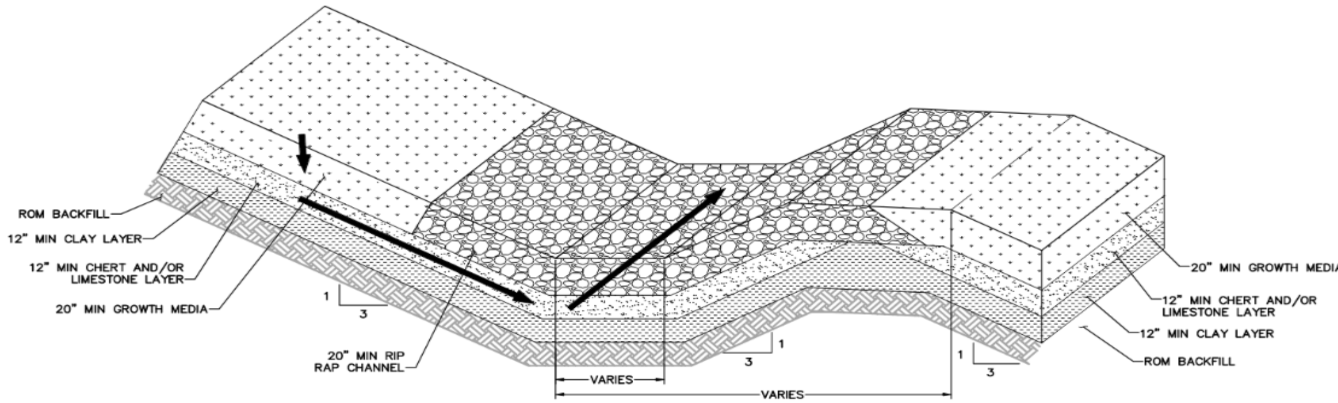


Source: (Arcadis, 2021a, p. 3/4 Figured 3)

2.2.4.4 Lateral Drain Cover

The chert/limestone is used as a lateral drainage layer over the low-permeability clay. The lateral drainage layer captures infiltrated water above the low-permeability clay layer and conveys the water off the backfill. The backfill would be graded to facilitate constructing approximately 10-foot-wide, riprap-lined benches trending roughly parallel to the slope contour that serve to intercept and route water to riprap-lined drain down channels at the margins of the cover. Benches would be spaced at approximate 150-foot intervals (**Figure 10**).

Figure 10. Lateral Drain Cover



Source: (Itafos, 2020c, pp. 16 Figure 4-5) (Arcadis, 2021a, p. 4/4 Figured 4).

2.2.5 Water Management System

Where Stewart Creek crosses an area to be mined, a diversion channel would be constructed as shown in **Figure 14** that would bypass 4,100 feet of Stewart Creek. stream would be relocated uphill into a constructed channel. The diversion channel would be 4,443 feet long.

Water that accumulates in the pits would be managed per a SWPPP[3] and the Surface Water Management Plan, which is Appendix D in the MRP.

- Based on Itafos' experience operating the Rasmussen Valley Mine, lined ponds would be sized to control the volume of runoff produced by either the 10-year, 24-hour storm event plus the average calculated weekly snowmelt volume, or the 100-year, 24-hour storm event, whichever is larger.
- Unlined stormwater ponds would be sized to control the volume of runoff produced by the 2-year, 24-hour storm event with an emergency spillway that would safely discharge the peak flow from the 25-year, 24-hour storm event.
- Diversion ditches, energy dissipators, outlet protection, and culverts associated with ditches that are expected to have a lifespan between 2 and 25 years would be designed to control stormwater runoff produced by the 50-year, 24-hour storm event.
- Long-term drainage channels and associated structures would be designed to control stormwater runoff produced by the 100-year, 24-hour storm event.

"Contact water" is precipitation that has contact with mine surface disturbance such as waste rock with a higher potential for containing constituents of potential concern (COPCs) that could leach into water. Contact water, including drainage from haul roads, would be managed for zero discharge from the mine site to any surface waters. Contact runoff would be collected in basins lined with an impervious liner. Contact water collected in basins would be disposed of through evaporation, dust suppression in zero-release areas, or moved to areas of un-reclaimed backfill for infiltration.

3 The SWPPP would be developed according to Idaho Pollutant Discharge Elimination System IDAPA 58.01.25. https://www.deq.idaho.gov/water-quality/ipdes/ approved by the IDEQ.

Non-contact water would also be managed under the SWPPP. Non-contact runoff would be intercepted and diverted around disturbed areas in diversion ditches. Non-contact runoff water would enter unlined basins to collect sediment, then slowly released through evaporation, percolation, and spillways.

The small amount of perched groundwater that may be encountered would drain into the pit and be managed as contact water. If necessary, water would be moved to areas of un-reclaimed backfill for infiltration, used as dust suppression in zero-release areas, or placed in the contact water basins. All drainage features would be designed to prevent erosion.

No long-term water treatment is proposed by Itafos after reclamation is complete. It is anticipated that if the analysis indicates that the Proposed Action is not sufficiently protective of water quality, additional source control measures would be pursued.

Stewart Creek would remain in the realigned channel.

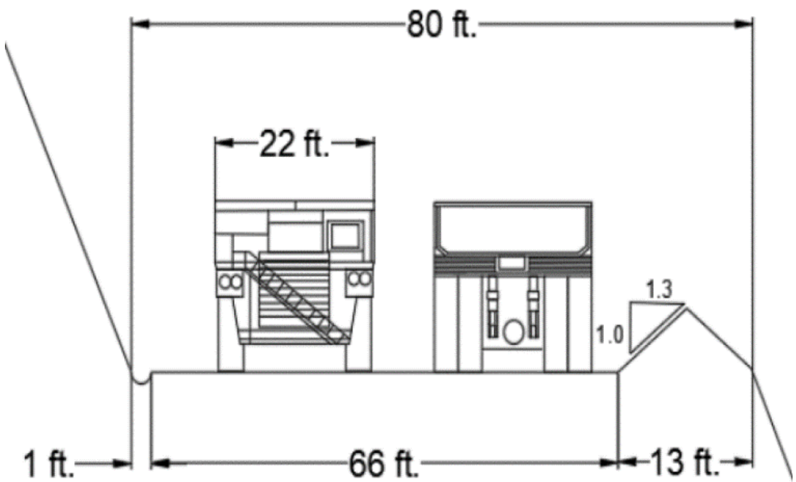
2.2.6 Relocation of Simplot Slurry Pipeline

An active phosphate ore slurry pipeline crosses one of the off-lease (lease modification) areas proposed for mining. The pipeline owner is responsible for re-routing the pipeline before mining occurs in that area. The proposed pipeline relocation is shown on **Figure 3** as the Simplot Slurry Line Re-route. Re-routing the pipeline would disturb approximately 3 acres (the other 3 acres of disturbance for the reroute is already disturbed by the former North Maybe Mine) and requires an amendment to the 2003 RFP as described in Section 1.8 and an amendment to Special Use Authorization SSC51.

2.2.7 Service and Haul Roads

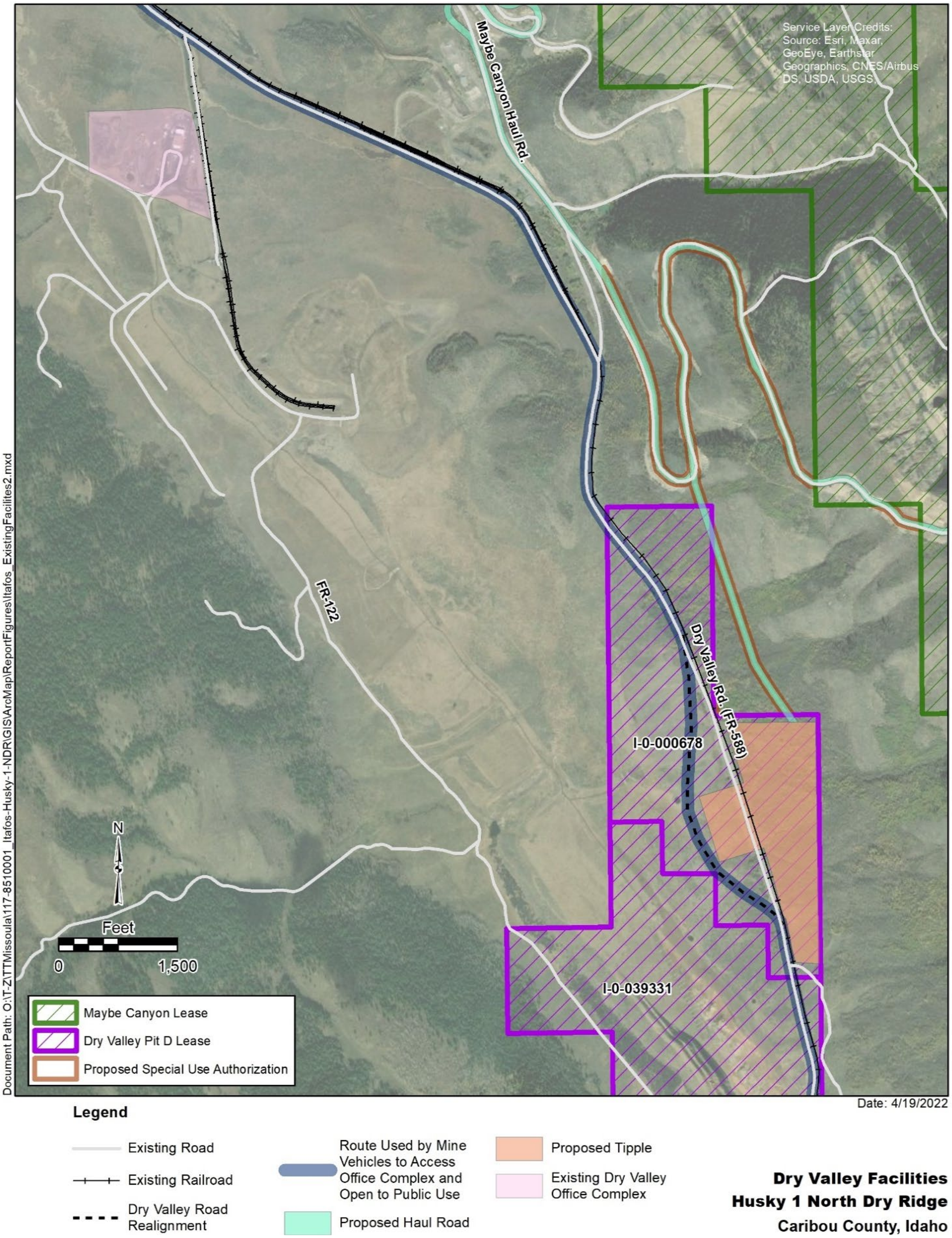
The existing historical Maybe Canyon haul roads would be improved to a width of 80 feet (**Figure 11**). A new haul road ramp would be constructed from the first (lower) switchback of the Maybe Canyon haul road to the tipple (**Figure 12**). Nu-West Industries owns the existing historical Maybe Canyon Haul Roads and are partially under a Special Use Authorization. Haul roads total 7.2 miles, with 3.2 miles of new construction and 4.0 miles of existing road. Using NFS Road 134 to haul ore would require closing the road to the public during mining until reclamation is complete, approximately 15 years.

Figure 11. Example of a Double-Lane Design Haul Road



Source: (Itafos, 2020a, pp. 4-6 Figure 4-1)

Figure 12. Dry Valley Facilities



Staging areas would be constructed as places for miners to meet, receive operational instruction, and discuss safety items. Mobile office trailers may be fitted with shower(s) and have restrooms. The staging area would also have a "ready line" or temporary equipment storage and generators.

Due to the steep, narrow topography and the pit sequence, mining the H1 lease area would require three temporary staging areas. One staging area would be required for the NDR lease area. This staging area would require construction of a 50-foot-wide access road (**Figure 11**). The other staging areas would be developed in the existing disturbance/backfill footprint.

2.2.8 Dry Valley Mine Facilities, Tipple Area, and Ore Haulage

The existing Dry Valley shop/office facilities would be used as the main base, and for production engineering, geology, maintenance, and management staff. The Dry Valley yard area would be used for fuel storage tanks, an equipment parking/hot-start line, and a lay-down yard (**Figure 12**).

The tipple area is east of the existing rail line and within the eastern portion of the Dry Valley Mine Pit D lease. A haul road ramp would be constructed from the switchback to the tipple on NFS lands. The entire tipple area would be lined to prevent impacts on water quality and fenced to restrict public and livestock access. Water management would be in accordance with the SWPPP, and runoff would be managed as contact water. To accommodate railcar loading requirements, the public access road would be safely relocated around and away from the tipple area.

2.2.9 Environmental Protection Measures and Best Management Practices

Itafos has committed to implementing environmental protection measures (EPMs) and best management practices (BMPs) to ensure responsible mining operations and reduce adverse environmental impacts. Key components of the EPMs are described in the MRP, and additional BMPs would be included in the Point of Compliance application.

2.2.9.1 Air Quality

- Up to three wells would be constructed and used to supply water for spraying haul roads, access roads, and other areas for dust suppression. An estimated 80,000 to 200,000 gallons of water would be used per day through the months of April to November, depending on the haul road length required to transport ore or overburden and environmental conditions.
- Contact water may also be used for dust suppression in areas such as within the pit, haul roads, ore stockpiles, or staging areas. Contact water used for dust suppression would only be used within zero-discharge areas according to the site's SWPPP.
- Watering and chemically sealing the roads with magnesium chloride would be done as necessary during the dry season to control dust emissions on the roads.
- A fugitive dust control plan would be submitted to the IDEQ as part of the Air Quality Permit to Construct (IDAPA 58.01.01) to minimize dust generation, including selenium-containing particles, thus minimizing selenium deposition to meet IDEQ permitting requirements.
- Monitoring, testing, record keeping, and reporting for air quality will be required per the Air Quality Permit to Construct that will be issued by the IDEQ, similar to what is required in the Rasmussen Valley Mine Permit (IDEQ, 2018).

2.2.9.2 Cultural and Historical Resources

- If any unidentified cultural resources are discovered during the mining process or associated activities, or during an agency mine inspection, operations in the immediate area of the discovery would be halted. The discovery would be reported to the BLM or USFS, and the BLM or USFS or its authorized representatives would document and evaluate the discovery. If necessary, a treatment plan would be developed and implemented.

2.2.9.3 Livestock Grazing

- To limit the potential for vegetation to take up selenium and minimize risks to livestock, various covers would be placed on the mine backfill.
- USFS will notify permittees 2 years in advance of any reductions in head months or changes in use (36 CFR § 222.4).
- Itafos would place a fence around the tipple area and haul road approaches to the tipple to restrict public and livestock access, and maintain the fence in accordance with wildlife-friendly fencing standards.
- Approximately 0.17 acres of wetland habitat removed as part of the proposed mine would be restored off-site.
- Itafos will relocate or replace existing livestock water improvements that are damaged or destroyed by mining activities as described in **Table 8**, including the following requirements (Guedes, 2022).
  - Grazing permittees are responsible for keeping livestock out of active mining areas;
  - Grazing permittees will be required to keep livestock out of reclamation areas until the USFS and/or the BLM indicate that reclamation has been achieved according to the environmental monitoring plan;
  - USFS will work with Itafos to move livestock across the active mining area/reclamation area with 3-days notification before the move and after consultation with the permittee and USFS; and
  - Itafos will facilitate the mobilization and demobilization of sheep camps 2 times per year per lease by providing safe access to haul roads.
- Additional mitigation for disruption to grazing patterns or access to water will be discussed between Itafos and the USFS when those impacts are more imminent. Additional mitigation for impacts to grazing could include, but not be limited to:
  - Updating the Annual Operating Instructions to provide for clockwise grazing;
  - Coordination between Itafos, USFS, and permit holder for controlled migration over the mine site;
  - Itafos provisioning of temporary water to specific locations during operations; and/or
  - Updating the grazing permit(s) to suspend grazing on either the east or west side of the mine during operations.

2.2.9.4 Surface Water and Wetlands

- Geologic materials at the site have been extensively chemically tested. It has been determined that chert and limestone materials obtained on-site that are proposed to be utilized to construct geologic drains, roads, stream crossings, mine caps, and other features will not leach contaminants detrimental to water quality.

- The MRP Surface Water Management Plan (Itafos, 2020a, pp. D-1 Appendix D) is designed for controlling surface water runoff and minimizing erosion, and sedimentation, and would be employed to minimize adverse effects on water quality.
- The SWPPP (Section 2.5.9.4) would prevent habitat degradation of adjacent and downstream wetlands and non-wetland waters, and would prevent the potential for plant uptake of COPCs. Additional measures are in place to minimize the potential of bioaccumulation (see sections 2.2.9.9, 2.2.9.17, 2.2.9.18, and 2.2.10).
- Surface water would be managed to effectively segregate contact water from non-contact water, with the goal of preventing discharge of contact water. The following water would be classified as contact water:
    - Surface water that contacts waste that, based on both historical data and the site- specific geochemistry program, has a higher potential of containing leachable COPCs (MRP Section 5.2.2), most notably selenium;
    - Water that mixes with water identified above;
    - Water that has collected in the pit; and
    - Water collected from the running surfaces of haul roads and the ore stockpile.
- The following water would be classified as non-contact water:
    - Surface water that contacts only waste with a historically lower potential of containing leachable COPCs (MRP Section 5.2.2); and
    - Run-on water diverted around mining disturbances.
- Groundwater is not anticipated to be encountered in sufficient quantity to require special handling. Small, perched aquifers may be encountered during mining. These would be allowed to drain to the pit and would be managed as contact water.
- Where mining obliterates NFS Road 134, it will be reestablished after mining at least outside of the AIZ from Stewart Creek.
- Sedimentation to wetlands and non-wetland waters from access and haul road construction would be minimized by proper placement of culverts to maintain connectivity between streams and wetlands at stream crossings and minimize erosion and sedimentation. The culvert design would meet peak discharge requirements based on the size of a storm event and duration of culvert installation. Roads would meet guidelines established in the 2003 RFP, as described in MRP Sectionz 4.1.4 and 5.2.7, to design roads to the intended use while emphasizing protection of water quality, prioritizing maintenance, and avoiding construction on unstable slopes and highly erosive soils, where practicable.
- The locations of culverts that would remain, or new culverts that would be installed, would be dependent upon final road grading and adjacent contouring (to be completed during final reclamation) of the reclaimed surface. BMPs would be used to address soil erosion at culvert removal sites until vegetation is established.

- Upon reclamation, all road culverts on roads not needed for future access would be removed and the natural drainage patterns re-established.
- Erosion prevention BMPs such as seeding soil stockpiles and implementing run-on and run-off control measures would minimize loss of stockpiled soil and replaced growth media through erosion.
- Ditches would be constructed in sequence with the mining to minimize run-on into the pit and excessive precipitation contact with exposed shales. It is not feasible to capture and divert all offsite stormwater runoff utilizing diversion ditches, which would require that run-on at certain locations be permitted to drain to adjacent pits. Appendix D in the MRP describes the detailed design criteria of these structures.
- The OSA along Maybe Creek would be designed and engineered specifically to prevent runoff from entering Maybe Creek.

2.2.9.5 Storm Water Pollution Prevention Plan

- Surface water management would consist of managing water based on its potential for transporting COPCs. Specific control measures and BMPs to minimize impacts on water quality would be included in the project SWPPP, developed in accordance with the Idaho Pollutant Discharge Elimination System.
- Degradation of wetlands and riparian habitat from erosion and sedimentation during construction and operations, or from stormwater runoff contacting wetlands and streams, would be minimized through design features, BMPs, adherence to 2003 RFP Standards, and implementation of a site-specific SWPPP. Itafos would prepare a SWPPP in accordance with applicable state regulations. The SWPPP would identify all potential sources of pollutants that could be transported to surface waters during precipitation events. In addition, the SWPPP would outline control measures and BMPs to be used to prevent or reduce the discharge of pollutants in stormwater.
- As part of the SWPPP, Itafos would comply with several requirements for storm event-related surface water monitoring established by the U.S. Environmental Protection Agency (USEPA) and the IDEQ. The overarching goal of the various monitoring requirements is to demonstrate that episodic stormwater runoff from the site does not degrade surface water quality. A conceptual approach to stormwater management is provided in MRP Appendix D; however, the comprehensive SWPPP would be contingent upon final approval of the MRP and would be updated and approved throughout the mine life to accommodate the changing mining operations.

2.2.9.6 Spill Prevention, Control, and Countermeasures Plan

- Itafos would prepare a Spill Prevention, Control, and Countermeasures (SPCC) Plan in accordance with applicable regulations. An SPCC Plan would be implemented to meet the requirements in 40 CFR 112 before placement of the petroleum products on site and would be reviewed every 3 years by the Spill Prevention Coordinator or other qualified personnel. As required by the regulation, all amendments to this SPCC Plan would be reviewed by a Professional Engineer. The engineer would certify that the SPCC Plan has been prepared in accordance with good engineering practices and meets applicable standards.

2.2.9.7 Groundwater

- Any wells/core holes to be used for groundwater monitoring will comply with IDAPA 37.03.09 Well Construction Standards Rules.
- Constituents mobilized from backfill areas and other mining features during precipitation events could enter groundwater systems through infiltration. Of specific concern at phosphate mines in southeastern Idaho is the introduction of selenium to the groundwater system. Itafos would protect groundwater resources by placing selenium waste[4] directly to pit backfills and the OSA and using BMPs designed to control runoff of sediments from mining features.
- Materials higher in selenium would be directly backfilled to previously mined-out areas or to historically mined pits. These materials would be used for backfill in the lower portions of the mined-out pit, where practicable, and capped and covered. MRP Section 4.1.8 describes each of these cap and cover systems in detail and are summarized in EIS Section 2.2.4.
- Before capping, the backfill would be graded to reduce run-on and infiltration, while revegetation would encourage evapotranspiration of precipitation. Proper placement and cap/cover of the material with selenium would reduce, to the extent possible, precipitation infiltration into the backfill storage areas and subsequent mobilization of selenium to groundwater.
- During mining, water can pool in the bottom of the pit even when diversion ditches are used to divert surface runoff away from the pit walls. Some runoff would be allowed to drain into the pit to be managed as contact -water. Other sources of pit water include direct rainfall, snow melt, and groundwater exfiltration. Groundwater exfiltration is not expected beyond the occasional interception of a perched aquifer.
- As surface runoff accumulates in active pits, it may be necessary to pump the water away from the active pits to facilitate safe mining operations. Pit water would be managed as contact water. Therefore, pit water would be pumped or moved by a water truck to areas of un-reclaimed active backfill within the pit area for infiltration, utilized for dust suppression within zero-release areas in accordance with the SWPPP, or delivered to lined contact water basins with available capacity. Where possible, contact water basins are proposed at various locations to collect and retain stormwater runoff and pit water, as applicable, for zero release.
- Itafos would design and implement BMPs for erosion, sedimentation, and selenium control to limit runoff from mining components and potential infiltration. Sediment control could include, but not be limited to, the use of erosion mats, straw wattles, brush barriers, silt fences, diversion ditches, and sedimentation ponds (MRP Section 5.5.1).
- Itafos would conduct mining in accordance with Section 39-120, Idaho Code (Ground Water Quality Rule). Itafos may request set points of compliance from the IDEQ before mining operations per IDAPA 58.01.11.401. The set points of compliance requested would be determined as planning proceeds and baseline data are collected.

4 The MRP refers to this material as seleniferous waste or SeW. This is waste with a higher potential of containing leachable selenium and includes the non-ore portions of the Phosphoria Formation (center waste shales, footwall and hanging wall muds, and ore partings). See section 5.2.2 of the MRP for more information.

2.2.9.8 Noxious Weeds

- Noxious weeds would be continuously managed throughout mining. A noxious weed control program would be instituted throughout mining operations and during site closure, and would continue until agreement with the agencies agree that site closure is complete. The noxious weed control program would be designed and implemented according to the requirements of the Idaho State Department of Agriculture and the 2003 RFP. With implementation of these proposed control measures, the potential for spread and invasion would be minimized.

2.2.9.9 Wildlife

- The proposed use of synthetic and/or thick geologic mine caps topped with growth media will ensure that roots of reclamation vegetation cannot access selenium or other contaminants contained in the run-of-mine waste rock, and create a bioaccumulation hazard to foraging wildlife, livestock, or Treaty rights use of vegetative materials.
- To minimize the possibility of take of nesting migratory birds, a nest clearance survey (to include general/songbird surveys and raptor-specific surveys) would be conducted 7 to 10 days prior to initiating timber removal or other ground clearing during the migratory bird breeding season to identify active nests.
- The mine disturbance area has been reduced where feasible through placement of haul roads on previously disturbed areas.
- Reclamation would establish native vegetation suitable to wildlife habitat over approximately 98 percent of the total disturbance (1,180 acres) disturbed by mining operations. The historic North Maybe Mine and South Maybe Canyon Mine open pits would also be backfilled and reclaimed to provide up to approximately 148 acres of additional wildlife habitat.

2.2.9.10 Fire Prevention

- Fire prevention would be accomplished by an active safety training program that includes safe work practices. All mining equipment is fitted with appropriately sized fire extinguishers or automatic fire suppression systems. All light trucks and support vehicles are equipped with fire extinguishers as well. Small wildfires may be extinguished using a dust suppression water truck and/or track-mounted equipment. However, mine personnel and public safety would be considered the highest priority. Local land management agencies and county authorities would be immediately notified in the event of a wildfire on or near the mine site.

2.2.9.11 Fuel Storage Area and Containment

- Fuel would be stored at the existing Dry Valley shop and distributed directly to equipment by fuel trucks that comply with relevant federal and state regulations. The total fuel storage capacity may be as much as 40,000 gallons. Fuel would be stored in multiple aboveground storage tanks. Barriers have been constructed under and around fuel tanks to meet applicable requirements for secondary containment of petroleum products. The Dry Valley fuel storage area would be maintained according to relevant federal and state regulations and the H1NDR SPCC Plan.

2.2.9.12 Growth Media

- Growth media would be salvaged and would be applied at a minimum 20 inches.

- When direct placement of salvaged growth media is not practical, it would be salvaged and stockpiled until used in reclamation. Stockpiles on historical backfill areas would be constructed on 2 feet of limestone as a base to prevent contamination. Stockpiles on native ground would be placed directly on native ground after clearing and grubbing. Growth media would be stored in the fewest stockpiles to be most efficient.

2.2.9.13 Stability

- The bottoms of the open pits would not exceed 12% grade, where reasonable. Steeper grades may occur due to localized discontinuity of the deposits, which are interpreted as faults.
- On the footwall side of the deposit, the slope is parallel to the dip of the strata where it is shallow. In steeper portions, the overall slope uses a maximum of 48 degrees for a face angle and 30-foot-wide catch benches for each 90 feet of pit depth.
- Hanging wall slopes in the Rex Chert would have a 48-degree face angle with 20-foot-wide catch benches for every 80 feet of depth.
- A slope stability study would be completed to determine more accurate slope design parameters. Localized conditions within the pit may require additional layback of the pit walls for safety.

2.2.9.14 Access and Haul Road Design

- All access and haul roads outside the pits are designed to minimize surface and natural resource impacts and to ensure maximum efficiency and safety in truck haulage. Road design features include the following:
  - Road locations would minimize wetland and riparian area disturbance.
  - Where practical, haul roads would be placed within the pit boundaries to reduce the disturbance footprint of mining operations.
  - Road cut slopes would be designed with a 1:1 or 45-degree angle.
  - Road fill slopes would be designed at a repose angle of approximately 36 degrees.
  - Road surfaces would be graded to minimize standing water.
  - If necessary, large fill or cut slopes may be hydro-mulched, seeded, or otherwise stabilized to prevent excessive soil erosion from runoff.
  - Growth media would be salvaged from the proposed road areas in accordance with MRP Section 4.1.10 and MRP Section 5.6.9 of the MRP.
  - BMPs such as sediment control fencing, straw waddles, and erosion mats, would be used as needed to minimize impacts around haul roads.
- Haul roads are an 80-foot travel width, including a 10-foot safety berm. As most of the roads are on steep terrain, haul roads would generally need only one berm on the outside shoulder. The minimal road widths are a result of the steep terrain and to minimize impacts. The improvements to the existing roads would rehabilitate and widen the road to a total width of 80 feet by removing cut slope ravel, removing oversized water control ditches, and reconditioning berms.
- All roads would be constructed with a cut-fill, full cut, and/or full-fill method. Any fill construction would use selective materials with side berms where necessary for safety.

2.2.9.15 Culverts

- Surface water runoff would be conveyed under the access and haul roads through culverts. Culverts are considered long-term or permanent structures; therefore, they were designed to convey the peak discharge from a design storm event selected based on the anticipated life of the culvert installation (**Table 7**).

Table 7. Design Storm Criteria for Peak Flow Conveyance

Anticipated Life of Structure	Design Storm Event[1]
Less than 2 years, or approximately one phase of mining	10-year, 24-hour
2 to 25 years, or multiple mining phases	50-year, 24-hour
Long-term or permanent	100-year, 24-hour

Source: (Itafos, 2020a, pp. Table 4-5)

1 Appendix D of the MRP includes maps showing the proposed culvert locations, a description of the conceptual design, and tabulated hydraulic design parameters.

2.2.9.16 Blasting

- Blasting would be conducted consistent with the requirements of the Mine Safety and Health Administration; the Bureau of Alcohol, Tobacco, Firearms, and Explosives; and the Department of Homeland Security. Blasting would be performed with a mixture of ammonium nitrate-fuel oil, blasting emulsions, or other standard blasting agents placed in drilled blast holes.
- Before blasting, inspection of the blasting area, warning sirens, personnel cleared, blast warnings broadcast by two-way radio, and guards posted on all roads, would occur to ensure control of access to the blasting area.

2.2.9.17 Measures to Meet 2003 RFP Requirements

The USFS has reviewed the MRP against the requirements in the 2003 RFP (USFS, 2003a), and included additional EPMs to meet standards and guidelines. These measures would be included in the approval decision:

- Itafos would construct wildlife structures at reclamation such as slash piles, rock piles, and logs using native vegetation and materials to provide habitat diversity in creating openings where possible (Prescription 8.2.2(6g) Phosphate Mine Areas, wildlife guideline 3).
- Interim reclamation shall be conducted according to a plan submitted by Itafos at the time the USFS is notified of a temporary shutdown (Forest-Wide guidance, Drastically Disturbed Lands standards (6)).
- Reclamation vegetation shall be monitored by Itafos for bioaccumulation of hazardous substances prior to release for multiple use management (Forest-Wide guidance, Drastically Disturbed Lands standards (7)).
- Loss of available surface water sources for uses such as wildlife or grazing due to mining operations shall be replaced or mitigated by the mine operator. This includes the loss of water quality sufficient to maintain post-mining uses (Forest-Wide guidance, Drastically Disturbed Lands standards (9)). Itafos has committed to replace the following water sources (**Table 8**). Also see requirements in Section 2.2.9.3.

Table 8. Applicant Committed Water Source Replacements

Water Source Affected	Replacement
Pond #6	While mining impacts Pond #6, Itafos will offer a temporary replacement of the water for the days requested, 7 days on the east side and 7 days on the west side for a total of 14 days per season. Itafos will do so while the current Grazing Permit 5524RD is in effect until its expiration date of 12/31/2024, after which Pond #6 should would be removed from the grazing permit description. At the end of mining, Itafos will install a guzzler (or similar) to provide for water for wildlife after agreeing on a location within the footprint with the USFS. Itafos would construct the guzzler, then transfer the ownership, operation, and maintenance to USFS.
Pond #8	For Water Right 27-11505, Itafos would provide temporarily provide replacement water during impacts from mining and until the NDR reclamation achieves success criteria to be established in the NDR Environmental Monitoring Plan.
Lower Maybe Pond	Itafos would provide one permanent replacement pond for the Lower Maybe Pond, Water Right 27-11748. The replacement would be designed into the realignment of the Lower Maybe Pond.
Schmid Ridge Trough	The current status of the Schmid Ridge Trough is nonfunctional for Water Right 27-11544. Itafos will work with USFS to assist with implementing USFS planned improvement.
Stewart Creek	Itafos would temporarily provide replacement water as indicated on the figure for Water Right 27-11488 during impacts from mining and until the NDR reclamation achieves success criteria to be established in the H1 Environmental Monitoring Plan.
Trough 6	This trough is located on the pipeline associated with Water Right 27-7257, but the trough is not identified as a point of use on the grazing permit. Itafos will provide a new trough once the proper point of use has been updated with Idaho Department of Water Resources.
Trough 7	Water Right 27-7257: This trough will be replaced.

Source: (Guedes, 2022)

- USFS would select plant species for establishment to reflect the surrounding ecosystem and post-remedial land use. Plant materials used should be adapted to the climate of the site. Preference should be given to promoting natural succession, native plant species, and structural diversity (Forest-Wide guidance, Drastically Disturbed Lands guidelines (2)).
- USFS would prescribe reclamation plant species known to reduce the risk of bioaccumulation of hazardous substances, if such risk is present (Forest-Wide guidance, Drastically Disturbed Lands guidelines (3)).
- In reclaimed areas, vegetation should include species that meet wildlife habitat needs. Wildlife structures (slash piles, logs, rock piles) using native vegetation and materials are designed to provide cover for wildlife movements in created openings (Forest-Wide guidance, Drastically Disturbed Lands guidelines (7)).
- Culverts (permanent and temporary) should be sized so that the probability of flow exceedance is 50% or less during the time the culvert is expected to be in place (Prescription 2.8.3 (AIZ) Roads and Trails Guidelines (2)).
- Itafos would avoid placing ditch relief culverts where they may discharge onto erodible slopes or directly into streams (Prescription 2.8.3 (AIZ) Roads and Trails Guidelines (4)).
- Where feasible, Itafos would install cross-drainage above stream crossings to prevent ditch sediments from entering streams (Prescription 2.8.3 (AIZ) Roads and Trails Guidelines (5)).

- New or reconstructed roads and trails should cross the AIZ riparian areas as perpendicular as possible (Prescription 2.8.3 (AIZ) Roads and Trails Guidelines (6)).
- Design and install drainage crossings to reduce the chances of turning stream flows down the road prism in case of a blocked or overflowing culvert (Prescription 2.8.3 (AIZ) Roads and Trails Guidelines (8)).
- Road drainage patterns should avoid disruption of natural hydrologic flow paths (Prescription 2.8.3 (AIZ) Roads and Trails Guidelines (9)).
- These [Phosphate Mine] areas may be opened to grazing after meeting the restoration criteria identified in the mine reclamation plan (Prescription 8.2.2(g) Phosphate Mine Areas Livestock Grazing Guideline (1)).

2.2.9.18 Measures to Meet BLM Policy Requirements

Instruction Memorandum 2021-038

On July 21, 2021, BLM issued Instruction Memorandum 2021-038[5] rescinding the previous Instruction Memorandum 2019-018 on compensatory mitigation due to inconsistency with recently issued Executive Order 13990 and Secretary's Order 3398 and indicated that BLM would be establishing policies that align with the orders. On September 22, 2021, BLM issued Instruction Memorandum 2021-046. This instruction memorandum reinstated Manual MS-1794 and Handbook 1794-1. The Manual and Handbook provide BLM policy and guidance for implementing mitigation to address impacts to resources from public land uses.

Itafos has submitted a compensatory plan (**Appendix A**), in compliance with BLM policy and guidance, which is based on the impacts stated in Chapter 3. This compensatory mitigation will be immortalized in the BLM Record of Decision as a required Conditions of Approval.

BLM ARMP

The BLM has reviewed the MRP against the requirements in the ARMP (BLM, 2012). In addition to EPMs and BMPs specified in the MRP, measures included to meet 2003 RFP standards and guidelines above are consistent with the ARMP (management actions ME 1.2.4, ME-1.2.5, and ME-2.6.3).

The analysis and interdisciplinary team discussions indicated the need for the following EPMs:

- If intact vertebrate fossils are exposed during mining activities, the locations would be recorded and, if possible, the fossil may be tentatively identified. Notification would be provided to the BLM and USFS.
- Backfill caps to eliminate the threat of selenium bioaccumulation in reclamation vegetation.
- Geochemical testing of backfill and cover materials to demonstrate material used for cap and drain construction won't result in leaching of selenium or uptake into reclamation vegetation.
- All soils must be salvaged and utilized for reclamation. It has been demonstrated that these natural soils will not cause any bioaccumulation of selenium into vegetation.

5 https://www.blm.gov/policy/im-2021-038.

2.2.10 Reclamation

Reclaimed areas over backfill would be covered with at least 20 inches of growth media. The USFS would approve a reclamation seed mix that would consist of native grasses, forbs, and shrubs similar to the existing plant communities and would minimize bioaccumulation in vegetation.

The H1NDR disturbance footprint would be 98% reclaimed. The remaining 2% would consist of exposed pit walls as limited portions of the pits are partially backfilled and certain haul roads that will be partially reclaimed to a much smaller final width to allow for access and maintenance.

Reclamation of mine pit areas would be concurrent with mining. Reclamation of other areas of the H1NDR Mine site are scheduled to be completed within 2 years after cessation of mining. Reclamation is designed to restore the site to beneficial post-mining multiple land uses, protect the environment, and reclaim disturbed areas to conditions compatible with the surrounding landscape. This section summarizes the reclamation plan included in Sections 5.6 of the MRP.

Reclamation practices are designed to meet the objectives set by 43 CFR 3592.1, the BLM’s ARMP, USFS’s 2003 RFP, and Idaho’s Reclamation Plan Title 47, Chapter 15 – Idaho Code. The reclamation plan is intended to stabilize (protect from erosion) disturbed areas and to meet the final multiple land use goals of wildlife habitat and grazing.

2.2.11 Financial Assurance

The BLM, USFS, and the IDL would determine reclamation performance bond amounts required by the Idaho Surface Mining Act (Idaho Code Title 47, Chapter 15), 43 CFR 3504.50, and 36 CFR 251.56(e). Itafos would post reclamation performance bonds or other instruments (financial assurance) prior to any surface disturbance. Per 43 CFR 3504.71 and in accordance with the BLM actual-cost reclamation bonding policy, Bond Requirement for Phosphate Mining Operations, September 10, 2013, that prescribes the procedures for ensuring that an accurate actual-cost reclamation bond is in effect for phosphate mines in Idaho. The performance bond is to assure that reclamation obligations are met, the project site is reclaimed, and resources are not adversely affected. A BLM production royalty bond for mining phosphate ore from the federal lease is also required.

The bond amount would be calculated based on the alternative(s) selection when a final MRP is approved and requirements have been identified and would be adjusted as needed due to operational changes or as projected reclamation costs change. Because the bond amount is calculated based on the alternative selected in the Records of Decision and proscribed by statute and existing agency policy it is not in this EIS. The bond would provide adequate funding to complete reclamation, pre- and post-closure maintenance, and monitoring until affected areas are determined to meet reclamation goals consistent with the Records of Decision and existing rules, regulations, and standards by the IDL, BLM, and USFS. Once the bond amount has been determined, the performance bond and information forming its basis would be available for public inspection.

2.3 Alternatives Development

BLM conducted public and internal scoping to identify concerns and issues best resolved by considering alternatives. These alternatives and the reasons they were proposed are discussed below. Additionally, the No Action Alternative is evaluated as an alternative in the EIS.

2.4 Reasonable Alternatives to the Proposed Action

2.4.1 Significant Issues and Preliminary Alternative Suggestions

BLM, USFS, USACE, and IDEQ reviewed the issues and potential impacts from the project and used their knowledge of previous phosphate mining projects in southeastern Idaho to develop a list of preliminary issues. The public scoping was completed on January 22, 2021. The EIS team reviewed the comments from public scoping and supplemented the preliminary issues to develop the final set of issues. For the purposes of this EIS, "significant issues" are the issues that drive alternative development. They cannot be resolved through design or analysis. Other issues are addressed through the EIS analysis or measures that can be applied to all the action alternatives.

2.4.1.1 The Significant Issues

- Degradation of groundwater and surface water quality that does not meet state standards caused by backfilling the open pits with overburden after mining, and the subsequent infiltration of rainwater and snowmelt through the backfill cover after reclamation. Additionally, permanently realigning Stewart Creek may not be consistent with 2003 RFP requirements in AIZs.
- Interruption of access (1) to Shoshone-Bannock Tribes for exercising treaty rights, (2) to the public for recreation, and (3) to herd managers for grazing operations caused by the mine's planned usage of currently existing forest roads for ore hauling, the requirement to impair public access into the mine area for safety, and mining that would remove access roads or sever access to trails.

2.4.2 No Action Alternative

Under this alternative, the MRP and special use authorizations would not be approved. Leases would not be modified. The 2003 RFP would not be amended. No mining and ore recovery would occur. No Section 404 permit would be issued or mitigation completed.

The future CERCLA cleanup would continue, and final reclamation of the North Maybe Mine and South Maybe Canyon Mine would take place following CERCLA. The Conda Plant is likely to remain open, but may not stay open, depending on whether Itafos would elect to purchase phosphate rock from another source.

Selecting this alternative does not mean the ore would never be mined, just that it would not be mined with this MRP. Another MRP could be submitted at any time. The leases and the development rights associated with the leases would remain.

2.4.3 Alternative Cover

This alternative was developed to reduce potential impacts from the Proposed Action on surface water and groundwater quality by reducing percolation of rain and snow. Itafos designed the Alternative Cover and submitted designs to the agencies (Itafos, 2020c). Each of the four cover types have a different effectiveness or predicted infiltration rate. This alternative would increase the use of the more effective designs where necessary and slightly decrease the footprint of the backfill. Based on a preliminary groundwater modeling analysis, Itafos would reconfigure placement of overburden and re-arrange and optimize the placement of the four types of cover described in Section 2.2.4. The reconfiguration would reduce the area needing a cover from 705 to 611 acres. In addition, based on the agency groundwater model, the most effective cover design would be deployed where it would decrease impacts to the greatest degree. The area of flexible liner cover would increase from 22 to 315 acres. This alternative would increase the acreage of unreclaimed highwall from 19 to 68 acres of Grandeur Tongue or Wells Formation limestone. Overall, the alternative would meet the following performance criteria:

- Prevent contact of surface water runoff with run-of-mine overburden.
- Prevent water that infiltrates through the cover system and run-of-mine overburden from subsequently expressing at the ground surface because of elevated pit backfill water levels.
- Prevent subsurface transport of COPCs in downgradient groundwater from resulting in additional loading to 303(d) listed surface waters or concentrations exceeding surface water quality standards in non-303(d) listed waters.
- Limit impacts to groundwater and the extent of impacted groundwater beyond the mining area so there is no injury to current or projected future beneficial uses of groundwater.

Construction materials may change slightly from those described in Section 2.2.4, but all performance criteria would be met. Acres of each type of cover that would be applied to each pit are shown on **Figure 13** and in **Table 9**. Differences in acres by location are shown in **Table 10**. There is a noticeable decrease in Low Permeability Clay and an increase in Flexible Membrane Liner in Table 9 (Selected Alternative cover) compared to Table 6 above (Proposed Action cover). The change in cover type usage in the Alternative Cover resulted from agency acknowledgement of the effectiveness of the Flexible Membrane Liner as a very-low permeability solution to excessive amounts of meteoric water percolation into seleniferous backfill as was indicated in the Proposed Action.

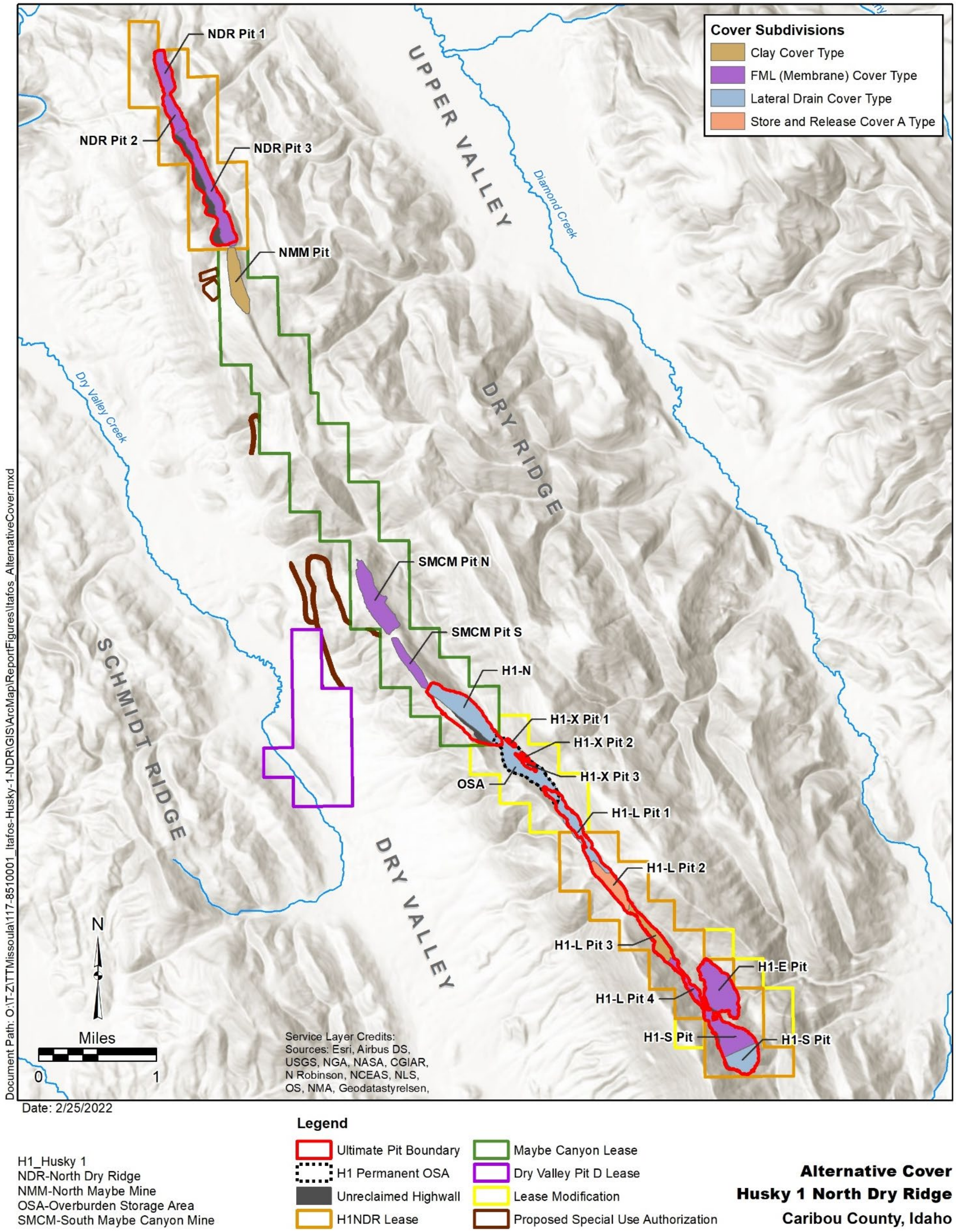
Table 9. Acres of Cover Materials in the Alternative Cover

Pit	Earthen Cover	Low-Permeability Clay	Flexible Membrane Liner	Lateral Drain	Total Acres
NDR Pit 1	--	--	26	--	26
NDR Pit 2	--	--	22	--	22
NDR Pit 3	--	--	61	--	61
North Maybe Mine Pit	--	37	--	--	37
South Maybe Canyon Mine Pit 1	--	--	57	--	57
South Maybe Canyon Mine Pit 2	--	--	23		23
H1-N	--	--	--	61	61
H1-X (1, 2, 3), Permanent OSA				67	67
H1-L Pit 1	--	--	--	41	41
H1-L Pit 2	30	--	--	--	30
H1-L Pit 3	--	29	--	--	29
H1-L Pit 4	--	--	18	--	18
H1-E Pit	--	--	64	--	64
H1-S Pit	--	--	43.5	31.5	75
Total	30	66	315	200.5	611

Source: (Anderson, 2021a, p. 5/8 Table 3)

All other components of the Proposed Action would be the same (mining methods, lease modifications, water management, roads, Dry Valley facilities, EPMs and BMPs, reclamation, mitigation commitments, and financial assurance on this cover) as described in Section 2.2. This

Figure 13. Alternative Cover



alternative would also modify the backfill placement, but not the total amount of backfill to be managed. Approximately 2.9 million more cubic yards would be placed in the OSA than the Proposed Action, which increases the size of the OSA from 55 to 61 acres. Overall, the Alternative Cover has 94 fewer acres needing cover due to backfill placement.

Performance of the cover to meet design criteria would be monitored at the Points of Compliance established by IDEQ (Section 2.2.9). The potential to meet these design criteria are evaluated with a robust, predictive groundwater model to assess the effect of the cover alternatives to ground water over time. (Tetra Tech, Inc., 2021d).

Table 10. Proposed Action Cover Acres Compared to Alternative Cover Acres

Location	Proposed Action	Alternative Cover	Difference
NDR Pit 1	27	26	-1
NDR Pit 2	24	22	-2
NDR Pit 3	82	61	-21
North Maybe Mine Pit	71	37	-34
South Maybe Canyon Mine Pit 1	55	57	+2
South Maybe Canyon Mine Pit 2	22	23	+1
H1-N	89	61	-28
H1-X, Permanent OSA	61	67	+6
H1-L Pit 1	46	41	-5
H1 L Pit 2	29	30	+1
H1 L Pit 3	31	29	-2
H1 L Pit 4	22	18	-4
H1 East Pit	65	64	-1
H1 South Pit	81	75	-6
Total	705	611	-94

Source: (Itafos, 2020d, pp. 5, Table 1; Anderson, 2021a, pp. 5/8, Table 3)

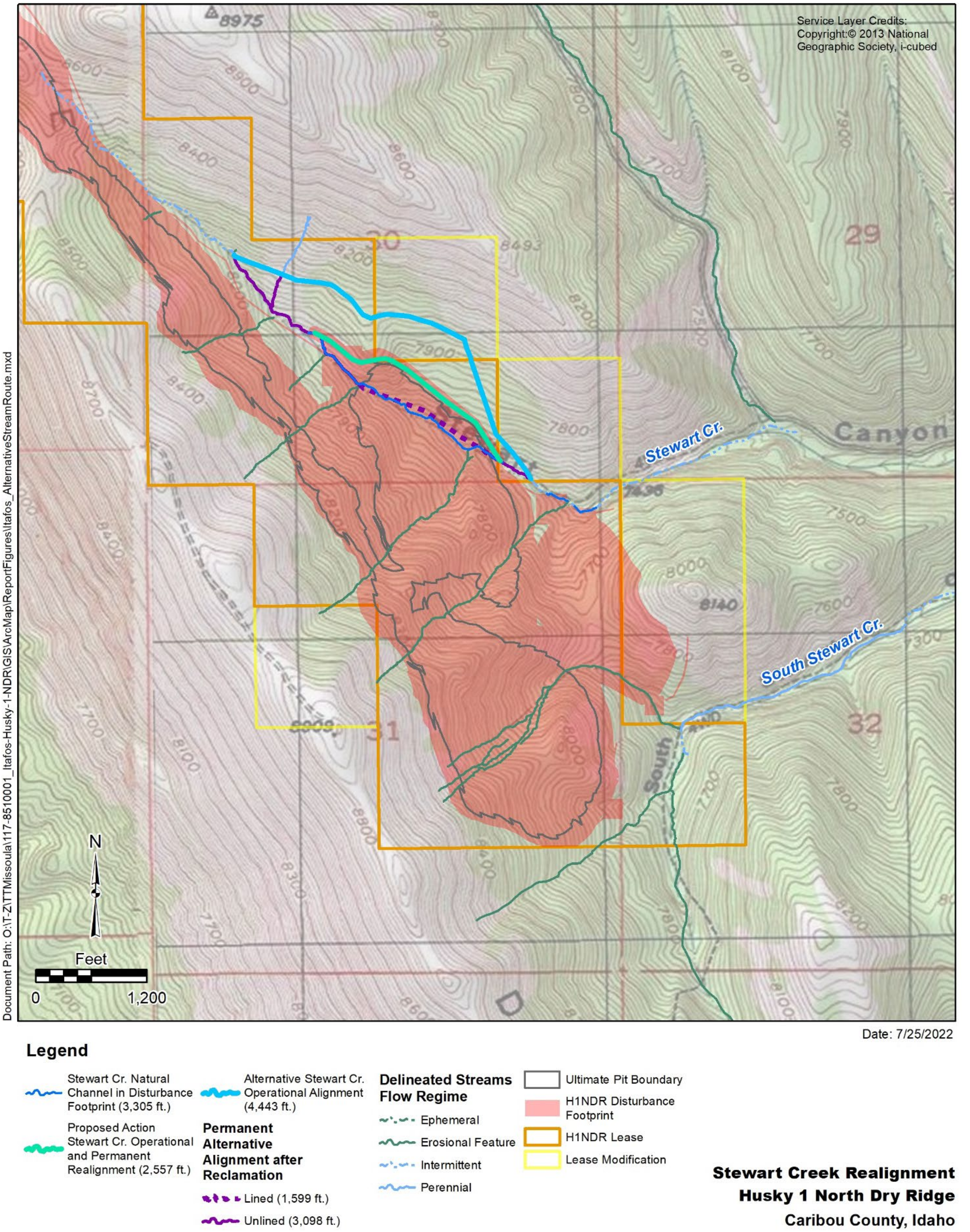
2.4.4 Alternative Stream Routing

To reduce long-term and permanent impacts to Stewart Creek, an alternative is considered that temporarily reroutes Stewart Creek into an open channel uphill from its current location during operations and then returns it permanently to its natural channel except where it would cross the backfill area. Where the stream crosses the backfill, the channel would be lined to minimize water contacting the backfill cover. This alternative would create an additional 5 acres of disturbance beyond the Proposed Action. The locations of the Alternative Stream Routing and the Proposed Action stream reroute are shown on **Figure 14**.

2.4.4.1 Reclamation of the Alternative Stream Routing

The operational reroute would be reclaimed by returning the channel to its natural slope and revegetating with a seed mix approved by USFS to meet the objectives of reclamation, which are low potential for uptake of COPCS, wildlife habitat, livestock grazing, native plant emphasis, accommodating gathering needs of native people, and soil and site stabilization (erosion control). The approved seed mix varies by site depending on environmental conditions, aspect, and reclamation objectives.

Figure 14. Stewart Creek Realignment (Proposed Action and Alternative Stream Routing Alternatives)



2.5 Alternatives to Address the Loss of Access

To address the loss of public access from temporarily closing NFS Road 134, Itafos would be required to build a new public road to maintain access. Two alternatives were developed to permanently move portions of NFS Road 134 away from mining operations and maintain public and tribal access during mining operation. Two different alignments are considered.

2.5.1 Alternative Access 1

Alternative Access 1 was developed to address the significant issue of the loss of public and tribal access caused by the mine's use of the existing NFS Road134 for a haul road (Section 2.4.1.1). In following the 2003 RFP Forest-Wide Roads Analysis, the USFS requested alternatives to reroute NFS Road 134 that would eliminate Itafos from having to reestablish the old road following mining. The alternative includes a 12-foot-wide new road from existing NSF Road 134 approximately 1.5 miles west of Diamond Creek Road, following the Simplot Slurry Pipeline Right-of-Way then heading north on the east side of Dry Ridge then east of the Maybe Mine area, crossing NFS Road 354 then down the west side near Maybe Creek, merging with NFS Road 611 approximately 1 mile east of the Dry Valley Road, as shown on **Figure 15**. The Alternative Access Road 1 would be 7.6 miles, of which 5.8 miles would be new construction and 1.8 miles would be constructed adjacent to the existing slurry pipeline corridor. The new route would entail 6.1 miles of new road construction between Dry Valley and Diamond Creek, and approximately 1.5 miles of new disturbance adjacent to the slurry pipeline from Diamond Creek to where the new road would begin. Approximately 18 acres of new disturbance and 4 acres of previously disturbed areas would be included in the road construction area for the road. NFS Roads 134 and 193 would be fully decommissioned in the disturbance footprint (mining area). The new alignment would rejoin the existing NFS Road 134 immediately to the south of where the existing road does cross the Cross Valley Fill.

An option for this road would use the same alignment but construct a 50-inch-wide all-terrain vehicle (ATV) trail (ATV Options) motorized trail. Instead of constructing a new road adjacent to the slurry pipeline road, the ATV trail would be within the slurry pipeline right-of-way. Gates would be installed at two locations where larger vehicle access would end and a small parking area would be developed near each gate. The gates would restrict access of the trail to ATVs and pedestrians/equestrian only (but would retain access for administrative access). This option would result in an overall disturbance area of approximately 3 acres of new construction and 2 acres of previously disturbed area (Arcadis, 2021c). The ATV trail including administrative access would become a permanent route on the Caribou National Forest Travel Plan.

Upon completion of the new road or motorized trail alignment, the existing NFS Road 134 would be fully decommissioned to USFS standards as part of mining operations. Reclaimed surface slopes would be approximately 3:1 or shallower. On **Figure 15**, NFS Road 134 will be fully decommissioned from Reference Point A to Reference Point C. The guidance for decommissioning comes from FSM 7734 (USFS, 2019; USFS, 1996) with an objective (FSM 7734.02) to stabilize, restore, and revegetate unneeded roads to a more natural state to protect and enhance NFS lands. FSM 7734.1 describes the various treatments to decommission a road by reestablishing vegetation and, if necessary, initiating restoration of ecological processes interrupted or adversely impacted by the unneeded road. Decommissioning includes applying various treatments, including one or more of the following:

1) Reestablishing former drainage patterns, stabilizing slopes, and restoring vegetation;

2) Blocking the entrance to a road or installing water bars;
3) Removing culverts, reestablishing drainages, removing unstable fills, pulling back road shoulders, and scattering slash on the roadbed;
4) Completely eliminating the roadbed by restoring natural contours and slopes; and
5) Other methods designed to meet the specific conditions associated with the unneeded road.

This FSM direction for decommissioning is used in concert with 2003 RFP direction and other pertinent laws and regulations such as Clean Water Act and Executive Orders to restore ecological processes (USFS, 2012b).

Where roads to be decommissioned are located in RFP AIZ Management Prescription 2.8.3 (including stream and wetland), and/or along an IDEQ 303(d)[6] listed impaired waterbody, the road would be fully or partially eliminated by restoration of the natural contours and slope along with re-establishing former drainage patterns, stabilizing slopes, and restoring vegetation (full recontour). This would also include decompaction of the road surface before recontouring, removing culverts, stream crossing, and scattering slash on the reclaimed surface. Outside of these areas, restriction of future motorized access, restoring hydrologic conditions, restoring soil productivity and natural vegetative conditions, are the objectives to be achieved in road decommissioning. Road decommissioning in these areas would consist of removing culverts, reestablishing drainage, removing unstable fills, decompaction of the road surface, pulling back the road shoulder, and scattering slash on the reclaimed surface. This treatment would be considered a full recontour where existing cut and fill materials are available and partial recontour where road material may have been lost.

2.5.2 Alternative Access 2

Alternative Access 2 was developed to address the significant issue of the loss of public and tribal access caused by the use of the existing NFS Road 134 for a haul road (Section 2.4.1.1), but also addresses concerns that the Alternative Access 1 would be adjacent to the Cross-Valley Fill CERCLA site and concerns about the potential risk to the slurry pipeline (Fuell, 2022).

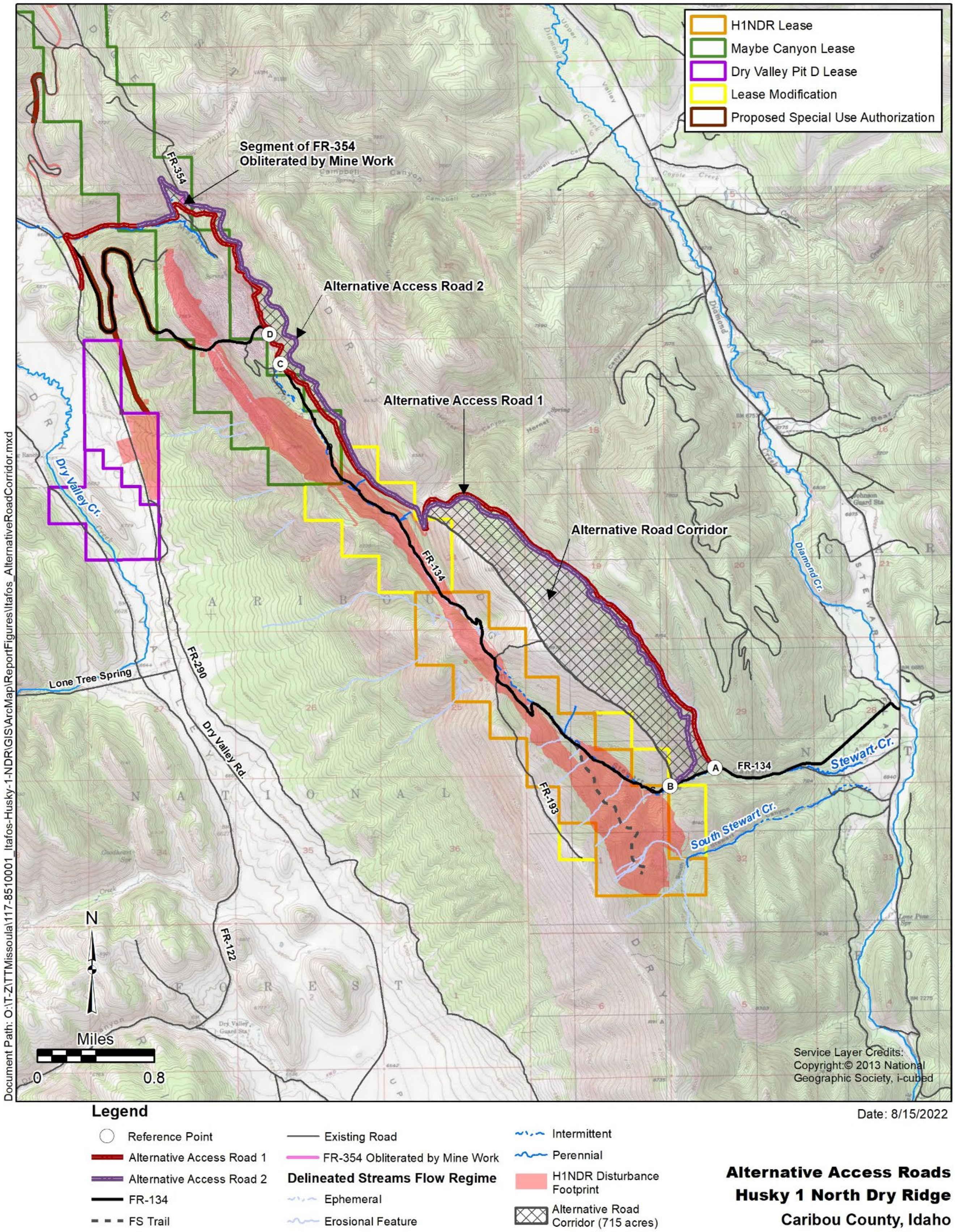
The alternative would also avoid using the slurry pipeline right- of- way as a road due to concerns of potential damage by vandalism or road maintenance equipment. A rupture of the slurry pipeline could cause significant environmental impacts.

While the existing NFS Road 134 crosses the Cross-Valley Fill and existed prior to the CERCLA remediation work that occurred in 2017 to 2018, the USFS wants to take the opportunity to move the road off the Cross-Valley Fill to reduce potential damage from vandalism. Previous remediation was completed at the expense of millions of dollars paid for by private corporations and taxpayers.

An initial analysis determined effects (length, area, resource impacts described in Chapter 3) on the alignment shown on **Figure 15**. Future refinements to the location within the hatched area would be reviewed to minimize resource impacts. With USFS oversight, a new permanent alignment meeting USFS standards for NFS Roads within the hatched area shown on **Figure 15** would be field verified that incorporates the EPMs (Section 2.5.2.1). This route would be entirely new construction,

6 Section 303(d) of the Clean Water Act requires states and tribes to identify and prioritize water bodies that do not meet water quality standards through Idaho's Integrated Report.

Figure 15. Alternative Access 1 and Alternative Access 2



approximately 7.3 miles and 55 acres of new disturbance. The alternative includes a 16-foot-wide new from NFS Road 134 near the slurry pipeline as shown on **Figure 15**, along the east side of Dry Ridge then through the Maybe Mine area, crossing Dry Ridge where the road would cross NFS Road 354 then down the west side near Maybe Creek and tying with the Dry Valley Road, as shown on **Figure 15**. This route would be within the corridor shown on **Figure 15**. There would not be an ATV trail option considered, such as described in Alternative Access 1.

Upon completion of the new road alignment, the existing NFS Road 134 would be fully decommissioned to USFS standards as part of mining operations as described in Alternative Access 1. On **Figure 15**, NFS Road 134 will be fully decommissioned from Reference Point B to Reference Point D.

2.5.2.1 Environmental Protection Measures Specific to Alternative Access 2

- Cultural Resources – the new road location would avoid National Register of Historic Places (NRHP)-eligible sites. Once the road location and disturbance area are identified in the field, the area would be surveyed by the proponent per the same protocols used for the EIS.
- Livestock Grazing – Range improvements would be avoided or mitigated, such as described in Section 2.2.9.17.
- Surface Water and Wetlands – jurisdictional wetlands and other waters will be avoided. If the road and its disturbance area occur in an area that has not been surveyed, a survey would be completed and a reroute done as needed to avoid the wetlands and jurisdictional water.
- Visual Quality – The road location will consider whether the road would be visible from viewpoints 1, 5, 6, 7, 8, and 18 as shown on **Figure 15**, and attempt to avoid locating the road where cuts would be visible.

2.6 Alternative Sequence

This alternative was added at the Proponent's request to analyze an alternative mine sequence from that specified in the Proposed Action and described in **Table 5** (Arcadis, 2022) to provide additional flexibility in sequencing of the mining. The Proponent presented this new alternative after the publishing of the DEIS. This alternative would modify the original mining sequence to begin mining the NDR first, and then, H1. The modification would have mining begin in phases 10, 11 and 12 for approximately 3 years as listed in **Table 5** followed by phases 1 through 9 with each of those latter phases delayed by approximately 3 years compared to the Proposed Action. Other aspects of the Proposed Action, such as the tons of ore mined in the individual phases would not change. Only the production year would change. The mining sequence in the Alternative Sequence would be phases 10, 11, 12, 1, 2, 3, 4, 5, 6, 7, 8, and finally, 9. The total time needed to mine and reclaim under this alternative would be the same as in the other action alternatives, including the Proposed Action.

Handling and placement of overburden described in Section 2.2.3 would be the same. The Environmental Protection Measures and Best Management Practices would be the same as described in Section 2.2.9. Reclamation and cover would be the same as described in the Proposed Action. The mitigation measures described for the Proposed Action would not change. The schedule for development of the other mine facilities including the loadout tipple and the Alternative Access would not change. The permits described in Section 1.5.1 including the Special Use Authorization in **Table 2** would not change.

2.7 Alternatives Considered but Not Studied in Detail

BLM and USFS considered public comments and potential project effects when determining what alternatives should be evaluated in this EIS. Some alternatives were suggested during scoping, but after a preliminary evaluation of their effects or benefits, it was determined that the alternatives suggested did not need to be considered in detail.

This section describes how the alternatives not studied in detail differ from the Proposed Action, the reasons for considering the alternatives, and then provides the rationale for why the alternatives were not considered in detail.

In general, alternatives to the Proposed Action may be eliminated from detailed analysis if (BLM NEPA Handbook H-1790-1):

- It is ineffective (it would not respond to the purpose and need).
- It is technically or economically infeasible (consider whether implementation of the alternative is likely given past and current practice and technology; this does not require cost-benefit analysis or speculation about an applicant's costs and profits).
- Its implementation is remote or speculative.
- It is inconsistent with the basic policy objectives for the management of the area (such as, not in conformance with the land use plan).
- It is substantially similar in design to an alternative that is analyzed.
- It would have substantially similar effects to an alternative that is analyzed.

In general, alternatives to the Proposed Action that are considered in detail should:

- Address an issue raised or the need to meet a standard, rule, management plan, or policy;
- Reduce or eliminate one or more impacts that could result from the Proposed Action;
- Be technically and economically feasible; and
- Be effective and adequately respond to the purpose and need (Section 1.4).

2.7.1 Cover Systems

2.7.1.1 Total Store-and-Release Cover

In Itafos' original MRP, they included an earthen store-and-release soil cap and cover described in Section 2.2.4. Preliminary groundwater fate and transport modeling indicated that the backfill cover in the MRP would not meet regulatory requirements for surface water due to discharge of groundwater into surface water and would be less effective than the Proposed Action. The model indicated that some of the backfilled pits would fill with water, which would eventually overtop the pit and create seeps that would allow poor quality pit water into the surface water. As the nearby streams are 303(d) listed, no measurable discharge is allowed.

2.7.1.2 Alternative 1 Cap and Cover System

Based on groundwater model assumptions and analysis methods, Itafos proposed a cap and cover system that was designed to demonstrate that an alternative could be developed that would meet Idaho water quality standards (no measurable loading of selenium to Maybe Creek) (Arcadis, 2021j). This cover system is similar to the Total Store and Release Cover (Section 2.7.1.1). The thicker chert and/or limestone layer would provide additional protection for vegetation but would not appreciably reduce impacts on surface or groundwater. It was not discussed in detail because it can be reasonably concluded that potential impacts would be greater than both the Proposed Action and the Alternative Cover. This alternative did not propose additional cover types but, rather, modified the locations and acreages of the cover types presented in the Proposed Action cover. Alternative 1 included approximately 348 acres of flexible membrane liner. Based on material characteristics, this alternative would have greater infiltration than the Proposed Action and Alternative Cover and would be less effective in protecting surface water and groundwater quality than the Proposed Action and the Alternative Cover.

2.7.2 Mining Location Alternatives

2.7.2.1 No Lease Modifications

Lease modifications are a discretionary BLM decision. This alternative would not include the proposed lease modifications and reduce surface disturbance by 126 acres.

This alternative was dismissed from detailed analysis for several reasons. The action alternatives include the lease modifications and meet all applicable requirements. Impacts on surface resources are compliant with land use direction, and reclamation of surface disturbance is predicted to meet post mining land uses. Potential water quality impacts on Maybe Creek would be minimized by the backfill design.

Without the lease modifications, the H1 pit mining and backfill would not occur and the permanent and temporary OSAs would need to be located elsewhere on lease. If not recovered with this MRP, the phosphate resource would likely be rendered un-recoverable, due mostly to the small size of the existing lease and lack of enough remaining ore to support an independent mine. Given BLM's policy to consider resource recovery along with safety and other competing land uses since the addition of the modification area does not affect compliance, the reduced recovery would unnecessarily bypass the recoverable phosphate resource, create negative economic impacts, and could lead to other areas being opened to phosphate mining sooner (Arcadis, 2021d).

Although the above supports the lease modifications, mining H1NDR may not be economically feasible without the lease modifications. Approximately 2.2 million tons of the recoverable ore in H1 pits are from the lease modifications. Practically, the project might not be feasible without the space provided for backfill by the nearby pits and on-lease area within the proposed lease modifications. Essentially, the southern portion of H1 would not be feasible to mine because there is no place else to store overburden on the leases (the permanent and temporary OSAs need approximately 104 acres, see **Table 4**).

2.7.2.2 Expand Mining to Include All Reserves in Blackfoot River Wildlife Management Area

A portion of the NDR lease (IDI-008289 (NDR) Lease8289) extends into the Blackfoot River Wildlife Management Area. Once the NDR lease is mined as described in the MRP and reclaimed, the ore within the wildlife management area would be permanently severed and likely never recovered, which is a loss of revenue to the taxpayers from royalties. The BLM has also considered that:

- Important habitat and resources in the Wildlife Management Area would be adversely affected;

- Mining this area would increase the disturbance by 15 acres;
- The structural geology at the north end of the NDR Lease indicates that mining the ore in the Wildlife Management Area be difficult and costly (Arcadis, 2021e); and
- The volume of phosphate ore in the Wildlife Management Area is small and a pit extension into this area “only added a few days’ worth of ore” (Arcadis, 2021e).

This alternative was not considered in detail because it would have disproportionate impacts compared to other alternatives considered.

2.7.2.3 Avoid Mining Below the Water Table

This alternative was suggested by the Tribes and others to prevent contamination of groundwater by not mining below the Wells aquifer water table and installing liners in any areas subject to percolation.

No mining is proposed below the water table. A separate alternative is not considered in detail because it is the Proposed Action.

2.7.2.4 Eliminate Mining on the IDI-04 (Maybe Canyon Mine Lease)

This alternative was suggested because groundwater and surface water quality has been adversely affected by past mining of the Maybe Canyon Lease in the North Maybe Mine and South Maybe Canyon Mine. The past mines are now in remediation under the CERCLA. H1NDR would recover additional ore from the Maybe Canyon Lease that remains after previous mining activity. Previous mining at the South Maybe Canyon Mine recovered only a portion of the resource, taking only the highest-grade ore at the lowest cost, which resulted in a shallow pit and phosphate ore left behind. Re-entering the existing pit footprint would recover an estimated 7.3 million wet net tons of the remaining phosphate resource. Recovering the ore remaining within the Maybe Canyon Lease would maximize ore recovery and would improve the economic viability of H1NDR. Approximately 7.3 million wet net tons of phosphate ore on the Maybe Canyon Lease would be bypassed if the Maybe Canyon Lease is not mined.

Analysis of the Proposed Action and the Alternative Cover indicate that the ore can be recovered from the Maybe Canyon Lease while maintaining compliance with regulatory requirements.

This alternative was also not considered in detail because it does not meet the purpose and need.

2.7.3 Backfilling Alternatives

2.7.3.1 Eliminate the Permanent Overburden Storage Area

This alternative is dismissed from further analysis because the OSA provides some benefits for stream reconstruction and there are no water quality, recreation, or grazing access impacts from the OSA. This alternative would not provide any reduced impacts over the Proposed Action or other action alternatives. One of the benefits is that the eastern boundary of the permanent OSA would serve as a limestone buttress to support and stabilize the Maybe Creek realignment and reduce the risk of Maybe Creek self-realigning to a less desirable location, such as across backfill.

2.7.3.2 Place High-selenium Waste "High and Dry" Below an Impermeable Cover

This alternative, suggested in public scoping, is not considered in detail because the Proposed Action would not place waste high in selenium below the water table. All overburden in the action alternatives will be above the water table. The effectiveness of the cover is evaluated, and another alternative is studied in detail that reduces infiltration to maintain surface and groundwater quality, eliminating the need to consider an alternative with an impermeable cover.

2.7.4 Reduce Resource Impacts

2.7.4.1 Avoid Significant Impacts on Historic and Traditional Cultural Properties

An alternative to avoid significant impacts on historic or traditional cultural properties is not considered in detail because neither government-to-government consultation between BLM and Tribes, staff to staff meetings between BLM and Tribes, nor surveys identified any traditional cultural properties. Surveys identified some cultural sites, but none were determined eligible for listing. No eligible sites would be disturbed.

The Tribes have not disclosed any traditional cultural properties that may be affected. An EPM was included to manage unanticipated discoveries, which is anticipated to result in no significant impact.

2.7.4.2 Avoid Roadless Area Impacts

Approximately 19 acres, including 18 acres for a permanent OSA, would be used within the Dry Ridge Inventoried Roadless Area. This alternative would be similar to the "No Lease Modifications" alternative and is not considered in detail for the same reasons. Any temporary road access to this area from the mine would be permanently obliterated by reclamation activities.

2.7.4.3 Avoid Discharges to Waters of the U.S.

An alternative was suggested to avoid discharges to waters of the U.S. for compliance with the Clean Water Act section 404(b)(1) Guidelines.

A separate alternative is not considered because the Proposed Action and other action alternatives incorporate avoiding and minimizing impacts to the extent practicable. The Proposed Action and all of the action alternatives are designed to be a zero-discharge facility.

2.7.4.4 Implement Road and Grazing Closures, Fence Removals, Noise Limits, Stream Restoration

Alternatives were suggested to include road and trail closures to attain a scientifically defensible density per square mile, grazing allotment closures, fence removals, setting noise limits on vehicles, and limit or close winter use. The suggestion was made to provide lynx, wolverine, and other far-ranging species (elk, deer) to migrate and have security cover during all seasons and protect goshawk and native plant communities.

These alternatives are dismissed because they do not meet the purpose and need and are outside the scope of a project-specific analysis. These alternatives are more appropriate for a 2003 RFP revision or amendment.

2.7.4.5 Avoid Climate Change Impacts

An alternative suggested eliminating phosphate mining, logging and "vegetation management", livestock grazing impacts on forest stands, understory conditions and aspen recruitment, and the impact that climate change and livestock grazing have on overall forest resiliency.

This alternative is dismissed because it does not meet the purpose and need and is outside the scope of a project-specific analysis. This alternative is more appropriate for a 2003 RFP revision or amendment.

2.7.4.6 Use a Conveyor for Ore Transportation Instead of Constructing a Haul Road

Construction of the haul road would eliminate public access on NFS Road 134 to NFS lands from Dry Valley to Dry Ridge and eliminate a direct route to Diamond Valley. The suggestion was made that instead of the haul road, a conveyor system could be used to transport ore to the tipple, leaving NFS Road 134 open to the public. If feasible, this alternative would also reduce haul truck use and could reduce greenhouse gas emissions associated with ore transportation. The alternative was studied as a result of the above perceived beneficial impacts.

There are two conveyor system scenarios that were evaluated to replace the haul road and subsequent interference with public access to NFS Road 134:

- Option A is a 'final mile' alternative. Haul trucks would still be utilized to transport the ore for most of the distance (i.e., from the active pit to the north end of the H1 site). The conveyor would be utilized to transport the ore the final distance to the tipple.

  The only location that the beginning of the conveyor could be built in Option A would be on the South Maybe Canyon Mine pit backfill. To create such a backfilled area, Phase 1 would have to be mined first (**Table 5**). This would mean that as ore is removed from Phase 1, the Proposed Action haul road would still have to be built to transport ore before the conveyor could be built. Option A would still require the closure of NFS Road 134 and therefore does not fulfill the need for the alternative. Option A was shown to be unsuccessful at meeting either objective of the study. A public-accessible NFS Road 134 did not result due to the belt heading's inflexible location. Also, because the conveyor head would be at the location of the mine start-up, the location would not be available until 5 years of mining was complete, which would shorten the period that the conveyor could justify its investment cost. In addition, carbon dioxide (CO_2) emissions from ore haul trucks would be reduced by no more than 28% due to the limited duration of the conveyor belts service.
- Option B would continually relocate the feed point of the conveyor as mining progressed south along the strike. The only initial location where the beginning of the conveyor could be built in this option would again be on the South Maybe Canyon Mine pit backfill. To create such a backfilled area, Phase 1 would have to be mined first (**Table 5**). This would mean that as ore is removed from Phase 1 the Proposed Action haul road would still have to be built to transport ore before the conveyor could be built. Option B would still require the closure of NFS Road 134 and, therefore, does not fulfill the need for the alternative. This is not a viable alternative given the site topography, short mine life, and low conveyor utilization (Arcadis, 2021h). Option B would have high capital costs ($25 million), inflexible design parameters, and likely availability issues in adverse weather conditions.

For these reasons, a conveyor to replace the proposed haul road would not be technically or economically practical.

2.8 Agency Preferred Alternative

The BLM has identified the Alternative Cover, including the lease modifications, along with the Alternative Stream Routing (temporary stream routing) and Alternative Sequence as its preferred alternative. The USFS has identified the Alternative Cover with its Special Use Authorizations for off-lease activities (**Table 2**) including relocating the Simplot slurry pipeline and associated amendment to the 2003 RFP. The USFS preferred alternative will also include adjustments to the grazing allotments. The USFS has identified Alternative Access 2 as the preferred alternative for public access to establish an alternative open road from Stewart Creek.

2.9 Comparison of Alternatives

Table 11 shows the key differences between key features of the alternatives studied in detail. **Table 12** compares the key impacts that distinguish the differences between the alternatives. Explanations of the effects and analysis methods used to arrive at the effects are disclosed in Chapter 3, along with some other effects that are noted, but do not differentiate between alternatives.

Table 11. Comparison of Alternative Features

Feature	Proposed Action and Alternative Sequence	Alternative Cover	Alternative Access[2]	Alternative Stream Routing
Total Acres Disturbed	1,146	1,146	Access 1 Road - 42, Access 1 ATV Trail - 14 Access 2 - 55	NA
Backfill Cover				
Earthen Store and Release (acres)	338	30		
Low permeability Clay (acres)	324	66		
Flexible Membrane Liner (acres)	22	315		
Lateral Drain (acres)	22	197		
Total Acres Covered (acres)	705	611		
Disturbed Area Acres covered[1]	725	713	Access 1 Road - 42, Access 1 ATV Trail - 14 Access 2 - 55	
Highwall Area[1]	19	68		
Highwall Linear Distance (Feet)[1]	7,430	15,960		
Existing Disturbed Area Reclaimed[1]	148	114		
Miles of Re-routed NFS Road 134	0	0	Access 1 Road - 7.6 Access 2 Road - 7.3	0
Feet of Temporary Stream Reroute	0	0	0	4,443
Feet of Permanent Relocation of Stewart Creek	4,597	4,597	0	0
Million Tons of Ore removed NDR H1	 6.2 21.3	 6.2 21.3	 6.2 21.3	 6.2 21.3

Feature	Proposed Action and Alternative Sequence	Alternative Cover	Alternative Access[2]	Alternative Stream Routing
Total	27.5	27.5	27.5	27.5

Sources: (Itafos, 2020a; Itafos, 2020c)
1 (Anderson, 2021b)
2 (Arcadis, 2021c)

2.9.1 Summary Comparison of Environmental Impacts

Table 12 shows the differences in effects between alternatives. For more explanation on how these effects were determined and what they mean, please see Chapter 3. The No Action Alternative would have no effects on any of the resources analyzed except Social and Economic Conditions and remediation, so it is not included in the table. The No Action Alternative could reduce the employment, income, revenue, and contributions to the community from Itafos, their operations, and their employees approximately 15 years earlier than the action alternatives if the Conda Plant closes. These changes would occur with any alternative after mining H1NDR is complete if other ore reserves are not found and mined and the mining and production facilities end and close.

Investigation and remediation of the Maybe Mine CERCLA site would be ongoing, as would contamination until remediation is complete. Because the Proposed Action, Alternative Cover, and Alternative Sequence reduce contaminant loading from the CERCLA site by the addition of covers on backfill, this benefit would not be realized in the No Action Alternative.

Table 12. Comparison of Environmental Impacts by Alternative

Resource/Issue	Proposed Action	Alternative Sequence	Alternative Cover	Alternative Access 1	Alternative Access 2	Alternative Stream Routing
Groundwater						
Groundwater Quality - Trace metals, including selenium, leaching into groundwater.	Groundwater modeling shows potential for selenium, manganese and sulfate to enter shallow groundwater and discharging to seeps and surface water.	Same as the Proposed Action	Groundwater modeling shows limited discharge of COPCs to shallow groundwater would not affect seeps and surface water.	No additional effect on groundwater quality.	No additional effect on groundwater quality.	Reroute would be lined where it crosses the backfill, there is little potential for water to infiltrate through the backfill and contribute concentrations of COPCs to groundwater. There is no additional effect on groundwater quality.
New mining operations effect on the timing and effectiveness of the CERCLA remediation.	No impacts to the investigation schedule are anticipated. Groundwater modeling shows that the percolation of water into the backfill would be reduced, reduce future contaminant loading from the CERCLA site.	Same as the Proposed Action	Same as the Proposed Action.	No additional effects.	No additional effects.	No additional effects.
Surface Water						
Reduction in surface water flows of streams, seeps, creeks or impacts to water rights downstream from the drawdown of groundwater.	Groundwater flow modeling shows no adverse impacts to surface water baseflows in streams. 7 Stock water rights would be lost (1 permanently) and would be replaced (Section 2.2.9.17)	Same as the Proposed Action	Same as the Proposed Action.	No additional effects.	No additional effects.	An additional short-term loss of access to the Stewart Creek stock water right.
Surface water quality effects from discharged groundwater and contaminant trace elements, including selenium, compliance with water quality standards, and relocation of the NFS Road 134.	Minor loading of selenium and other COPCs 40 years after closure in the headwaters of South Stewart Creek, East Mill Creek, and Maybe Creek. No detectible impacts to water quality would be expected in Diamond Creek or the Blackfoot River.	Same as the Proposed Action	Impacts to surface water quality would be reduced from the Proposed Action, negligible or eliminated.	Same as the Proposed Action.	Same as the Proposed Action.	Same as the Proposed Action.
Soil erosion causing sedimentation.	Negligible to minor impacts due to BMPs. Closure of NFS Road 134 could reduce sedimentation to Stewart Creek in the mine area.	Same as the Proposed Action	Same as the Proposed Action.	Reduced or eliminated sedimentation impacts from the current NFS Road 134 by eliminating close proximity to the creek.	Same as Access 1	No additional impacts.
Wetlands, Non-wetland Waters, and Riparian Vegetation						
Acres of wetlands permanently lost.	0.16	Same as the Proposed Action	Same as the Proposed Action.	No additional impacts.	No additional impacts.	No additional impacts.
Linear feet of streams (non-wetland waters) impacted and riparian vegetation permanently lost.	1,439 linear feet of perennial stream. 8,666 linear feet of intermittent stream. Permanent loss of riparian vegetation along perennial and intermittent	Same as the Proposed Action	Same as the Proposed Action.	Alternative Access 1 – additional 159 linear feet of disturbance or 27 linear feet for the ATV trail.	No additional impacts.	4,443 linear feet of new channel to reroute Stewart Creek during mine operations (Operational Realignment). Reclamation

Resource/Issue	Proposed Action	Alternative Sequence	Alternative Cover	Alternative Access 1	Alternative Access 2	Alternative Stream Routing
	segments. 5,289 linear feet of ephemeral channel segments with no riparian vegetation lost.					would return the alignment of Stewart Creek to its original location as a channel. Effects similar to the Proposed Action but the channel locations differ.
Stormwater runoff to contact wetlands and streams.	Minimal degradation of wetlands and riparian habitat from erosion and sedimentation due to design features and BMPs.	Same as the Proposed Action	Same as the Proposed Action.	Same as the Proposed Action.	Same as the Proposed Action.	Same as the Proposed Action.
Fish and Amphibians						
Miles of fish and amphibian habitat modified or removed. Miles restored by reclamation to current conditions.	0 miles of fish-bearing streams. 2.1 miles of fishless streams. 1.5 miles of Maybe Creek. 0.5 mile of upper Stewart. Creek (sections of Maybe Creek occupied by tiger salamanders). 2 ponds permanently removed (one occupied by breeding tiger salamanders). 0.17 acre of wetlands permanently removed (mitigated off site).	Same as the Proposed Action	Same as Proposed Action.	No additional impacts.	No additional impacts.	No additional impacts.
Reduction in the quantity of water in streams, and ponds.	Effects to fish habitat downstream from changes to base flow in streams would be negligible. Amphibian habitat could be reduced by the loss of water volume at the seeps.	Same as the Proposed Action	The reduction in volumes discharged from seeps to surface water would have a negligible effect on the volume of water in fish-bearing streams.	No additional impacts.	No additional impacts.	No additional impacts.
Alteration of surface water quality to a degree that fish and amphibians would be affected, including in the Blackfoot River.	Negligible increase in sedimentation with implementation of BMPs and EPMs in Surface Water Management Plan. Negligible discharge to the headwaters of Stewart Creek, East Mill Creek, and Maybe Creek downstream. Increase in selenium loading in streams above baseline conditions is expected to result in a negligible, long-term toxicity impact to aquatic life. Closing NFS Road 134 would improve water quality in downstream fish and amphibian habitat in the long term because sedimentation in Stewart Creek from the current road would be reduced once the road is reclaimed outside of AIZs.	Same as the Proposed Action	Impacts to surface water quality would be reduced compared to the Proposed Action and would be negligible. Effects to aquatic life would be negligible.	The Alternative Access 1 road would cause an additional 2.6 acres of AIZ disturbance. The Alternative Access 1 ATV trail would cause an additional 0.9 acre of AIZ disturbance.	An additional 3.4 acres of AIZ disturbance.	1.6 additional acres of AIZ disturbance.
Sensitive Fish						
Yellowstone cutthroat trout or their habitat.	May affect individuals or their habitat but	Same as the Proposed	No impact to individuals.	No additional impacts.	No additional impacts.	No additional impacts.

Resource/Issue	Proposed Action	Alternative Sequence	Alternative Cover	Alternative Access 1	Alternative Access 2	Alternative Stream Routing
	would not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species	Action	Not likely to contribute to a trend toward federal listing or cause a loss of viability to the population or species.			
Vegetation						
Acres by type of vegetation impacted by disturbance.	891 acres of vegetation. 823 forested acres. Less than 20% of the total forested acres in these watersheds. 98% of the total disturbance would be reclaimed.	Same as the Proposed Action	Same as the Proposed Action, except 91% of the total disturbance would be reclaimed.	42 additional acres of vegetation removed for the Alternative Access 1, 55 acres for Alternative Access 2.	55 additional acres of vegetation removed	14 acres of vegetation in addition to vegetation removed under the Proposed Action.
Suitable timber acres. designated in the 2003 RFP.	294 acres of suitable timberlands resulting in a 0.35% reduction in forest wide suitable timber acres and allowable sale quantity.	Same as the Proposed Action	Same as the Proposed Action	22 additional acres of suitable timberlands,	2 additional acres of suitable timberlands.	No additional impact.
Acres of change by vegetation type and forest community structure change following reclamation.	823 acres of forest permanently changed to grassland/shrubland (72% of the analysis area). 285 previously disturbed acres would be converted to a grassland or grassland/shrubland mix, an improvement over existing condition.	Same as the Proposed Action	Same as the Proposed Action.	22 acres of forested vegetation type permanently changed to grassland/shrubland in addition to the Proposed Action (75% of the analysis area) for the Alternative Access 1, 34 acres for Alternative Access 2. Acres of previously disturbed acres converted to a grassland or grassland/shrubland mix would be the same as the Proposed Action.	34 acres of forested vegetation type permanently changed to grassland/shrubland in addition to the Proposed Action (75% of the analysis area). Acres of previously disturbed acres converted to a grassland or grassland/shrubland mix would be the same as the Proposed Action.	5 additional acres of forest changed to grassland/shrubland.
Acres of old-growth forest removed, and long-term change in old-growth characteristics.	2.4 acres of Stand D would result in the stand no longer meeting the R4 definition of the minimum area to be identified as old-growth (10 acres). The impact to old-growth is considered minor, though the extent of the Douglas-fir stand would be reduced, but the entire stand would not be removed.	Same as the Proposed Action	Same as the Proposed Action	Effects on forest stand structure and old-growth forest would be similar to those of the Proposed Action. The additional acres of forested type removed would not result in a detectible difference from effects under the Proposed Action.	Same as Access 1	Effects on forest stand structure and old-growth forest would be similar to those of the Proposed Action. The additional acres of forested type removed would not result in a detectible difference from effects under the Proposed Action.
Acres susceptible to the invasion or spread of noxious weeds and timeframe for a higher risk of invasion or spread and effects on native plant communities.	All areas of disturbance would be susceptible to weed invasion and spread. The potential for spread and invasion would be minimized with proposed control efforts through reclamation.	Same as the Proposed Action	Same as the Proposed Action	Same as the Proposed Action.	Same as the Proposed Action.	Same as the Proposed Action.

Resource/Issue	Proposed Action	Alternative Sequence	Alternative Cover	Alternative Access 1	Alternative Access 2	Alternative Stream Routing
Wildlife, Including Threatened, Endangered, and Sensitive						
Wildlife habitat that would be lost or permanently altered, including loss of mature forest habitat.	890 acres of wildlife habitat removed, 98% would be reclaimed to the existing use of wildlife habitat. Species that use grasslands and grass-shrub mix may benefit from the additional habitat that would exist post-reclamation. Some pit walls would remain and may be beneficial if it is suitable roosting habitat for bats and nesting habitat for cliff-nesting birds. 823 acres of mature forest habitat would be permanently lost (72% of the analysis area) and therefore would permanently reduce the number and diversity of forest wildlife species that can inhabit the analysis area.	Same as the Proposed Action	Habitat types removed and reclaimed would be similar under the Alternative Cover, but with 49 additional acres (total of 68 acres) of pit highwalls left exposed. 92% would be reclaimed. Additional highwalls could provide more habitat for species that use cliff habitat (certain raptor and bat species). The acres of habitat reclaimed would be reduced to 611 acres from the 705 acres in the Proposed Action. Effects on wildlife from changes to habitat would be similar to the Proposed Action.	An additional 42 acres of wildlife habitat, including coniferous forest, aspen forest, mixed aspen-forest, mountain brush, and grass/forb permanently removed in addition to the Proposed Action or 14 for the ATV trail. Construction of the new Alternative Access would permanently shift this disturbance to a different location as the old road (portions of NFS Road 134) would be removed by mining.	An additional 55 acres of wildlife habitat, including coniferous forest, aspen forest, mixed aspen-forest, mountain brush, and grass/forb permanently removed in addition to the Proposed Action. Construction of the new Alternative Access would permanently shift this disturbance to a different location as the old road (portions of NFS Road 134) would be removed by mining.	An additional 5 acres of habitat (coniferous forest and mixed aspen-conifer forest) in addition to the Proposed Action would be temporarily removed. The post-reclamation condition of wildlife habitat and riparian function would be the same as that expected under the Proposed Action. However, the stream restoration would occur at a different location (i.e., back to Stewart Creek's original location) compared to the Proposed Action.
Risk to wildlife from selenium toxicity, due to reclaimed vegetation selenium uptake or selenium contamination of wildlife water sources.	Wildlife exposure to selenium in overburden or fugitive dust during mining would be limited through use of BMPs. The risk of selenium toxicity in wildlife foraging in reclaimed areas would be negligible because an agency-approved seed mix (low selenium accumulating and shallow rooted species) would be used, and vegetation monitoring would ensure selenium concentrations are below BLM performance standards. The greatest potential for wildlife selenium exposure is from water sources. Selenium levels in wildlife could increase above current levels but are not expected to have measurable effects to survival or reproduction.	Same as the Proposed Action	Surface water would not be contaminated by selenium because groundwater daylighting downstream of the pits would be reduced to negligible amounts (within the measure of error in the groundwater flow model) and therefore selenium concentrations released into streams would be none to negligible (below the limits of detection), and never above IDEQ aquatic life criteria. The risk of wildlife selenium toxicity would be negligible.	No additional impact.	No additional impact.	No additional impact.
Threatened and Endangered Species	May affect individual Canada lynx but not populations or critical habitat.		Same as the Proposed Action.	Additional habitat loss as summarized above.	Additional habitat loss as summarized above.	No additional impact.
Sensitive Species	May affect individuals and habitat but would not likely contribute to a trend towards federal listing or cause a loss of viability in the population or species.	Same as the Proposed Action	Same as the Proposed Action.	Additional habitat loss as summarized above.	Additional habitat loss as summarized above.	No additional impact.

Resource/Issue	Proposed Action	Alternative Sequence	Alternative Cover	Alternative Access 1	Alternative Access 2	Alternative Stream Routing
Mule deer and elk that would be affected by habitat loss or alteration and from mining noise/disturbance/human activities.	890 acres of big game habitat removed, of which 1.48 acres is Prescription 2.7.2(d) areas (Elk and Deer Winter Range). Reclamation would return some shrub habitat over the long term, mining noise/disturbance would be temporary, and substantial areas of aspen and mountain shrub would remain intact on the west slopes of Dry Ridge; the effect would be moderate and localized to Dry Ridge. Given that mule deer numbers in game management unit 76 are currently declining, adding effects from H1NDR would have a moderate adverse effect to the overall mule deer population. The elk numbers are stable to increasing and therefore more resilient but given the level and long-term nature of the impact, H1NDR would have a moderate adverse effect on the elk population in game management unit 76.	Same as the Proposed Action	Same as the Proposed Action.	Additional habitat loss as summarized above and would remove 7.5 acres of Prescription 2.7.2(d) (Elk Deer Winter Range)	Additional habitat loss as summarized above and would remove 15.4 acres of Prescription 2.7.2(d) (Elk Deer Winter Range)	Same as the Proposed Action.
Migratory birds that would be affected by habitat loss or alteration, and mining noise/disturbance/human activities.	Overall, due to minor effects from disturbance and selenium, measures to reduce the likelihood of mortality, and the permanent removal of mature forest habitat in a small area, the Proposed Action would have a moderate effect on birds.	Same as the Proposed Action	Same as the Proposed Action.	Additional habitat loss as summarized above.	Additional habitat loss as summarized above.	No additional impacts.
Soils						
Acres of soil disturbed.	1,076	Same as the Proposed Action	Same as the Proposed Action.	42 additional acres of soil disturbance for the Alternative Access 1 road and 14 additional acres for the Alternative Access 1 ATV trail	55 additional acres for Alternative Access 2	5 additional acres of soil disturbance.
Potential for trace elements to be mobilized from stockpiles to contaminate on-site or adjacent soil resources.	Soil trace element total concentrations would be unaffected by soil handling operations. Trace element mobility would also be unaffected as the existing near-surface soil is currently subjected to the same atmospheric weathering processes as the resulting growth media placed for reclamation. Excavation would not cause a change in the oxidation state of trace element-containing minerals and subsequent increases in trace element mobility.	Same as the Proposed Action	Same as the Proposed Action.	No additional potential.	No additional potential.	No additional potential.

Resource/Issue	Proposed Action	Alternative Sequence	Alternative Cover	Alternative Access 1	Alternative Access 2	Alternative Stream Routing
Soil available to meet reclamation requirements.	Soil available is sufficient to meet reclamation requirements.	Same as the Proposed Action	Same as the Proposed Action.	Same as the Proposed Action with an additional 150,549 cubic yards of soil available for salvage from areas of soil mapped within the 42 acres of new disturbance within Alternative Access 1 road.	Same as the Proposed Action with an additional 21,086 cubic yards of additional soil would be available from the 55 acres of disturbance for Alternative Access 2.	Same as the Proposed Action with an additional 8,357 cubic yards of soil available for salvage from areas of soil mapped within the Alternative Stream Routing.
Grazing						
Acres of change in suitable rangeland.	Kendall Canyon: 101 acres lost in Phase 10-12 Maybe Canyon in Phase 1: 109 acres lost Stewart Canyon in Phase 6 - Phase 9: 105 acres lost Dry Valley Unit 11 - 39 acres lost Dry Valley Unit 12: 191 acres lost	Same as the Proposed Action. Note that Phase 10-12 would occur at the beginning of mining in the Alternative Sequence, compared to the end of mining in the Proposed Action. Phases 1 through 9 would occur later in the Alternative Sequence than the Proposed Action.	Kendall Canyon: Same as the Proposed Action. Maybe Canyon: Same as the Proposed Action. Stewart Canyon: Same as the Proposed Action. Dry Valley Unit 11 and Unit 12: Same as the Proposed Action.	Kendall Canyon: Same as the Proposed Action. Maybe Canyon: 25 acres, Stewart Canyon: Alternative Access 1 road – 0.4 acre Dry Valley Unit 11 and Unit 12: Same as the Proposed Action.	Kendall Canyon: Same as the Proposed Action. Maybe Canyon: 13 acres Stewart Canyon: – 0.4 acre Dry Valley Unit 11 and Unit 12: Same as the Proposed Action.	Kendall Canyon: Same as the Proposed Action. Maybe Canyon: 4 acres lost. Stewart Canyon: 0.1 acre lost short-term. Dry Valley Unit 11 and Unit 12: Same as the Proposed Action.
Estimated reduction in head months.						
Kendall Canyon	187 head months (4.0%)	Same as the Proposed Action	Same as the Proposed Action.	No additional impacts.	No additional impacts.	No additional impacts.
Maybe Canyon	187 head months (1.8%)	Same as the Proposed Action	Same as the Proposed Action.	Alternative Access 1 road – 43 additional head months Alternative Access 1 ATV trail - 0 head months	Alternative Access 2 road - 22 additional head months	8 additional head months
Stewart Canyon	985 head months (20.8%)	Same as the Proposed Action	Same as the Proposed Action.	Alternative Access 1 road or ATV trail – 0 additional head months	Alternative Access 2 road - 1 addition head month	0 additional head months
Dry Valley Unit 11 Dry Valley Unit 12	14 head months (1.6%) 75 head months (11.2%)	Same as the Proposed Action	Same as the Proposed Action.	No additional impacts.		No additional impacts.
Areas where the mining activities split an allotment or reduce movement to or between feed or water.	Kendall Canyon allotment split from north to south. The west side of the allotment would be accessible to grazing with prior authorization to cross mine areas granted by Itafos. Ample access to feed and water on each side. Maybe Canyon allotment from northwest to southeast. Lower Maybe Pond and	Same as the Proposed Action	Same as the Proposed Action.	Although the Alternative Access 1would permanently split the Maybe Canyon allotment, it would allow uninhibited access to the eastern portion of the allotment and sheep would be afforded	Same as Alternative Access 1	The re-routing of Stewart Creek may result in a short-term loss of access to the Stewart Creek stock water right place of use within the Maybe Canyon Allotment during the construction of the

Resource/Issue	Proposed Action	Alternative Sequence	Alternative Cover	Alternative Access 1	Alternative Access 2	Alternative Stream Routing
	Schmid Ridge Trough range improvements would be lost to livestock. Very little access to water sources on the west side and ample access to water sources on the east side, ample access to feed during mining and reclamation. The Stewart Canyon allotment would not be completely bisected by the disturbance; therefore, livestock rotation may not be as difficult as for Maybe Canyon and Kendall Canyon. Ample access to feed and water Dry Valley Unit 12 split from east to west. Tipple site would isolate the northern most portion of Unit 12 and a small portion of Unit 11 east of the proposed Dry Valley Road Realignment, this area would likely become unusable during the life of the Proposed Action. With the unit split, livestock would have very little access to water sources on the north end and ample access to water sources on the southern side. Livestock would still have ample access to feed during mining and reclamation.			the same crossing privileges they currently have on NFS Road 134. Although a small portion of the Alternative Access would permanently occupy the Stewart Canyon allotment, it would allow uninhibited access to the allotment and sheep would be afforded the same crossing privileges they currently have on NFS Road 134. Therefore, the effects on the livestock rotation and access to feed and water would be the same as the Proposed Action.		operational stream bed. During construction of the alternative reclamation realignment, livestock would have access to the Stewart Creek operational realignment. The alternative reclamation realignment of Stewart Creek may result in a short-term loss of access to the Stewart Creek stock water right place of use within the Stewart Canyon Allotment during the construction of the reclaimed stream bed. Itafos would supply a supplemental water source to livestock if access to surface water sources is inhibited. Therefore, the effects on the livestock rotation and access to feed and water would be the same as the Proposed Action.
Recreation Changes in acreage available for dispersed (both motorized and non-motorized) recreation activities particularly hunting.	Acres available to the public for dispersed non-motorized recreation including hunting and winter motorized recreation (snowmobiling) would decrease by 1,130 acres. There would be no change in developed recreation acreage. NDR lease extends onto the Blackfoot River Wildlife Management Area.	Same as the Proposed Action	Same as the Proposed Action.	No additional impacts.	No additional impacts.	No additional impacts.
Access Acres of public lands closed to public use during mining and reclamation.	1,130	Same as the Proposed Action	Same as the Proposed Action.	No additional impacts.	No additional impacts.	No additional impacts.
Miles of primary access roads (NFS Road 134) closed to public use by mining and reclamation activities for about 1 year.	4.6	Same as the Proposed Action	Same as the Proposed Action.	Same as the Proposed Action, except 6.1 miles of new road constructed for the Alternative Access 1. The Alternative Access 1 ATV trail option would	Same as the Proposed Action, except and 7.6 miles of new road constructed for the Alternative Access 2	No additional impacts.

Resource/Issue	Proposed Action	Alternative Sequence	Alternative Cover	Alternative Access 1	Alternative Access 2	Alternative Stream Routing
				allow small vehicles, not large.		
Changes in the number of miles of NFS roads and trails open to motorized travel.	Miles of NFS roads and trails open to motorized travel would not change long-term. 1.2 miles of ATV Trail #138 would be closed during mining in the area and then reopened.	Same as the Proposed Action	Same as the Proposed Action.	NFS road miles would increase by 1.1 miles for the Alternative Access 1, except for the 50-inch Alternative Access 1 ATV trail option which would result in no change to NFS road mileage and an increase in motorized trail mileage of 6.1 miles.	NFS road miles would increase by 3.0 miles for the Alternative Access 2	No additional impacts.
Inventoried Roadless Area Acres of disturbance including roads and other infrastructure within a designated Inventoried Roadless Area.	Approximately 19 acres, including 18 acres for a permanent overburden stockpile, would be used within the Dry Ridge Inventoried Roadless Area.	Same as the Proposed Action	Same as the Proposed Action.	Under Alternative Access 1, road or ATV trail construction would result in 0.45 acres or 0.29 acres of disturbance, respectively, within the Schmid Peak Inventoried Roadless Area.	No additional impacts under Alternative Access 2.	No additional impacts.
Tribal Treaty Rights and Interests The Shoshone-Bannock Tribes ability to access unoccupied lands of the U.S. where they may exercise treaty-reserved rights in accordance with the terms of the Fort Bridger Treaty of 1868.						
Acres of unoccupied lands available or unavailable during mining activities and the Shoshone-Bannock Tribes ability to access these acres.	Short-term, temporary loss of access during active mine years. Permanent long-term loss of 124 acres (unreclaimed highwall and partially reclaimed haul roads) after reclamation. Minor impacts to tribal access of unoccupied lands.	Same as the Proposed Action	Same as the Same as Proposed Action but an increase in unreclaimed acres.	Short-term Alternative Access construction would guarantee there would be no loss of access for tribal members to exercise their treaty rights to hunt, fish, and gather resources within unoccupied lands outside the mine area. Long-term same as the Proposed Action.	No additional impacts.	No additional impacts.
Effects on fisheries, water, grazing rights, vegetation, wildlife, and cultural resources that are important to the Shoshone-Bannock Tribes and those effects on traditional practices. Changes in the quality and quantity of						

Resource/Issue	Proposed Action	Alternative Sequence	Alternative Cover	Alternative Access 1	Alternative Access 2	Alternative Stream Routing
valued resources on unoccupied public land including:						
Water and fish	No impacts.	Same as the Proposed Action	Same as the Proposed Action.	No additional impacts.	No additional impacts.	No additional impacts.
Grazing rights, vegetation, and wildlife	Grazing rights would not be affected. Increased acres of grassland and shrubland after reclamation and no permanent impacts to plants and animals. Alternatively, the loss of 823 acres of forest types represents a major impact on plants and animals in forested environment.	Same as the Proposed Action	Same as the Proposed Action.	No additional impacts.	No additional impacts.	No additional impacts.
Cultural resources	No impact on significant cultural resources.		Same as the Proposed Action.	No additional impacts.	No additional impacts.	No additional impacts.
Effect of these changes on the Shoshone-Bannock Tribes.	No Traditional Cultural Properties have been identified; therefore, no impacts would occur.	Same as the Proposed Action	Same as the Proposed Action.	No additional impacts.	No additional impacts.	No additional impacts.
Social and Economic Conditions						
Number of employees and wages, short-term and long-term.	239 miners	Same as the Proposed Action	Same as the Proposed Action.	No additional impacts.	No additional impacts.	No additional impacts.
Federal payments	$3.6 million in annual royalty payments	Same as the Proposed Action	Same as the Proposed Action.	No additional impacts.	No additional impacts.	No additional impacts.

Chapter 3
Affected Environment and Environmental Consequences

3.1 Introduction

This chapter discusses the existing conditions of affected resources deemed significant for evaluation, the analytical conclusion of impacts on those resources that were identified, and the analysis methods used to evaluate the impacts. After describing the existing environment for each resource, direct, indirect, and cumulative effects as define by the CEQ (40 CFR 1508) are discussed. Assumptions, definitions, and past, present, and reasonably foreseeable actions (for cumulative impacts) that were considered in the analysis of effects are described below. The analysis of effects on resources assumes the EPMs and BMPs listed in Chapter 2 (Section 2.2.9) would be implemented.

Some resources were considered and evaluated but are not discussed in detail because they would not be affected or are not necessary to understand the effects of the alternatives. These are discussed in Section 3.18 and include noise, scenery, cultural resources, threatened and endangered plants, sensitive plants and state-ranked plants, threatened and endangered fish, threatened and endangered wildlife, sensitive wildlife (some species), paleontological resources, bioaccumulation in vegetation, transportation, and geologic hazards. Per the Council on Environmental Quality (CEQ) regulations (40 CFR 1502.15), this information is summarized, consolidated, or referenced.

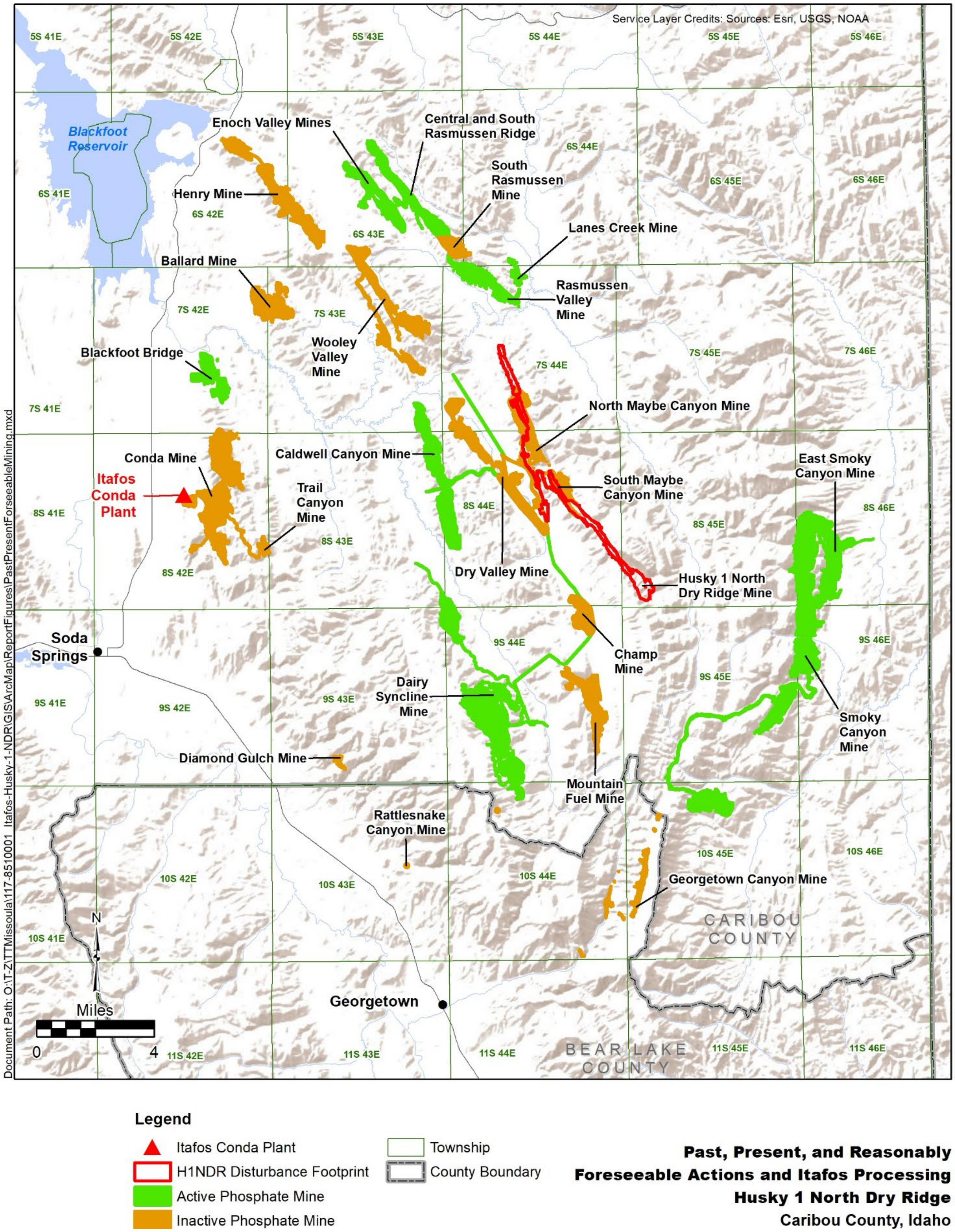
Itafos indicated that many of the H1NDR operations would be very similar to operations at the Rasmussen Valley Mine analyzed in that FEIS. The Rasmussen Valley Mine is approximately 3 miles north of the HINDR (see **Figure 16**). The BLM determined that where appropriate (including the impacts from past, present, and reasonably foreseeable actions), the *Final Environmental Impact Statement Rasmussen Valley Mine* (BLM, USFS, USACE, IDEQ, 2016) (Rasmussen Valley EIS) would be incorporated by reference. Information from the Rasmussen Valley EIS is cited and summarized where used.

Geographic Information System (GIS) data was used to calculate impacts (miles, acres, etc.) and to map activities and indicate the location of impacts. GIS is generally developed using aerial photography, global positioning systems, or some other remote sensing. Boundaries and locations are rarely surveyed. Therefore, the GIS information is useful for displaying and calculating the comparative impacts, but it is not exact and minor differences in sizes and locations are likely to occur.

In some instances, impacts are characterized qualitatively. Where used, these terms are defined as:

- No Impact: No discernible or measurable impacts.
- Negligible Impact: Impacts in the lower limit of detection of an impact that could cause an insignificant change or stress to a resource or use.
- Minor Impact: Impacts that could be detectable but would be slight.
- Moderate: Impacts that could cause some change or stress to a resource, but the impact levels are not considered major.
- Major: Impacts that could cause significant depletion, change, or stress to resources or stress within the social, cultural, and economic realm.
- Short-term: Impacts occur during mining or reclamation, then cease.

Figure 16. Past, Present, and Reasonably Foreseeable Actions and Itafos Processing



Past, Present, and Reasonably Foreseeable Actions and Itafos Processing
Husky 1 North Dry Ridge
Caribou County, Idaho

- Long-term: Impacts extend beyond reclamation activities (but could end before bond release).
- Permanent: Impacts would last into the foreseeable future, with no reasonably certain date for ending.
- Temporary: Less than 5 years after initial impacts.

As described in Section 1.9, it is important for the public, agencies, and decision makers to understand how the proposed H1NDR mine would interact with or affect the existing water quality issues stemming from the historic North and South Maybe Canyon Mine facilities. Comments on the DEIS requested additional discussion of their current impacts on both surface and groundwater quality. There were also requests for additional discussion of how the water quality cumulative effects analysis evaluated impacts from the existing historic mine facilities which are currently being addressed under the CERCLA. While the DEIS water quality conclusions did not change, additional text was added to summarize water quality data from the project record and describe the existing conditions in more detail. In addition, since historic sources would be affected by the Proposed Action and alternatives, how the existing conditions would comingle with the impacts from the Proposed Action and alternatives is further clarified. Where possible, individual historic mine facilities are discussed separately.

3.2 Past, Present, and Reasonably Foreseeable Actions Considered

When considering the cumulative impacts, other actions that had or will have similar types of impacts on the issues analyzed within the analysis areas for the resource sections below were evaluated. Examples of these are modifications of vegetation types from previous mining and reclamation, or changes seen in water quality.

Past land management activities have occurred on BLM, NFS, state, and private lands for a century or more and have contributed to the current conditions described in the affected environment sections in this chapter. These activities include mining, timber management (harvesting, site preparation, planting, salvage, and thinning), weed treatment (herbicide application), prescribed burning (for wildland fuel management, habitat improvement, site preparation), fuel break construction, mechanical fuel treatment, farming and ranching (grazing), firewood gathering, and recreation. Some activities created trails, roads, railroads, fences, power lines, mine pits, and OSAs. More is known about more recent activities, which are shown in **Table 13** and where location information is available, which are shown on **Figure 16**.

Reasonably foreseeable actions were identified as those activities which are approved, and those activities that have been proposed (such as an application submitted or included on the schedule of proposed actions) but are not yet underway. These are also shown in **Table 13**. Past mining listed in **Table 13** that have contributed to CERCLA actions are discussed in Section 3.2.1.

Table 13. Past, Present, and Reasonably Foreseeable Actions

Activity/Project Name	Period of Activity	Description
Mining – Past and Present		
Ballard Mine	1952-1969	635 acres[1]
Bear Lake Mine	1920-1921	0.1 acres[1]
Blackfoot Bridge Mine	2013-Present	420 acres

Activity/Project Name	Period of Activity	Description
Champ Mine and Champ Extension	1982-1985	460 acres
Conda Mine and Trail Canyon Mine	1920-1984	1,572 acres
Diamond Gulch Mine	1960	32 acres[1]
Dry Valley Mine	1992-2014	1,082 acres
Enoch Valley Mine	1990-Present	645 acres
Georgetown Canyon Mine	1958-1964	251 acres[1]
Henry Mine	1969-1989	1,074 acres[1]
Home Canyon Mine	1916-1924	0.8 acres[1]
Lanes Creek Mine	1978-1989; 2014 to Present	256 acres[1]
Mountain Fuel Mine	1966-1967, 1985-1993	781 acres[1]
North Maybe Mine and South Maybe Canyon Mine	1951-1995	1,028 acres[1]
Rasmussen Ridge Mine[2]	1991- 2020	858 acres[1]
Rattlesnake Canyon Mine	1920-1926	0.4 acres[1]
Smoky Canyon Mine	1982-Present	3,338 acres[1]
South Rasmussen Mine	2003-2015	390 acres[1]
Waterloo Mine	1907-1920, 1945-1960	196 acres[1]
Wooley Valley Mine	1955-1989	808 acres[1]
Rasmussen Valley Mine (Federal Lease I-05975)	2017 to 2024	An open pit phosphate mine with approximately 440 acres of planned disturbance for mining, backfilled pits, a haul road, and ancillary facilities, on private land, State of Idaho land, and public land administered by the BLM and USFS.
Caldwell Canyon and Trail Creek Exploration Plan Environmental Assessment	Completed	Exploration drilling to gather information about phosphate reserves on portions of two federal phosphate leases and three off lease areas. The Caldwell Canyon portion is complete. Trail Creek will resume into 2019.
Caldwell Canyon Mine	2019- present	Phosphate mining in open pits. 1,559 acres of disturbance. Backfilling new mine pits and part of an existing mine pit at Dry Valley Mine. New haul road, new rail loop.
Ballard Exploration and Lease	2019	Phosphate mining on previously disturbed Ballard Mine to recover ore and facilitate reclamation. No additional disturbed areas.
Dairy Syncline Mine (Federal Leases)	Ground disturbing activities approximately 2030-2060 when Smoky Canyon Mine depleted	Phosphate mining in open pits, beneficiation plant, tailings pond, and facilities on private land, State of Idaho land, and public land administered by the BLM and USFS. Approximately 2,767 acres would be disturbed.
East Smoky Panel Mine EIS (Federal I-26843, I-012890, and I-015259)	Ground disturbing activities approximately 2023-2036 (12 years)	Phosphate mine expansion plan and associated projects and infrastructure at the existing J.R. Simplot Company's Smoky Canyon Mine. 720 acres of new disturbance.

Activity/Project Name	Period of Activity	Description
Other – Past and Present		
Flat Valley Road Stream Crossing Improvements on Lanes Creek and Brown Canyon Creek	2016	The project focused on upgrading two undersized and problematic road stream crossings on the USFS Flat Valley Road (NFS Road 107) to restore stream/riparian function and aquatic passage in Lanes Creek.
John Wood Forest Management Project EIS	2019	Forest vegetation management activities (mechanical timber harvest and pre-commercial thinning) and road work (temporary and permanent). Johnson and Wood canyon drainages.
Lanes Creek Recreational Trail Improvements	2015	Improved 1.8 miles on ATV Trail 088 and 2.5 miles on Trail 022 by relocating and adding drainage.
Lanes Creek Restoration	2015	Upper Lane Creek restoration occurring on about 3 miles of stream on private lands.
Bayer Processing Plant in Soda Springs, Idaho	Past, Present, and Future	Operating phosphate processing plant and associated facilities including railroads.
Itafos Conda Plant	Past, Present, and Future	Operating phosphate processing plant (since 1965) and associated facilities including railroads. Itafos holds several air permits from IDEQ, available on IDEQ's website https://www.deq.idaho.gov/permits/issued-permits-and-water-quality-certifications/. Groundwater monitoring conducted for a RCRA Consent Order is reported semi-annually. Monitoring in 2021 indicated 9 percent of the wells with improved groundwater quality with stable or decreasing concentrations of metals, fluoride, sulfate, total dissolved solids, and total phosphorus, and increasing groundwater pH, 83 percent of the wells had no trend and 6 percent had an increasing trend with concentrations above MCLs, indicating degrading groundwater quality (WSP, 2022). Air quality monitoring indicate PM_{10} and SO_2 in compliance with standards
Sheep Creek [stream] Restoration	2016	Sheep Creek [stream] Restoration occurring on about 1 mile of private lands.
South Soda Sheep Allotments Environmental Assessment	2018	Livestock grazing and permit re-administration for multiple allotments on the Soda Springs Ranger District. Legal Description – Township 7 South/Township 8 South, Range 45 East, multiple sections.
Hooper Springs Transmission Line	2019	A 138/115-kilovolt Hooper Springs Substation, 24 miles of double-circuit 115-kilovolt transmission line, a connection facility to connect the new line to Lower Valley Energy's transmission system, about 0.2 miles of single-circuit 138-kilovolt transmission line between the Hooper Springs Substation and PacifiCorp's existing Threemile Knoll Substation, and ancillary facilities such as access roads. 112 to 188 acres is affected.

Activity/Project Name	Period of Activity	Description
Other – Reasonably Foreseeable		
Caribou-Targhee National Forest and Curlew National Grassland Integrated Weed Management Analysis	Decision issued August 30, 2021	Update the existing weed management strategy using an Integrated Weed Management approach.
Lanes Creek Forest Management Project	Decision issued October 7, 2021	Upper Lanes Creek watershed (170402070101). Treat 494 acres using (355 harvest and 139 tending) to address the need to restore and improve forested vegetation.
Freeman Ridge-Husky 2 Exploration	On hold	Exploration Drilling of 967 holes to gather information about phosphate reserves on portions of two federal phosphate leases and three off lease areas. Overall disturbance is 168.0 acres. Federal phosphate leases I-08194 (Freeman Ridge) and I-07942 (Husky Unit 2).

Notes:

1 Disturbed Areas (acres) (permitted or actual disturbance): Acreage does not account for current reclamation status of mine areas.

2 Consists of North Rasmussen Ridge, Central Rasmussen Ridge, and South Rasmussen Ridge mines.

3.2.1 CERCLA

Several mine sites are in or near H1NDR-produced contamination where clean-up is active and ongoing. The Maybe mines are located between the H1 and NDR pits. In addition, there are numerous other historic phosphate mine sites in the region that are also being addressed through the CERCLA. Both the Maybe Canyon Mines and the other mines are discussed in this section, but the Maybe Canyon mines are emphasized because of their proximity to the H1NDR mine features.

The Maybe mines are divided into North Maybe Mine and South Maybe Canyon Mine. North Maybe Mine and South Maybe Canyon Mine each disturbed approximately 600 acres (GAO, 2012). CERCLA actions began in 1997 for the South Maybe Canyon Mine and in 2000 for the North Maybe Mine. The lead agency for CERCLA at these mines is the USFS and the respective USFS Remedial Project Manager is included in the H1NDR NEPA Interdisciplinary Team. The Maybe Canyon mines are currently under response actions in which investigation, removal, and/or remedial actions have or are being completed. The historic mine facilities within the Maybe Canyon lease area include adit, mine pits, waste dumps, ore stockpiles, a sediment catchment and stormwater pond, railroad line, and associated facilities, and other disturbed mine land (USGS, 2001a).

The Potentially Responsible Parties at the historic mine sites are obligated by law to remediate the site as determined by the CERCLA process. These remedial actions began in 2015 and will continue through the duration of the H1NDR NEPA process; they will also continue during mining if an action alternative is selected.

Selenium contamination from the South Maybe Canyon Mine was first discovered in 1996 in Maybe Creek water and pasture plants exposed to creek water after six pastured horses presented with selenosis. Selenium is the most widespread and concentrated contaminant of concern and is the main driver related to human health risks from surface water and sediment (USFS and Millennium Science & Engineering, Inc., 2011). Selenium and several other metals, such as cadmium, chromium, nickel, vanadium, and zinc are concerns for ecological receptors - surface water, sediment, and vegetation.

The South Maybe Canyon Mine is an open pit phosphate mine with a North Pit and a South Pit separated by a land bridge and approximately 30 million cubic yards of overburden in the South Maybe Cross Valley Fill, located east of the open pits. The eastern side of the Cross Valley Fill includes a chert French drain, which allows storm water from the eastern slope and Maybe Creek to flow under the fill unimpeded. This water contains dissolved selenium leached from the overburden (USFS and Millennium Science & Engineering, Inc., 2011) and other metals are transported offsite via Maybe Creek. Selenium was also detected in shallow alluvial groundwater wells in Maybe Canyon and Dry Valley. Vegetation covering the Cross Valley Fill also indicated an uptake of selenium above background concentrations (USFS and Millennium Science & Engineering, Inc., 2011).

Actions completed in November 2017 included installation of an engineered, mostly synthetic, cover system. Arcadis (2021e) indicated that monitoring, inspection, and maintenance related to the cover has shown it effective at reducing selenium concentrations in surface water. Arcadis (2021e) indicated surface water selenium concentrations from 2016 to 2020 decreased between 88% and 97% along Maybe Creek, and decreased from 85% to 96% in alluvial groundwater wells along Maybe Creek and downgradient of the Cross Valley Fill. Other metals concentrations also decreased. Monitoring and data analysis related to the cover will continue.

The East Mill Dump at the North Maybe Mine is a significant contributor to and the primary source of surface water and groundwater contamination at this site. The 81-acre East Mill Dump is approximately 1,400 feet wide by 3,100 feet long. The East Mill Dump was constructed to maintain an original topographic divide between the northern and southern drainage slopes (Arcadis, 2021f). Approximately 58 acres on the north side of the East Mill Dump drain toward East Mill Creek, 11 acres on the south side drain toward North Fork Kendal Creek, and the remaining 11 acres form the top surface of the dump. Waste shale in the East Mill Dump releases selenium and other metals/metalloid contaminants through infiltration of precipitation. Selenium and other contaminants are present in surface soil, vegetation, surface water, sediment, and groundwater (Arcadis, 2021f). As of the writing of this FEIS a remedial action plan is in draft. The areas of East Mill Creek and Maybe Creek are also CERCLA actions and are known to contain contaminated sediments. Of note, CERCLA uses different screening values than those presented in this EIS, which results in different screening value exceedances.

The H1NDR groundwater model domain includes active and inactive mines: Maybe mines, Dry Valley Mine, and Champ Mine. Mines, active and inactive, within Caribou County located outside the groundwater model domain include (from north to south): Henry Mine, Enoch Valley Mine, Rasmussen Ridge Mine, Wooley Valley Mine, Ballard Mine, Lanes Creek Mine, Conda/Woodall Mine, Trail Canyon Mine, Smokey Canyon Mine, Mountain Fuel Mine, and Diamond Gulch Mine (USGS, 2001a) (**Figure 16**). The Wooley Valley Mine complex is three mines: Mill Canyon Mine, Little Long Valley Mine, and Blackfoot Narrow Mine (Buck & Jones, 2002, p. Figure 1).

The Southeast Idaho Phosphate Mine Site Trustee Council (2015) stated remedial actions are being conducted at many of these mines, some of which are under the CERCLA remedial investigation/feasibility study process or other agreed-upon similar remedial action activities. These efforts are being conducted by the mining companies, with oversight primarily provided by IDEQ, USFS, and EPA. Other oversight agencies include BLM and the Shoshone-Bannock Tribes. Established agreements include, but are not limited to, Administrative Order on Consent, Administrative Settlement Agreement/Order on Consent, or Unilateral Administrative Orders in effect for CERCLA Remedial Investigation/Feasibility Study work and other CERCLA response actions.

Table 14 summarizes the dates of known CERCLA actions through 2019. Mines that have established orders with one or more federal or state agency for removal actions, remedial actions under CERCLA, or related remedial action agreements with IDEQ or IDL are listed.

IDEQ currently has not established a priority date for a Total Maximum Daily Load (TMDL) to address selenium in Maybe Creek but has elected to address these exceedances under the consent order which was established for the CERCLA Remedial Investigation/Feasibility Study (IDEQ, 2020).

Table 14. Summary of CERCLA and Remedial Actions Near H1NDR

Mine and Mining Company	Agency Oversight	Removal and Remedial Action Status
Mines Under CERCLA Action Within Groundwater Model Domain		
North Maybe Mine (Inactive) NuWest	USFS, EPA, IDEQ	2000 – CERLCA Preliminary Assessment 2002 – Administrative Order of Consent 2004 – Removal action process initiated 2009 – Remedial Investigation/Feasibility Study underway, removal action initiated for sedimentation ponds[1] 2010 – Remedial action process initiated 2013 – Investigation on East Mill, Remedial Investigation/Feasibility Study[1] 2014 – Time critical removal action for Bear Lake Grazing Association property 2015-2016 – Remedial Investigation continued, screening Level Ecological risk Assessment[1] 2018 – Remedial Investigation/Feasibility Study underway[1] 2021 – Proposed plan is being drafted by the USFS
South Maybe Canyon Mine (Inactive) NuWest	USFS	1997 – CERCLA Preliminary Assessment 1998 – Administrative Order of Consent 1998 – Removal action process initiated 2007 – Site investigation report complete 2011 – Engineering Evaluation/Cost Analysis complete 2012 – Administrative Settlement Agreement and Order on Consent signed for Cross Valley Fill cap[1] 2013 – Remedial Investigation/Feasibility Study initiated 2014 – Cross Valley Fill cap design approved[1] 2015 – Cross Valley Fill cap construction[1] 2015 – 2018 – Remedial Investigation/Feasibility Study in progress[1] 2016 – Baseline ecological risk assessment began 2019 – Cross Valley Fill cap construction complete[1] Upcoming – proposed plan
Champ Mine (Inactive) NuWest	USFS, IDEQ, the Tribes	2000 – CERCLA Preliminary Assessment 2012 – Administrative Settlement Agreement and Order on Consent signed[1] 2013 – 2015 – Remedial Investigation field work[1] 2015 – 2017 – Remedial Investigation/Feasibility Study[1] 2016 – Baseline risk assessment 2018 – Remedial Investigation/Feasibility Study in progress and risk assessments are under agency review[1] Upcoming Record of Decision
Mines Under CERCLA Action Within Caribou County in General H1NDR Area		
Henry Mine	IDEQ,	2003 – Administrative Order of Consent and Removal action process

Mine and Mining Company	Agency Oversight	Removal and Remedial Action Status
(Inactive) P4/Monsanto	EPA, USFS	initiated 2004 – 2009 Investigations conducted 2009 – Remedial action process initiated 2011 – Remedial Investigation/Feasibility Study work plan completed, treatability study initiated[1] 2016 – Remedial Investigation report[1] 2018 – Remedial Investigation/Feasibility Study and proposed plan for cleanup complete[1] 2019 – Record of Decision anticipated
Enoch Valley Mine (Inactive) P4/Monsanto	IDEQ, EPA, USFS	2002 – CERCLA Preliminary Assessment 2003 – Administrative Order of Consent 2004 – 2009 Investigations conducted 2009 – Remedial action process initiated 2011 – Remedial Investigation/Feasibility Study work plan completed, treatability study initiated[1] 2017 – Remedial Investigation/Feasibility Study planned/underway[1] 2018 – Work on hold to gain progress on Henry and Ballard Mines[1] 2019 – Record of Decision anticipated
Ballard Mine (Inactive) P4/Monsanto	IDEQ, EPA, USFS	2003 – Administrative Order of Consent, removal action process initiated 2004 – 2009 - Investigations conducted 2009 – Remedial action process initiated 2011 – Remedial Investigation/FS work plan completed, treatability study initiated[1] 2014 – Remedial Investigation report complete[1] 2015 – Supplemental soil data reported, partial Feasibility Study prepared[1] 2016 – Proposed cleanup plan[1] 2017 – Remedial Investigation/Feasibility Study and proposed plan for cleanup complete[1] 2019 – Record of Decision anticipated
Conda/Woodall Mine (Inactive) Simplot	IDEQ, EPA, BLM	2008 – Administrative Order of Consent, CERLA Preliminary Assessment, Remedial Investigation/Feasibility Study 2011 – Engineering Evaluation/Cost Analysis complete, Time-critical removal action 2012 – Settlement Agreement/Consent Order, field-scale selenium pilot study completed[1] 2013 - 2014 – Draft Remedial Investigation[1] 2013 - 2015 – Non-time critical removal action of the Overburden Disposal Area[1] 2015 – 2016 – Risk Assessment[1] 2015 – Post Removal Action Site Control Plan[1] 2016 –Remedial Investigation complete[1] 2018 – Feasibility Study in progress; field-scale pilot treatability study completed[1] Upcoming – Proposed plan and Record of Decision[1]
Smokey Canyon Mine (Active mine) Simplot	USFS, EPA, IDEQ	2000 – CERCLA Preliminary Assessment 2002 – Administrative Order of Consent 2003 / 2013 – Removal action process initiated 2005 / 2013 – Site investigation report complete 2008 – Removal action to divert water from Pole Canyon Creek around

Mine and Mining Company	Agency Oversight	Removal and Remedial Action Status
		Overburden Disposal Area[1] 2013 – Administrative settlement agreement 2014 – Overburden Disposal Area non-time critical removal action, Remedial Investigation completed[1] 2012 – Engineering Evaluation/Cost Analysis complete[1] 2007 / (2015) [2] – Removal action complete 2009 – Remedial action process initiated 2015 – 2017 – Treatability studies to reduce selenium in surface water, risk assessments completed[1] 2018 – Pilot water treatment plan (Phase 2) constructed Upcoming – Feasibility Study, proposed plan[1]
Mountain Fuel Mine (Inactive mine) NuWest	USFS, IDEQ	2000 – CERLCA Preliminary Assessment 2012 – Administrative Settlement Agreement/Order of Consent 2013 – 2015 – Remedial Investigation field work initiated[1] 2015 – 2016 – Feasibility Study[1] 2016 – 2018 – Remedial Investigation in progress, risk assessments under agency review[1] Upcoming – Feasibility Study, proposed plan, Record of Decision[1]
Rasmussen Ridge Mine (Active mine) NuWest	EPA, IDEQ, IDL	2002 – CERCLA Preliminary Assessment
Mines Undergoing Other Actions or Scheduled for Remedial Investigation/Feasibility Study		
Wooley Valley Mine (Inactive) Rhodia Inc.	USFS, BLM	2000 – Preliminary Assessment
South and Central Rasmussen Ridge Mine (Active Mine) NuWest	EPA	2005 and 2006 – Notice of Violation: selenium discharge to two creeks 2013 – Consent Order: address groundwater/surface water impacts[1] 2015 and 2016 – Source characterization work and report1 2018 – Draft Remedial action plan submitted
South Rasmussen Mine P4/Monsanto	EPA IDEQ	2007 – Notice of Violation: selenium discharge from seep to a dump and creek 2012 – Consent Order signed, remedial action plan[1] 2014 – 2015 – Horseshoe Overburden Area source characterization and action plan 2016 – Investigation and monitoring, remedial construction[1] 2018 – Remedial and investigative work continued
Mines on State Land Scheduled for or that are Undergoing Other Remedial Actions		
Lanes Creek Mine (Inactive mine) Agrium / NuWest	IDL	2014 – Approved mine plan to open Lanes Creek Mine

Source: (Southeast Idaho Phosphate Mine Site Trustee Council, 2015), except where noted.
1 Information obtained from (EPA and USFS, 2012; 2014; 2016; IDEQ, EPA, and USFS, 2017; 2019)
2 (USGS, 2001b)
( ) – Indicates estimated date

3.2.2 Ongoing Processing Operations at Itafos Conda

The Conda Plant occupies 3,729 acres of private land in Caribou County (Golder, 2019, pp. 4-1). In 2018, Itafos acquired the Conda Plant from Agrium. As part of these transactions, the previous owner, NuWest Industries, a subsidiary of Nutrien, retained past historical and legacy liabilities at the Conda Plant and is subject to an Administrative Order on Consent (AOC) (under the Resource Conservation and Recovery Act (RCRA)(Docket No. RCRA-10- 2009-0186), which was entered with the USEPA in 2009 (Golder, 2019, pp. 4-9). The Conda Plant has almost a 60-year history of producing fertilizers. The plant employs about 275 people (Itafos, 2022).

As the current owner and operator, Itafos holds several air permits from IDEQ, available on IDEQ's website https://www.deq.idaho.gov/permits/issued-permits-and-water-quality-certifications/.

Past groundwater contamination from the plant was from mineral processing wastewater discharge from partially lined phosphogypsum waste stacks.

The USEPA has an ongoing national enforcement initiative directed at the phosphate fertilizer manufacturing industry from mineral processing and alleged violations of an exemption for mineral processing wastes under RCRA - the Bevill Amendment (section 3001(b)(3)(A)). Most of the facilities, including the Conda Phosphate plant, are in the process of working to resolve the alleged violations with the EPA, the US Department of Justice and the state agencies (Nutrien, 2021). Due to the number of facilities and nature of the allegations, it is uncertain when the matters for the Conda Plant, will be resolved.

Nu-West's historic environmental liabilities at the plant include resolution of the notices of violation and closure of the partially lined phosphogypsum stack F-Gyp 0 (Nutrien, 2021). Itafos does not use the legacy phosphogypsum stack (F-Gyp 0) owned by Nu-West Industries (Itafos, 2022) and would not use it for processing ore from H1NDR. Itafos uses three lined active phosphogypsum stacks at the plant (F-Gyp 1, F-Gyp 2, F-Gyp 3) to dispose of or store phosphogypsum by-product and would use these for the processing of ore from H1NDR. The three stacks were constructed and put into operational service in 2006, 2010, and 2020. These phosphogypsum stacks were designed, lined, constructed, and operated according to an operations plan with IDEQ oversight. New or lateral expansion of the existing gypsum stacks must meet the minimum design standards required in Idaho Code 39-176.

Hazardous waste generated at the Conda Plant (**Table 15**) include those materials regulated under the RCRA Subtitle C and Idaho Rules and Standards for Hazardous Waste (IDAPA 58.01.05). The plant is classified as a Large Quantity Generator per RCRA regulations. The hazardous waste generated is generally related to processing of the ore and production of phosphate fertilizer products. The waste is disposed of at off-site licensed RCRA waste treatment, storage, disposal facilities according to the particular waste disposal requirements. These waste products are not stored onsite beyond the 90 days allotted by RCRA. Disposal consists of either incineration, reuse/recycling, treatment, or landfill placement. A total of 9,219 pounds of hazardous waste was generated at the Conda Plant in 2021, as reported by Itafos pursuant to State of Idaho hazardous waste reporting regulations and RCRA. The following are the classifications of the hazardous wastes generated at the Conda Plant. These annual volumes and hazardous waste codes are typical for the Conda Plant. Where required, all hazardous waste that represent indirect impacts are permitted by the State of Idaho and/or the EPA. Under the Proposed Action and Alternatives, such waste generation would not be expected to change from current conditions and, therefore, would not have a significant impact.

Table 15.Conda Plant Hazardous Waste Permits

EPA Hazardous Waste Number	Description
D001	A solid waste identified for ignitability
D002	A solid waste identified for corrosivity
D006	Cadmium
D007	Chromium
D009	Mercury
D035	Methyl ethyl ketone
F003	Any of the following spent non-halogenated solvents: Xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol; all spent solvent mixtures/blends containing, before use, only the above spent non-halogenated solvents; and all spent solvent mixtures/blends containing, before use, one or more of the above non-halogenated solvents, and, a total of 10 percent or more (by volume) of one or more of those solvents listed in F001, F002, F004, and f005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures.

Source: (Nutrien, 2021).

3.2.2.1 Proposed Action and Alternative Cover

Ongoing operations at Conda would not have indirect or cumulative impacts on geology and minerals, wetlands, aquatic species, vegetation, wildlife soils, grazing, recreation, access, Inventoried Roadless Areas, and tribal treaty rights. Ongoing operations at Conda will have indirect or cumulative impacts on groundwater, air quality, social and economic conditions, and climate change and greenhouse gasses.

Groundwater

Groundwater monitoring conducted for a RCRA Consent Order is reported semi-annually. Monitoring in 2021 indicated 9 percent of the wells with improved groundwater quality with stable or decreasing concentrations of metals, fluoride, sulfate, total dissolved solids, and total phosphorus, and increasing groundwater pH, 83 percent of the wells had no trend and 6 percent had an increasing trend with concentrations above maximum contamination levels, indicating degrading groundwater quality (WSP, 2022).

Operations at the plant are regulated by IDEQ. Because ore would likely be hauled from H1NDR to the existing Conda Plant in Soda Springs, trends in groundwater quality at the Conda Plant as described in Section 3.2.2 would continue.

The Conda Plant is approximately 13 miles from H1NDR and in a different groundwater basin. Historic impacts from the Conda Plant to groundwater are anticipated to be addressed through a consent decree with the EPA. Itafos and its predecessor have been implementing various projects for more than a decade to address groundwater impacts from the Conda Plant. This has included installation of a synthetic liner underlying all active phosphogypsum stacks, making other infrastructure improvements in the manufacturing process, and monitoring groundwater. These efforts have significantly reduced the amount of contaminants released to groundwater. With the curtailment of the use of gypsum stack F-Gyp 0 owned by Nu-West Industries and settlement of the USEPA enforcement action, existing environmental effects to groundwater should be reduced.

Providing ore to the Conda Plant from H1NDR would extend the Plant's current operations further into the future. Prior phosphogypsum storage areas have been the source of groundwater impacts; however, the recent construction of new stacks incorporating synthetic liners are designed to prevent additional impacts to subsurface water. All continued operations, new or lateral expansion of phosphogypsum stacks are required to comply with state laws governing phosphogypsum stack designs as well as any EPA requirements contained in any consent decree for the Conda Plant related to the national enforcement initiative.

In summary, H1NDR would likely to extend the life of the Conda Plant by approximately 13 years. Impacts to groundwater associated with continued operation of the Conda Plant for an additional 13 years are expected to be consistent with what is described above. Because of new management practices and technology, the groundwater impacts associated with continued operations would be less than the legacy impacts associated with the Plant. The impacts associated with continued operation of the Conda Plant are regulated by IDEQ pursuant to RCRA, Clean Water Act, Idaho Groundwater Rule, and state phosphogypsum stack design requirements. They are indirect impacts of the Proposed Action and the action alternatives and are fully considered.

Social and Economic Conditions

Because H1NDR ore would likely be hauled to the existing Conda Plant for processing, trends in employment and income would continue. Production would remain about the same, which would maintain about the same employment and continue at similar levels through the 13 years of mine life.

Air Quality, Climate Change and Greenhouse Gasses

The Conda Plant air emissions are permitted by the IDEQ under Permit to Construct Nu. P-2010.0002 (IDEQ, 2018). Under this permit, Itafos is required to monitor emissions and report them semi-annually. Recent air quality monitoring indicates particulate matter less than 10 microns (PM_{10}) and sulfur dioxide (SO_2) are in compliance with standards.

Impacts from transporting ore from H1NDR to the Conda Plant are discuss in Section 3.16.3.1.

Because the manufacturing process and products would be the same as current operations at the Conda Plant, the character and rate of emissions would not change. Air emissions from the Conda Plant are regulated by an IDEQ Title 1 operations permit. Emissions to the air from the Conda Plant in Soda Springs include point sources generally related to processing of the ore and production of phosphate fertilizer products, as well as fugitive emissions generally related to various raw materials and product handling activities. Actual emissions to the air from the Conda Plant during 2020, as reported by Itafos pursuant to State of Idaho emission reporting regulations and Section 313 of the Emergency Planning & Community Right-to-Know Act are summarized below.

All emissions **(Table 16)** that represent indirect impacts are permitted and addressed by the State of Idaho. Under the Proposed Action and action alternatives, such emissions would not be expected to change from current levels.

Implementation of H1NDR would likely extend the life of the Conda Plant by approximately 13 years. Impacts to air quality associated with continued operation of the Conda Plant for an additional 13 years are expected to be consistent with what is described above and are not expected to considerably change from current levels. The impacts associated with continued operation of the Conda Plant are regulated by IDEQ pursuant to State of Idaho regulations. They are indirect impacts of the Proposed Action and the action alternatives and are fully considered.

Table 16. Conda Plant Emissions

Pollutant	Fugitive Sources	Point Sources	Total
Lead (pounds)	0.14	1.58	1.72
Mercury (pounds)	0.00	0.84	0.84
Ammonia (pounds)	6,667.00	5,042.00	11,709.00
Arsenic Compounds (pounds)	0.00	0.43	0.43
Barium Compounds (pounds)	0.54	7.53	8.07
Cadmium Compounds (pounds)	0.39	2.95	3.34
Chromium Compounds (pounds)	0.24	7.88	8.12
Cobalt Compounds (pounds)	0.00	0.55	0.55
Copper Compounds (pounds)	0.20	1.46	1.66
Hydrogen Fluoride (pounds)	96,248.00	4,743.70	100,991.70
Manganese Compounds (pounds)	0.00	7.25	7.25
Nickel Compounds (pounds)	0.05	8.17	8.22
Nitric Acid (pounds)	0.00	3.38	3.38
Selenium Compounds (pounds)	0.12	22.57	22.69
Sulfuric Acid (acid aerosols) (pounds)	8.60	9,435.00	9,443.60
Vanadium Compounds (pounds)	3.40	3.94	7.34
Zinc Compounds (pounds)	0.35	49.66	50.01
Greenhouse Gas as CO_2 (tons)	39,242.00	104,318.00	143,560.00
Carbon Monoxide (tons)	0.00	76.01	76.01
Nitrogen Oxides (tons)	0.00	83.48	83.48
PM_{10} (tons)	18.57	20.74	39.31
$PM_{2.5}$ (tons)	2.74	12.09	14.83
Sulfur Dioxide (tons)	0.00	424.52	424.52
Volatile Organic Compounds (tons)	0.00	2.88	2.88

Source: Itafos EPCRA 313 Report 2020, Emissions Inventory System Report 2020, and the Greenhouse Gas Reporting Program 2020.

3.2.2.2 No Action Alternative

As stated in Section 2.4.2, the Conda Plant is likely to remain open but may not stay open, depending on whether Itafos would elect to procure phosphate rock from another source other than H1NDR. For this reason, it is difficult to analyze the indirect effects of the Conda Plant from the No Action Alternative, and because Itafos could purchase ore as feed for the Conda Plant, the impacts of the operations of the Conda Plant under the No Action Alternative would likely be the same as the Proposed Action and action alternatives. In addition, the legacy issues from previous operations before Itafos obtained ownership of the plant would continue, regardless of whether H1NDR proceeds. If the plant closes, purchases from businesses that support the processing industries would be reduced and approximately 275 jobs would be lost. The reductions would be proportional to the reduction in overall phosphate processing under the No Action Alternative. Should the processing facilities close due to a lack of available phosphate, losses to businesses throughout the economy could be major.

3.2.2.3 Alternative Access 1 and 2 and Alternative Stream Routing

Alternative Access 1 and 2 would not contribute impacts to those stated for the Proposed Action, Alternative Cover, and Alternative Sequence to the impacts from ongoing Conda Plant operation.

3.3 Geology and Minerals

3.3.1 Analysis Area and Methods

The geology and minerals are affected solely by the mining; therefore, the analysis area for geology and minerals is the leases, lease modifications, and off-lease areas containing surface roads. The entire lease and lease modification areas are included to provide information to other resources near the site and to account for potential modifications to the pit boundaries during implementation. The issues for analyzing impacts on geology and minerals and their indicators are shown in **Table 17**.

Table 17. Issues and Indicators for Geology and Minerals

Issue	Analysis Method
Million tons of ore to be removed.	Predications from Itafos in MRP.
Geochemical characteristics with potential to leach COPCs.	Description of the methods and results of testing and how used in the fate and transport model based on geochemical investigation and source term calculations.

3.3.2 Affected Environment

3.3.2.1 Geologic Formations

Information for this section is summarized from the MRP. Information was obtained by Itafos and their predecessor Agrium through exploration drilling between 1969 and 2014. In all, 253 holes were drilled in NDR and 235 drill holes in H1.

Phosphate

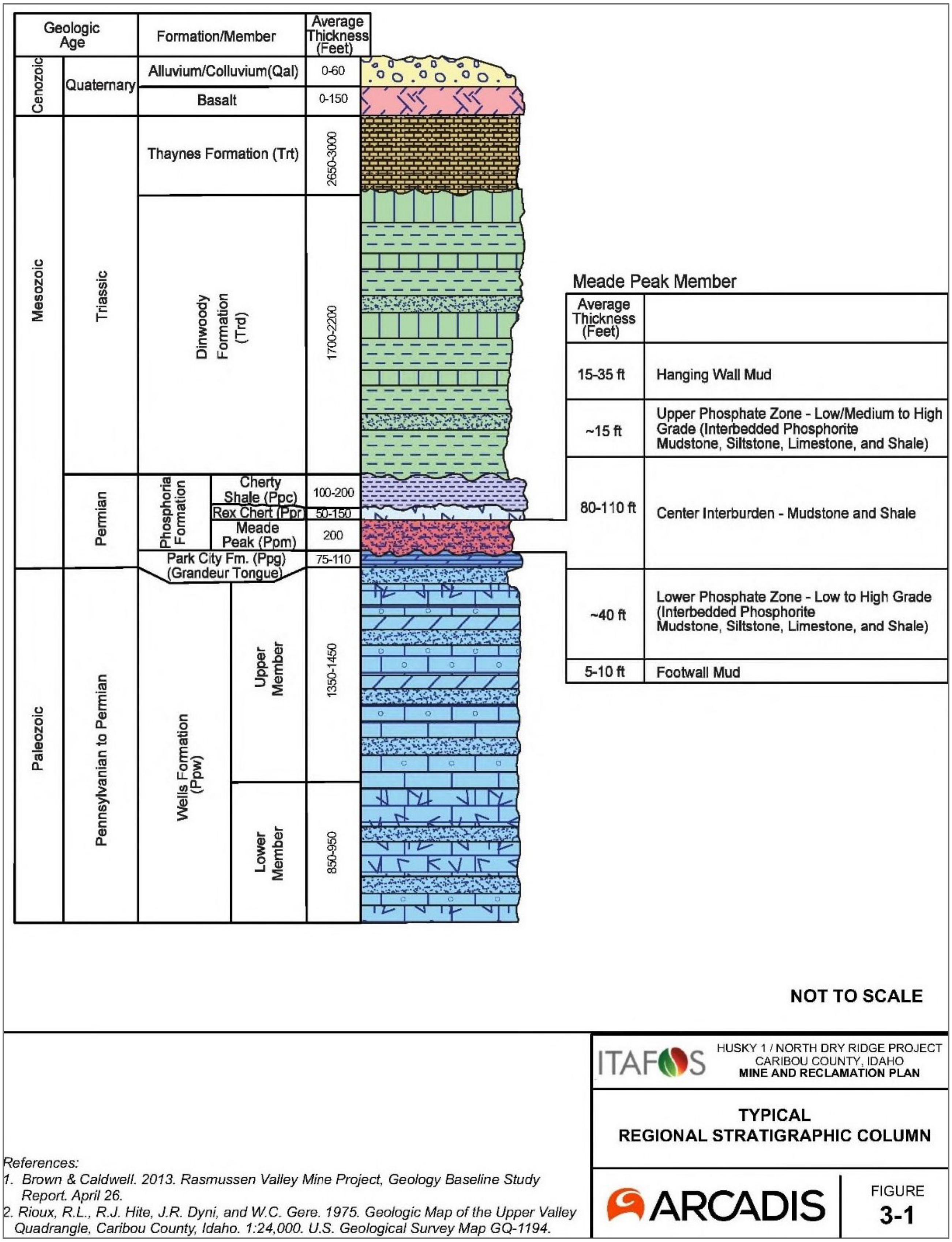
The Mineral Leasing Act, as amended, directs leasing of phosphate deposits so they can be recovered and used to fulfill regional and national demand. **Figure 17** is a graphical display of the regional stratigraphy and shows how the geologic formations generally relate to each other. Phosphate to be mined from the H1 and NDR pits is found in the Phosphoria Formation, which includes the Rex Chert Member and Meade Peak phosphatic shale. The phosphate mineralization is sedimentary, occurring in alternating phosphatic and weakly- to non-phosphatic shale, mudstone, carbonate, and chert beds. The thickness and geometry of the beds have been affected by variability during deposition and subsequently by faulting and folding.

Non-Phosphate Geologic Units

Units above the Phosphoria Formation constitute the overburden that would be removed, stored (temporarily or permanently), and backfilled into the pits. Non-phosphate-bearing geologic units occur above and below those that are phosphate-bearing. Above the Phosphoria Formation are the following:

- Alluvium/Colluvium – Unconsolidated sand, silt, and gravel in drainages and along hillsides.
- Dinwoody Formation – Thin-bedded siltstone, shale, and interbedded limestone, where surface weathering forms dense, clayey soils. Outcrops occur on the eastern slope of Dry Ridge.

Figure 17. Regional Stratigraphic Column



Source (Itafos, 2020a).

- Geologic layers below the Phosphoria Formation include the following:
  - Grandeur Tongue Member of the Park City Formation – Directly underlies the Phosphoria Formation and outcrops on the central-western portion of Dry Ridge.
  - Wells Formation – The upper layer of the Wells Formation is sandy limestone, sandstone, dolomitic limestone, and interbedded limestone and dolomite. The lower layer is thin- and medium-bedded silty limestone with cherty nodules, flattened oolites, and some interbedded sandstone. The Wells Formation outcrops along the western side of Dry Ridge. Areas below the Phosphoria Formation would not be disturbed but the Wells Formation typically hosts a regional groundwater aquifer that metals and COPCs may drain into (Arcadis, 2020a).

Structurally, the geology is characterized by thrust faulting and folding into a series of northwest- to southeast-trending folds (i.e., anticlines and synclines). Bedrock forms the eastern limb of the Dry Valley Anticline and generally dips northeastward. The Meade Peak Member is overturned at the NDR lease and is overturned in the southern portion of the H1 lease with subsidiary folding and faulting in the southern portion of the H1 Lease.

The Maybe Canyon Lease lies between the NDR and H1 leases (**Figure 18**) and was previously mined between 1951 and 1995 as part of the North Maybe Mine and South Maybe Canyon Mine.

Geochemical Characteristics

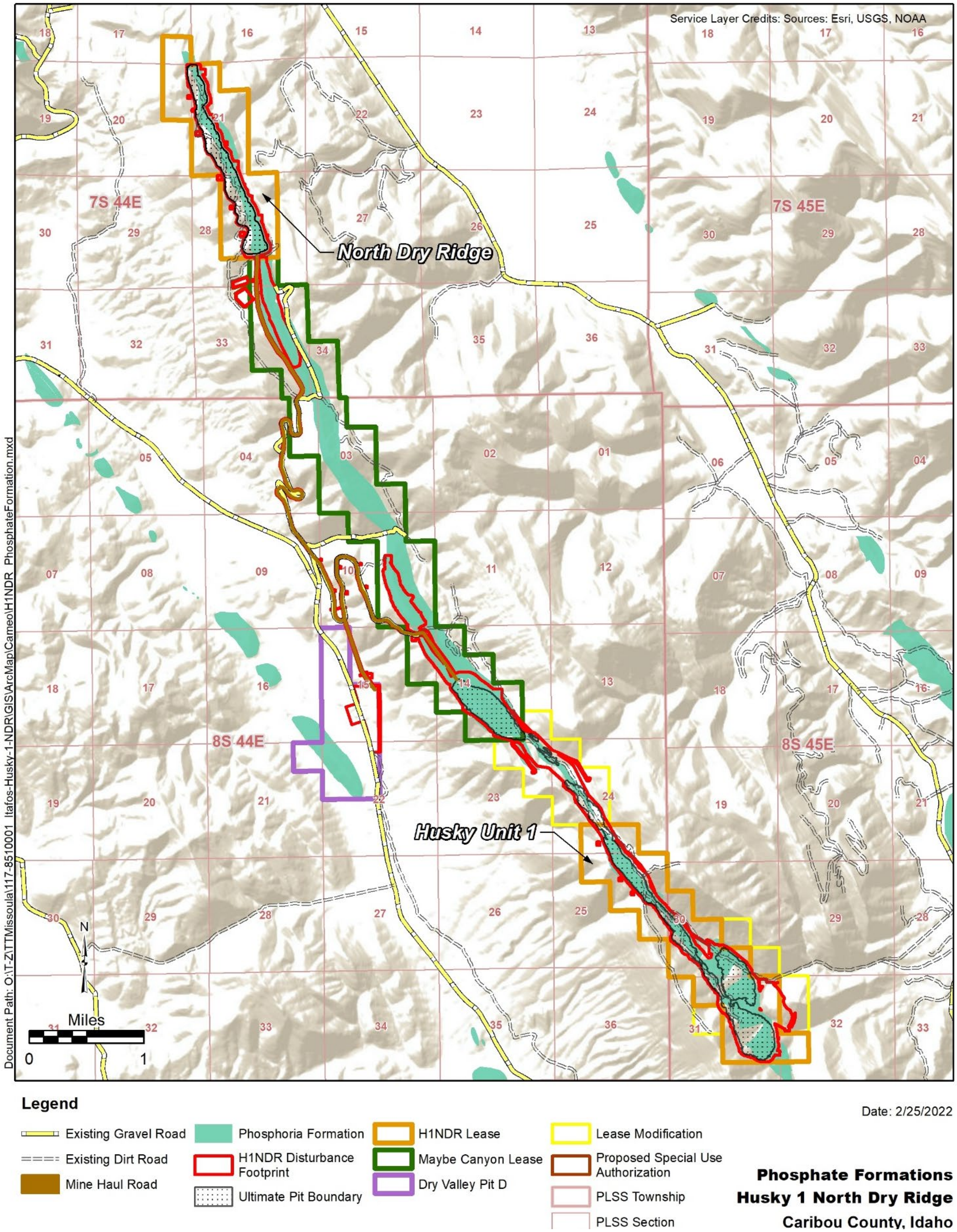
Geochemical baseline study methods and conclusions are detailed in the Final Geochemical Baseline Characterization Study Report (Arcadis, 2020a). The study characterizes the overburden materials to be mined, stored, and replaced as backfill; obtain data and information to support evaluating cap and cover designs; identify materials that might leach COPCs into surface water and groundwater; and develop concentrations of contaminants to be used in the groundwater fate and transport model. The samples included in the geochemistry baseline study are representative of materials that will be mined. They were confirmed to be from boreholes within the proposed pit boundaries, and are both laterally and vertically representative. The chemistry of groundwater aquifers in the region is generally a calcium-bicarbonate water type with neutral to slightly alkaline pH. Shallow groundwater in the alluvium tends to be highly oxic with seasonal variation in pH and major ion concentrations.

Acid rock drainage is not a concern due to overall lack of sulfide mineralogy and the abundant neutralization potential of carbonate minerals in the limestone and other geologic units.

Historically, leaching from shale exposed during mining following placement in external storage piles has resulted in the release of dissolved constituents via the dissolution of soluble minerals and organic matter (see Section 3.2.1). Selenium is of concern due to its high concentration in the shale, its leachability through dissolution reactions, and its limited attenuation downgradient of source zones under oxic conditions, which was confirmed through unsaturated H1NDR column testing (Arcadis, 2020a). Selenium concentrations are generally lower in low-oxygen environments and may be further attenuated by biological activity. Lower selenium concentrations have been observed in deep zones of saturated backfilled pits and OSAs where oxygen concentrations are low compared to shallower zones.

Other metals and oxyanions released from the shale can be attenuated by various geochemical processes, including co-precipitation with iron and manganese. Adsorption of metals to carbonate minerals can be an important protective mechanism as seen in the underlying Wells Formation. Other constituents (most notably, cadmium) can be a concern in localized environments where insufficient geochemical attenuation has occurred. Dissolved metal and oxyanion (such as arsenic) concentrations

Figure 18. Phosphoria Formation and Leases



can also be locally elevated where strongly reducing conditions are observed from either natural (e.g., wetland) or mining-related influence. A detailed discussion of selenium fate and transport under various redox conditions is in the Geochemical Baseline Study Plan (Tetra Tech, Inc., 2014a).

Geochemical evaluations indicated leachable metals from the Center Waste Shale, Hanging Wall Mud, Rex Chert, and limestone lithologies. The following COPCs were detected during geochemical testing described in the Geochemistry Baseline Study Report and Addendum (Arcadis, 2020a).

- Center Waste Shale/Hanging Wall Mud: antimony, arsenic, cadmium, iron, manganese, nickel, selenium, sulfate, thallium, total dissolved solids, uranium, and zinc.
- Rex Chert: cadmium, manganese, nickel, selenium, sulfate, total dissolved solids, uranium, and zinc.
- Limestone: cadmium, nickel, selenium, thallium, and total dissolved solids.
- Lithologies without much potential to leach COPCs include the alluvium and Dinwoody.

Manganese was elevated above the groundwater quality reference standard and remained steady through the leaching cycles in leachates from all lithologies. The limestone unit does not typically exhibit leachable COPCs in concentrations exceeding water quality limits. The presence of leachable COPCs from limestone in H1NDR is believed to be primarily due to the inclusion of samples identified as limestone during drilling, but from the transition zone between Footwall Mud and limestone lithologies based on X-ray fluorescence sampling in the geochemical program, not just pure limestone from deeper in the lithologic unit (Tetra Tech, Inc., 2014b; Tetra Tech, Inc., 2019a).

3.3.3 Environmental Consequences

3.3.3.1 Proposed Action and Action Alternatives

Ore Removed

Phosphate deposits are leased to fulfill regional and national demand. Approximately 27.5 million wet tons of phosphate ore (21.3 million tons from H1 and 6.2 million tons from NDR) would be mined over approximately 13 years. The Proposed Action and other action alternatives would mine the same amount of ore and overburden, and make the same volume of material available to potential leaching. Removal and use of the ore would deplete the deposit and would be an irretrievable (ore would not be replaced) and irreversible impact (ore will not regenerate). However, the leased phosphate resource would be used as intended, to fulfill regional and national demand for agricultural supplies. Backfilling of pits would likely eliminate opportunities for future ore recovery.

The ore measurement method described in Section 2.2.3 would ensure that an accurate volume is recorded to calculate the royalties owed by Itafos to the U.S., and to adjust the ore density, if necessary, as has been done in other mining projects.

As shown in **Table 13**, phosphate ore has been removed from the mining district since at least the 1920s. The total ore that has been removed over this period is unknown; however, it is likely that the phosphate resources in the area would eventually be depleted. The more phosphate that is recovered from each mine area, slows the rate at which new areas are developed.

Potential to Leach COPCs

It is anticipated that the pit backfill and OSA could be a source of potential leaching. Other activities such as the roads, moving the slurry pipeline, and the lined tipple area would not be sources of leached

COPCs. Concentrations of contaminants expected to be leached out of the overburden were calculated based on the geochemical testing program results (source terms) (Arcadis, 2020a). Source terms concentrations were calculated for each of the pit backfill/OSA locations, using the proportion of each lithology expected to be part of the overburden material (calculated as weighted averages of the COPC concentrations for each lithology). The source term concentrations used in the groundwater fate and transport modeling (Section 3.4) depended on the hydraulic residence time of a cycle of water within the total void space contained within the oveburden in each pit backfill/OSA (pore volume) (Arcadis, 2020b, pp. 15, Table 12). The concentrations were applied to the fate and transport model as pore volume concentrations for each pit backfill/OSA for the duration of the applicable residence time (8.9 to 20.9 years). The concentrations were reduced at the start of each pore volume timeframe until the last pore volume concentration was reached, which was used for the duration of the model simulation.

The calculation methods and results are described in detail in a memo *Source Term Results for the Husky 1/North Dry Ridge Mine Project* (Arcadis, 2020b). Source term concentrations are specified for total and dissolved selenium, whereas total concentrations are specified for all other COPCs. The dissolved selenium source terms were used in the fate and transport model. The differences between total and dissolved source terms are small. The fate and transport model report (Tetra Tech, Inc., 2022a) explains in more detail how the source term was used. **Table 18** presents the selenium source terms calculated for each pit backfill area and pore volume used in the fate and transport modeling.

Table 18. Source Term Concentrations for Each Pit Backfill and Pore Volume

Location	Pore Volumes (mg/L)				
	0.5-1	0.5-2	2	3	4
Total Selenium					
South Maybe Canyon Mine-south	1.73	0.0089	0.0065	0.0039	0.0039
South Maybe Canyon Mine-north	1.69	0.0088	0.0066	0.0045	0.0045
H1-N	2.08	0.0099	0.0072	0.0039	0.0037
H1-X	3.07	0.0131	0.0094	0.0056	0.0047
H1-L	2.85	0.0124	0.0105	0.0063	0.0051
H1-E	3.11	0.0127	0.0112	0.0066	0.0053
H1-S	3.16	0.0133	0.0109	0.0066	0.0052
North Maybe Mine	6.75	0.5966	0.0514	0.0281	0.0274
NDR	4.96	0.4206	0.0425	0.0249	0.0244
Dissolved Selenium					
South Maybe Canyon Mine-south	1.62	0.0082	0.0089	0.0032	0.0029
South Maybe Canyon Mine-north	1.57	0.0081	0.0087	0.0037	0.0035
H1-N	1.94	0.0092	0.0099	0.0032	0.0027
H1-X	2.86	0.0119	0.0132	0.0045	0.0037
H1-L	2.67	0.0113	0.0137	0.0052	0.0041
H1-E	2.91	0.0116	0.0142	0.0056	0.0043
H1-S	2.95	0.0121	0.0144	0.0054	0.0042
North Maybe Mine	7.14	0.5873	0.0516	0.0228	0.0248
NDR	5.15	0.4062	0.0429	0.0203	0.0224

ml/L = milligram per liter

Geochemical characteristics of the oveburden by each rock type are shown in Appendix B in Table B-1 and Table B-2. Results of the calculations for unsaturated conditions are shown in Table B-3.

The Alternative Stream Routing and Alternative Access 1 would not affect geology and minerals.

There would be no cumulative impacts on the geochemical characteristics with potential to leach COPCs.

3.3.3.2 No Action Alternative

Under the No Action Alternative, the phosphate resource would not be mined under this MRP nor provide resource to fulfill the regional and national demand. until such time that another MRP is submitted and approved It would remain in the ground as a future resource. The mining benefits of phosphate recovery and increasing the nation's supply of available phosphate would not be realized.

No COPCs in overburden would be leached from backfill material.

There would be no cumulative impacts on geology or geochemical characteristics from the No Action Alternative.

3.4 Groundwater

3.4.1 Analysis Area and Analysis Methods

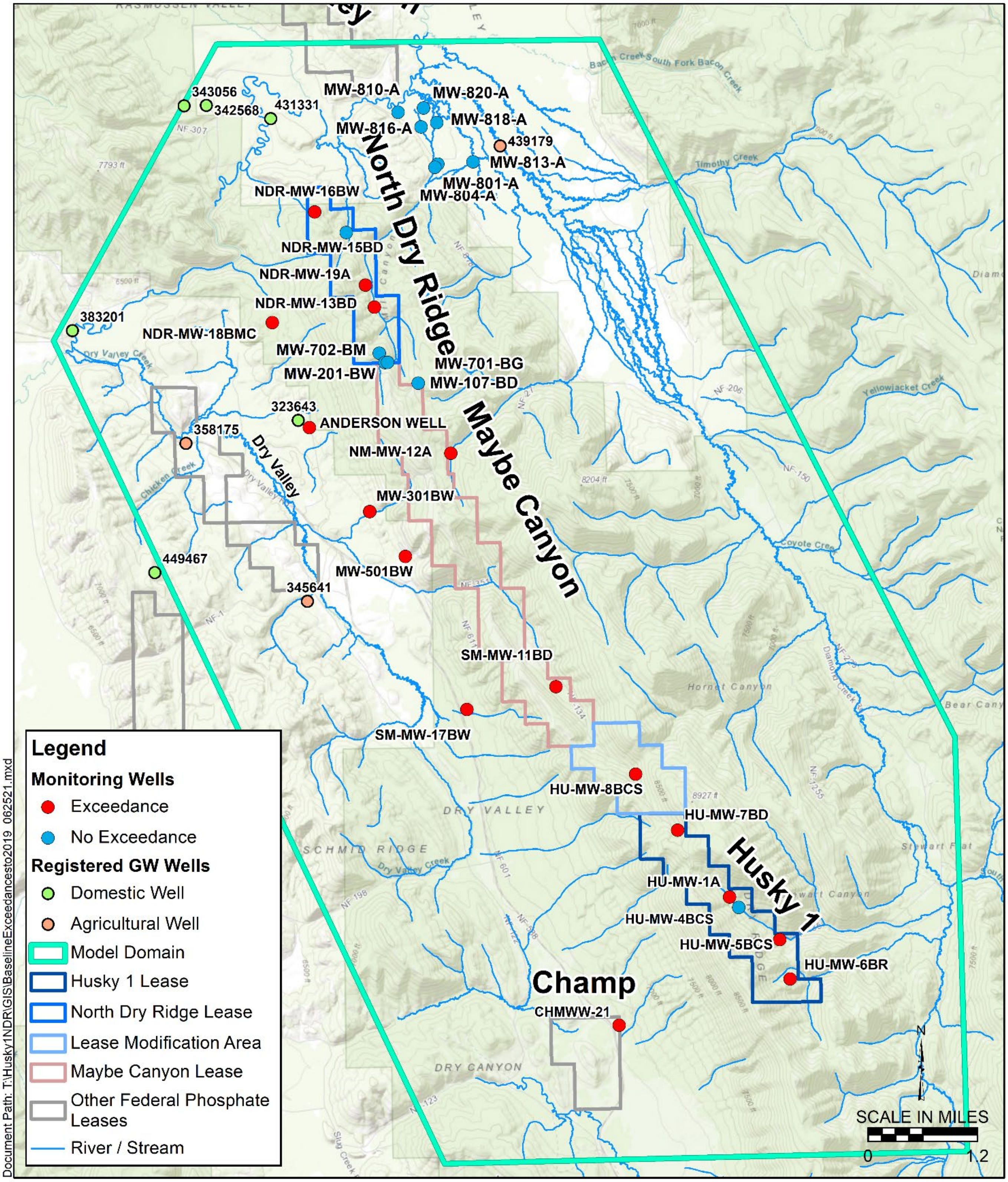
The Idaho Ground Water Quality Rule IDAPA 58.01.11 defines groundwater as "Any water of the state which occurs beneath the surface of the earth in a saturated geological formation of rock or soil." The groundwater analysis area is the groundwater model domain boundary, which was developed in the *2014 Final Groundwater Modeling Study Plan* (HydroGeo, 2014) and covers approximately 186 square miles, including Dry Valley Creek and Diamond Creek drainages. It was defined so the impacts from H1NDR on groundwater are completely encompassed by the model boundary (HydroGeo, 2014; Tetra Tech, Inc., 2019b). **Figure 19** shows the groundwater model domain boundary and the groundwater wells. **Table 19** shows the issues for analyzing impacts on groundwater and the indicators to discuss them.

Table 19. Issues and Indicators for Groundwater

Issue	Analysis Method
Groundwater Quality - Trace metals, including selenium, leaching into groundwater	Groundwater model to predict the fate and transport of COPCs in the groundwater. The trace metals will be simulated using the leachate concentrations from the geochemical baseline study for the backfill.
New mining operations effect on the timing and effectiveness of the CERCLA remediation	Groundwater model to predict changes in flows caused by the placement of backfill and cover to predict the impacts from the COPCs on groundwater where groundwater discharges are already affected by the CERCLA site.

The analysis predicts the direct effects on groundwater using a quantitative, numeric model. The analysis also considers the cumulative impacts using both a quantitative approach where mixing with existing conditions is anticipated (pits), and a qualitative approach where no mixing with existing conditions (other historic site sources) would occur. The groundwater modeling included areas where mixing was expected to occur, represented as sources of leachate loading that could affect the shallow and deep groundwater (e.g., source terms representing South Maybe Canyon Mine North and South open pits and the North Maybe Mine open pit). The groundwater model did not include source terms for other historic sites where mixing between new and historic wastes would not occur (e.g., South

Figure 19. Analysis Area and COPCs Baseline Exceedances in Monitoring Wells



Date: 6/25/2021

Model Domain and Exceedances

Husky 1 North Dry Ridge

Caribou County, Idaho

Maybe Canyon Mine Cross Valley Fill and North Maybe Mine East Mill Dump and West Ridge dumps).

The MRP would have to comply with the Idaho Groundwater Rule and no measurable load could be added to 303(d) listed streams.

The existing conditions created from the historic mine operations and facilities are also being assessed through CERCLA (see Section 3.2.1).

3.4.2 Affected Environment

3.4.2.1 Groundwater Quality

Baseline groundwater monitoring was conducted 2012 through 2019, and the results are reported in the Final Groundwater Baseline Study Report (Arcadis, 2020d). As part of the baseline groundwater monitoring, registered domestic and agricultural wells were also searched (Idaho Department of Water Resources, 2020). Most of the wells are monitoring wells for H1NDR or nearby mines. Wells for domestic or agricultural use are shown on **Figure 19**. There are no municipal wells in the study area.

The baseline geochemistry study evaluated the potential for backfill materials to leach constituents (Arcadis, 2020a). COPCs identified during the geochemical baseline study, along with the applicable groundwater standard are shown in **Table 20**. One or more groundwater samples from monitoring wells showed elevated background concentrations that exceeded primary standards for total cadmium or selenium, and/or secondary standards for iron, manganese, and total dissolved solids. Some are due to the existence of impacted groundwater from nearby inactive, historic mines (see Section 3.2.1). Some areas have a naturally elevated background level of iron and manganese.

The extent of historic plumes has not been fully investigated to the extent possible at this time. Although there is sufficient data to document exceedances and inform CERCLA actions; there is not enough data to fully define the nature and extent of all the historic impacts for use in a numeric model, nor has a source term been developed to represent the current condition. The historic sources of COPCs (e.g., South Maybe Canyon Mine Cross Valley Fill and North Maybe Mine East Mill Dump and West Ridge dumps) are not anticipated to be affected as a contaminant source by H1NDR, except within the open pits where additional material will be placed over the existing backfill. Closure of the new areas of backfill will be completed with engineered cover systems designed to limit infiltration and continued chemical contributions from the backfill material. It is not anticipated that the mining activities associated with H1NDR would adversely affect the existing plumes. for several reasons. First, mixing with historic plumes is not predicted from areas outside of the North Maybe Mine and South Maybe Canyon Mine pits because the existing sources of contaminants are hydrologically separated from H1NDR. Next, the existing groundwater data is sufficient to identify local exceedances of standards, and sources and concentrations of COPCs in these areas, and predict effects to the degree necessary to make a reasoned choice among the alternatives. In the areas of existing and new backfill within the pits, source terms have been developed for the numeric modeling to account for the combined cumulative contributions from new and historic waste.

Additionally, because CERCLA activities have been ongoing and several effective remedial actions have been completed, background conditions are not static. Since the initiation of remediation actions in 2016 at the Cross Valley Fill, associated impacts to surface water and groundwater have declined significantly (Section 3.2.1). A set of background data groundwater concentrations used in a model now would be irrelevant and would change by the time H1NDR effects appear, due to the continuing remedial actions under CERCLA. The groundwater model also does not include the naturally occurring, elevated levels or distribution of COPCs.

Table 20. Applicable Groundwater Standards for Each COPC

COPC	Groundwater Standard	Units	Source
Antimony	0.006	mg/L	Primary IDEQ
Arsenic	0.05	mg/L	Primary IDEQ
Cadmium	0.005	mg/L	Primary IDEQ
Copper	1.3	mg/L	Primary IDEQ
Iron	0.3	mg/L	Secondary IDEQ
Manganese	0.05	mg/L	Secondary IDEQ
Selenium	0.05	mg/L	Primary IDEQ
Sulfate	250	mg/L	Secondary IDEQ
Thallium	0.002	mg/L	Primary IDEQ
total dissolved solids	500	mg/L	Secondary IDEQ
Uranium	0.03	mg/L	EPA Drinking Water MCL
Zinc	5	mg/L	Secondary IDEQ

Source: (Arcadis, 2020a, p. 1/2 Table 8)

Note: In the absence of IDEQ standard for Uranium, EPA drinking water standard was used.

The most frequent exceedances were for iron, manganese, and selenium as total concentrations in unfiltered samples. **Figure 19** shows the locations of the wells with exceedances. A summary listing all exceedances in monitoring wells is shown in **Table 21**.

Table 21. Monitoring Wells and Chemicals Above IDEQ Groundwater Quality Standards

Well	Sample Date Range	Chemical Name
Anderson Well	5/7/2013 through 7/22/2014	Iron, Manganese
CHMWW-21	9/24/2013 through 10/2/2019	Manganese
HU-MW-1A	10/2/2013 through 10/4/2019	Aluminum, Iron, Manganese
HU-MW-4BCS	7/16/2012 through 10/4/2019	No chemical above IDEQ groundwater standards
HU-MW-5BCS	10/9/2012 through 10/4/2019	Manganese, Iron
HU-MW-6BR	7/18/2013	Aluminum, Cadmium, Iron, Manganese
HU-MW-7BD	11/1/2013 through 10/3/2019	Iron
HU-MW-8BCS	9/22/2013 through 10/3/201916	Selenium, Iron, Manganese
MW-301-BW	5/15/2013 through 8/27/2019	Selenium
MW-501-BW	5/15/2013 through 8/26/2019	Aluminum, Iron
NDR-MW-13BD	8/4/2013 through 10/1/2019	Selenium
NDR-MW-14BD	10/11/2012 through 10/1/2019	Total Dissolved Solids, Iron
NDR-MW-15BD	10/22/2012	No chemical above IDEQ groundwater standards
NDR-MW-16BW	7/25/2013 through 10/2/2019	Antimony, Iron, Manganese
NDR-MW-18BMC	11/15/2013 through 10/5/2019	Iron, Manganese
NDR-MW-19A	6/4/2014 through 7/17/2019	Aluminum, Iron, Manganese
NM-MW-12A	6/4/2014 through 8/21/2019	Aluminum, Iron, Manganese
SM-MW-11BD	10/16/2013 through 10/3/2019	Iron, Manganese, Total Dissolved Solids, Sulfate
SM-MW-17BW	10/28/2013 through 10/2/2019	Iron

Source: (Arcadis, 2020d, pp. 62-95; Table 3-5 and Figure 4-3 (pp. 111))

Historic Mine Facilities

Several mine sites in or near H1NDR have historically produced contamination, of which clean-up, administered by the USFS, is active and ongoing under CERCLA. Groundwater quality exceedances are from the North Maybe Mine and South Maybe Canyon Mine, and specifically, the South Maybe Cross Valley Fill and North Maybe Mine East Mill Dump (see Section 3.2.1) which are in close proximity to the H1NDR project. The USFS is currently investigating and remediated these sites under CERCLA. Site investigations and monitoring that have been conducted are summarized in **Table 14** and will continue to be conducted to define the nature and extent of groundwater impacts from past mining activities. The following sections discuss the current understanding of the South Maybe Canyon Mine and North Maybe Mine features that are the subject of the CERCLA investigations and remediation.

South Maybe Canyon Mine Open Pits

The South Maybe Canyon Mine consists of two open pits, the North pit and the South pit. Overburden was backfilled into both open pits which were revegetated at the completion of mining. The mining activities would place additional backfill over the existing backfill in both South Maybe Canyon Mine pits. The remedial investigation and feasibility study of the operable unit including the open pits has not been initiated, so there is limited groundwater data specifically for the open pit backfill.

Based on North Maybe Mine CERCLA trace element studies, isotope studies, and monitoring well data, any leachate currently being generated by the historic pits and their backfill is likely migrating downdip (to the east) at South Maybe Canyon Mine. Therefore, the backfill material present within the open pits was sampled and included in the geochemical baseline study (Arcadis, 2020d). Samples were collected from the existing backfill material and analyzed using the testing program of the geochemical baseline study to develop a source term representative of the existing backfilled material. Because the new material will be placed over the existing material, the source term developed for the South Maybe Canyon Mine open pits was combined with the source term representing the new mining backfill. The combined (existing and new) backfill source term was then applied to the groundwater model to allow for a combined impact analysis to be completed.

South Maybe Canyon Mine Cross Valley Fill

East of the South Maybe Canyon Mine open pits is the Cross Valley Fill. This feature contains 30 million cubic yards of overburden material from the historic mine that was placed in Maybe Canyon. The Cross Valley Fill facility was constructed on Dinwoody and Chert with a drain that runs along the eastern side and routes water beneath the overburden material placed in this storage facility. Based on the current understanding, the Cross Valley Fill directly affects Maybe Creek via surface discharge from the toe of the fill and affects the shallow alluvial groundwater system in the Maybe Creek drainage, down-gradient of the fill. Because the facility was constructed stratigraphy above the Meade Peak Member (which can act as an aquitard) and to the east of the open pits, impacts to deeper portions of the groundwater system would be through down dip flow toward the west.

A cover system was placed over the Cross Valley Fill in 2017. Concentrations of selenium in Maybe Creek downgradient of the Cross Valley Fill were in the range of 1.37 to 2.13 mg/L during high flow conditions (spring) and 0.72 to 1.2 mg/L during low flow conditions (fall) during cover construction (Arcadis, 2021e). Location SW-2R, which is directly downstream of the Cross Valley Fill had the highest concentrations, with locations downgradient on Maybe Creek showing lower concentrations. Since 2016, the concentration of selenium in Maybe Creek has been decreasing at the surface water monitoring locations at a similar rate at all locations. The percent decrease in selenium concentration from 2016 to 2020 during spring high-flow, ranged between 95 and 97 percent, and was a little less, between 88 and 89 percent, during low-flow. Spring locations at the base of the Cross Valley Fill also historically showed elevated selenium concentrations that exceeded water quality standards. However, since the cover placement, concentrations have decreased between 39 and 97 percent. Other COPCs (arsenic, cadmium, chromium, and vanadium) that historically exceeded water quality standards have decreased since the completion of the cover system.

Groundwater is monitored at 11 wells in the alluvial system along Maybe Creek. The wells monitor the conditions from upgradient of the Cross Valley Fill to Dry Valley. The well closest to the toe of the Cross Valley Fill has the highest concentrations of selenium, which are similar to the concentrations measured in surface water and seeps directly downgradient of the mine feature. Groundwater selenium concentrations decrease downgradient from the Cross Valley Fill similar to the surface water monitoring observations. The selenium concentrations have also continued to decrease in the alluvial groundwater system since the completion of the cover system. In close proximity to the Cross Valley Fill, concentrations have decreased between 85% and 96%. Locations furthest downgradient from the Cross Valley Fill have decreased 53% to 85% (Arcadis, 2021e). It is uncertain, but possible, that impacted water from Maybe Creek re-infiltrates, also affecting groundwater west of Dry Ridge.

North Maybe Mine Open Pits

The two primary sources of contaminant release at the North Maybe Mine are the East Mill Dump and the partially backfilled pits. For the purposes of CERCLA, the North Maybe Mine site has been divided into the West Ridge Operable Unit and East Mill Operable Unit. The East Mill Operable Unit contains the open pit, the East Mill Dump, and the Creeks Sub-Operable Units. The West Ridge Operable Unit contains the overburden disposal areas west of the open pit. Investigation of the groundwater and surface water quality was initiated in 2012. The partially backfilled pits also contribute to the baseline groundwater impacts. Based on North Maybe Mine CERCLA trace element studies, isotope studies, and monitoring well data, any leachate currently being generated by the historic pits and their backfill is likely migrating downdip to the east.

North Maybe Mine East Mill Dump

The East Mill Dump is east of the North Maybe Mine open pit. The East Mill Dump facility was constructed on Dinwoody and Chert, which is stratigraphy above the Meade Peak Member (which can act as an aquitard), thus impacts to deeper portions of the groundwater system would be through down dip flow toward the west. The East Mill Dump is known to release leachate directly into East Mill Creek and into the shallow alluvial groundwater system in the East Mill Creek drainage. It is not clear how much deeper groundwater is affected or to what degree due to the limited number of monitoring wells completed in the deeper groundwater system below the dump. Surface water monitoring of East Mill Creek downgradient of the East Mill Dump showed selenium concentrations that exceed applicable standards. Closest to the dump the concentrations are approximately 1.6 mg/L (IA1-30A), while further downgradient concentration decreases to approximately 0.15 mg/L at location IA8-TR01. Sampling in the Blackfoot River downgradient of East Mill Creek observed measurable selenium, but at concentrations below surface water quality standards.

Groundwater was sampled at six locations in the shallow alluvial and deep alluvial groundwater systems. The range of selenium concentrations observed during the 2020 sampling events ranged from 0.0071 mg/L (MW-820-A) to 0.141 mg/L (MW-801A) in the shallow alluvial wells (**Figure 19)**. Only one well exceeded the groundwater quality standards during the spring sampling event, and no wells exceeded the selenium standard in the fall. Sampling of the deep alluvial well, and a stock well completed in the deep alluvium, also found selenium concentrations below the water quality standard during the 2020 monitoring events. The monitoring well showed selenium concentrations indicative of mining impacts, and the stock well did not. Other COPCs (antimony, arsenic, manganese, uranium, and nitrate/nitrite) were observed to exceed water quality standards during groundwater monitoring.

North Maybe Mine West Ridge Dumps (West Mill Dump, South Dump, El Paso Dump, and Dumps 6, 7, and 8)

The West Ridge Operable Unit of the North Maybe Mine includes nine overburden disposal areas located on Dry Ridge and areas along the western slope of Dry Ridge and within Dry Valley. From north to south the nine dumps include West Mill Dump (includes Dump 2 and Dump 4), Dump F, Dump 5 North, Dump 5 South, Big Draw Dump, El Paso Dump, Dump 6, Dump 7, and Dump 8.

The Remedial Investigation/Feasibility Study of the West Ridge Operable Unit was completed in 2012, which included monitoring of groundwater elevation and quality, surface water flow and quality, gain/loss survey, and geotechnical investigation. The groundwater monitoring program focused on the local shallow groundwater system present in the colluvial and alluvial deposits of Dry Ridge, Maybe Creek Canyon, and Dry Valley and the deep regional Wells Formation system. The shallow groundwater monitoring network included 15 wells, but many locations were dry or had significantly lower water levels than when installed. Where groundwater was present, the groundwater flow is parallel to surface water in Maybe Creek and Dry Valley Creek. Water quality measurements from the shallow system only exceeded water quality standards for aluminum, iron, and manganese at one location, but exceeded the CERCLA risk-based levels at one or more wells for aluminum, arsenic, cadmium, cobalt, iron, manganese, selenium, thallium, uranium, and vanadium. Similarly, the surface water quality samples found antimony, arsenic, cadmium, chromium, copper, nickel, selenium, thallium, and zinc exceeded water quality standards.

The deep groundwater system is monitored using seven wells, three in the Upper Wells Formation and four wells in the Lower Wells Formation. Additionally, wells that are part of the Dry Valley Mine monitoring network are in close proximity and were used to understand the West Ridge area. In general, flow within the regional groundwater system is toward the west with localized areas of flow to the north and south. One well exceeded water quality standards for selenium and one or more wells exceeded the risk-based levels for nitrate, arsenic, selenium, thallium, uranium, and zinc.

3.4.3 Environmental Consequences

3.4.3.1 Model Uncertainty

The regional flow models used to simulate the groundwater system are limited due to the simplifications necessary to represent complex natural systems. Flow and transport model grid size and available data constrain the resolution and accuracy of the predictions. Estimations of approximate magnitudes and timing of groundwater system changes is possible with regional-scale predictive flow models. Small changes in water levels and stream flows are inherently difficult for a regional model to accurately simulate, but the predictions are useful for assessing the potential range of impacts and comparing alternatives.

Other factors affecting model uncertainty is representing an inherently fractured-bedrock system as a porous medium. In fractured systems, steep gradients, complex saturation profiles, and poorly connected fracture networks can be present, which are difficult to simulate accurately with a finite-difference, porous-medium model.

The models were constructed based on present-day conditions, but natural and anthropogenic changes should be expected over the simulation period. As predictive simulations extend further in time, the potential error from the predictions increases. These factors limit the precision and accuracy of the model. However, the results presented here represent the current best estimate of groundwater system changes. The uncertainty in these predictions was evaluated as part of a detailed sensitivity analysis (Tetra Tech, Inc., 2022a).

The groundwater model has been constructed with a modest amount of conservatism to better ensure that impacts are not under-predicted.

3.4.3.2 H1NDR Groundwater Interaction with Existing Conditions

The MRP developed by Itafos is specifically designed to avoid affecting the existing historic mine facilities that are the sources of surface and groundwater impacts. This includes the Cross-Valley Fill, the East Mill Dump, and the West Ridge dumps. The exception is the existing North Maybe Mine and South Maybe Canyon Mine pits. The existing pits were only partly backfilled and reclaimed so they are mostly open and unreclaimed. The Proposed Action and other action alternatives would backfill portions of the existing open pits and reclaim them with an infiltration-reducing cover system (varies by cover alternatives).

A key consideration in this analysis is estimating how the H1NDR project impacts would interact with existing groundwater impacts from historic mining and facilities. The groundwater analysis predicts impacts from the proposed mining activities and alternatives after development and closure of the H1NDR mine. Since the backfill from the Proposed Action and other action alternatives would co-mingle with the existing backfill (i.e., mix with), the fate and transport model includes existing overburden backfilled in the historically mined North Maybe Mine and South Maybe Canyon Mine pits as contributing to the future impacts. Like the H1NDR overburden that would be generated, samples of the existing historic North Maybe Mine and South Maybe Canyon Mine backfill were collected, geochemically characterized, column tests conducted, and the results mathematically combined with the results from the H1NDR backfill columns to develop source terms in the *Geochemical Baseline Characterization Study Report* (Arcadis, 2020a, pp. 16, Section 3.2.2) for the fate and transport modeling. The net result is an H1NDR source term that represents the leachate that results from the H1NDR backfill when placed over or combined with the historic North Maybe Mine and South Maybe Canyon Mine backfill.

Sections 3.2 and 3.2.1 describe historic mining and the current status of CERCLA actions. Also, Section 3.4.2 describes existing groundwater quality and identifies locations where water quality has already been degraded by the historic mine facilities.

The groundwater flow and transport model developed to assess the potential impacts to groundwater from H1NDR does not pre-populate the existing deep groundwater COPC concentrations with impacts derived from existing historic facilities at the North Maybe Mine and South Maybe Canyon Mine. The model sets COPC concentrations to zero as initial conditions. This procedure was performed for several reasons. First, according to the hydrologic data collected for the study area, any groundwater plumes being generated by the Cross Valley Fill and East Mill Dump would be confined to the Quaternary Alluvium and Dinwoody formations. The deep plumes generated by backfilling the North Maybe Mine and South Maybe Canyon Mine pits from H1NDR would be confined to the Wells

Formation at the North Maybe Mine and South Maybe Canyon Mine. The Dinwoody and Wells formations are separated by the Meade Peak aquitard and would prevent mixing of these two plumes.

Second, the groundwater impacts associated with the Cross Valley Fill and the East Mill Dump are poorly defined. There are four monitoring wells (MW-103-BD, MW-104-BD, MW-106-BD, and MW-107-BD) completed in the Dinwoody Formation below the East Mill Dump and one monitoring well (MW-201-BW) completed in the upper Wells Formation approximately 750 feet northwest of the East Mill Dump. There are no monitoring wells completed in the deep groundwater below the Cross Valley Fill (i.e., all of the downgradient monitoring wells are completed in the alluvium). These wells are not sufficient to define the nature and extent of the existing deep plumes beneath the North Maybe Mine and South Maybe Canyon Mine pits, Cross Valley Fill, or East Mill Dump. Subsequently, there are not sufficient data to accurately populate the groundwater flow and transport model with COPC concentrations from the historic facilities. There also are not sufficient data to back calculate or estimate possible source terms from the historic facilities. The time and expense needed to collect the necessary data would be exorbitant and would be unnecessary because the deep H1NDR plumes are not anticipated to mix with any deep historic plumes that may exist.

Third, because surface water and shallow groundwater releases have already been demonstrated, the USFS has taken actions pursuant to CERCLA (**Table 14**), including cap construction, to limit leaching at the Cross Valley Fill and is in the process of taking an action at the East Mill Dump. Existing historic impacts are in flux, currently decreasing in concentration, and may not necessarily be representative of actual field conditions at the time of agency decisions or project implementation.

Ultimately, the groundwater flow and transport model is used to predict the direct, indirect, and cumulative impacts of all dispositions of the overburden generated by the H1NDR operations. The model is used to generate potential plumes emanating from backfill in the existing North Maybe Mine and South Maybe Canyon Mine pits. The H1NDR plumes represent the source term of new H1NDR overburden combined with existing waste rock. These would be the cumulative plumes. Plumes from backfill of the proposed NDR and H1 pits (with no historic backfill) would represent the direct impacts, but because they would not mix with historic plumes, they also represent the cumulative condition. The H1NDR groundwater flow and transport model is also used to determine the concentration of COPCs from H1NDR leachate flowing along shallow pathways that would ultimately mix with historically impacted shallow groundwater and surface water.

As described in detail in sections 3.4.3.1 and 3.4.3.3, the Proposed Action and other action alternatives would create groundwater plumes of selenium and other contaminants that would generally migrate downdip to the east, and upon reaching the regional aquifer they would dilute and migrate westward.

South Maybe Canyon Mine Facilities

H1NDR would not affect the Cross Valley Fill as a potential source of contaminants. No overburden would be added, and the existing cover system would not be disturbed. The H1NDR backfill would be placed in the same South Maybe Canyon Mine pits currently generating some volume of leachate. The deep plumes predicted to be generated by the new backfill would be in the Wells Formation and would be separated from any deep plumes generated by the Cross Valley Fill in the Dinwoody Formation by the Meade Peak which is generally an aquiclude. No mixing is anticipated to take place.

The leachate generated from the H1NDR backfill would follow the same flow paths as any existing baseline leachate or contaminant plumes from the pits. Thus, the H1NDR plumes would follow the existing plumes in time and would not interact in an additive manner. The predicted H1NDR plumes would not add to the existing plumes or create higher concentrations.

The analysis of the H1NDR backfill placement indicates that it would also affect both the shallow alluvial aquifer and would migrate downdip to the east until intersecting the regional aquifer. Because the predicted groundwater impacts from the mining activity generally migrate to the east, they would not comingle with shallow groundwater infiltrating from Maybe Creek water west of Dry Ridge. As described in Sections 3.5.3.1 and 3.5.3.3, groundwater would interact with Maybe Creek and the shallow alluvial system along Maybe Creek and add to the baseline conditions, although the Alternate Cover would interact to a far lesser degree.

Site Improvements

As described in Section 3.2.1, CERCLA remedial actions at the Cross Valley Fill include construction of a synthetic cover system and surface water management control facilities. They have substantially reduced load and concentrations discharged to surface water and the shallow alluvial aquifer. Likewise, H1NDR includes backfill of the South Maybe Canyon Mine historic pits and construction of infiltration limiting cover systems. Although the project would add additional source material on top of existing backfill in the historic pits, the cover system would drastically reduce the generation of leachate compared to the existing conditions. The Proposed Action and Alternative Cover systems would be constructed over currently unreclaimed pit surface. The cover system addresses the pathways of release considered in the CERCLA remediation process: uptake of contaminants by vegetation, releases of leachate to groundwater, and releases of leachate to surface water. Although all future decisions will be based on future monitoring results, the proposed cover construction could render future CERCLA actions at the historic pits unnecessary.

North Maybe Mine Facilities

H1NDR would not affect the East Mill Dump as a potential source of contaminants. No overburden would be added, and the existing surface would not be disturbed. Some H1NDR backfill would be placed in the same North Maybe Mine pits currently generating some volume of leachate. The analysis of the H1NDR backfill placement indicates it would affect both the shallow alluvial aquifer and would migrate downdip to the east until intersecting the regional aquifer. As described in Sections 3.5.3.1 and 3.5.3.3, groundwater would interact with the shallow alluvial system along East Mill Creek, but the Alternate Cover would interact to a much lesser degree. The leachate from the H1NDR backfill would follow any existing contaminant plumes in time and would not interact in an additive manner. The H1NDR plumes would not add to the existing plumes to create higher concentrations. The backfill placed in the proposed North Dry Ridge Pit would generate a contaminant plume to the north and east of the pit. The northern extent of the H1NDR plume would be new and would not interact with any existing plumes. Since the groundwater migration is largely controlled by downdip flow, the easterly portion of the H1NDR plume would be stratigraphically below any deeper plumes, if they exist, emanating from the East Mill Dump, and would mainly stay separated.

Site Improvements

As described in Section 3.2.1, the East Mill Dump is being investigated through CERCLA. A synthetic cover and water management system, similar to the system constructed on the Cross Valley Fill, is being reviewed and is likely to be constructed between 2023 and 2024. Like at the Cross Valley Fill, substantial reductions in concentrations and loading to East Mill Creek and the shallow alluvial aquifer are foreseeable. If there is a deeper plume under the East Mill Dump, the cover would likely reduce the size of that plume, as well. H1NDR includes backfill of one of the North Maybe Mine historic pits and construction of infiltration limiting covers. Although H1NDR would add additional source material on top of existing backfill in the historic pit, the cover system would drastically reduce the generation of leachate compared to the existing conditions. The Preferred Alternative cover system would be constructed over 71 acres of currently unreclaimed pit surface. The cover addresses the release pathways considered in the CERCLA remediation: uptake of contaminants by vegetation, releases of leachate to groundwater, and releases of leachate to surface water. Although all future decisions will be based on future monitoring results, the cover construction could render future CERCLA actions at the northern portion of the North Maybe Mine open pits unnecessary.

3.4.3.3 Proposed Action

Groundwater Quality

Groundwater quality would not be affected by construction of surface facilities such as roads, moving the slurry pipeline, and other mine features. While the Proposed Action cover would limit the percolation of water into the backfill, selenium concentrations in groundwater downgradient and downdip of the mine in the vicinity of the pits would exceed 0.05 mg/L groundwater water standard primarily within the Rex Chert member before migrating downward into lower stratigraphic units (e.g., Wells Formation) according to geologic structure, fractures, and faults present (Tetra Tech, Inc., 2022a). Once COPCs migrate into the Wells Formation, plume direction changes toward the west following the hydraulic gradient in the regional aquifer. Due to this pathway, groundwater contamination in shallow aquifer systems is anticipated to be limited to within 1 mile of the mine pits. Groundwater modeling showed the potential for shallow groundwater to discharge to seeps or surface water and affect surface water quality (see Section 3.5.3.1). Manganese and sulfate plume migration shows similar shapes and extents as selenium in **Figure 20** and thus are not shown separately.

Groundwater modeling of COPCs indicates that the Proposed Action would result in COPCs in exceedance of primary and secondary groundwater standards (Tetra Tech, Inc., 2022a) (**Table 20**). Groundwater impacts would primarily be restricted to the eastern side of the H1-E, H1-S, NDR, and H1-N pits and would extend downdip following the geological structures in the pits. Limited migration of detectable COPCs to surface water would occur in East Mill Creek, Maybe Creek, and Stewart Creek, but not the Blackfoot River, causing groundwater discharge that exceeds selenium aquatic standards (i.e., greater than 3.1 microgram per liter (µg/L)) into surface water in the immediate pit vicinity. Existing domestic and agricultural wells screened in the alluvium would not be affected by H1NDR. Some additional groundwater contamination is expected to the north of the mine pits (Tetra Tech, Inc., 2022a). **Figure 21** and **Figure 22** presents the simulated extent of selenium transport in the Wells Formation at the groundwater standard of 0.05 mg/L under the Proposed Action simulation from north to south and include the leachate from the existing historic backfill.

The extent of manganese transport with concentrations above the secondary groundwater standard of 0.05 mg/L is predicted to be hundreds of feet farther than selenium (**Figure 23** and **Figure 24**). Because the source area manganese concentrations would exceed the groundwater standard through at least pore volume 4, and at higher concentrations than selenium at the end of pore volumes 1 through 4 except pore volume 1 (Section 3.3.3.1) for NDR and North Maybe Mine, the manganese plume was predicted to extend farther downgradient and downdip. See **Table 18** for pore volume by location.

The extent of sulfate transport above the secondary groundwater standard of 250 mg/L is predicted to be smaller in lateral extent than selenium or manganese (**Figure 25** and **Figure 26**).

Figure 20. Cross-Sections of Predicted Selenium Concentrations 40 Years after Mine Closure for Proposed Action

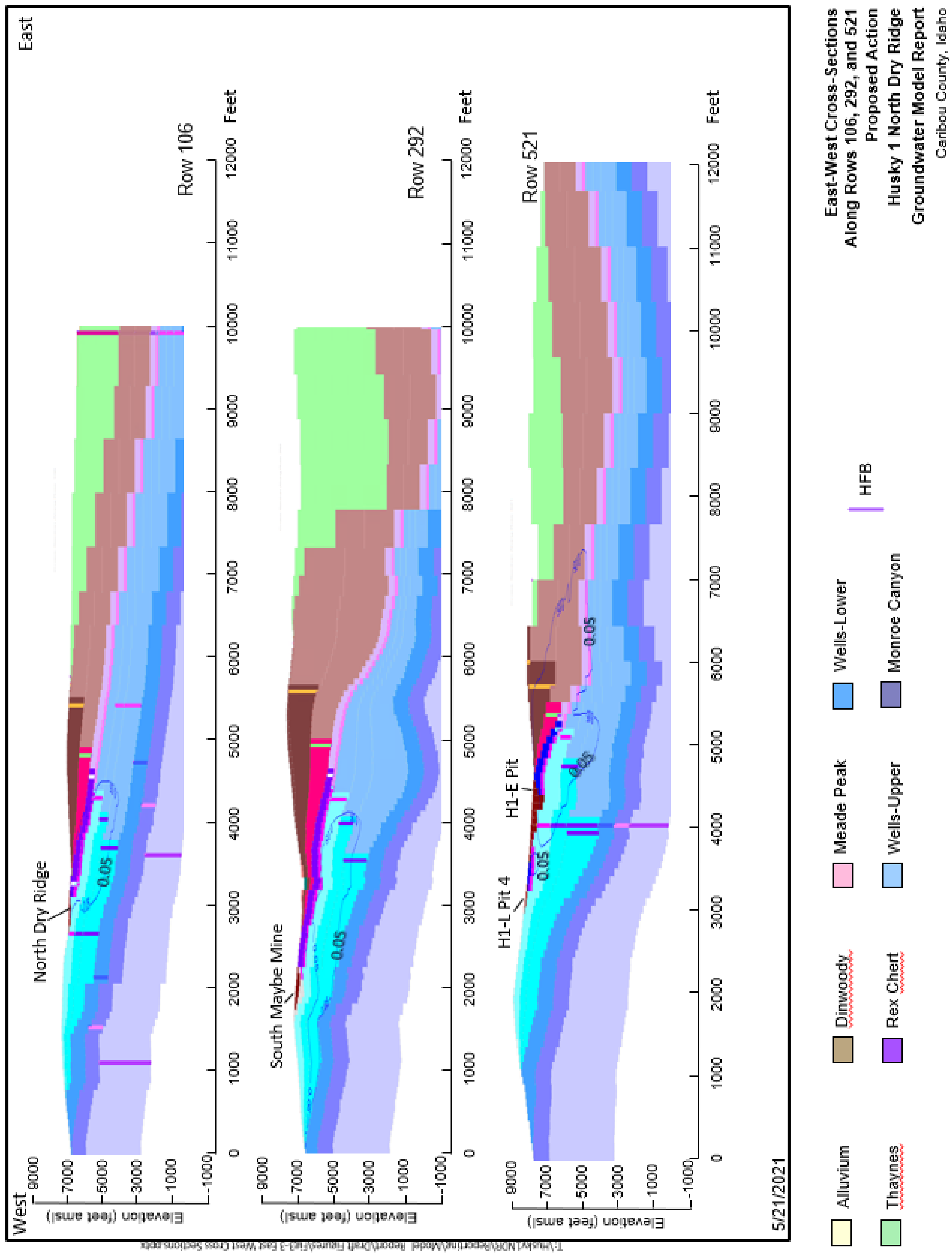
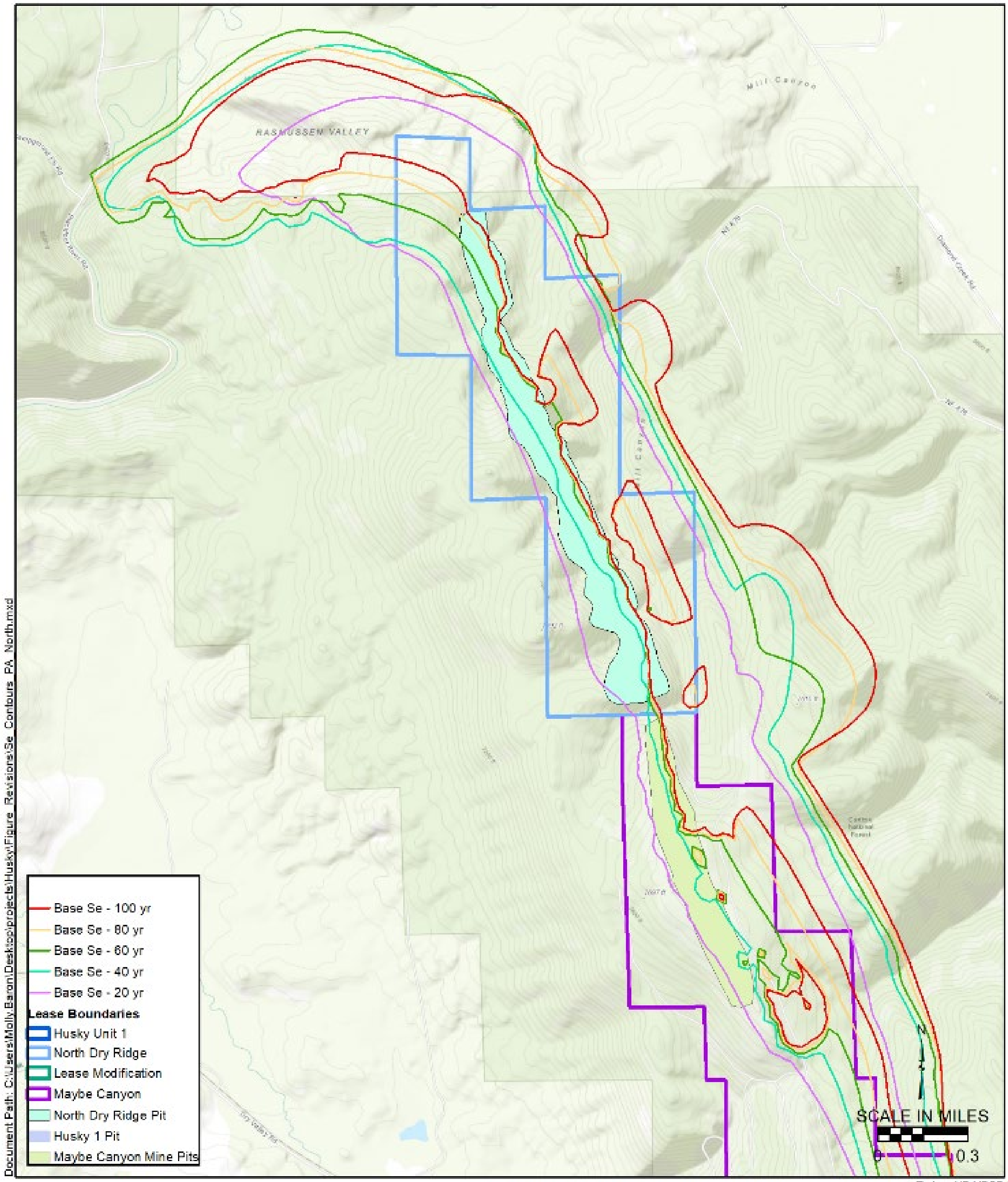


Figure 21. Proposed Action Predicted Extents of Selenium Plumes at 20-Year Intervals from NDR and North Maybe Mine



Date: 4/21/2021

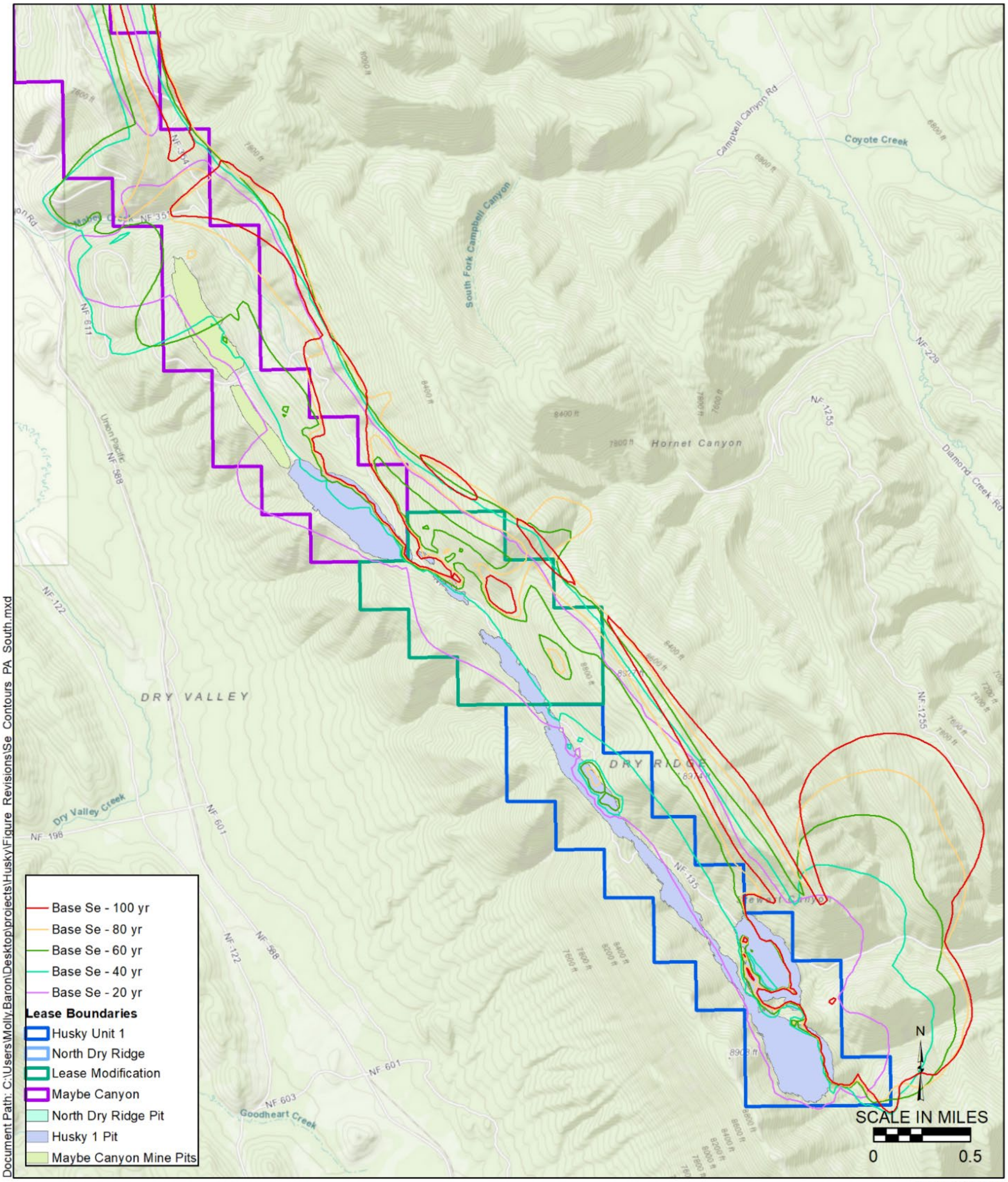
Predicted Extent of Selenium Plumes at 20 - Year Intervals

Proposed Action

Husky 1 North Dry Ridge

Caribou County, Idaho

Figure 22. Proposed Action Predicted Extents of Selenium Plumes at 20-Year Intervals from South Maybe Canyon Mine and H1



Date: 5/21/2021

Predicted Extent of Selenium Plumes at 20 - Year Intervals
Proposed Action
Husky 1 North Dry Ridge
Caribou County, Idaho

Figure 23. Proposed Action Predicted Extents of Manganese Plumes at 20-Year Intervals from NDR and North Maybe Mine

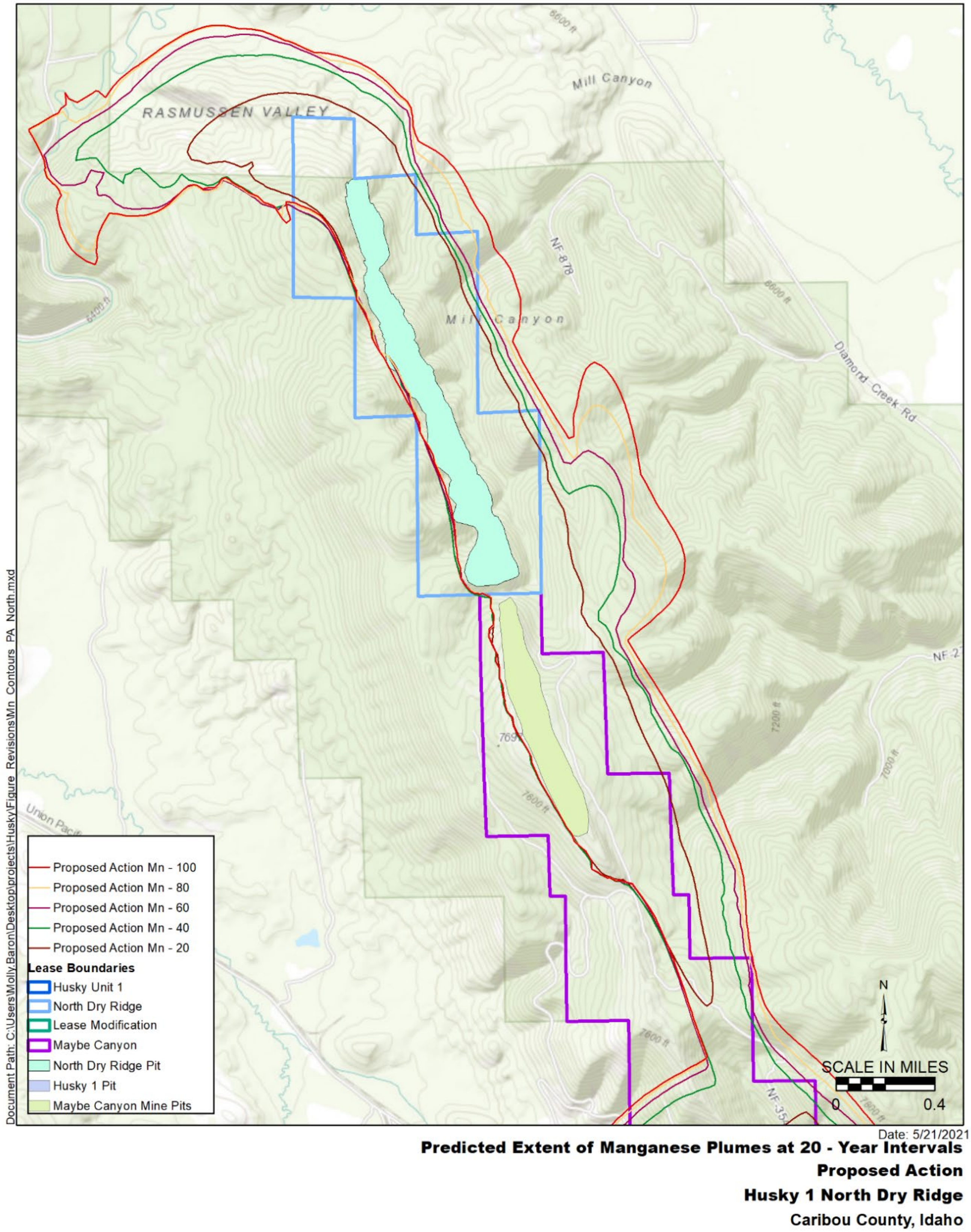
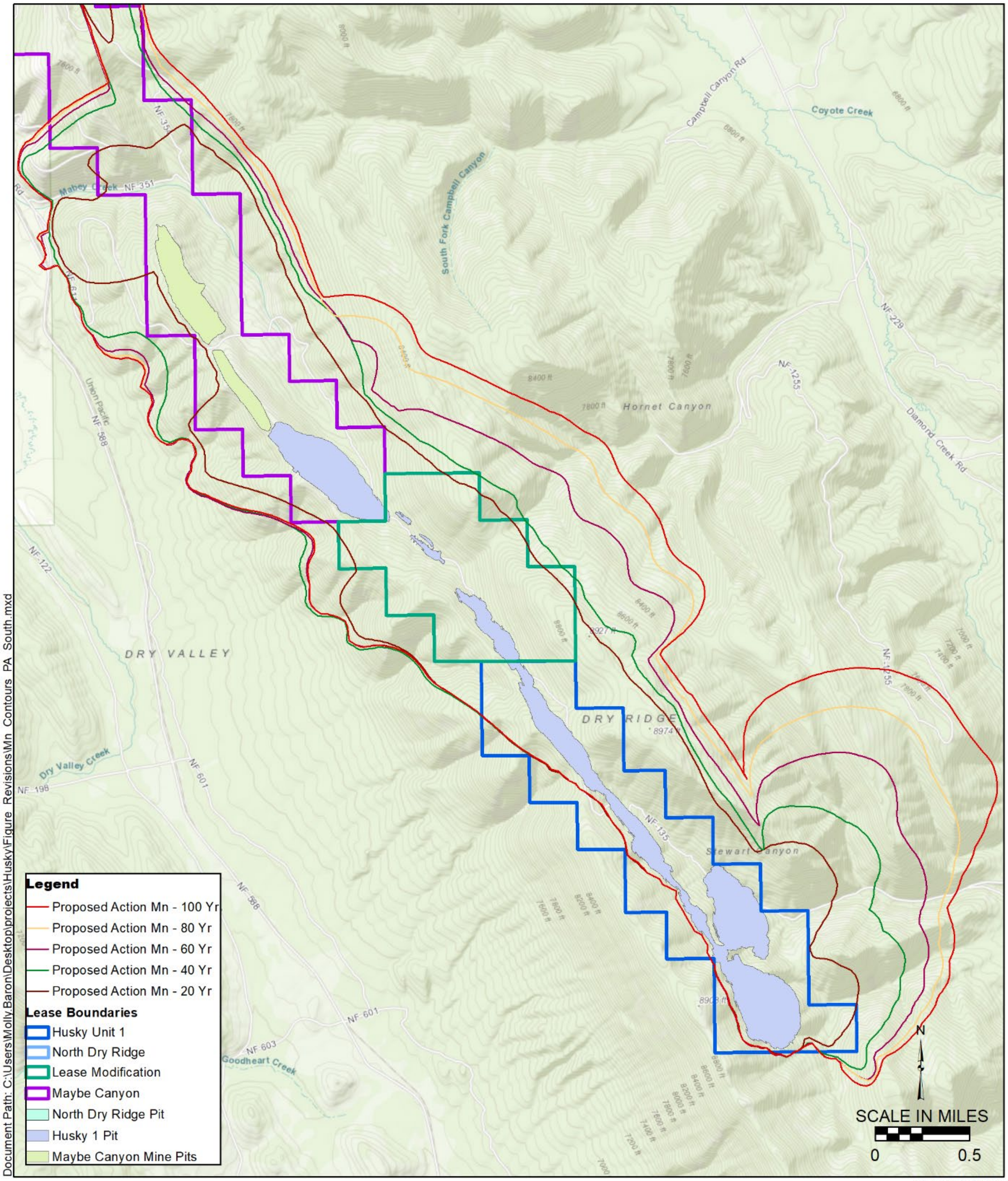


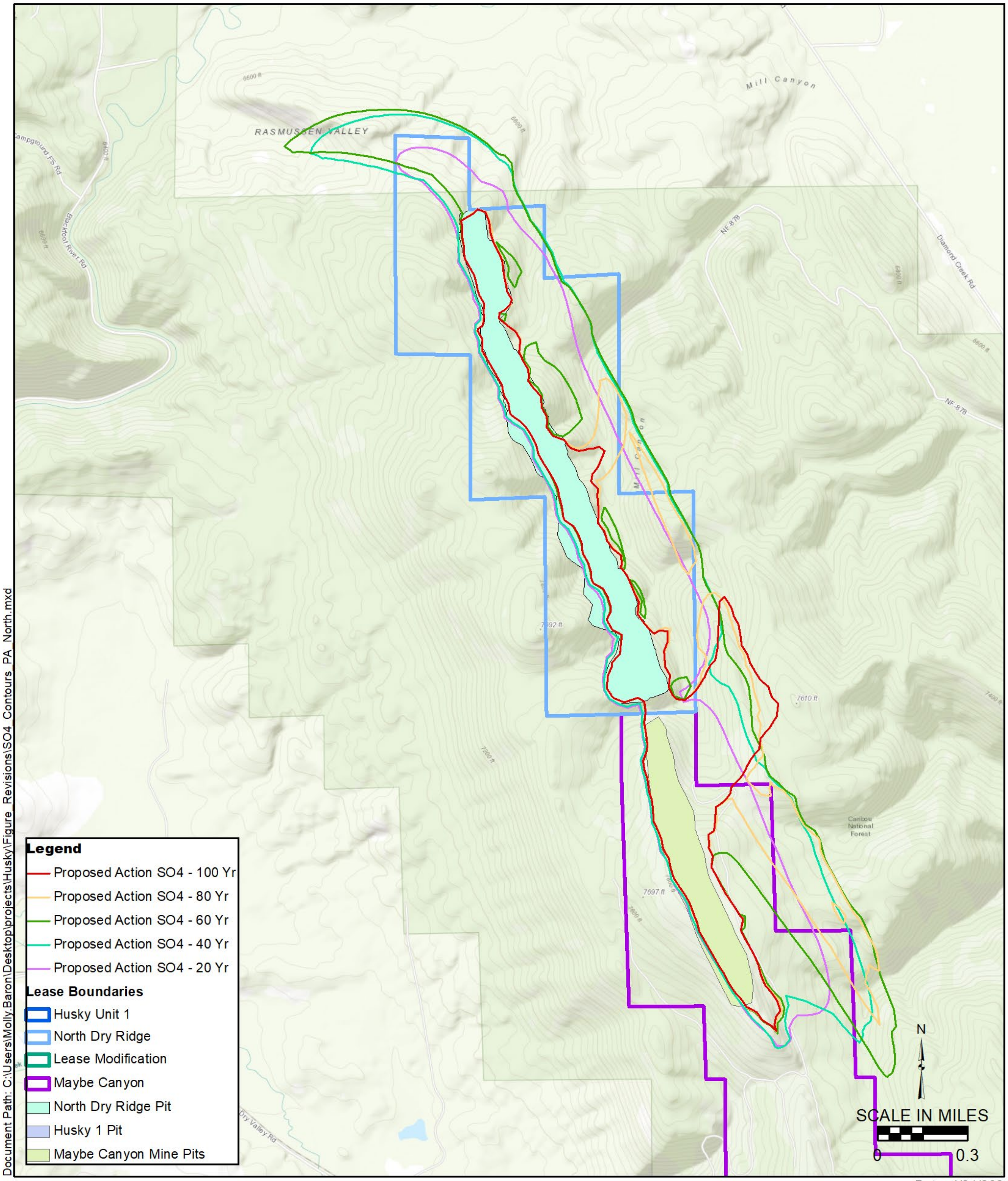
Figure 24. Proposed Action Predicted Extents of Manganese Plumes at 20-Year Intervals from South Maybe Canyon Mine and H1



Date: 5/26/2021

Predicted Extent of Manganese Plumes at 20 - Year Intervals
Proposed Action
Husky 1 North Dry Ridge
Caribou County, Idaho

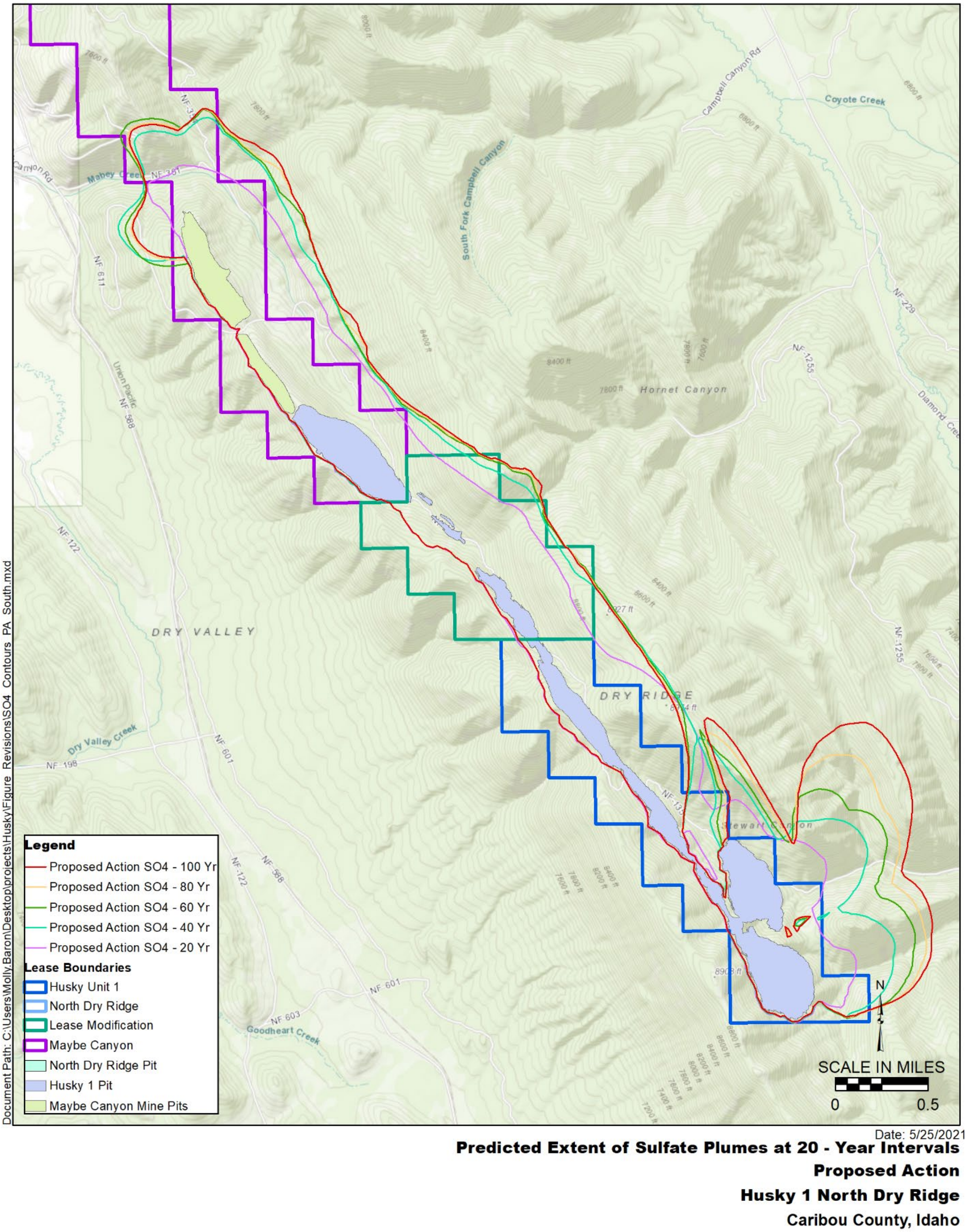
Figure 25. Proposed Action Predicted Extents of Sulfate Plumes at 20-Year Intervals from NDR and North Maybe Mine



Date: 4/21/2021

Predicted Extent of Sulfate Plumes at 20 - Year Intervals
Proposed Action
Husky 1 North Dry Ridge
Caribou County, Idaho

Figure 26. Proposed Action Predicted Extents of Sulfate Plumes at 20-Year Intervals from South Maybe Canyon Mine and H1



A sensitivity analysis (Tetra Tech, Inc., 2022a) assessed the change in groundwater discharge peak selenium concentrations into Stewart Creek, Maybe Creek, and East Mill Creek from the Proposed Action (**Table 22**). The high and low infiltration rate simulations indicated impacts from climate change related changes in precipitation or if the cover did not perform as expected. The other factors indicate what would happen if assumptions and testing did not accurately characterize the conditions or the model did not accurately account for them.

Table 22. Sensitivity Analysis on Groundwater Discharge Peak Selenium Concentrations for Proposed Action

Model Simulation	Sensitivity Tested	Stewart Creek (µg/L)	Maybe Creek (µg/L)	East Mill Creek (µg/L)
Base Case	NA	49	18	23
High Infiltration Rate	2 times the base case	67	35	52
Low Infiltration Rate	Half the base case	4.9	<0.1	1.0
High Hydraulic Conductivity	2 times the base case	37	4.3	17
Low Hydraulic Conductivity	Half the base case	47	19	31
High Effective Porosity	3.3 times the base case	48	18	23
Low Effective Porosity	1/3 the base case	48	18	23
Longitudinal Dispersivity	1½ the base case	48	17	22
Transverse Dispersivity	1½ the base case	48	17	22

As expected, higher backfill infiltration rates increase the groundwater selenium concentration entering the three creeks and vice versa for a lower backfill infiltration rate. A higher hydraulic conductivity of the weathered bedrock, Rex Chert, and Meade Peak caused a reduction in groundwater discharge concentration entering the three creeks because as water mounds within the backfill and reaches the Rex Chert, more selenium is transported downgradient and downdip, and the mounding in the backfill is reduced. Changes in effective porosity and dispersivity had minimal effect.

The predicted leachate plumes stemming from H1NDR operations would not mix with those originating from the Cross Valley Fill or the East Mill Dump. The conceptual flow model summarized in Section 3.4.1 and described in detail in the Final Groundwater Flow and Transport Modeling Report (Tetra Tech, Inc., 2022a) indicates that local leachate generally travels eastward and downdip along bedding planes until at depth groundwater moves westward with the regional groundwater system. The historic facilities are up-dip and any leachate stemming from those sources would travel along different flow paths than leachate from the H1NDR operations. They would not mix.

Potential Conflicts with CERCLA Maybe Mines Project

CERCLA site investigations and monitoring would continue as planned (see Section 3.2.1). The backfill and cover of the existing backfill in the North Maybe Mine and South Maybe Canyon Mine would reduce the water that can percolate into the backfill. Percolation is expected to be reduced by 4% at the North Maybe Mine and the northern portion of the South Maybe Canyon Mine, and reduced by more than 15% in the southern portion of the South Maybe Canyon Mine (Arcadis, 2020b), which would reduce the contaminant loading from the CERCLA site compared to the No Action Alternative.

3.4.3.4 No Action Alternative

Groundwater Quality

There would be no direct, indirect, or cumulative impacts on groundwater quality from H1NDR. No construction or operations associated with H1NDR would take place under this MRP. The existing North Maybe Mine and South Maybe Canyon Mine pits would not be partially backfilled or reclaimed under this MRP. The potential benefit that H1NDR covers may provide for the CERCLA actions would not occur, as the cap and cover design of Alternative Cover is expected to reduce the percolation of water into the backfill by 4% in North Maybe Mine and by approximately 30% in South Maybe Canyon Mine. CERCLA remediation of the existing mine facilities would continue.

Potential Conflicts with CERCLA Maybe Mines Project

Site investigations and monitoring would continue as planned (see Section 3.2.1). Impacts on groundwater quality and Maybe Creek from previous mining would continue to be remediated with no additional benefit from the added backfill and cover discussed in the Proposed Action. There would be no cumulative effect on the timing and effectiveness of the CERCLA remediation under this MRP.

3.4.3.5 Alternative Cover

Groundwater quality would not be affected by construction of surface facilities such as roads and other mine features. Many of the samples in the baseline investigation indicated current, secondary or primary groundwater quality standards are not being met. Results of groundwater and contaminant fate and transport modeling indicate that relative to the Proposed Action, the downgradient COPC concentrations would be reduced but would still exceed the groundwater standards in areas outside the immediate vicinity of the mine pits.

Groundwater Quality

Groundwater quality downgradient and downdip of the mine in the immediate vicinity of the pits would be affected, but the contamination extent would be more limited than the Proposed Action (**Table 23**) due to expected lower percolation from the increased acreage of flexible membrane liner and lateral drain cover compared to engineered soil covers. Groundwater modeling of selenium (Tetra Tech, Inc., 2022a) predicts that selenium concentrations above groundwater MCLs downgradient and downdip from H1-E and H1-S pits are reduced by approximately 40% in extent (**Table 23**). There would still be potential for shallow groundwater to discharge to seeps or surface water and affect surface water quality, but at a reduced concentration and flow rate compared to the Proposed Action.

Table 23. Comparison of Impacts to Groundwater from the Proposed Action and Alternative Cover

	Square Miles		Maximum Feet from Pit	
COPC	**Proposed Action**	**Alternative Cover**	**Proposed Action**	**Alternative Cover**
Selenium	4.06	2.62	6,950	4,300
Sulfate	4.47	2.75	5,600	3,250
Manganese	11.73	8.03	7,650	5,450

Impacts on groundwater would be primarily restricted to the eastern side of the mine pit and would extend to depth following geological structures. No additional measurable loading of COPCs to surface water would occur. Discharge to Stewart Creek would not exceed 0.1 µg/L for selenium which is below the detection limit of 0.5 µg/L and no detectable discharge to East Mill Creek or Maybe Creek is predicted. Some additional groundwater contamination is expected north of the mine pits into the Wells Formation (Tetra Tech, Inc., 2022a). **Figure 27** through **Figure 32** present the simulated extent of transport under the Alternative Cover simulation and include the existing historic backfill, a cumulative effect on the leaching of COPCs into groundwater.

The Alternative Cover reduces plumes in the Wells Formation by at least 500 feet downgradient and downdip at most of the mine pits. The largest reduction in plume extent is downgradient and downdip from H1-E and H1-S pits. At these locations the addition of flexible membrane liner covers has reduced the height of the water level within the backfill enough to prevent COPCs transport through the Lower Dinwoody Formation near H1-S and H1-E.

Potential Conflicts with CERCLA Maybe Mines Project

Under the Alternative Cover, site investigations and monitoring would continue as planned. The cap and cover design of Alternative Cover is expected to reduce the percolation of water into the backfill by 4% in the North Maybe Mine and by approximately 30% in the South Maybe Canyon Mine. The reduction in percolating water into the backfill material is expected to have a cumulative effect of reducing the contaminant loading from the CERCLA site compared to the No Action Alternative and Proposed Action.

The Alternative Cover would not affect the timing and would enhance the effectiveness of the CERCLA remediation.

3.4.3.6 Alternative Stream Routing

Conceptual channel designs for the Maybe Creek and Stewart Creek realignments (Itafos, 2020a) incorporate a 60 mils HDPE liner under a bedding layer and riprap for stability. The engineered fill and liner would prevent or inhibit infiltration of surface water through the fill to contribute to contamination of groundwater. There would be no expected impacts to groundwater or water quality. The design life of the buried liner system would be 200 to 750 years (Peggs, 2003). There would be no cumulative effects of trace metals leaching into groundwater or the timing and effectiveness of the CERCLA remediation.

3.4.3.7 Alternative Access 1 and Alternative Access 2

Alternative Access 1 or Alternative Access 2 would not have direct, indirect, or cumulative effects of trace metals leaching into groundwater or the timing and effectiveness of the CERCLA remediation.

3.4.3.8 Alternative Sequence

The mining sequence modified under Alternative Sequence to begin mining in NDR then moving to H1 would not change the impacts on groundwater described in section 3.4.3.3 and 3.4.3.5 because the backfill handling described in section 2.2.3 would not change (USFS, BLM, Tetra Tech, 2022). No adjustment in the groundwater model is needed to account for a different sequence.

Figure 27. Predicted Selenium Plumes at 20-year Intervals, Alternative Cover from NDR and North Maybe Mine

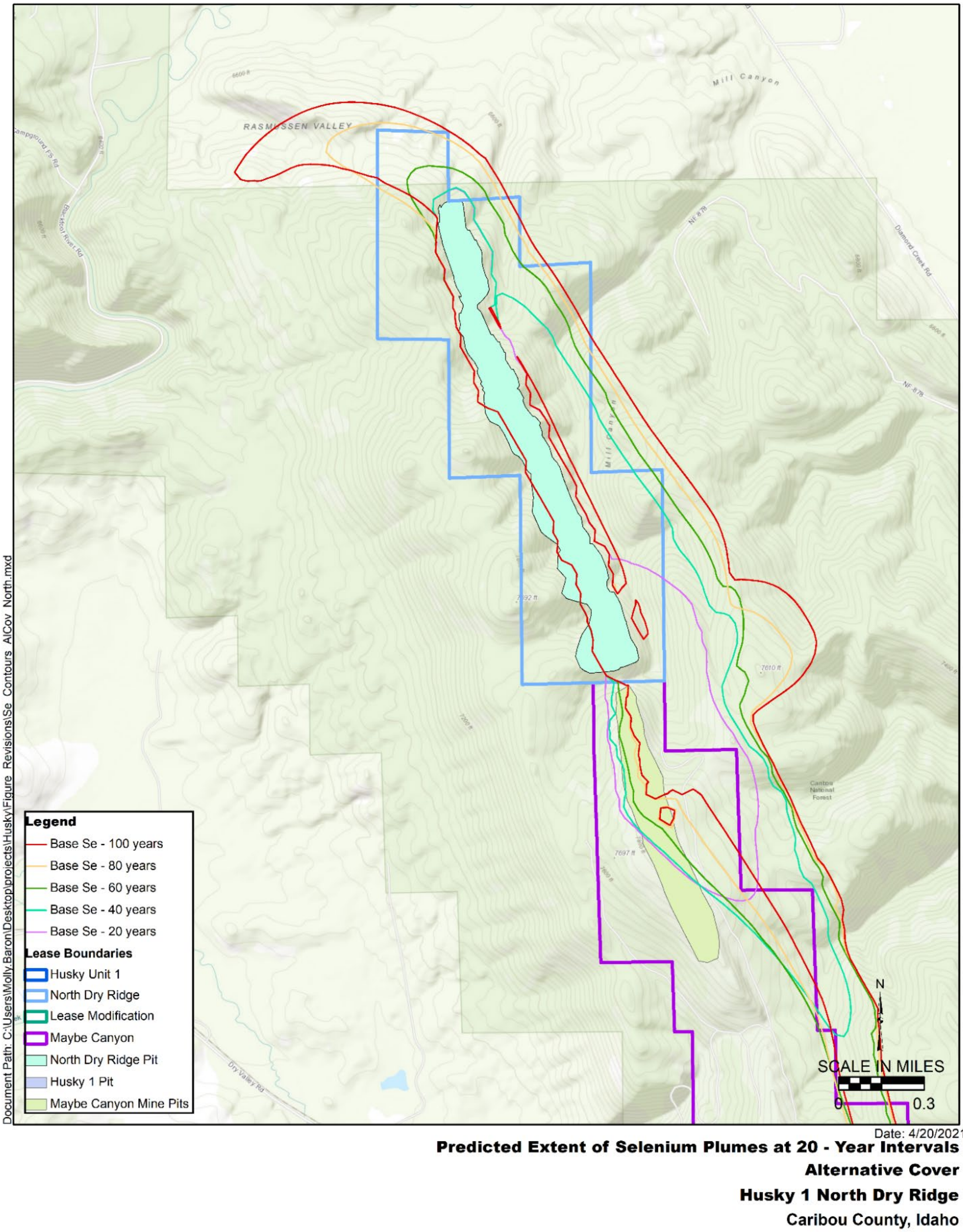


Figure 28. Alternative Cover Extent of Selenium Contamination at 20-Year Intervals from South Maybe Canyon Mine and H1

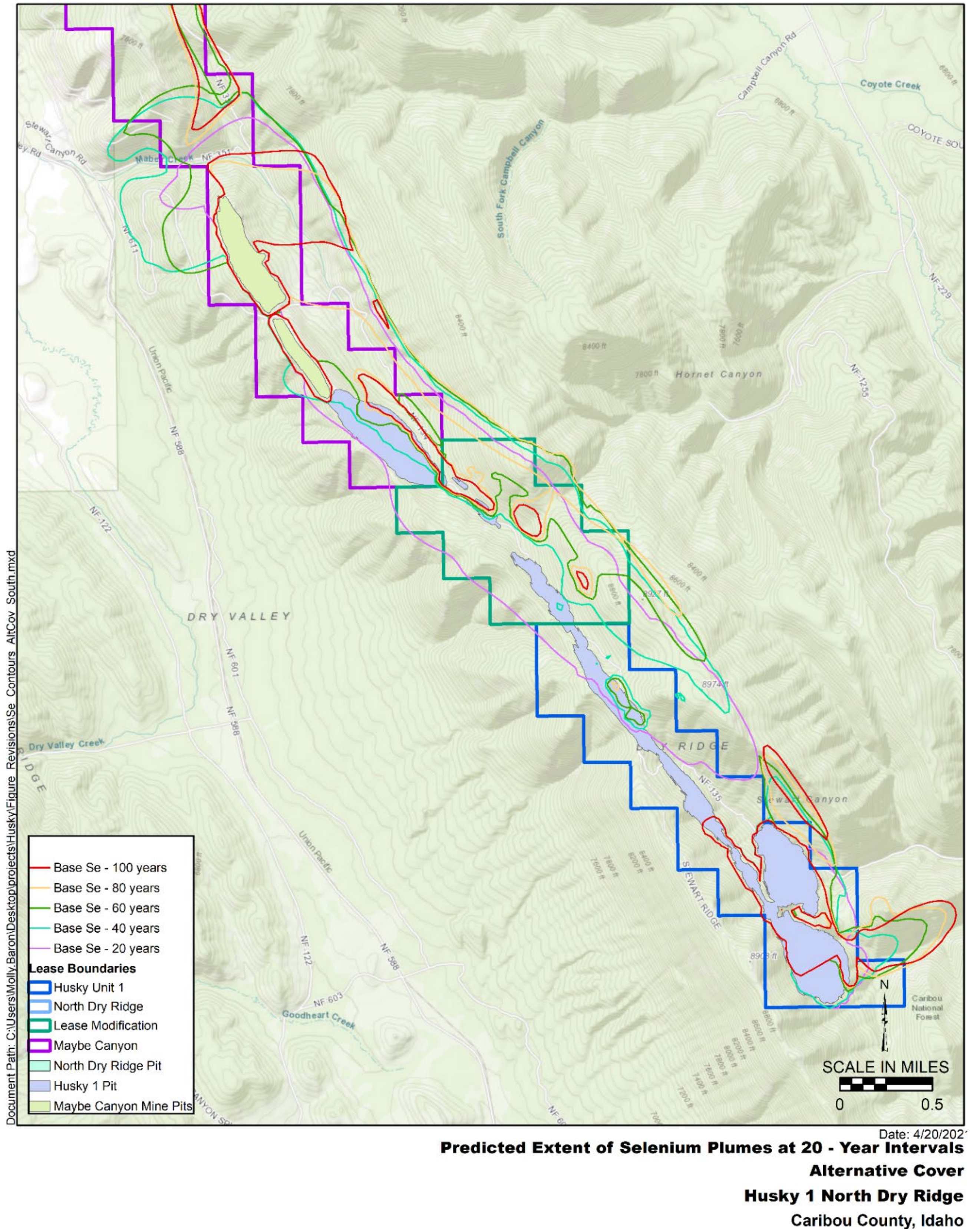
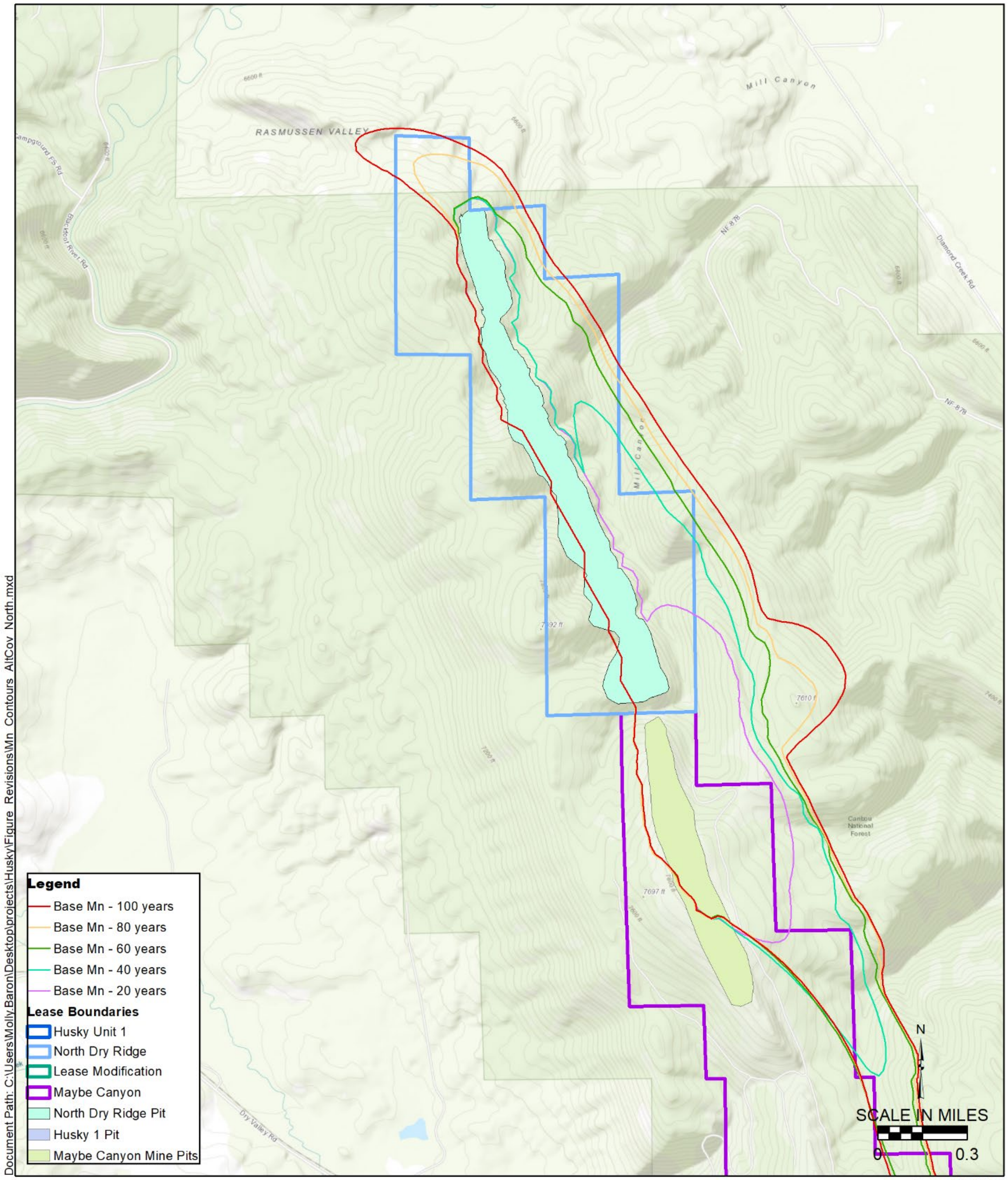


Figure 29. Predicted Manganese Plumes at 20-year Intervals, Alternative Cover from NDR and North Maybe Mine



Date: 5/7/2021

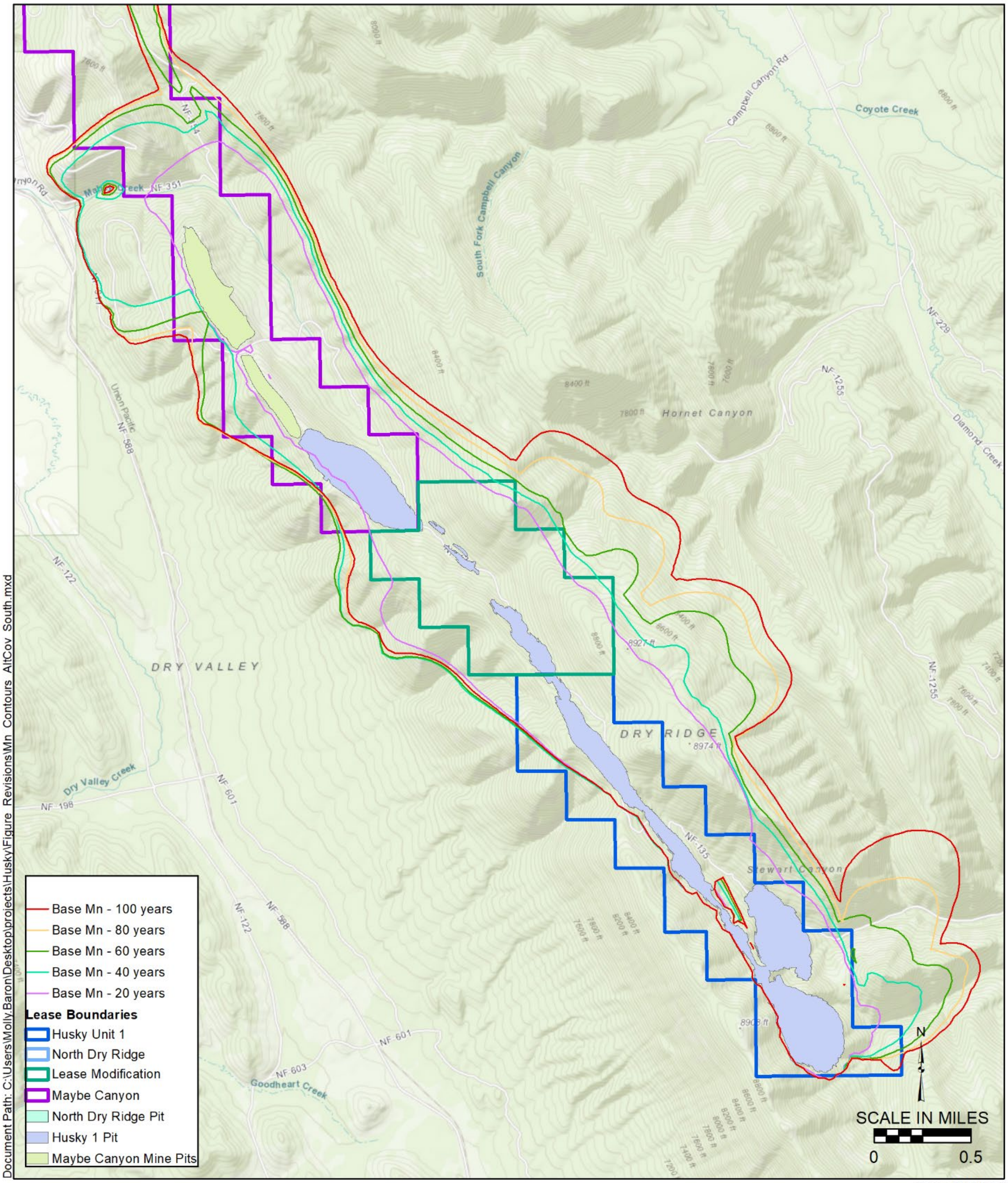
Predicted Extent of Manganese Plumes at 20 - Year Intervals

Alternative Cover

Husky 1 North Dry Ridge

Caribou County, Idaho

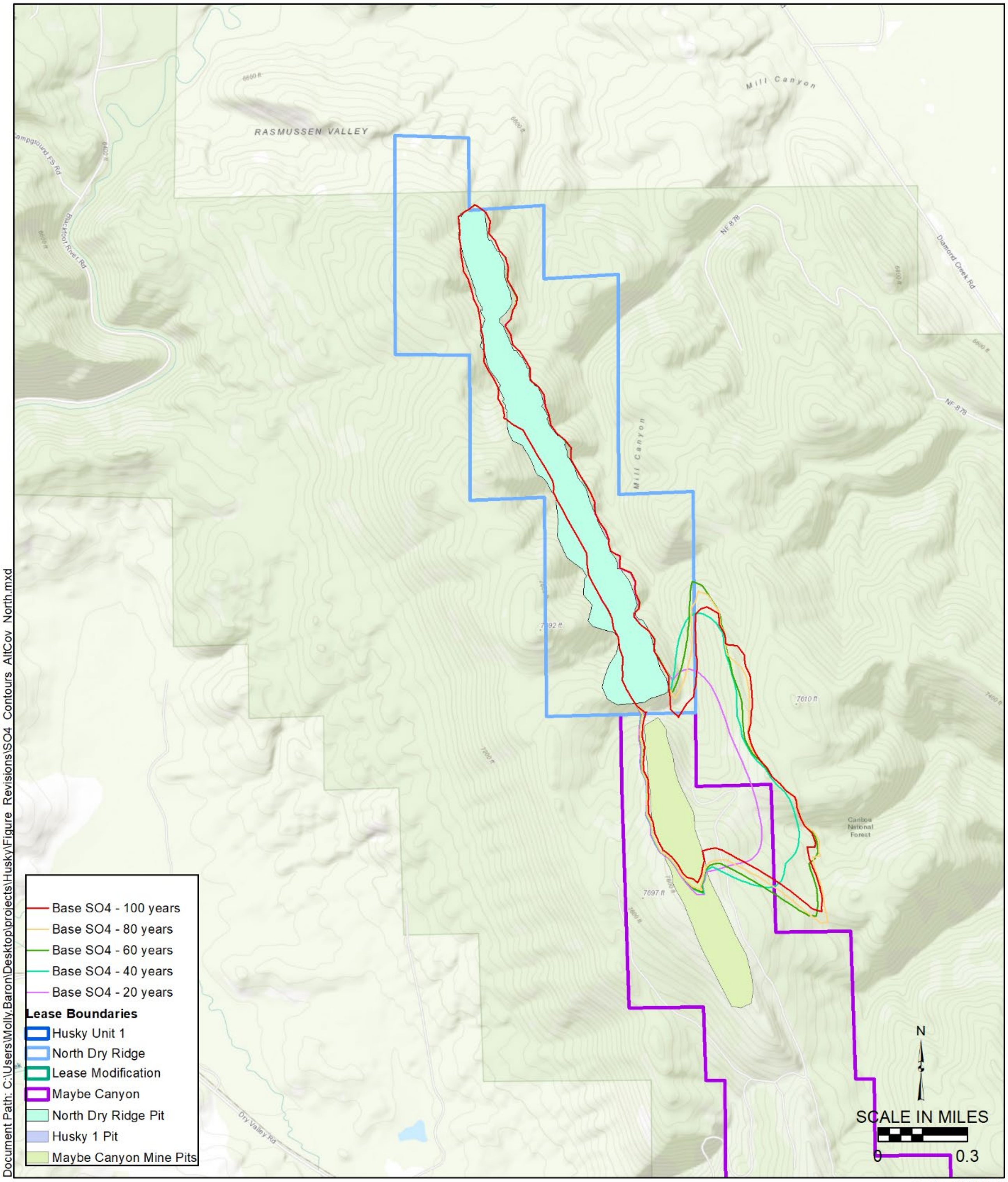
Figure 30. Alternative Cover Extent of Manganese Contamination at 20-Year Intervals from South Maybe Canyon Mine and H1



Date: 5/25/2021

Predicted Extent of Selenium Plumes at 20 - Year Intervals
Alternative Cover
Husky 1 North Dry Ridge
Caribou County, Idaho

Figure 31. Predicted Sulfate Plumes at 20-year Intervals, Alternative Cover from NDR and North Maybe Mine



Date: 5/7/2021

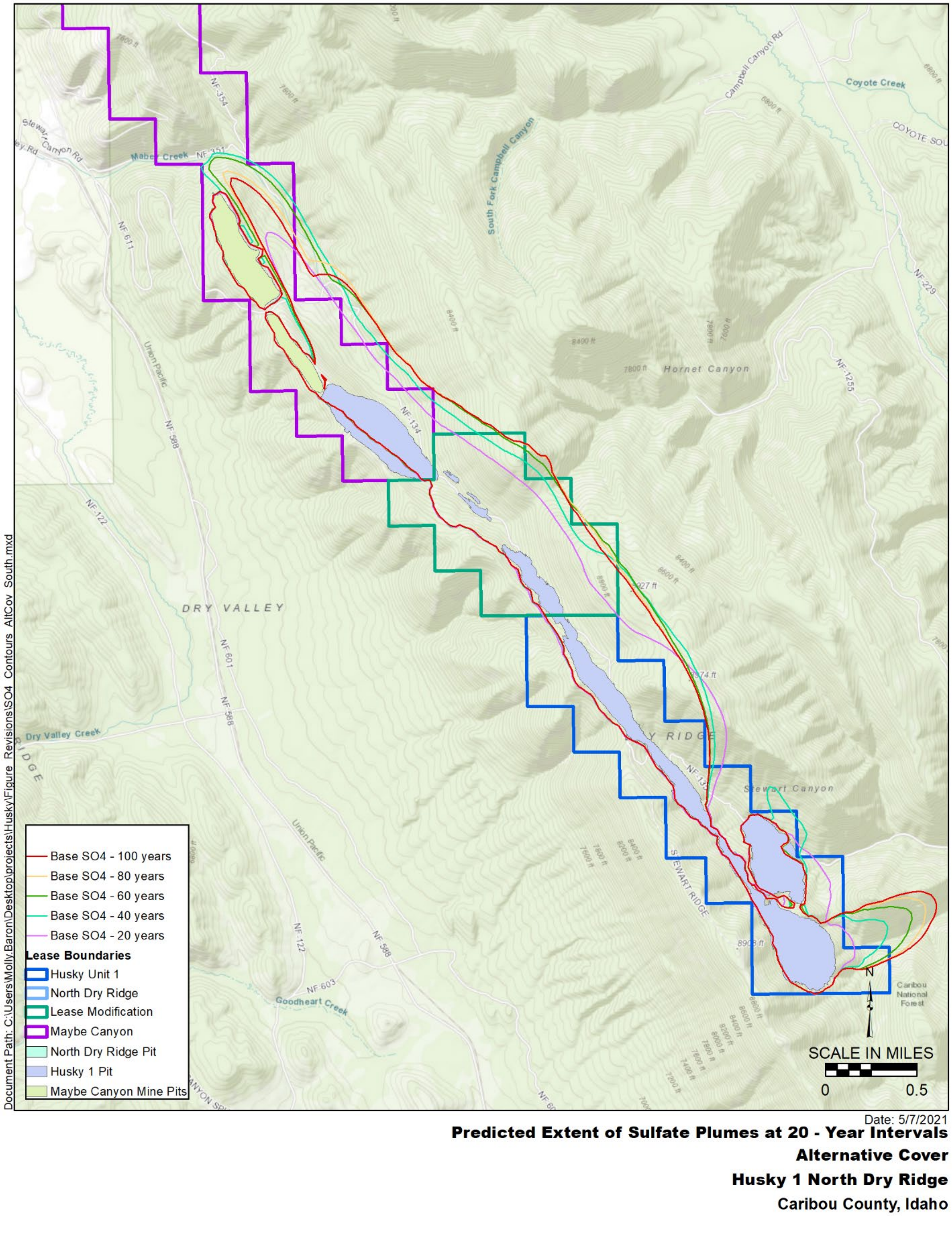
Predicted Extent of Sulfate Plumes at 20 - Year Intervals

Alternative Cover

Husky 1 North Dry Ridge

Caribou County, Idaho

Figure 32. Alternative Cover Extent of Manganese Contamination at 20-Year Intervals from South Maybe Canyon Mine and H1



3.5 Surface Water

3.5.1 Analysis Area and Methods

The surface water study area includes watershed boundaries along the north-south topographic ridge known as Dry Ridge that is bounded by Diamond Creek to the east, Dry Valley Creek to the west, and the Blackfoot River to the north (**Figure 33**). H1NDR is in the Blackfoot River Subbasin upstream of the Blackfoot Reservoir, is approximately 1,270 square miles, and drains into the Snake River Basin. The issues for analyzing impacts on surface water and the indicators that will be used to discuss them are shown in **Table 24**.

Table 24. Issues for Analyzing Impacts on Surface Water

Issue	Analysis Method
Reduction in surface water flows of streams, seeps, creeks or impacts on water rights downstream from the drawdown of groundwater.	Results from groundwater pre-mining baseline analysis and groundwater modeling will be used to quantify impacts on quantity and flow of surface water features, including seeps, creeks, and wetlands. Qualitative assessment to downstream surface water rights.
Surface water quality effects from discharged groundwater and contaminant trace elements, including selenium, compliance with water quality standards, and relocation of the NFS Road 134.	Results from groundwater modeling used to assess impacts to surface water quality, including evaluation of trace metals and selenium from discharges of groundwater to surface water features, including seeps and wetlands, quantitative and qualitative assessment of fate and transport of contaminates, including trace metals and selenium, to downstream creeks and rivers, including the Blackfoot River. Qualitative assessment of the NFS Road 134 now, and if relocated.
Sedimentation from soil erosion	Soil erosion from mining resulting in sedimentation of surface water bodies, and compliance with water quality standards.
Potential Conflicts with CERCLA actions from Maybe Creek realignment	Comparison of water quality and sedimentation impacts to existing and foreseeable CERCLA actions.

3.5.2 Affected Environment

Surface Water Flow and Water Rights

The main drainages are described below with perennial, intermittent, and ephemeral determinations based on definitions specified by the Idaho water quality standards (IDAPA 58.01.02.010) and definitions established by the USACE. The Blackfoot River, Diamond Creek, and Dry Valley Creek are characterized as low-gradient, wide valley streams; while all other drainages are relatively high-gradient channels surrounded by steep, mountainous slopes. The west flank of Dry Ridge is dominated by steep ephemeral drainages which rarely form a confluence with Dry Valley Creek (**Figure 34**).

Surface water baseline characterization sampling was conducted between 2011 and 2019 (Tetra Tech, Inc., 2014c; Arcadis, 2020c). The surface water monitoring network has historically included 252 locations, with stations added or removed based on data evaluation and study objectives. Stations were sampled for some or all the following parameters: flow (discharge), water quality, seep/spring surveys, sediment quality, and stream gain-loss determination. An overview of the 2011-2019 stream discharge measurements for prominent monitoring stations is provided in **Table 25**. Calculated discharge rates from sampling events and sampling locations are in the Surface Water Baseline Report (Arcadis, 2020c).

Table 25. Surface Water Flow Characteristics

Drainage	Classification	Flow
Blackfoot River	perennial	33 cubic feet per second (cfs) to 274 cfs (Station SW-BF4)
Dry Valley Creek	intermittent	0.05 cfs and 21 cfs (Station SW-DV2)
Maybe Creek	intermittent	dry to 5 cfs (Station SW-MB1)
Goodheart Creek	Ephemeral stream upstream of the Champ Mine and intermittent immediately downstream of the Champ Mine.	0.004 cfs to 0.135 cfs (Station SW-SP2).
Diamond Creek	perennial	dry to 45 cfs (Station SW-DC3)
East Mill Creek	perennial	0.57 cfs to 6.9 cfs (Station IA8-07A)
Stewart Creek	intermittent above the lease boundary and perennial below the lease boundary	dry to 14 cfs (Station SW-SC1)
South Stewart Creek	perennial	0.004 cfs to 3.93 cfs (Station SW-SSC1)

Source (Arcadis, 2020c).

Groundwater – Surface Water Interactions on Flow

The upper-most groundwater system potentially interacts with surface water and includes groundwater from alluvium and colluvium near the land surface and shallow bedrock above the low-permeability Meade Peak Member of the Phosphoria Formation (Tetra Tech, Inc., 2019b). During runoff in April and May, water infiltrates into the upper system and eventually discharges into seeps or gaining stream reaches (**Figure 34**).

Surface Water Rights

A January 2020 search of the Idaho Department of Water Resources general mapping tool (Idaho Department of Water Resources, 2020) for surface water rights found 163 water rights and documented points of diversion. Ownership and points of diversion for these water rights are presented in the *Final Surface Water Baseline Report Addendum* (Arcadis, 2020c).

Surface Water Quality

Idaho surface water quality standards are the basis for evaluating surface water quality (IDAPA 58.01.02). Only the Blackfoot River has designated beneficial uses (IDAPA 58.01.02), cold water aquatic life, salmonid spawning, primary/secondary recreation, and agricultural and domestic water supply. Other water bodies are undesignated but are required to be protected for beneficial uses including “all recreational use in and on the water and the protection and propagation of fish, and wildlife wherever attainable” by IDAPA 58.01.02 Section 101. If an undesignated surface water body is intermittent, the numeric criteria do apply during periods of “optimal” flow that are sufficient to support the uses for which the water body is designated (IDAPA 58.01.02 Section 070).

The COPCs that may be released to water contacting overburden materials (antimony, arsenic, cadmium, copper, iron, manganese, nickel, selenium, sulfate, thallium, total dissolved solids, uranium, and zinc) and the water quality standards are shown in **Table 26** for aquatic life and for human health consumption. Human health drinking water standards for water supply sources and groundwater were previously shown in Section 3.4.2.1 (**Table 20**). There are no applicable surface water standards for iron, manganese, sulfate, thallium, total dissolved solids, or uranium (Arcadis, 2020a). The aquatic life standard for copper is determined using the Biotic Ligand Model which calculates copper criteria using

Figure 33. Surface Water, Wetlands, Riparian, and Wildlife Resources Study Area

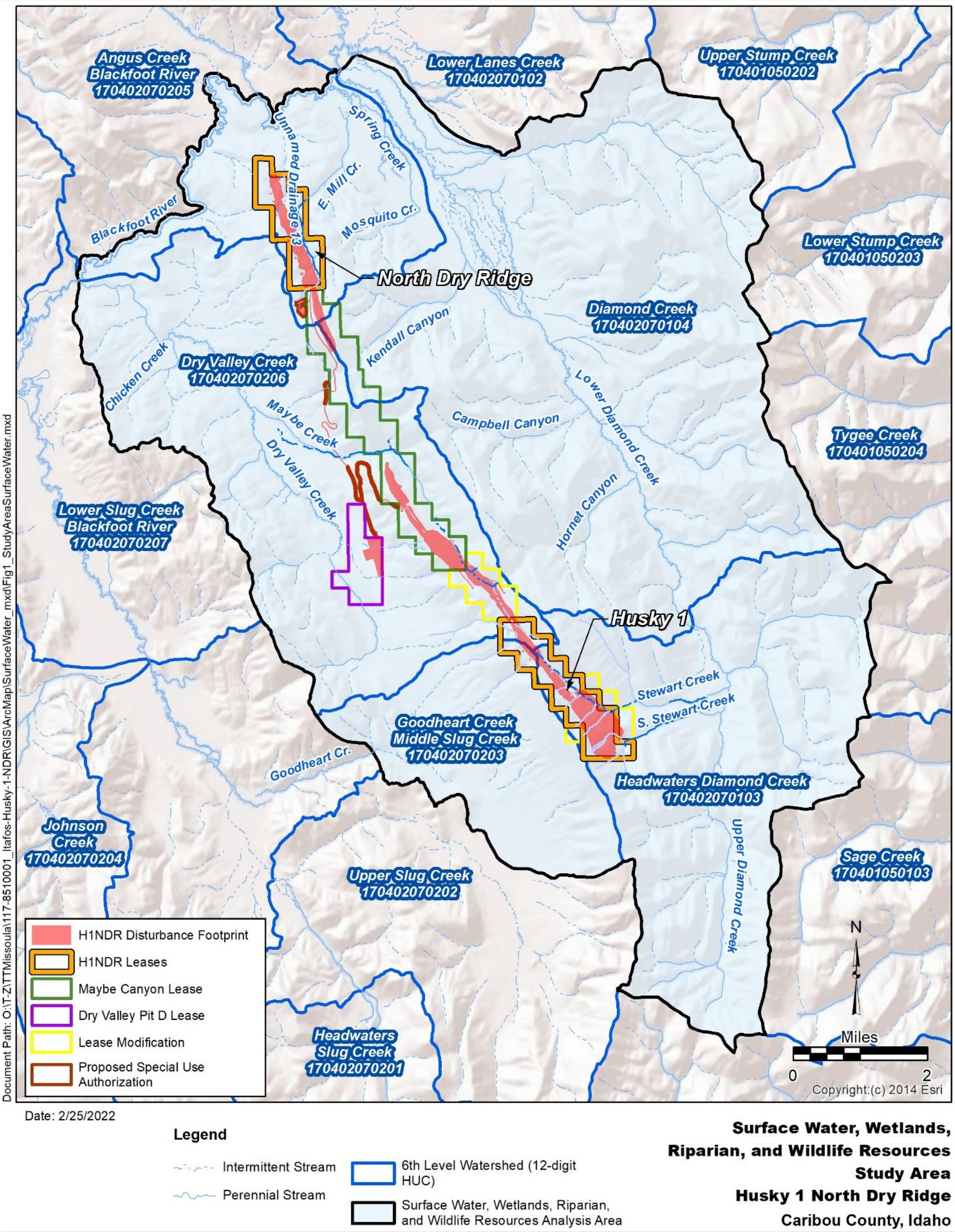
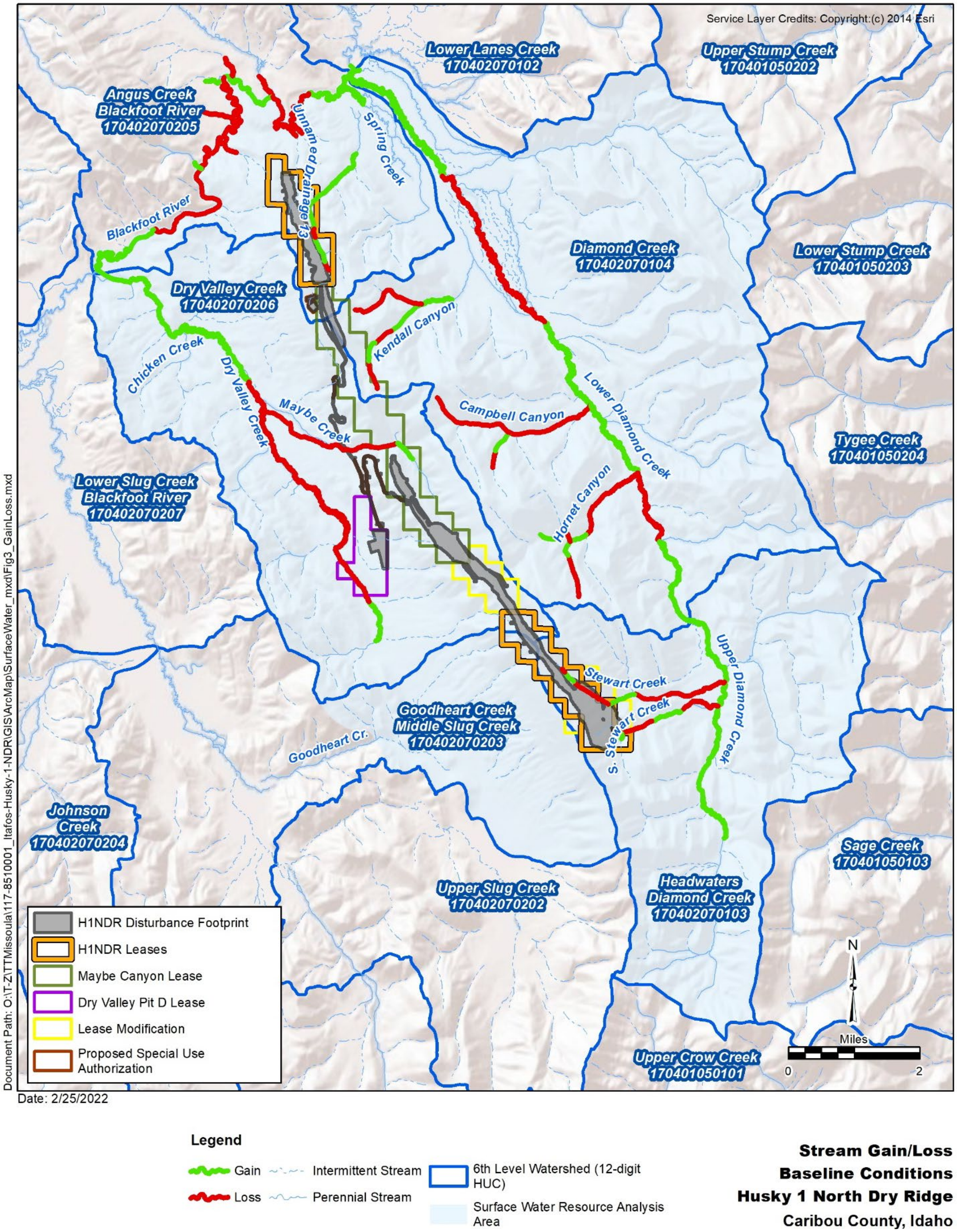


Figure 34. Stream Gain/Loss Baseline Conditions



the ambient measured parameters of temperature, pH, dissolved organic carbon, calcium, magnesium, sodium, potassium, sulfate, sulfide, chloride, and alkalinity (IDAPA 58.01.02.210). The aquatic life standards for cadmium and zinc are calculated using ambient stream sample hardness. The selected screening levels were based on the minimum value for protection of aquatic life or protection of human health for comparative purposes only.

Table 26. Surface Water Quality Standards for COPCs

Analyte	Fraction	Units	Criteria for Aquatic Life[1]		Criteria for Human Health[2]	
			Criteria Maximum Concentration (Acute)	Criteria Continuous Concentration (Chronic)	Water & Fish	Fish Only
antimony	dissolved	µg/L	No Standard	No Standard	5.2	190
arsenic	total	µg/L	--	--	10	10
arsenic	dissolved	µg/L	340	150	--	--
cadmium	dissolved	µg/L	2.0	0.8	No Standard	No Standard
copper	total	µg/L			1,300	
copper[3]	dissolved	µg/L	12.3	7.6		
iron	dissolved	µg/L	No Standard	No Standard	No Standard	No Standard
manganese	dissolved	µg/L	No Standard	No Standard	No Standard	No Standard
nickel	dissolved	µg/L	770	86	58	100
selenium	dissolved	µg/L	See footnote [4]	1.5 or 3.1[4]	29	250
sulfate	total		No Standard	No Standard	No Standard	No Standard
thallium	dissolved	µg/L	No Standard	No Standard	0.017	0.023
total dissolved solids	dissolved	mg/L	No Standard	No Standard	No Standard	No Standard
uranium	total		No Standard	No Standard	No Standard	No Standard
zinc	dissolved	µg/L	193	194	870	1,500

1 Values for cadmium, nickel, and zinc are for comparative purposes only and based on a hardness value of 180 mg/L measured as calcium carbonate

2 Criteria are based on consumption

3 Values are for comparative purposes only; based on the Biotic Ligand Model

4 Site specific water column values are based on dissolved total selenium in water and are derived from fish tissue values via bioaccumulation modeling. The default water column values shown are the applicable criterion element in the absence of steady-state condition fish tissue data. Lentic (ponded) locations are screened against the 1.5 µg/L criterion. Lotic (flowing) locations are screened against the 3.1 µg/L criterion; there is no specific acute criterion for aquatic life; however, the aquatic life criterion is based on chronic effects and is expected to adequately protect against acute effects.

Section 303(d) of the Clean Water Act requires states to identify streams and lakes that do not meet water quality standards. Listed 303(d) water bodies are presented in **Table 27** and on **Figure 35** (IDEQ, 2020). Several stream segments have been listed as impaired under Section 303(d) for sedimentation/siltation and temperature. For most of these segments, TMDLs have been developed to establish procedures and BMPs to bring these waters into attainment with standards and beneficial uses. Several segments have also been listed for selenium. TMDLs for most of these segments have not currently been developed by IDEQ or a specific schedule established.

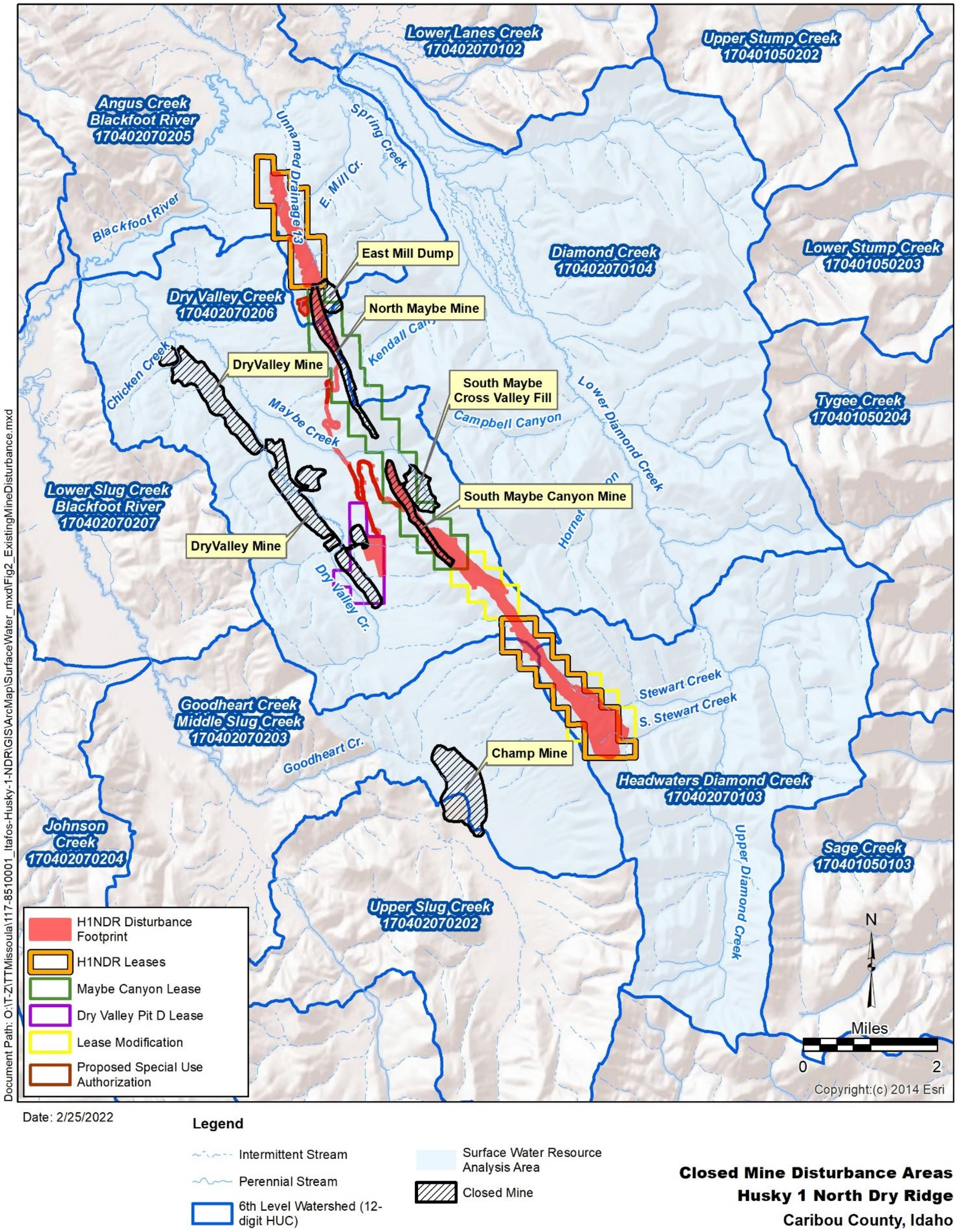
A portion of NFS Road 134 closely follows Stewart Creek and contributes sediment loads to the creek through erosion and fugitive dust. As noted in **Table 27**, Stewart Canyon is listed under Section 303(d) for sedimentation and a TMDL has been established by IDEQ.

Table 27. Section 303(d) Listed Streams and Rivers

Water Body	Stream Miles	Impaired Not from Pollutant[1]	Impaired 303(d) Listed[2]	TMDL Established[3]	Listed Pollutant
Blackfoot River – Hydrologic Unit Code (HUC) No. 17040207					
Blackfoot River - ID17040207SK010_05	20.72	No	Yes	No	selenium, dissolved oxygen
		No	Yes	Yes	sediment, temperature
Goodheart Creek - D17040207SK012_02b	7.55	No	Yes	No	selenium
		Yes	No	--	physical substrate
Maybe Creek – Source to Mouth - ID17040207SK014_02	5.23	No	Yes	No	selenium
		No	Yes	Yes	sediment
Dry Valley Creek - ID17040207SK013_02a	6.44	No	Yes	No	selenium
		Yes	No	--	physical substrate
Chicken Creek – Tributary to Dry Valley Creek - ID17040207SK013_02b	2.85	No	Yes	No	selenium
		No	Yes	Yes	sediment
Dry Valley Creek – Source to Mouth - ID17040207SK013_03	4.99	No	Yes	No	selenium
East Mill Creek - ID17040207SK015_02a	2.44	No	Yes	No	selenium
Stewart Canyon - ID17040207SK016_02f	2.99	No	Yes	Yes	sediment
Campbell Canyon - ID17040207SK016_02g	2.16	No	Yes	Yes	sediment
Diamond Creek – unnamed tributaries - ID17040207SK016_02	41.77	No	Yes	Yes	sediment
Upper Diamond Creek - ID17040207SK016_02a	4.43	No	Yes	No	temperature
Middle Diamond Creek - ID17040207SK016_03a	10.63	No	Yes	No	temperature
		No	Yes	Yes	sediment, e-coli
Lower Diamond Creek - ID17040207SK016_03	19.31	No	Yes	No	temperature
		No	Yes	Yes	sediment, e-coli

1 IDEQ 2020 Integrated Report Category 4c (Impaired by Other Pollution list)
2 IDEQ 2020 Integrated Report Category 5 (303d list). No TMDLs established.
3 IDEQ 2020 Integrated Report; Category 4a. Waters with established TMDL approved by EPA.
4 IDEQ Assessment Unit Code for the designated stream reach (IDEQ, 2020)

Figure 35. Closed Mine Disturbance Areas



The water bodies listed in **Table 28** as impaired for selenium are generally impacted by historic phosphate mining operations. Notably, East Mill Creek is impacted by effluent emanating from the toe of the East Mill Dump at the North Maybe Mine, and Maybe Creek is impacted from effluent emanating from the toe of the Cross Valley Fill at the South Maybe Canyon Mine. Historic concentrations of selenium at Station SW-2 in Maybe Creek below the Cross Valley Fill area ranged between 2,170 µg/L and 805 µg/L between 2011 and 2014 (Arcadis, 2020c). However, a single sample from Station SW-2 in 2019 resulted in a selenium concentration of 93 µg/L which may indicate positive effects from a recently employed synthetic cover and other water management remedial actions in the Cross Valley Fill area. Similarly, selenium concentrations below the North Maybe Mine pit in East Mill Creek have historically been elevated with concentrations ranging between 1,120 µg/L and 2,800 at Station HNSS-1 and between 34 µg/L and 666 µg/L at Station SWMC-1 approximately 2 miles downstream (Arcadis, 2020c).

3.5.3 Environmental Consequences

3.5.3.1 Proposed Action

Surface Water Flow and Water Rights

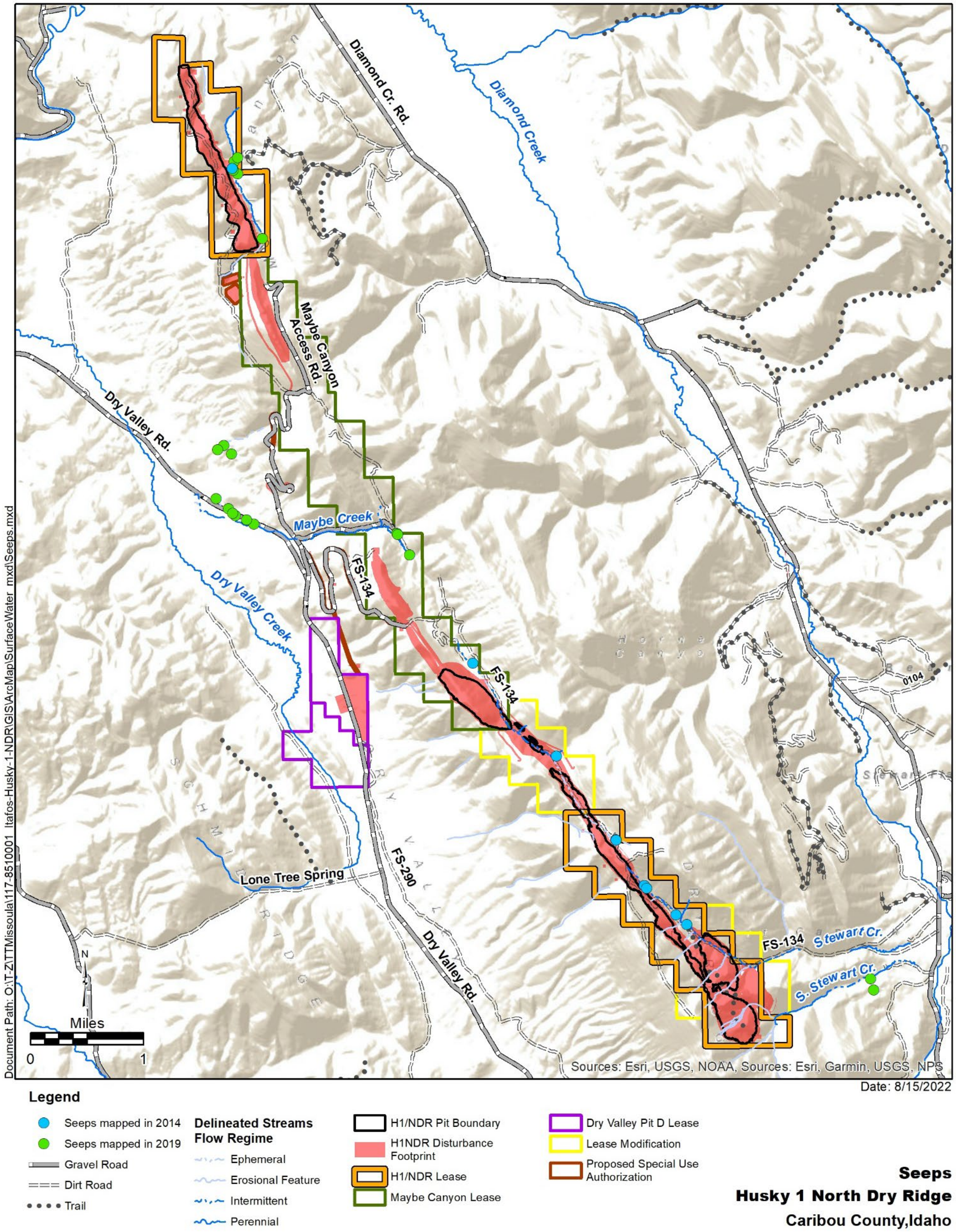
Groundwater flow modeling showed no adverse impacts on surface water base flows in stream (Tetra Tech, Inc., 2022a). Specifically, modeling of intermittent and perennial flows in Kendell Creek, East Mill Creek, Diamond Creek, Mosquito Creek, and Dry Valley Creek showed no reduction in stream baseflow. After closure, model results suggest that negligible or minor increases in baseline flow could occur in East Mill Creek, Diamond Creek, and Dry Valley Creek after approximately 20 years as the potentiometric surface recovers in the reclaimed mine pits. This potential increase becomes asymptotic after approximately 40 years. The model results showed no impacts on flow regimes in the Blackfoot River, and none are expected.

Groundwater flow modeling indicated that 28 mapped seeps within 1,000 feet of the proposed H1NDR pit boundaries could have reduced flow rates from reduced potentiometric heads that would result from mining. The majority of these seeps occur near East Mill Creek, Maybe Creek, and Stewart Creek (**Figure 36**). These seeps do not contribute significant flow to these creeks and would be expected to have no or negligible affects to stream flows.

The realigned channel of a portion of Stewart Creek would be designed to convey the stream flow that would result from the 100-year, 24-hour storm event plus a 6-inch freeboard. Conceptual channel designs would incorporate a 60 mils HDPE liner under a bedding layer and rip rap for stability. This design would limit infiltration of the flow into the fill or substrate. The design life of the buried liner system would be 200 to 750 years (Peggs, 2003). There would be no impacts to streamflow or flow regimes in Stewart Creek from the realignment. The engineered channel would be expected to be stable within the landscape because of the 100-year peak flow design capacity. Based on these design parameters, there would be limited flow events exceeding design capacity; due to the stream location and unyielding design, natural migration of the channel would not be expected. There would be no cumulative effect in surface water flows of streams, seeps, and creeks from the drawdown of groundwater under the Proposed Action.

The Proposed Action could result in the temporary loss of 7 stock water rights (1 permanently) that would be replaced in the short-term (Section 2.2.9.17). The permanent realignment of Maybe Creek and Stewart Creek could result in a direct, short-term loss of access to Maybe Creek and Stewart Creek stock water right place of use during the construction of the permanent stream beds. Impacts to grazing

Figure 36. Seeps



are discussed in more detail in Section 3.11.3.1. Additional indirect or cumulative impacts to existing water rights would not be expected because there are no other known impacts to water rights

Surface Water Quality from Groundwater

Groundwater modeling indicates that the Proposed Action cover would allow a gradual and limited selenium discharge into the headwaters of Stewart Creek, Maybe Creek, and East Mill Creek (**Figure 37** through **Figure 39**). Approximately 20 years after closure, selenium in groundwater discharging to these headwaters could exceed 20 to 50 µg/L, which is 10 times higher than the default aquatic life standard of 3.1 µg/L (**Table 26**).

Due to impacts from selenium and other COPCs stemming from the existing East Mill Dump, East Mill Creek is currently out of compliance with surface water standards and Idaho's Integrated Report listed it as impaired. Similarly, Maybe Creek is impacted by the existing Cross Valley Fill and is out of compliance with surface water standards and is listed as impaired. As a result of the above, the conditions at East Mill Creek and Maybe Creek would become further out of compliance and Stewart Creek, not currently impaired by selenium, would become out of compliance. This exacerbation of existing conditions is addressed by the Alternative Cover (see Section 3.5.3.3).

These H1NDR concentrations would reduce to undetectable levels after approximately 50 years. Stewart Creek, South Stewart Creek, and Diamond Creek are not listed under Section 303(d) as impaired for selenium (**Table 27**). Effects to water quality would be localized to headwater reaches where groundwater interactions occur and existing surface water flow would quickly mix with groundwater in the stream (Tetra Tech, Inc., 2021e). There would be no direct impacts on surface water quality, and indirect impacts would be negligible for all COPCs in downstream reaches of Stewart Creek and in Diamond Creek. No detectible impacts to water quality would occur in lower Diamond Creek, Dry Valley Creek, or the Blackfoot River.

The Blackfoot River has been adversely affected by increased selenium from phosphate mining activities, which are major and long-term until remediation actions at the inactive mines reduce selenium load to streams. While cumulative impacts from the Proposed Action after mixing would be negligible, they would represent a new source of loading of selenium to impaired streams, including East Mill Creek and the Blackfoot River. Reasonably foreseeable CERCLA remediation would reduce cumulative impacts.

Figure 37 through **Figure 39** present the predicted selenium concentration where groundwater discharges to Stewart Creek, East Mill Creek, and Maybe Creek.

Sedimentation

Negligible impacts to stream water quality and sedimentation could occur during construction and realignment of Stewart Creek. These impacts would be short-term and confined to construction disturbance. BMPs and EPMs (Sections 2.2.5 and 2.2.9.5) would minimize sedimentation. Long-term impacts on stream water quality would not be expected in Stewart Creek because of the stream realignment prior to mining.

Closing NFS Road 134 and the realignment of Stewart Creek are both expected to reduce sedimentation of the creek. At reclamation, the road would be restored and reopened but will be aligned so that all portions remain outside of AIZs in Stewart Creek, maintaining reduced sedimentation impacts to the creek. The site-specific stormwater management controls and BMPs would reduce the pollutants in storm water discharged and ensure that stormwater discharges meet

Figure 37. Proposed Action Simulated Selenium Discharging into Stewart Creek

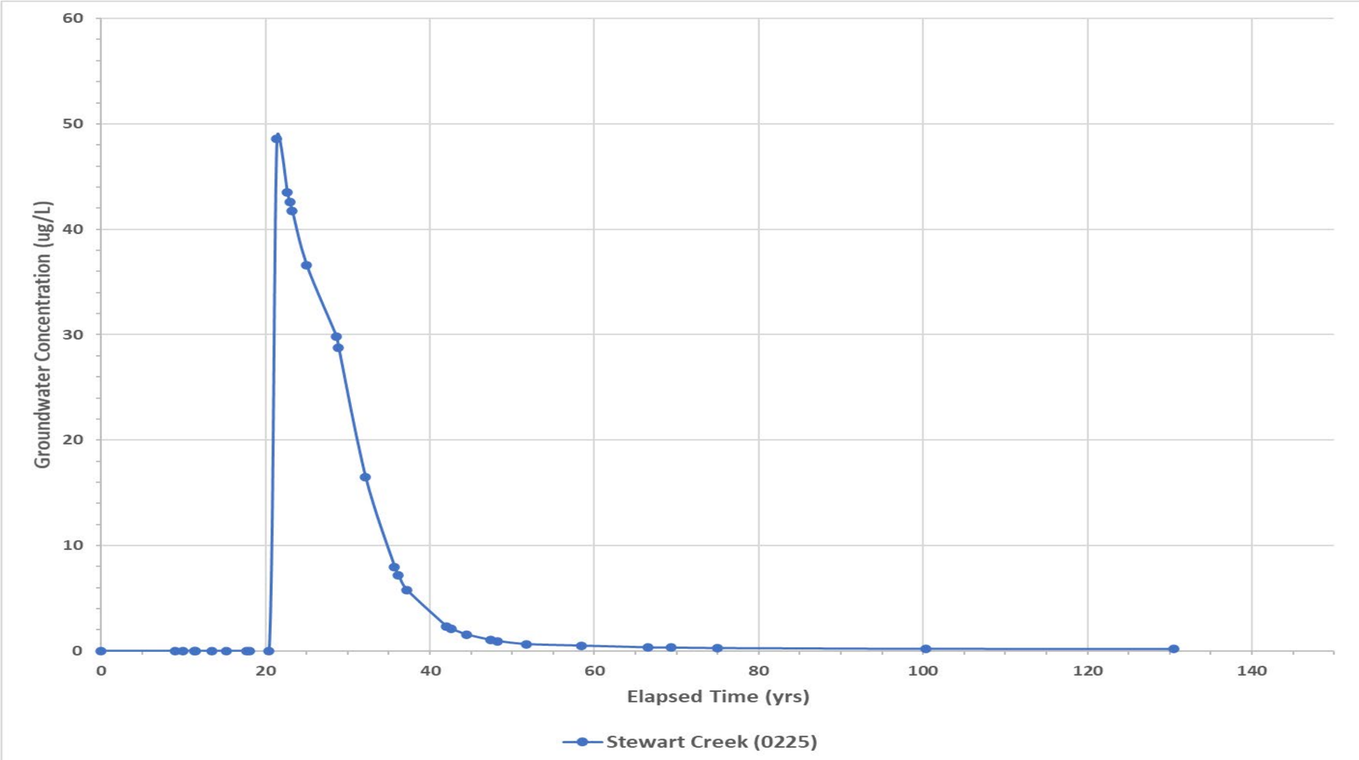


Figure 38. Proposed Action Simulated Selenium Discharging into East Mill Creek

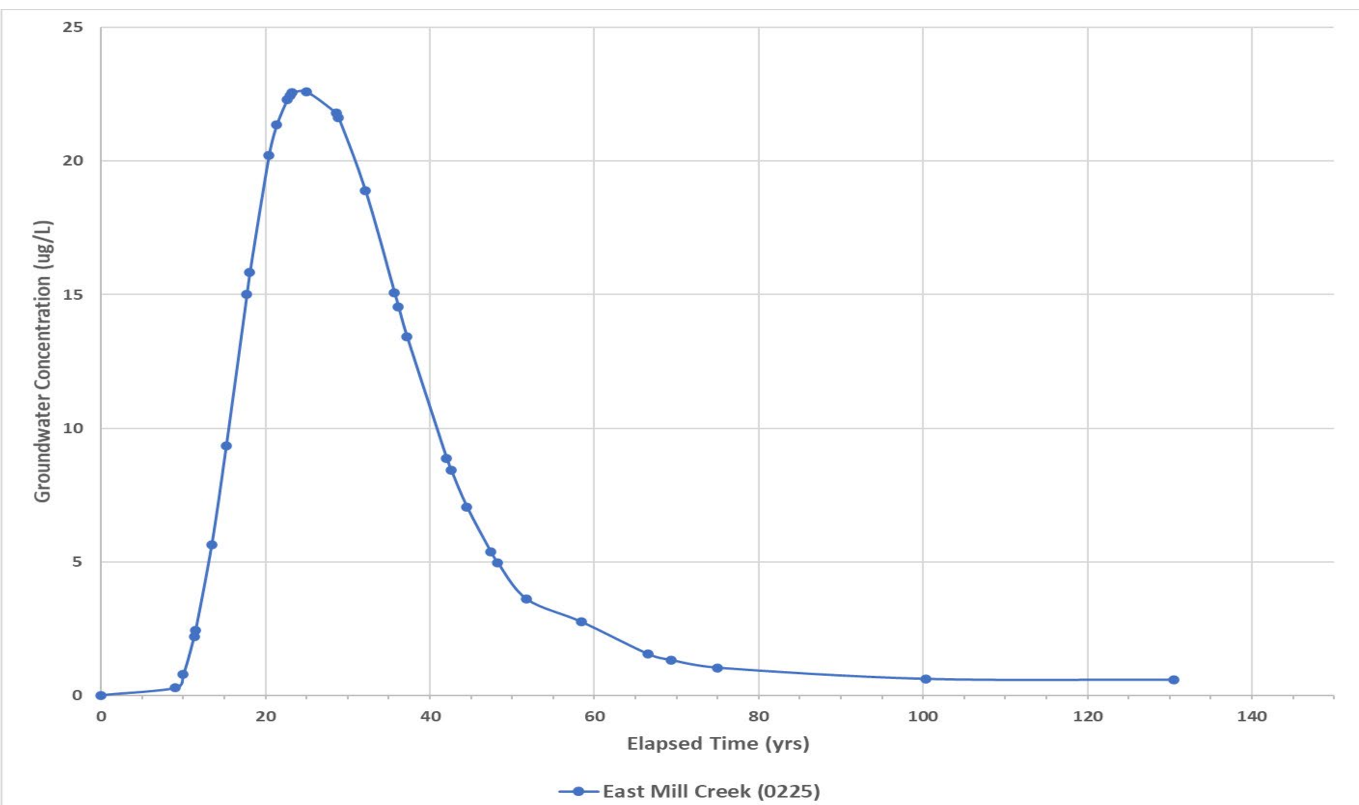
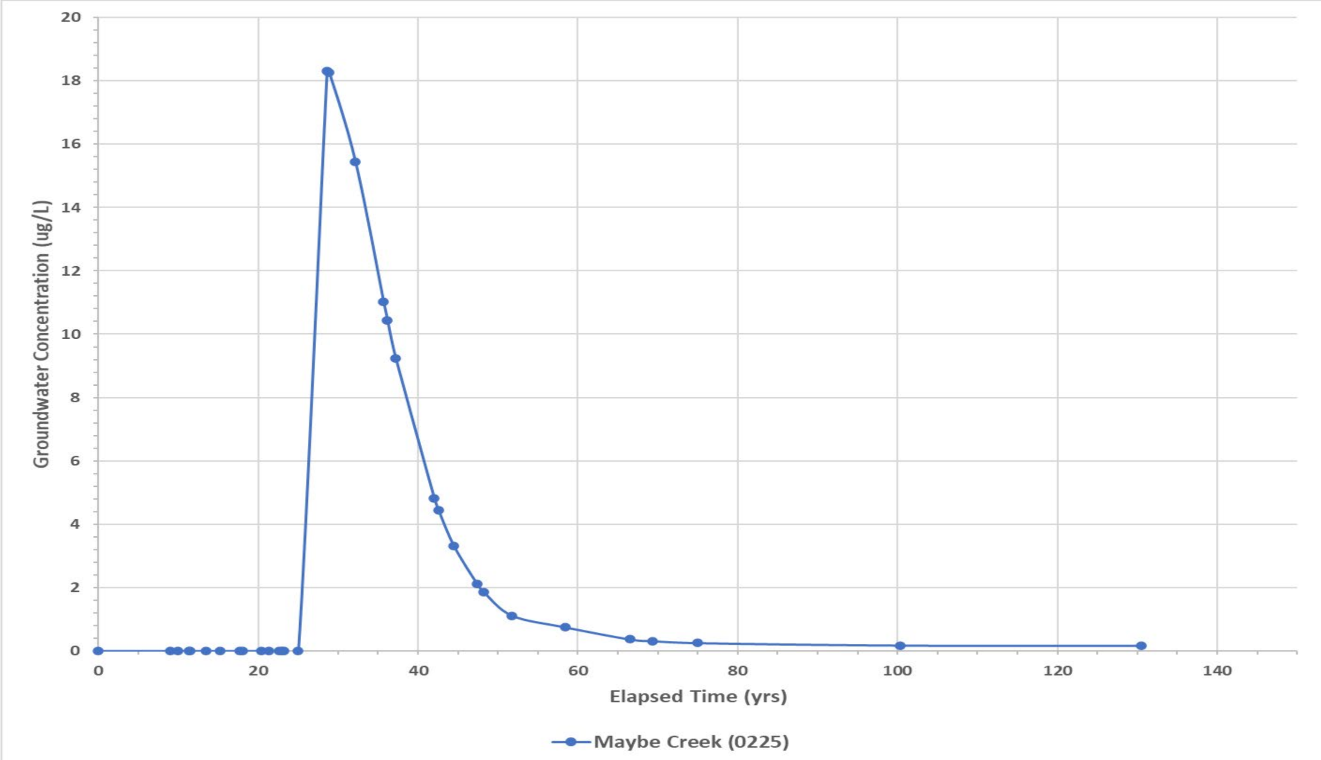


Figure 39. Proposed Action Simulated Selenium Discharging into Maybe Creek



applicable Idaho water quality standards and stormwater regulations. The 2003 RFP Transportation Guidelines include a requirement to design and construct roads to a standard appropriate to their intended use, considering safety, cost, and resource impacts, emphasizing protection of water quality.

Sediment impacts on surface water from construction or operation of the mine would be negligible because of the required permits and BMPs (MRP Surface Water Management Plan design for controlling surface water runoff and minimizing erosion, sedimentation (Itafos, 2020a, pp. D-1 Appendix D)) that would be employed.

Stewart Creek and Diamond Creek are Section 303(d) listed as impaired for sediment and temperature from past and present actions. The cumulative impacts on sedimentation would be reduced while the road is closed and be improved when the road is relocated outside the AIZ. Effects to water temperature in downstream reaches of Stewart Creek and in Diamond Creek would be negligible or minor from the Stewart Creek realignment, as surface water flow would quickly mix with groundwater in the stream. Temporary and permanent reclaimed channels would be designed and constructed using prescriptions according to the 2003) and AIZ guidelines.

Potential Conflicts with CERCLA actions from Maybe Creek Realignment

The Maybe Creek realignment would not result in additional impacts to water quality or produce conflicts with ongoing CERCLA actions (Section 3.2.1).

Because the channel will be constructed across limestone non-seleniferous fill, the water being conveyed north to the South Maybe Canyon Mine Cross Valley Fill would not add loading of COPCs, including selenium, to the areas under current remedial investigation.

3.5.3.2 No Action

Surface Water Flow and Water Rights

This MRP would not be implemented and stream flow and flow in seeps would not be affected. Existing water rights would not be affected.

Surface Water Quality from Groundwater

This MRP would not be implemented and stream water quality would not be affected above existing conditions. The streams that are listed as impaired under Section 303(d) of the Clean Water Act will remain in their current condition (**Table 27**). CERCLA remediation would continue and surface water quality would eventually improve. There would be no cumulative impacts.

Sedimentation

Impacts to stream water quality from ground disturbance, erosion, and sedimentation in the study area from the H1NDR Mine would not occur above existing conditions. Because NFS Road 134 would be reestablished outside of AIZ after mining (Section 2.2.9.4), sediment loads to Stewart Creek, which is listed under Section 303(d) for sedimentation, would be reduced after reclamation. There would be no cumulative impacts.

Potential Conflicts with CERCLA Actions from Maybe Creek Realignment

Impacts to flow and water quality in Maybe Creek from the North Maybe Mine and South Maybe Canyon Mine and specifically the South Maybe Canyon Mine Cross Valley Fill, would remain under current conditions. Site investigations and monitoring that are being conducted to define the nature and extent and the fate and transport of defined COPCs, including selenium, in support of a CERCLA Remedial Investigation/Feasibility Study would continue (see Section 3.2.1). There would be no cumulative impacts.

3.5.3.3 Alternative Cover

Surface Water Flow and Water Rights

The discharge of groundwater from the reclaimed mine pits to surface water would be less than under the Proposed Action, as indicated by the groundwater fate and transport model results (Tetra Tech, Inc., 2022a). There would be no impacts on surface water baseflows.

Potential direct impacts to the stock water rights would be the same as the Proposed Action. Indirect or cumulative impacts to existing water rights would not be expected.

Surface Water Quality from Groundwater

The Alternative Cover would reduce or prohibit the infiltration of meteoric water into the backfill and subsequent discharge to surface water compared to the Proposed Action. The groundwater model results indicate that limited discharge and no additional measurable loading of selenium and other COPCs would occur to Stewart Creek, Maybe Creek, and East Mill Creek. The reporting limit of selenium based on the EPA 6020B method is 0.5 µg/L (Arcadis, 2020d) and greater than the concentration of selenium modeled in the Alternative Cover. The maximum modeled concentration of selenium (0.2 µg/L) would be below the analytical reporting limit of 0.5 µg/L and essentially represents no detectable concentrations of selenium to the streams. Impacts to surface water quality would be undetectable in these streams. Concentrations of selenium in East Mill Creek and Maybe Creek would not change measurably when existing concentrations are added with H1NDR leachate.

Reasonably foreseeable CERCLA remediation would continue to address the existing conditions in these two steams, and with the deployment of the Alternative Cover system the H1NDR operations would not make this a more difficult endeavor.

No detectible impacts to water quality would be expected in the Blackfoot River. With the Alternative Cover, impacts from H1NDR would not add cumulatively to conditions in the Blackfoot River. Reasonably foreseeable CERCLA remediation would reduce cumulative impacts.

Sedimentation

Direct, indirect, and cumulative impacts from sedimentation to Stewart Creek and other site drainages from roads would not change the current conditions.

Potential Conflicts with CERCLA Actions from Maybe Creek Realignment

Direct, indirect, and cumulative impacts from the Maybe Creek realignment would be the same as the Proposed Action.

3.5.3.4 Alternative Stream Routing

Surface Water Flow and Water Rights

Direct, indirect, and cumulative impacts from water quantity and stream flow would be the same as described for the Proposed Action. Impacts to streamflow or flow regimes in Stewart Canyon would not be expected from construction of the alternate realignment at closure. because….

Both reclamation realignment alternatives and the ATV trail of Stewart Creek may result in an additional short-term loss of access to the Stewart Creek stock water right place of use during the construction of the reclaimed stream bed. Other impacts to the stock water rights would be the same as the Proposed Action.

Surface Water Quality

Direct, indirect, and cumulative impacts to surface water quality would be the same as the Proposed Action. Impacts to flow and water quality would be the same for both stream reclamation realignment alternatives.

Sedimentation

Direct, indirect, and cumulative impacts to water quality from surface disturbance, potential erosion, and sedimentation would be expected to be the same as described for the Proposed Action.

Potential Conflicts with CERCLA Actions from Maybe Creek Realignment

Direct, indirect, and cumulative impacts from the Maybe Creek realignment would be expected to be the same as the Proposed Action.

3.5.3.5 Alternative Access 1 and Alternative Access 2

Surface Water Flow and Water Rights

Direct, indirect, and cumulative impacts to water quantity and streamflow from Alternative Access 1 road or ATV trail or Alternative Access 2 would be expected to be the same as described for the Proposed Action. To meet standards in the 2003 RFP, the road will be designed to avoid impacts on surface water flow.

Surface Water Quality from Groundwater

Direct, indirect, and cumulative impacts to surface water quality from Alternative Access 1, Alternative Access 2, or the ATV trail would be the same as the Proposed Action.

Sedimentation

Realigning NFS Road 134 or the ATV trail would eliminate the close proximity of the road to Stewart Creek in the mining area. Sediment loading to Stewart and Maybe creeks from the current road would be reduced or eliminated by rerouting 5.8 miles of the road away from close proximity to the creek. Direct, indirect, and cumulative impacts to water quality would be negligible or none from the new road segment.

Potential Conflicts with CERCLA Actions from Alternative Access

Direct, indirect, and cumulative impacts from the Alternative Access 1 road or ATV trail would be expected to be the same as described for the Proposed Action.

Alternative Access Road 2 is specifically designed to avoid adjacency with the Cross Valley Fill to be more protective of the CERCLA cover by reducing inadvertent public access and limit surface water impacts.

3.5.3.6 Alternative Sequence

The mining sequence modified under Alternative Sequence to begin mining in NDR then moving to H1 would not change the impacts on surface water because impacts on groundwater described in sections 3.4.3.3 and 3.4.3.5 would not change and the surface water management described in section 2.2.5 would be the same (USFS, BLM, Tetra Tech, 2022).

3.6 Wetlands, Non-wetland Waters, and Riparian Vegetation

The Clean Water Act as amended in 1972 establishes the basic structure for regulating discharges of pollutants into waters of the U.S., including wetlands. Impacts to jurisdictional wetlands would be permitted through the U.S. Army Corps of Engineers.

Clean Water Act Section 404(b)(1) guidelines are the criteria used to evaluate discharges of dredged or fill material into waters of the U.S. A fundamental principle of the Section 404(b)(1) guidelines is that dredged or fill material should not be discharged into wetlands and other waters, unless it can be demonstrated that there is not a practicable alternative to the proposed discharge that would have less adverse impact on aquatic resources. Section 404(b)(1) also specifies that the proposed discharge must not cause or contribute to the violation of other applicable Federal or state laws (e.g., water quality standards, Section 7 of the Endangered Species Act, Section 106 of the National Historic Preservation Act), the project will not result in significant degradation of waters of the U.S., and any appropriate and practicable steps have been taken to minimize the adverse impacts on wetlands and other waters. This is referred to as the least environmentally damaging practicable alternative. For actions subject to NEPA, the Section 404(b)(1) guidelines provide the necessary information for evaluation.

3.6.1 Analysis Area and Methods

The wetland and non-wetland waters of the U.S. and riparian vegetation analysis area is the project footprint, including all areas of surface disturbance from development of the mine pits and supporting infrastructure. The analysis area for downstream effects to wetlands and non-wetland waters of the U.S. is the same as the surface water analysis area, shown in **Figure 33**. The analysis area extends outside of the mine disturbance footprint to include surface water adjacent to or downstream from the project that may be affected by changes in water quantity or quality. Thus, the analysis area also includes a portion of the upper Blackfoot River Subbasin.

The issues for analyzing impacts on wetlands, non-wetland waters, and riparian vegetation, and the methods that will be used to discuss them are shown in **Table 28.**

Table 28. Issues and Indicators for Wetlands, Non-wetland Waters, and Riparian

Issue	Analysis Method
Acres of wetlands and linear feet of streams (non-wetland waters) that would be permanently lost	Quantify the acreage of wetlands and linear feet of streams impacted and identify whether impacts are temporary or permanent. Qualitatively discuss the wetlands impacted and the riparian vegetation loss from affected streams.
Hydrologic changes due to mine development on wetlands, including seeps and streams	Qualitatively discuss the potential effects using information provided in the project water resources analysis (surface and groundwater effects)
Storm water runoff to contact wetlands and streams	Qualitatively discuss habitat degradation (sedimentation), potential plant uptake of COPCs, and proposed preventative measures.

3.6.2 Affected Environment

Wetlands

Baseline surveys delineated unique wetland features totaling 22.7 acres in the study area. Wetland types mapped, based on the Cowardin classification system (Cowardin, et al., 1979) and the hydrogeomorphic classification system (Brinson, 1993), included palustrine emergent, a mosaic of emergent and scrub-shrub, a mosaic of scrub-shrub and forested (noted as having been partially logged), scrub-shrub, riverine, slope, and depressional.

Non-Wetland Waters and Riparian Vegetation

Non-wetland water features were mapped as segments depending on flow regime and organized by 6^{th}-level watersheds. The 6^{th}-level watersheds in the analysis area are shown in **Figure 33**. Perennial and intermittent streams are included in the riparian vegetation assessment. Riparian communities documented in the study area include aspen/mesic forb, mesic forb meadow, conifer, shrub (*Salix* sp.), *Carex* sp., and conifer/mesic forb (Arcadis, 2020g). Streams and water quality are shown in **Table 27**.

3.6.3 Environmental Consequences

3.6.3.1 Proposed Action

Wetlands

Acres of wetlands that would be directly impacted by dredge/fill activities as part of the construction of mine pits and roads, resulting in a permanent loss are shown in **Table 29**. The Feature Identification label from the baseline studies is provided as a cross-reference. **Figure 40** shows approximately where the impacts would occur. Impacts on wetlands would be permanent, but the acreage of wetlands lost is a relatively small total amount. This loss would be irreversible. Wetlands affected include small seep-fed wetlands and wetlands formed due to impoundments. The total loss of wetlands would be minor.

Table 29. Acres of Wetlands Permanently Disturbed (Lost) by Type

Cowardin Classification[1] Hydrogeomorphic Class Feature ID2	Sub-watershed	Comments	Artificially Created	Acres
PEMC Slope AB-092712-1052	Angus Creek-Blackfoot River	Wide, low-gradient section of East Mill Creek with slope seep contributing to hydrology. Wallow within wetland boundaries and depressional wetland feature on slope.	No	0.03
PEMC Slope AB-072613-1220	Angus Creek-Blackfoot River	Hillside, seep-fed, located on slope above East Mill Creek.	No	0.01
PEMC Slope DV-092912-0830	Dry Valley Creek	Sedge, seep-fed wetland in valley bottom.	No	0.01
PEMC Slope DV-071614-1130	Dry Valley Creek	Seep wetland located at the head of non-wetland water feature DV-082313-1330	No	<0.01
PEMC AB-071714-1025	Angus Creek-Blackfoot River	Emergent depressional wetland	No	0.01
PEMCh Riverine DV-092912-1120	Dry Valley Creek	Fringe wetland around an impounded pond; water flows in and out of pond.	Yes; Excavated	0.09
Total Acres				0.16

1 PEMC = palustrine emergent, seasonally flooded; PEMCh= palustrine emergent, seasonally flooded - diked/impounded; PSSC=Palustrine Shrub-scrub

2 Sources: (Tetra Tech, Inc., 2014d; Arcadis, 2020g)

Non-wetland Waters and Riparian

Table 30 presents linear feet of streams impacted, grouped by sub-watershed. **Figure 40** shows where impacts would occur. The general effect on the length of other waters lost would be moderate. Impacts on riparian vegetation of the individual segments are discussed below.

Perennial or intermittent segments of East Mill Creek, Lower Maybe Creek, Upper Maybe Creek, Stewart Creek, and tributaries of Upper Maybe Creek would be dredged, filled, and/or realigned. A total of 1,439 linear feet (0.27 mile) of perennial stream and 8,666 linear feet (1.64 mile) of intermittent stream would be impacted with development of mine pits and construction of roads. Riparian vegetation along the impacted segments would be removed, resulting in a permanent, irreversible loss.

Approximately 5,289 linear feet (approximately 1 mile) of ephemeral channel segments in Upper Maybe Creek would be dredged or filled. Impacts on riparian vegetation would not occur along these channels, as riparian vegetation does not occur.

Figure 40. Wetland impacts

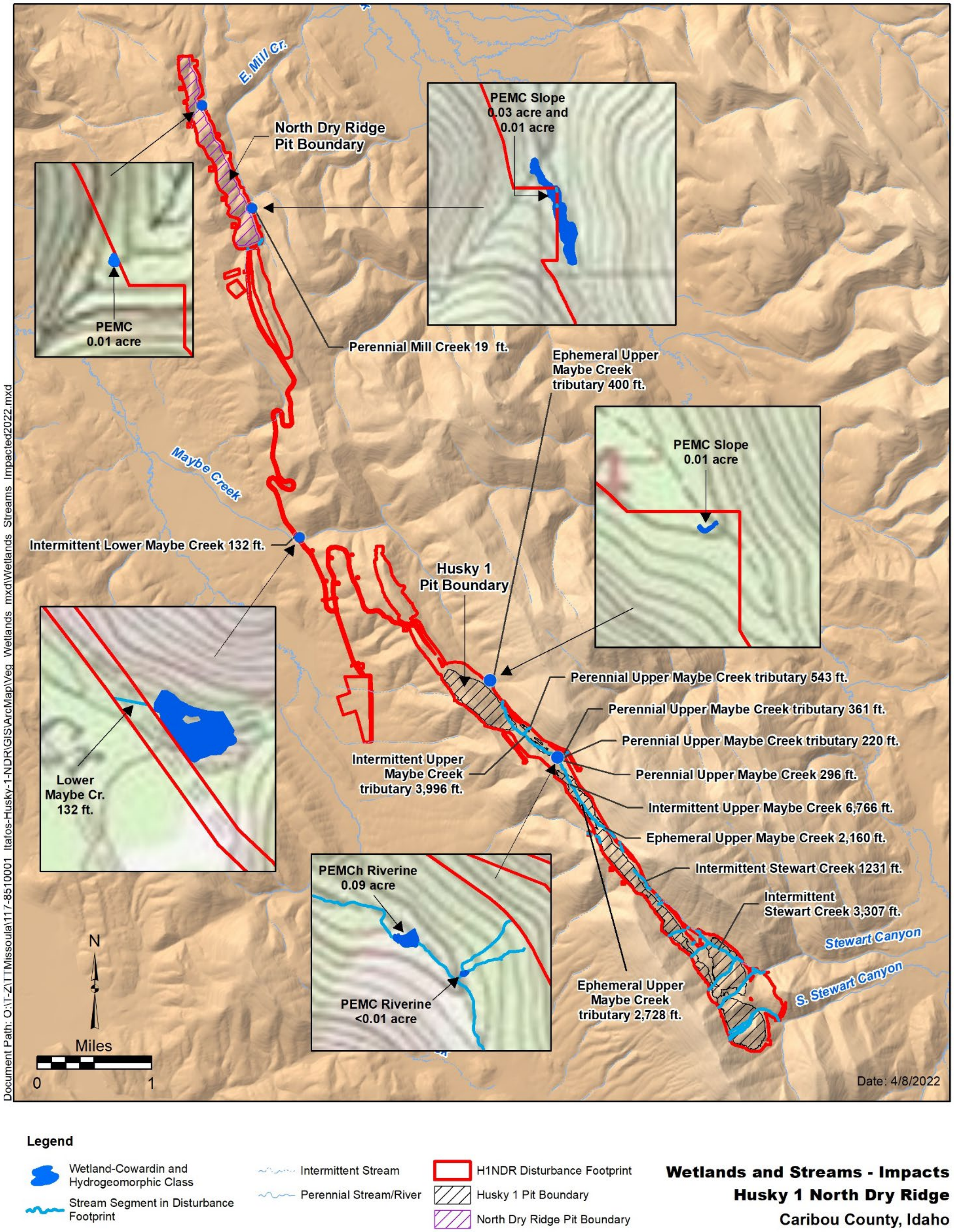


Table 30. Linear Feet of Streams Impacted by Flow Duration and Sub-watershed

Sub-watershed	Stream Name Feature Identification[1]	Notes	Feet[2]
Perennial Stream Segments			
Angus Creek-Blackfoot River	East Mill Creek AB-092712-1030	East Mill Creek originates from the down-gradient side of a large reclamation area and supports several wetlands along its reach.	19
Dry Valley Creek	Upper Maybe Creek DV-092912-0830	Small stretch of upper Maybe Creek fed from wetland features (082313-1330 and 082313-1350), flows into an excavated pond.	220
Dry Valley Creek	Upper Maybe Creek tributary DV-082313-1350	Seep-fed tributary to upper Maybe Creek, flows through wetland feature (082313-1330) before entering upper Maybe Creek.	361
Dry Valley Creek	Upper Maybe Creek tributary DV-082313-1330	Seep-fed tributary to upper Maybe Creek with an old spring box at the source. One culvert along reach.	296
Dry Valley Creek	Upper Maybe Creek tributary DV-082313-1130	Seep-fed tributary to upper Maybe Creek with shrub riparian community. One culvert along reach.	543
Total Perennial:			1,439
Intermittent Stream Segments			
Dry Valley Creek	Upper Maybe Creek DV-092912-0820	Intermittent portions of upper Maybe Creek. Seeps contribute flow to these sections.	3,996
Headwaters Diamond Creek	Stewart Creek HD-093012-0320	Includes a small seep within ordinary high-water mark.	1,231
Headwaters Diamond Creek	Stewart Creek HD-093012-0340	Lower portion of Stewart Creek, seep fed, adjacent to access road.	3,307
Dry Valley Creek	Lower Maybe Creek DV-072813-0945	Lower Maybe Creek channelized by railroad up-gradient and road lower in the valley. Three culverts were recorded in the reach.	132
Total Intermittent:			8,666
Ephemeral Stream Segments			
Dry Valley Creek	Upper Maybe Creek DV-092912-0825	Ephemeral section of Upper Maybe Creek. Dry channel with upland vegetation.	400
Dry Valley Creek	Upper Maybe Creek DV-092912-0820b	Ephemeral segment of Upper Maybe Creek.	2,728
Dry Valley Creek	Upper Maybe Creek DV-082213-0930	Ephemeral channel	2,160
Total Ephemeral:			5,289

1 Sources: (Tetra Tech, Inc., 2014d; Arcadis, 2020g)

2 Calculated from GIS

East Mill Creek

The approximately 19 feet of East Mill Creek that would be impacted by development of the mine pit receives flow from an existing holding pond of the NDR reclaimed mine area. Additional flow is added from seeps. Riparian vegetation lost by development of the mine pit would include the vegetation community/cover types of aspen/mesic forb, barren, anchored log, mesic forb meadow, and conifer/mesic forb (Arcadis, 2020g). The seep wetlands lost would be considered a minor effect because a relatively small area would be affected. The associated riparian vegetation impacted would be a minor and long-term effect, but vegetation was characterized as heavily disturbed.

Lower Maybe Creek

The approximately 132 feet of Lower Maybe Creek that would be disturbed by widening the access road to NDR, is currently channelized by the existing railway and road. The wetland associated with this stream segment has formed from an impoundment caused by a culvert. Haul road development would require placement of an additional culvert, which would result in a permanent loss of 0.05 acre of shrub-scrub wetland. The culvert would allow streamflow and connection between the wetland and the stream, maintaining the remainder of the existing wetland. The loss of a small portion of shrub-scrub wetland vegetation would be long-term and minor.

Sedimentation may occur during construction but would be minimized with implementation of BMPs and erosion control devices. Installation of a culvert would minimize sedimentation from road use.

Upper Maybe Creek and Tributaries

Approximately 2.0 miles (10,703 feet) of Upper Maybe Creek, as ephemeral, intermittent, and perennial segments combined, would be impacted by the realignment or culverts. Associated wetland communities and riparian vegetation lost would include mesic forb meadow, aspen/shrub, conifer, and aspen/mesic forb community types. The greenline transects results included anchored logs, indicating portions of this segment have been previously altered. The realignment would maintain flows during operations and during the reclamation phases. Impacts are shown in **Table 30**. Loss of the riparian vegetation from realignment would be permanent and moderate.

Stewart Creek

Approximately 0.86 mile (4,538 feet) of Stewart Creek (intermittent segments) would be permanently realigned. Flow would be maintained, but riparian vegetation removed along the intermittent and perennial creek segments would be a moderate, permanent impact. Riparian vegetation was documented as approximately 80% cover as a mix of confer/shrub, shrub (*Salix* sp.), shrub/mesic forb, and *Carex* communities.

Water Quantity

Hydrologic changes to groundwater under any of the action alternatives due to mine development, stream relocation, or alternative access provided would not occur to the degree that would alter hydrologic functions of wetlands, including seeps and non-wetland waters. Additional details are provided in Section 3.4 and Section 3.5, Groundwater Resources and Surface Water Resources, respectively. Water quantity would not be reduced because stream crossings and culverts would convey non-contact surface water under roads or other mining features to maintain drainage and water flows at a depth and volume similar to the surrounding portions of the stream. Natural flow would be maintained where fill materials and most culverts would be removed at the conclusion, and drainages truncated by the pits would be re-routed to not change flow quantities. Impacts on wetlands, including seeps and non-wetland waters due to changes in water quantity, would be negligible.

Water Quality

Degradation of wetlands and riparian habitat from erosion and sedimentation during construction and operations, or from stormwater runoff contacting wetlands and streams, would be minimized through design features, BMPs, adherence to 2003 RFP standards, and implementation of a site-specific SWPPP. These measures would also prevent habitat degradation of adjacent and downstream wetlands and non-wetland waters due to sedimentation. The potential for plant uptake of COPCs would be minimized but not eliminated, per direction that would be followed in the Surface Water Management Plan, Appendix D of the MRP. Water would be managed based on its potential for transporting COPCs, thus the potential of bioaccumulation would also be minimized.

EPMs and BMPs (Section 2.2.9) would minimize degradation of wetlands and non-wetland waters.

Sedimentation to wetlands and non-wetland waters from access and haul road construction would be minimized by proper placement and sizing of culverts to maintain connectivity between streams and wetlands at stream crossings and minimize erosion and sedimentation.

Cumulative impacts on wetlands were analyzed in the Rasmussen Valley EIS. The Rasmussen Valley Mine is approximately 3 miles north of the HINDR (see **Figure 16**). Although the cumulative acres of wetlands impacted were not quantified, past and present activities that occur in the area likely contribute to wetland impacts. Programs administered by various regulatory agencies have greatly reduced or eliminated potential net loss of wetlands through some type of mitigation (i.e., enhancement, restoration, or creation). Impacts resulting from agricultural activities are relatively transient and reversible, whereas roads, buildings, and mines may have long-term or permanent impacts on wetlands as a result of changes in topography and hydrology. Additionally, impacts resulting from sedimentation and selenium contamination have likely occurred in the area but are difficult to quantify. It is possible that elevated selenium concentrations have occurred in wetland waters, plants, and sediments in the area given the results of the Mebane study (Mebane, et al., 2015). However, visual inspection of the most recent 2 years of data suggests that impacts to wetlands from selenium may be less severe than the older data would indicate. The cumulative loss and alteration of wetlands and non-waters, and riparian vegetation would be moderate, as would the effect on water quality from sedimentation and transport of selenium. Net losses would be addressed through the Clean Water Act regulatory process.

3.6.3.2 No Action

Under the No Action Alternative, this MRP would not be implemented and there would be no acres of wetlands and no linear feet of streams and associated riparian vegetation impacted or lost. There would be no impacts to wetlands from erosion and sedimentation. No direct, indirect, or cumulative impacts would occur to wetlands, non-wetland waters, and riparian vegetation.

3.6.3.3 Alternative Cover

Acres of wetlands, linear feet of non-wetland waters, and riparian vegetation removed, and direct, indirect, and cumulative effects on water quality due to sedimentation would be the same as the Proposed Action. Groundwater flow modeling demonstrated that the Alternative Cover design would reduce infiltration of meteoric water into the backfill and, subsequently, the discharge of selenium-contaminated water into seeps and streams would be reduced compared to the Proposed Action.

Effects on water quality due to potential transport of COPCs from groundwater, and the potential for uptake by riparian and wetland vegetation, would be eliminated.

3.6.3.4 Alternative Stream Routing

Alternative Stream Routing would create 4,443 feet of new channel to reroute Stewart Creek during mine operations (Operational Realignment). Reclamation would return the alignment of Stewart Creek to its original location as a channel 4,705 feet in length (1,599 feet lined; 405 feet of unlined perennial; and 2,701 feet of unlined intermittent). Direct, indirect, and cumulative effects would be reduced compared to the Proposed Action in that the stream is still being relocated, and the stream would use the original stream bed, as shown in **Figure 14**.

3.6.3.5 Alternative Access 1 and Alternative Access 2

Additional effects on non-wetland waters are shown in **Table 31**. Road improvements under the Proposed Action that would affect Lower Maybe Creek would also occur under the Alternative Access 1 road or ATV trail. Riparian vegetation along the impacted segments would be removed, resulting in a permanent, irreversible loss of riparian vegetation, as 0.06 acre along intermittent segments and 3.3 acres along perennial segments (3.4 acres total) in the Alternative Access 2 disturbance area.

Table 31. Access Road Linear Feet of Non-Wetland Waters Disturbed

Stream Name Feature Identification[1]	Feet of Additional Disturbance over Proposed Action for Alternative Access 1	Feet of Additional Disturbance for ATV Trail	Feet of Additional Disturbance Over Proposed Action for Alternative Access 2
Maybe Creek (DV-072813-1400)	159	27	0

1 Sources: (Tetra Tech, Inc., 2014d; Arcadis, 2020g)

3.6.3.1 Alternative Sequence

The mining sequence modified under Alternative Sequence to begin mining in NDR then moving to H1 would not change the impacts on wetlands, non-wetland waters, and riparian areas because the impacts on surface water would not change (USFS, BLM, Tetra Tech, 2022, 2022), nor would the disturbance described in **Table 29** and **Table 30**.

3.7 Aquatic Species

3.7.1 Analysis Area and Methods

The analysis area for aquatic species is the portion of the Upper Blackfoot River Subbasin shown on **Figure 41**. Streams and rivers and HUC-6 were used for the boundaries of the analysis area, with the Blackfoot River as the northern boundary, the Diamond Creek and Headwaters Diamond Creek watersheds as the eastern and southern boundaries, and the Dry Valley Creek watershed and upper portion of the Middle Slug Creek watershed as the western boundaries. This topographically defined watershed area was selected to encompass all downstream aquatic species habitat that could be affected by transport of COPCs or sediment from the H1NDR Mine and existing and historic mines, and includes the Blackfoot River within the Blackfoot Wildlife Management Area. The analysis of aquatic species is focused on fish and amphibians. Monitoring of fish and macroinvertebrates are surrogates to detect changes or effects to other aquatic species, including mollusks and crayfish. Mollusks and crayfish could be present based on range and habitat suitability, but no mollusk and crayfish occurrences have been documented.

The issues for analyzing impacts on fish and amphibians and the indicators that will be used to discuss them are shown in **Table 32**.

Table 32. Issues and Indicators for Fish and Amphibians

Issue	Analysis Method
Miles of fish and amphibian habitat modified or removed. Miles restored by reclamation to current conditions	Estimate miles of fish-bearing streams and fishless streams, number of ponds, acres of other amphibian habitat (forests), acres of wetlands, and acres of AIZ directly modified by mining and reclamation activities.
Reduction in the quantity of water in streams, ponds, and seeps to a degree that habitat for fish and amphibians would be affected.	Based on quantitative data on surface and groundwater resource impacts, assess if reductions in surface water volumes would affect occupied fish and amphibian habitat.
Alteration of surface water quality to a degree that fish and amphibians would be affected, including in the Blackfoot River	Based on surface and groundwater impacts and compare to applicable IDAPA aquatic life criteria. Effects analysis will consider existing conditions of surface waters. Selenium is the focus because it bioaccumulates through the aquatic food chain, because high levels can have adverse effects on fish. Increases in selenium levels in streams, ponds, and seeps and impacts on downstream fish reproduction and survival will be discussed qualitatively. Sedimentation of surface waters and effects on occupied habitat will be discussed qualitatively.
Effects on threatened, endangered, and sensitive fish and amphibian species	Based on analysis in above issues, qualitatively describe impacts on threatened, endangered, and sensitive species that occur in the analysis area.

3.7.2 Affected Environment

Fish and Amphibian Habitat

Fish habitat includes streams that support fish or have the potential to support fish. Fish habitat is primarily in perennial streams, with intermittent streams being used seasonally or in high-water years. Ephemeral drainages that are dry except during storm events do not provide habitat for fish. Fish distributions in the analysis area were derived from IDFG-mapped fish distributions (IDFG, 2006), USFS's fish sampling database for the Caribou Targhee National Forest, and the H1NDR baseline fish study (Arcadis, 2020e). Based on these data sources, there are approximately 57 miles of fish-bearing streams in the fisheries analysis area (**Figure 41**). Fish-bearing streams in the analysis area that are not a primary or secondary receiver of water from H1NDR are not described further because these would not be affected by H1NDR. Fish-bearing streams downstream of H1NDR that are primary or secondary receiving waters are listed in **Table 33** along with the miles of stream in the analysis area. Although the headwaters of East Mill Creek are perennial, the midsection is usually dry, which precludes fish from occupying this portion of the stream. The upper half-mile of East Mill Creek (above the canyon bend) that is adjacent to H1NDR is considered fishless and not fish habitat. Fish are present in the portion of Dry Valley Creek near the confluence with the Blackfoot River but have not been detected in the upper reaches of Dry Valley Creek. Intermittent streams that were investigated as potential fish habitat during baseline surveys include Stewart Creek, which had water but no fish detected, and South Stewart Creek and Maybe Creek, which were dry (Arcadis, 2020e). Baseline water volumes in these streams are provided in **Table 25**.

Figure 41. Fish and Amphibians Analysis Area

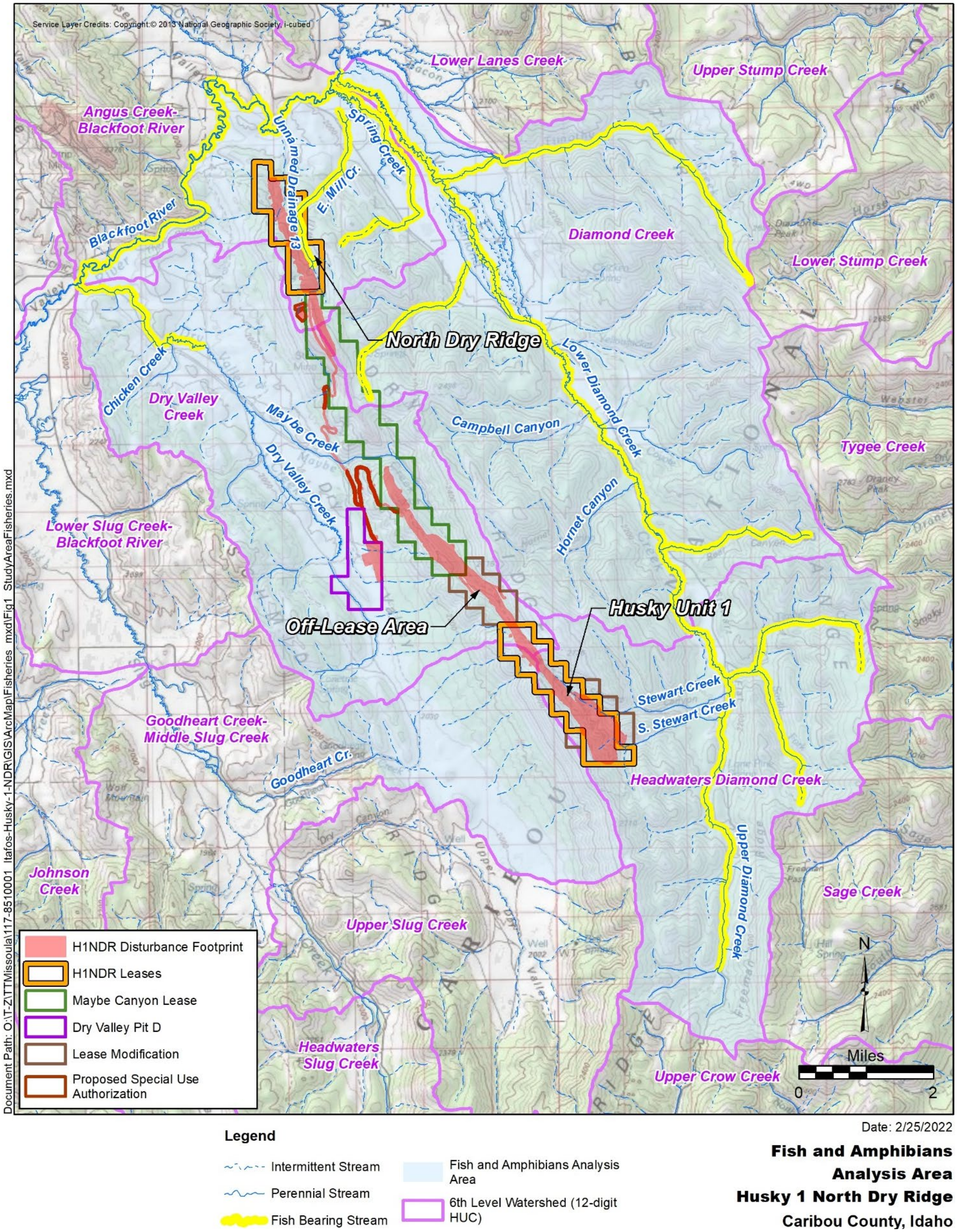


Table 33. Fish Bearing Streams in the Analysis Area

Stream Name	Miles within Fisheries Analysis Area[1]	Primary Receiving Water[2] From H1NDR
Diamond Creek	18.9	Secondary
Blackfoot River	10.6	Secondary, tertiary
Timothy Creek	6.4	No
Mosquito Creek	4.2	No
East Mill Creek[3]	2.7	Primary
Timber Creek	3.2	No
Kendall Creek	2.9	No
Dry Valley Creek	2.9	Secondary
Bear Canyon	2.4	No
South Fork Timber Creek	2.3	No
Angus Creek	0.1	No
Total	56.6	

Note: totals may not add up exactly due to rounding.

1 Based on US Geological Survey National Hydrography Dataset, Yellowstone cutthroat trout distribution (May, et al., 2003), and fisheries surveys.

2 Based on surface water flow within HUC- 12, a primary receiving water is a stream that flows directly out of H1NDR; secondary receiver is a stream that a primary receiver flows into; tertiary receiver receives flow from secondary receiver streams

3 Formerly known as Mill Creek, Mill Canyon, or Mill Canyon Creek

Physical properties of stream water were recorded during the baseline fisheries study to identify any factors that could be limiting fish habitation. Temperature, pH, and dissolved oxygen levels were adequate for fish and would not preclude fish from inhabiting any of the surveyed streams. See baseline report for other details on streams, such as condition ratings based on stream macroinvertebrate index and abiotic conditions (Arcadis, 2020e).

Land uses in the analysis area include agriculture, grazing, and mining.

Amphibian habitat in the amphibian analysis area consists of natural and man-made ponds, seeps, and wetted sections of streams. Many of the smaller ponds and streams that were surveyed in baseline studies were dry by the end of summer.

Amphibians

Amphibian species that have range and suitable habitat in the analysis area include boreal toad (*Anaxyrus boreas boreas*), northern leopard frog (*Lithobates pipiens*), boreal chorus frog (*Pseudacris maculata*), and western tiger salamanders (*Ambystoma mavortium*) (IDFG, 2020). None of these have been documented in the analysis area except tiger salamanders. Tiger salamanders were observed in both the 2013/2014 and 2019 baseline studies, including in ponds and along the creek in East Mill Creek canyon, in ponds in the upper Maybe Creek drainage, in four natural and man-made ponds to the southeast of the H1NDR Mine (south of South Stewart Canyon), and in ponds near Dry Valley Creek (Arcadis, 2020f) (Tetra Tech, Inc., 2014d). Tiger salamanders also use upland habitat outside the breeding season, with upland use likely focused on the area within 1.5 miles of breeding ponds (Orloff, 2011).

Fish Species

A summary of game and non-game fish species documented in the H1NDR-influenced streams in the analysis area is provided in **Table 34**. The Blackfoot River supports a robust fishery for both diversity and abundance of fish species. Diamond Creek also supports a sustained fishery, particularly on the lower segments. There are currently a limited number of fish in East Mill Creek, with four fish or less captured at each sampling event during the baseline studies.

Table 34. Fish Species Present in the Analysis Area

Stream Name	Species Present	Data Source
Blackfoot River	Brook trout[1] Longnose dace Mottled sculpin Mountain sucker Paiute sculpin Redside shiner Sculpin, unknown species Speckled dace Utah sucker Yellowstone cutthroat trout	IDFG, unpublished data
Diamond Creek	Brook trout[1] Mottled sculpin Paiute sculpin Rainbow trout[1] Redside shiner Sculpin, unknown species Speckled dace Yellowstone cutthroat trout	USFS, IDEQ, unpublished data, H1NDR 2013 baseline study
East Mill Creek[2]	Brook trout[1] Yellowstone cutthroat trout	USFS, H1NDR 2013 baseline study

Source: (Arcadis, 2020e)
1 Non-native game fish
2 Formerly known as Mill Creek, Mill Canyon, or Mill Canyon Creek

Aquatic Influence Zones

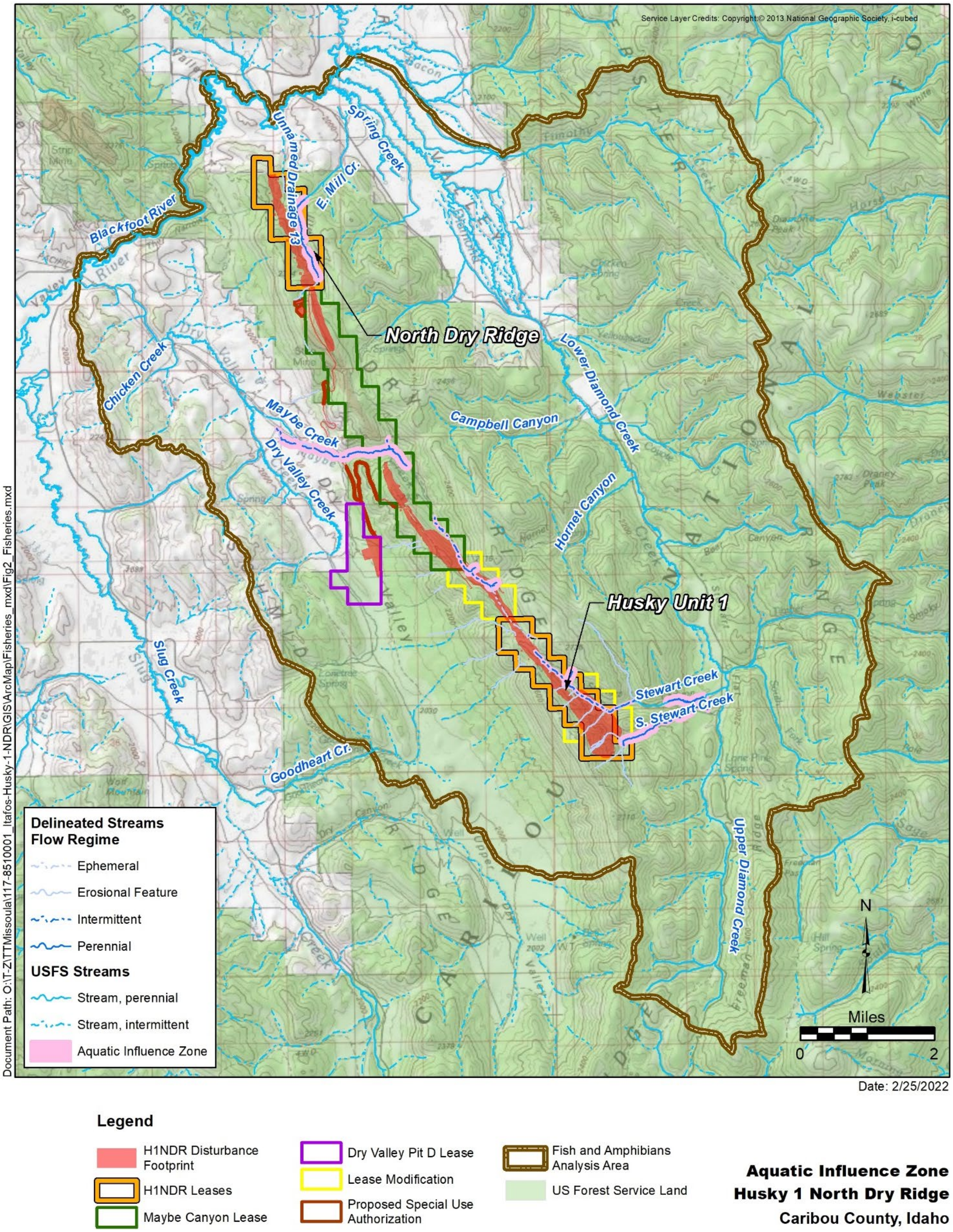
There are 484 acres of AIZs mapped on NFS lands in the fish and amphibian analysis area (**Figure 42**), which includes streams and two small ponds/marshes. Other ponds and seeps are also present.

Quality of Fish and Amphibian Habitat

For streams that have fish (**Table 33**), the fish tissue criterion element supersedes the water column criterion element for the purposes of meeting water quality standards (see section below on Selenium Aquatic Life Criteria for Fish Tissue).

For fishless streams, the range of selenium concentrations measured during baseline water monitoring from May 2011 to October 2019 (Arcadis, 2020c) are provided in **Table 27**. The applicable criteria for fishless streams are the selenium concentration in the water column, where concentrations over 3.1 µg/L exceed the state-wide water column selenium criteria for protection of aquatic life. Selenium in these streams comes from the historic North Maybe Mine and South Maybe Canyon Mine (see Section 3.2.1) and all eventually flow into the Blackfoot River. Selenium levels in the streams varies

Figure 42. Aquatic Influence Zones



seasonally and annually. High selenium levels are correlated with high streamflow and, therefore, are highest during spring runoff and high run-off years (Hamilton & Buhl, 2003; Zinsser, et al., 2018).

The baseline surface water study found that selenium concentrations in ponds (amphibian habitat) in the analysis area often exceeded the state-wide water column criteria for lentic waters, which is 1.5 µ/L (Arcadis, 2020c).

Table 35. Baseline Selenium Levels in Fishless Streams

Stream Name	Lowest Selenium Concentration (µg/L)	Highest Selenium Concentration (µg/L)	Exceeds 3.1 µg/L
Maybe Creek	0.34	2,600	Yes
Goodheart Creek	0.30	256.70	Yes
Unnamed Drainage 13	0.21	2.60	No
Stewart Creek	0.10	0.3	No
South Stewart Creek	0.25	0.25	No

Source: Final Surface Water Baseline Study Report Addendum (Arcadis, 2020c)

Selenium is measured in fish tissue to understand how selenium dissolved in water bioaccumulates and impacts fish. All streams in the analysis area fall under the Blackfoot River Subbasin site-specific aquatic life criteria at IDAPA 58.01.01.287.01. The site-specific fish tissue whole-body criterion is 12.5 milligrams per kilogram (mg/kg). The organisms in the Blackfoot River Subbasin that are most sensitive to selenium are trout species. The site-specific criteria, which is based on trout species, are also protective of other fish species and aquatic organisms, including insects, mollusks, and crayfish, that are less sensitive to selenium. Dace, shiners, sculpin and suckers are in general more tolerant of selenium and can inhabit selenium-contaminated systems (EPA, 2016; Nu-West Industries, 2017). The fish tissue data are summarized in **Table 36** using data acquired from the interagency Idaho Fish Tissue database (Idaho Fish Sampling Protocol Technical Team, 2020).

Table 36. Baseline Selenium Levels in Fish Tissue (Whole Body)

Stream Name	Sampling Year	Sampling Organization	Species (Number of Fish Collected)	Average Selenium Concentration (mg/kg)	Exceeds Fish Tissue Criteria of 12.5 mg/kg[1]
Blackfoot River	2007	IDFG	Yellowstone cutthroat trout (10)	16	**Yes**
		Greater Yellowstone Coalition	rainbow trout (4)	10	No
	2009	GEI Consulting Engineers and Scientists	Yellowstone cutthroat trout (10)	11	No
	2010	Greater Yellowstone Coalition	Yellowstone cutthroat trout (10)	11	No
	2011	Greater Yellowstone Coalition	Yellowstone cutthroat trout (9)	13	**Yes**
			brook trout (1)	14	**Yes**
	2012	Greater Yellowstone Coalition	Yellowstone cutthroat trout (8)	7	No
	2018	IDFG	Yellowstone	9	No

Stream Name	Sampling Year	Sampling Organization	Species (Number of Fish Collected)	Average Selenium Concentration (mg/kg)	Exceeds Fish Tissue Criteria of 12.5 mg/kg[1]
			cutthroat trout (10)		
Diamond Creek	2007	Greater Yellowstone Coalition	Yellowstone cutthroat trout (10)	4	No
			brook trout (1)	5	No
	2008	Greater Yellowstone Coalition	Yellowstone cutthroat trout (10)	9	No
			brook trout (10)	5	No
	2010	Greater Yellowstone Coalition	Yellowstone cutthroat trout (10)	9	No
	2011	Greater Yellowstone Coalition	Yellowstone cutthroat trout (8)	6	No
			brook trout (2)	5	No
	2012	Greater Yellowstone Coalition	Yellowstone cutthroat trout (9)	7	No
			brook trout (1)	5	No
Dry Valley Creek	2005	IDEQ	Yellowstone cutthroat trout (7)	12.1	No
East Mill Creek[2]	2007	Greater Yellowstone Coalition	BRK (1)	37	**Yes**

1 Site specific criteria for Upper Blackfoot River, Whole body value
2 Formerly known as Mill Creek, Mill Canyon, or Mill Canyon Creek
Source: Idaho Fish Tissue Database (Idaho Fish Sampling Protocol Technical Team, 2020)

USFS Sensitive Species

Yellowstone Cutthroat Trout

Yellowstone cutthroat trout occur in the analysis area in large rivers and small streams, including the Blackfoot River, Diamond Creek, East Mill Creek, Kendall Creek, portions of Dry Valley Creek, Timothy Creek, Bear Creek, Coyote Creek, and Timber Creek. Diamond Creek is the primary tributary of the Blackfoot River for spawning and rearing of Yellowstone cutthroat trout (USFS, 2009). Historically, East Mill Creek supported a population of cutthroat trout (USFS, 2009), though the species is currently found only in small numbers in this stream, with only one or two caught at each sampling event in baseline and agency studies (Arcadis, 2020e). The species has been documented in portions of Stewart Creek and Maybe Creek in the past (USFS, 2009) but not in recent studies (Arcadis, 2020e). The population in the analysis area appears stable (IDFG, 2007).

Yellowstone cutthroat trout occupying the streams in the analysis area are either resident fish that occur year-round or are migratory fish, spending most of their life in the Blackfoot River or Blackfoot Reservoir but migrating into small streams in the spring to spawn (USFS, 2003a). Because of these different life histories, individual fish in the analysis area have different exposures to selenium. Selenium levels in streams in the analysis area are typically highest during spring runoff (Hamilton & Buhl, 2003), which is also the spawning season for cutthroat trout.

3.7.3 Environmental Consequences

3.7.3.1 Proposed Action

Fish and Amphibian Habitat

Habitat Loss

The Proposed Action would not cause loss or physical alteration of fish habitat because no fish-bearing streams would be realigned, crossed, or otherwise modified by H1NDR. East Mill Creek is the only fish-bearing stream that is near the mine, but the upper portion within the mine operational zone does not support fish. There would be no direct, indirect, or cumulative impact from physical alternative of fish habitat.

Approximately 49.6 acres of AIZs would be modified or relocated (**Table 37**), but none of the affected AIZs are fish-bearing streams. The modification and relocation of AIZs would be a temporary (less than 5 years after initial impacts) loss of amphibian habitat until drainages are reclaimed. Because flows equivalent to baseline conditions would be maintained and erosion protection measures would be implemented, there would be no reductions in water quantity or increased sedimentation in fish-bearing streams that are downstream of the impacted AIZs. Impacts to non-fisheries AIZs are not avoidable because the location of the pits is dictated by the physical location of the phosphate resource. Closing NFS Road 134 would improve water quality in downstream fish and amphibian habitat in the long term because sedimentation in Stewart Creek from the current road would be reduced once the road is reclaimed outside of AIZs. There would be no direct, indirect, or cumulative impact.

Table 37. Mining Activities in Aquatic Influence Zone

Dataset	Acres[1]
H1 Highwall	0.6
Permanent Overburden Stockpile Area	20.1
Operational Zone	7.6
Pit Backfill*	9.8
Simplot Pipeline Reroute	0.8
Stream Realignment	3.7
Temporary OSA	0.5
Ultimate Pit Boundary[2]	10.3
Water Feature	6.5
Total	49.6

1 It is assumed that areas less than 0.5 acres are precision errors inherent in AIZ GIS mapping (compared to ground surface) and that the activity can easily avoid the AIZ.

2 The pit backfill and ultimate pit boundary overlap. The 10.3 acres of ultimate pit boundary is not included in the total.

Amphibian habitat loss and mortality from ground-clearing activities would occur. Mining would permanently remove 2 of 26 ponds (8%) in the amphibian analysis area, including one that is known to be used by tiger salamanders for breeding. A total of 0.9 miles of perennial stream, 1.5 miles of intermittent stream, and 2.6 miles of ephemeral channel would be impacted with development of mine pits and construction of roads. Approximately 1.5 miles (7,757 feet) of Maybe Creek and 0.5 mile (2,557 feet) of upper Stewart Creek would be permanently realigned to avoid pits and temporary and permanent OSA, including sections of Maybe Creek where tiger salamanders occur. Permanent drainage channels would be reproduced during reclamation. Therefore, riparian functions would return to these drainages over the long term. Approximately 0.17 acres of wetland habitat would be permanently removed (mitigation for wetlands impacts would be offsite). Tiger salamanders would lose foraging and winter hibernation habitat within 1.5 miles of the affected ponds, and dispersal habitat along the affected streams in the analysis area. This could reduce the number of salamanders the analysis area can support. Amphibian mortality could occur during ground disturbing activities in breeding ponds and adjacent upland habitats. These direct and indirect impacts on amphibian populations would be minor, the cumulative impact in the analysis area would be negligible.

Quality of Fish and Amphibian Habitat

Surface Water Quantity

There would be negligible changes to surface water volumes in streams because culverts at stream crossings would maintain drainage and water flows of non-contact water at a depth and volume similar to surrounding portions of the stream. Fill materials and culverts would be removed at the conclusion of mining to re-establish natural drainageways, and drainages truncated by the pits would be re-established in reclamation phases.

Groundwater flow modeling demonstrated no reduction in stream baseflow during mining, and a negligible increase in base flow in East Mill Creek, Diamond Creek, and Dry Valley Creek beginning 20 years after mining and lasting 40 years (Section 3.5.3.1). Groundwater flow modeling also demonstrated that discharge volumes from 28 seeps within 1,000 feet of the pit boundaries would be reduced due to mining. The seeps are near East Mill Creek, Maybe Creek, and Stewart Canyon, but these seeps contribute negligible flow to these creeks. Amphibian habitat could be reduced by the loss of water volume at the seeps. Therefore, overall direct, indirect, and cumulative effects to fish and amphibian habitat downstream from changes to base flow in streams would be negligible.

Surface Water Quality

The Proposed Action could introduce sediment into surface water and selenium into groundwater and surface water, potentially affecting downstream surface water quality in 33.4 miles of fish-bearing stream (or 61% of the 55 miles of fish-bearing streams in the analysis area). Effects on downstream fish and amphibian habitat from sedimentation would be negligible because BMPs would be implemented to minimize erosion and sedimentation in streams as described in the Surface Water Management Plan (Appendix D of the MRP).

Groundwater flow modeling indicates that water from seeps that discharge to the headwaters of Stewart Creek, East Mill Creek, and Maybe Creek would contain selenium concentrations exceeding the IDAPA 58.01.02 water column criteria for aquatic life (3.1 µg/L). Selenium concentration would exceed 3 µg/L in groundwater discharging to Stewart Creek from 21 to 39 years after mine closure, peaking at 49 µg/L at 21 years. Selenium concentration would exceed 3 µg/L in groundwater discharging to East Mill Creek from 12 to 52 years after mine closure, peaking at 23 µg/L at 25 years. Selenium concentration would exceed 3 µg/L in groundwater discharging to Maybe Creek from 28 to 45 years after closure, peaking at 18 µg/L at 29 years. The concentrations would then reduce to undetectable levels. Effects on surface water quality from the groundwater discharge would be limited to the headwaters because existing surface water flow in these streams would mix with the groundwater, diluting the selenium concentration (see Section 3.6.3.1). The selenium concentration in Stewart Creek and Diamond Creek is expected to be below the IDAPA water column criteria (3.1 ug/L) (Tetra Tech, Inc., 2021e). In streams where selenium concentrations are currently above the 3.1 ug/L criteria, the level of increase in selenium concentrations in streams would be negligible (Tetra

Tech, Inc., 2021e). Therefore, there would be negligible long-term effects on water quality in Stewart Creek, East Mill Creek, Maybe Creek, Diamond Creek, and the Blackfoot River. However, cumulatively, even negligible amounts of selenium transported downstream would be additional loading to streams already impacted by historic selenium releases, and a new source of selenium to previously unimpacted streams.

Tiger salamanders could be exposed to high selenium concentrations in the localized area of groundwater discharge, but no fish occur at the headwaters. The expected selenium concentration in fish tissue cannot be predicted because the concentration of selenium in the water column of the streams cannot be quantified. However, as described in Section 3.5.3, the selenium concentration in the water column of Stewart Creek and Diamond Creek is expected to be below the IDAPA surface water criteria standard (3.1 ug/L), which is protective of aquatic life. The negligible increase in selenium levels in downstream waters is expected to result in a negligible long-term increase in toxicity impacts to fish, amphibians, and other aquatic life.

USFS Sensitive Species

The effects described above for general fish, including potential increases in toxicity from selenium loading and sedimentation in streams, apply to Yellowstone cutthroat trout because the species occurs in waters downstream of the H1NDR Mine. The site-specific selenium criteria were developed to protect the most sensitive species in the Blackfoot River system, which is rainbow trout. Yellowstone cutthroat trout are less sensitive to selenium compared to rainbow trout (Nu-West Industries, 2017; EPA, 2016). H1NDR may impact individual Yellowstone cutthroat trout or their habitat but will not likely contribute to a trend toward federal listing or cause a loss of viability to the population or species. Sensitive fish and amphibian species that were dismissed from detailed analysis are listed in **Table 66**.

3.7.3.2 No Action

Under the No Action alternative, this MRP would not be implemented and no new ground disturbance and no new exposure of selenium-bearing materials would occur; therefore, there would be no additional sediment or selenium releases into seeps and streams and no cumulative effects. Fish would continue to inhabit streams in the analysis area in their current condition, some of which are currently impaired due to elevated levels of sediment and selenium from historic phosphate mines. The legal obligation to reduce selenium loading from the legacy facilities, to within allowable limits, would remain. There would be no loss of amphibian habitat (forest, ponds, or wetlands). Tiger salamanders would continue to breed and forage in this habitat. Seeps would continue to discharge water at their current rates, and streams would maintain their current volumes of water. AIZ function would continue to be impaired by the NFS Road 134 within the AIZ.

3.7.3.3 Alternative Cover

Groundwater flow modeling demonstrated that the Alternative Cover design would reduce infiltration of meteoric water into the backfill and, subsequently, the discharge of selenium-contaminated groundwater into seeps and streams would be reduced compared to the Proposed Action. Gradual and limited migration of selenium to surface water would occur but would never exceed the IDEQ aquatic life criteria. Selenium concentration in groundwater discharging to Stewart Creek and East Mill Creek would be below the analytical reporting limit of 0.5 µg/L. Groundwater flow modeling estimates that the selenium concentration in groundwater discharging to Maybe Creek would peak at 0.2 µg/L 42 years after mine closure, which is below the analytical reporting limit. Therefore, new selenium loading into Stewart Creek, and additional selenium loading to Maybe Creek, and East Mill Creek would be negligible, and direct, indirect, and cumulative selenium toxicity effects to fish would be negligible. Impacts from sedimentation would be the same as the Proposed Action and would be negligible with implementation of BMPs. The reduction in volumes discharge from seeps to surface water would have no effect on the volume of water in fish-bearing streams.

3.7.3.4 Alternative Stream Routing

The alternative routing of Stewart Creek would have the same effects to fish and amphibians as the route proposed under the Proposed Action. There would be no loss or alteration of fish habitat because no fish occur in this creek. The operational realignment of Stewart Creek would affect 0.1 acre of AIZ. The reclamation realignment would affect 3.0 acres of AIZ, of which 1.6 acres would be additional disturbance outside the Proposed Action disturbance footprint. Once reclamation is complete, AIZ function is expected to return over the long-term. The alternative routing would not change water quality in terms of selenium levels because the portion crossing the backfill would be lined and, therefore, there would be no contact with seleniferous material. Sedimentation would be the same as the Proposed Action and would be negligible because the same BMPs would be implemented. The alternative routing would not change water quantity (stream flow and stream regime) in Stewart Creek in the long term because natural flow would be restored. During reclamation the permanent drainage channel would be reconstructed in the original Stewart Creek alignment, and riparian function and amphibian habitat would return over the long term. The cumulative effects would be the same as the direct and indirect effects.

3.7.3.5 Alternative Access 1 and Alternative Access 2

The Alternative Access 1 road or ATV Option crosses 2.6 acres or 0.9 acres of AIZs, respectively. The corridor for Alternative Access 2 contains 3.4 acres of AIZs that are unavoidable for any access route, and it is anticipated that Alternative Access 2 route would affect 2.6 acres of AIZ (the entire corridor would not be disturbed). There would be no loss or alteration of fish habitat because neither alternative would realign, cross, or otherwise physically modify any fish-bearing streams. Once reclamation is complete, AIZ function is expected to return over the long term. No seeps would be affected by Alternative Access 1 or Alternative Access 2. Constructing either access alternative as a permanent replacement for NFS Road 134 would improve water quality in downstream fish and amphibian habitat in the long term because NFS Road 134 is causing sedimentation in Stewart Creek. Although fish do not occur in Stewart Creek, they do occur directly downstream in Diamond Creek, and would benefit from the improved water quality, an indirect effect. Sedimentation from the new road would be negligible because it would be engineered to minimize future erosion, and BMPs would be used to control sediment release during construction. The Alternative Access 1 or the Alternative Access 2 would have no direct, indirect, or cumulative effect on selenium levels in water or fish tissue as no seleniferous materials would be exposed. The road/trail would not create any new stream crossings. Any potential crossings (i.e., where the road/trail crosses a draw but does not have a delineated stream) an armored wet crossing would be used. Therefore, there would be no direct, indirect, or cumulative effect on habitat quality in terms of the quantity of water in streams.

3.7.3.6 Alternative Sequence

The mining sequence modified under Alternative Sequence to begin mining in NDR then moving to H1 would not change the impacts on aquatic species because the disturbance of AIZ or impacts on water quality would not change (USFS, BLM, Tetra Tech, 2022, 2022).

3.8 Vegetation

3.8.1 Analysis Area and Methods

The analysis area for general vegetation, threatened, endangered or sensitive plants, and noxious weeds **(Figure 43)** is the project footprint, including all areas of surface disturbance from development of the mine pits and supporting infrastructure. The analysis area for impacts to forest stand structure and old-growth forest is the project footprint plus the two 5th-level (HUC-10) within which the project is located: Upper Blackfoot River (ID-1704020702) and Lanes Creek-Diamond Creek (ID 1704020701).

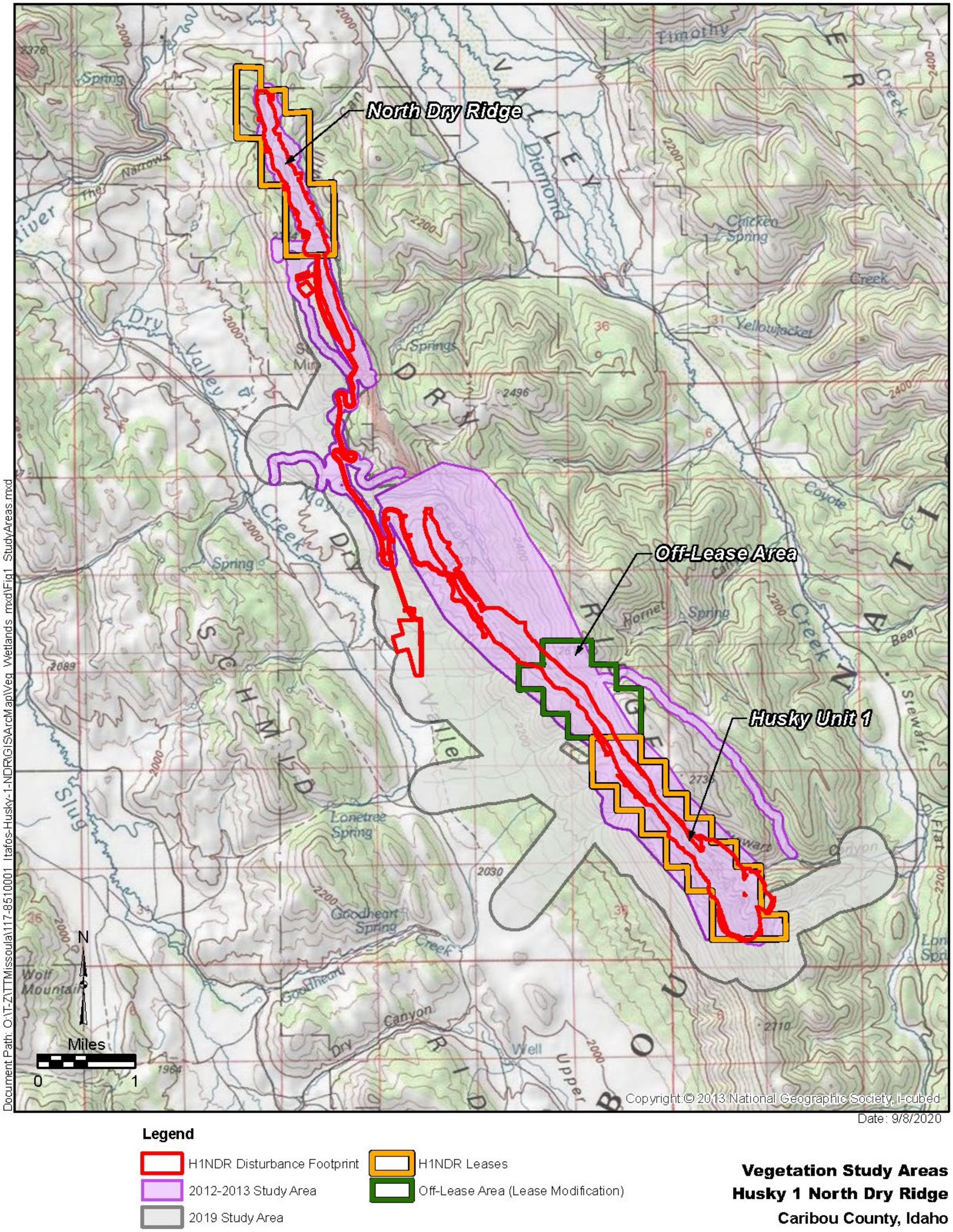
The analysis area for old-growth forest extends to the Caribou Zone of the Caribou National Forest to allow for an evaluation of consistency with the desired future conditions set forth in the 2003 RFP (USFS, 2003a).

The issues for analyzing impacts on vegetation and the indicators that will be used to discuss them are shown in **Table 38**.

Table 38. Issues and Indicators for Vegetation

Issue	Analysis Method
Acres by type of vegetation impacted by disturbance	Calculate the acres of disturbance for each vegetation type and the percent of each type impacted relative to total disturbance. Evaluate acres of mature and late-seral forest by HUC 5 watersheds in the analysis area.
Suitable timber acres designated in the 2003 RFP	Percent of acres in 2003 RFP Prescription 5.2b that will be permanently converted to grass/shrub and no longer suitable for timber management, compared to the total acres of suitable timber on the Caribou National Forest, and disclose allowable sale quantity amount compared to forest-wide allowable sale quantity.
Acres of change by vegetation type and forest community structure change following reclamation	Qualitatively discuss reclamation, how vegetation types will change, and provide anticipated years for reclamation success and potential for pre-disturbance vegetation communities to return. Disclose acres by type that would change to a different type versus those considered a permanent loss. Evaluate change in forest structure stage, specifically change in acres of mature and late-seral forests at the scale of the 5th level HUC, to meet 2003 RFP
Acres of old-growth forest removed, and long-term change in old-growth characteristics	Use baseline survey data to document acres impacted and relative amount of old-growth at HUC-5 watershed level
Acres susceptible to the invasion or spread of noxious weeds, timeframe for a higher risk of invasion or spread and effects on native plant communities	Based on disturbance area as the footprint for potential invasion or spread, disclose areas of high risk and qualitatively discuss the potential for weeds to be an issue in the reclaimed areas; evaluate the adequacy of EPMs and BMPs to control weeds. Disclose noxious weeds that were identified in the baseline study and common to southeastern Idaho.
Effects on threatened, endangered or sensitive plant species or habitat	Baseline surveys confirmed no threatened, endangered or sensitive plants occur in the analysis area.

Figure 43. Vegetation Analysis Area



3.8.2 Affected Environment

Vegetation Types

The distribution of vegetation types across the analysis area is shown in **Figure 44.** Forest vegetation types documented in the 2012-2013 study area from greatest percent cover to least in the study area are as follows: Mixed Conifer, Aspen/Conifer, Douglas-fir, Aspen, Dry Aspen, Dry Aspen/Conifer, Dry Conifer Mix, Subalpine Fir, Engelmann Spruce/Subalpine Fir, Subalpine Fir, Lodgepole Pine, Aspen/Subalpine Fir, and Forest Riparian Mix (Tetra Tech, Inc., 2014e).

Based on the CTNF 2012 vegetation mapping, non-forest vegetation/cover types in the 2012-2013 study area from greatest percent cover to least are as follows: mountain brush, mine, reclaimed mine, sagebrush, riparian shrub, grass, grass/forb, low riparian, and barren. The dominant cover type, as defined by the Society of American Foresters, is Douglas-fir, followed by aspen, and Engelmann spruce/subalpine fir. Lodgepole pine and limber pine were also documented in the study area but were less common (Tetra Tech, Inc., 2014e). The 2019 baseline surveys added woodland riparian mix to the vegetation types (Arcadis, 2020h).

Forested Stand Structure

The 2003 RFP has a standard that each 5th-level HUC shall have at least 20% of the forested acres in the combination of mature and old age classes. The condition of all watersheds, as it relates to this 2003 RFP direction, was documented in a USFS report, Caribou National Forest, Forest Structural Age Assessment (Beck, 2016). The forest structure stage categories in that assessment were seedling/sapling, young/mid, mature, and late seral. The term late seral was used to reduce the confusion between the terms old and old-growth.

The Upper Blackfoot River (HUC 1704020702) was categorized as: Seedling/sapling, 4%; Young/mid, 2%; Mature, 9%; Late-seral, 85%. The Lanes Creek-Diamond Creek (HUC 1704020701) was categorized as: Seedling/sapling, 6%; Young/mid, 4%; Mature, 11%; Late-seral, 79%.

The forest structural stage classification for the analysis area was confirmed and improved based on field review. Most stands in the analysis area were classified as mature/late seral, with lesser amounts of young/mid and less than 1% were classified as seedling structure. Overall, the forest structure of the analysis area is similar to that found in the watersheds as a whole.

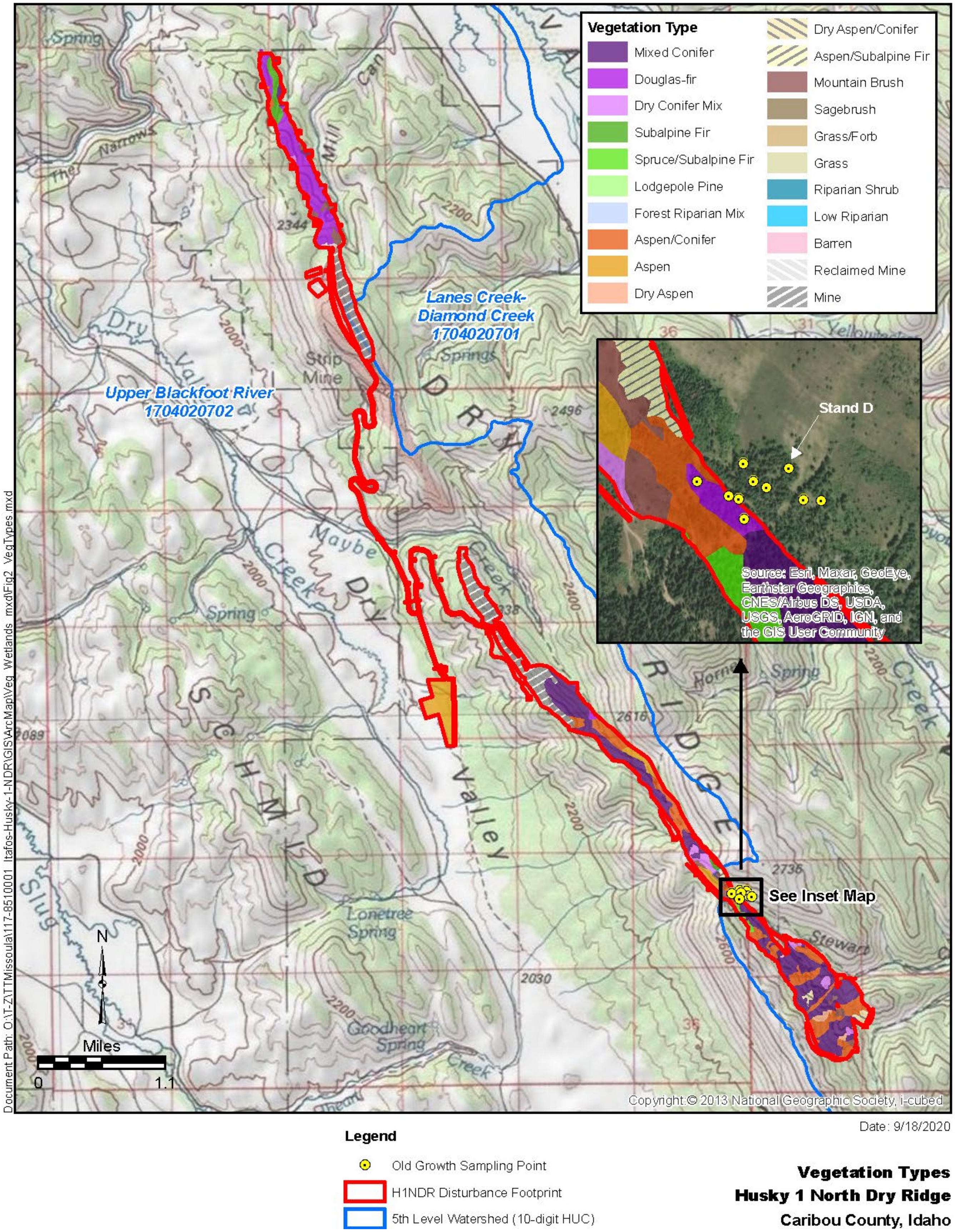
Allowable Sale Quantity

Stands classified as suitable for timber management in an area designated with a Forest Vegetation Management emphasis (Prescription 5.2) contribute to the allowable sale quantity. The FEIS for the 2003 RFP indicates there are approximately 84,000 acres suitable for timber in Prescription 5.2 (USFS, 2003a, pp. 4-170). Current USFS GIS data indicates there are 84,560 acres of suitable allowable sale quantity timberlands.

Old-Growth Forest

The second part of the structure standard in the 2003 RFP states that at least 15% of the forested acres in a watershed are to meet or be actively managed to attain old-growth characteristics. The 2003 RFP also has a standard that states the *Characteristics of Old-Growth Forests in the Intermountain Region* (referred to as the Region 4 definition) (Hamilton, 1993) will be used to define old-growth. The baseline studies evaluated found one 11-acre stand (Stand D) within the project footprint currently meets the structural Region 4 definition of old-growth (Tetra Tech, Inc., 2014e),

Figure 44. Vegetation Cover Types and Subtypes



Noxious Weeds

Baseline field survey methods included the mapping of Idaho State Department of Agriculture-listed (ISDA, Idaho State Department of Agriculture, 2019) and Caribou County-listed (Caribou County, 2019) noxious weeds, estimating the footprint of infestation, and identifying adjacent land uses that may contribute to the establishment and proliferation of noxious weeds.

A total of 11 noxious weed species were observed during the baseline surveys, all of which are on the Idaho State Department of Agriculture list, and seven of which are on the Caribou County list (Arcadis, 2020h). Past and current land uses or disturbances observed that could have led to the introduction and spread of noxious weed species included mining, roads, logging, wildfire, grazing, recreation, and railroad tracks.

3.8.3 Environmental Consequences

3.8.3.1 Proposed Action, Alternative Cover, and Alternative Sequence

Vegetation Types

Approximately 891 acres of vegetation would be removed (excluding already disturbed mine site and barren areas). Acres of vegetation removed by vegetation type under these alternatives are listed in **Table 39.** The acres in **Table 39** represent conditions from past actions.

Table 39. Vegetation or Land Cover Types Removed

Vegetation/Land Cover Type	Subtype – Acres Removed	Subtype Acres	Total Acres Removed and % of Analysis Area
Coniferous Forest	Mixed Conifer Douglas-fir Subalpine Fir Dry Conifer Mix Spruce/Subalpine Fir	338 136 28 27 7	536 47%
Aspen and Mixed Aspen/Conifer Forest	Aspen/Conifer Aspen Dry Aspen Dry Aspen/Conifer Aspen/Subalpine Fir	159 100 12 12 4	287 25%
Mine[1]	Mine	255	255 22%
Mountain Brush/Montane Shrub	Mountain Brush Montane Sagebrush	37 2	39 3%
Reclaimed Mine (crested wheatgrass/alfalfa)	Reclaimed Mine	29	29 3%
Barren	Barren	<1	<1 <0.1%
Riparian Shrub	Riparian Shrub	<0.1	<0.1 <0.01%
TOTAL			1,146

1 Areas with disturbance such as previously mined areas with little to no reclamation, small portions of reclaimed mines within larger landscape of old mine, roads, and/or mine headquarters.

Under the Proposed Action and Alternative Sequence, 98% of the total disturbance would be reclaimed, with 19 acres (approximately 2%) remaining as exposed pit highwalls and portions of haul roads retained for use. Vegetation removal would be the same under the Alternative Cover, but the acres of cover material would be reduced from 705 to 611. Approximately 49 acres of additional highwall (for a total of 68 acres, 8%) would remain after reclamation under the Alternative Cover. For both, the highwall would be an irreversible change in the vegetation type.

Vegetation removal would be long-term, when considering the time required for vegetation cover to re-establish following mining and reclamation. Reclamation would occur concurrently with phased mining using an approved seed mix of native grass, forb, and shrub species (Itafos, 2020a, pp. 5-15, Table 5-7); however, re-establishment of vegetation would require several growing seasons to reach adequate percent cover.

These alternatives would remove vegetation and change the current distribution and acreage of vegetation types following reclamation. The direct, indirect, and cumulative impact would be long-term, with only grassland, and eventually some shrubland communities returning following reclamation. Vegetation types that re-establish following reclamation would differ across the analysis area over time when compared to those pre-disturbance. This change would be permanent for several vegetation types. Of the vegetation types impacted, 39 acres are a non-forest/shrubland community. These areas would initially re-establish as a grassland type and would then return to a grass/shrub community mix over the long term.

Approximately 823 acres of vegetation proposed for removal is currently a forested vegetation type. The forested types would not be expected to return, due to changes in soil conditions, removal of the aspen root system, and the lack of a seed source. A permanent change in vegetation type from forest to grassland/shrubland would occur over 72% of the analysis area. This would be an irreversible change in the vegetation type.

The remaining 285 acres affected in the analysis area are previously disturbed, reclaimed mine, or barren area cover types, which would be converted to a grassland or grassland/shrubland mix and considered an improvement compared to existing conditions.

Given the permanent loss of forested types, and the resulting change in vegetation types and distribution of types across the analysis area, impacts to existing vegetation types under the Proposed Action, the Alternative Cover and Alternative Sequence would be moderate.

Forested Stand Structure

These alternatives would reduce forest acres and acres of mature and late-seral classes, but would not reduce mature/late seral acres to less than 20% of the total forested acres in either affected watershed.

Forested acres removed within the Upper Blackfoot River HUC (1704020702) would be approximately 486 acres. This would reduce the forested acres in the watershed to 37,600 from the current 38,086 acres. It would reduce the mature/late seral acres to 35,315, keeping the watershed at about 94% mature/late seral.

Forested acres removed within the mature or late-seral stage in the Lanes Creek-Diamond Creek HUC (1704020701) would be approximately 336 acres, reduced to 41,553 acres from the current 41,889 acres. This would not reduce the forested acres in the watershed or reduce the mature/late seral acres, keeping the watershed at about 90% mature/late seral.

Given the minimal change in forest structural stages, these alternatives would have minimal impact on the ability to meet the 20% mature/late seral standard. The cumulative impact is the continued loss of forested acres.

The direct, indirect, and cumulative impacts would be consistent with the 2003 RFP direction.

Allowable Sale Quantity

The timber removed from 2003 RFP Prescription 5.2 areas would count toward the annual allowable sale quantity. This area would not return to forest types following reclamation and would result in a permanent loss of forested types to support timber production. In turn, there would be an increase in grassland/shrubland types across the analysis area. Approximately 530 acres of 2003 RFP Prescription 5.2 are in the disturbance area (Section 1.8), which is approximately 0.6% of the 84,560 acres of Prescription 5.2 acres. After reclamation, approximately 294 acres of Prescription 5.2 would be maintained without timber on the backfill cover and, therefore, 294 acres would be removed from suitable timberlands, reducing the acres by 0.35% (294 ÷ 84,560), resulting in a reduction of the allowable sale quantity by 0.35%. This effect on allowable sale quantity would be permanent but negligible. The permanent loss of forested types and the change in vegetation types would be an irreversible direct, indirect, and cumulative impact.

Old-growth Forest

The proposed mine footprint would affect approximately 2.4 acres, or about 22% of Stand D, which was identified as meeting the structural definitions of old-growth. H1NDR activities would remove individual large, old trees, but the entire stand would not be removed. The removal of 2.4 acres of Stand D would result in some loss of old-growth values. Reducing the stand size by 2.4 acres would reduce the habitat value; however, the remainder would still function as old-growth and be accounted for under old-growth for mapping purposes. The watershed where this stand is located is 90% mature/late-seral stands; therefore, opportunities to manage for old-growth objectives exist in adjacent areas. The 2003 RFP standard of at least 15% of all the forested acres in the HUC are to meet or be actively managed to attain old-growth characteristics would be met, given that approximately 90% of the watershed is considered mature/late-seral. The existing acres of old-growth reflects the impacts from past activities. The cumulative impacts would meet the 2003 RFP standard.

Noxious Weeds

Removal of vegetation, soil disturbance, and human traffic and use of equipment would increase the opportunity for invasions and spread of noxious weeds. The risk would be highest within the proposed disturbance footprints and adjacent to roads. Noxious weeds will be continuously managed throughout mining. The MRP requires concurrent reclamation followed by monitoring for noxious weeds; therefore, the spread of weeds or introduction of new species will be limited and controlled. A noxious weed control program would be instituted throughout mining operations, during site closure, and would continue until agreement with the agencies that site closure is complete. The noxious weed control program would be designed and implemented according to the requirements of the 2003 RFP. With implementation of these proposed control measures, the direct, indirect, and cumulative potential for spread and invasion would be minimized. Degradation of vegetation composition from the potential increase in noxious weeds would be minor.

3.8.3.2 No Action

Vegetation Types

By not implementing this MRP, there would be no acres of vegetation removed and no direct, indirect, or cumulative impacts on vegetation.

Forest Stand Structure

By not implementing this MRP, there would be no acres of vegetation removed and no direct, indirect, or cumulative impacts on forest stand structure.

Allowable Sale Quantity

By not implementing this MRP, there would be no acres of vegetation removed and no direct, indirect, or cumulative impact on allowable sale quantity.

Old-Growth Forest

By not implementing this MRP, there would be no direct, indirect, or cumulative impacts on old-growth forest.

Noxious Weeds

By not implementing this MRP, there would be no acres of vegetation removed and no potential increase in noxious weed spread or invasions. No direct, indirect, or cumulative impacts would occur to vegetation due to increases in existing populations or spread of new populations of noxious weeds.

3.8.3.3 Alternative Stream Routing

The operational realignment of Stewart Creek would remove approximately 5 acres of forest that would be changed to grassland/schrubland in addition to vegetation removed under the Proposed Action, none of which is suitable timber or old growth. This difference would not change direct, indirect, or cumulative effects on vegetation, including forested types, old-growth forests, allowable sale quantity, or noxious weeds as disclosed for the Proposed Action. Reclaiming the channel back to its natural location would disturb approximately 2.4 acres, but the area would have already been disturbed by mining.

3.8.3.4 Alternative Access 1 and Alternative Access 2

In addition to the vegetation removed under the Proposed Action (see **Table 39**), **Table 40** shows new disturbance by vegetation type to build a new, 7.6-mile access road or ATV trail between Dry Valley and Diamond Creek. Vegetation removed would be permanent. Approximately 11 acres under Alternative Access 1 and 20 acres under Alternative Access 2 of the removed forest types would occur in 2003 RFP Prescription 5.2, an increase from the Proposed Action.

Direct, indirect, and cumulative effects on forest stand structure and old-growth forest would be similar to those of the Proposed Action. The additional acres of forested type removed would not result in a detectible difference from effects under the Proposed Action. No old-growth would be affected by either of the access alternatives. There would be no change in bioaccumulation, as the road or ATV trail would not be reclaimed. Noxious weed spread and infestations of new populations of noxious weeds could occur with new disturbance and use of a new road in a previously undisturbed area. Effects would be minor with the noxious weed management proposed.

Table 40. Vegetation or Land Cover Types Removed for Alternative Road or Trail

Vegetation/Land Cover Type	Subtype	Subtype Acres Removed for Road	Subtype Acres Removed for ATV Trail	Total Cover Type Acres Removed for Alternative Access 1/ Alternative Access 2	Total Cover Type Acres Removed for ATV Trail
Coniferous Forest	Mixed Conifer Douglas-fir Subalpine Fir Dry Conifer Mix Lodgepole Pine	4.6 7.8 0.5 6.0 2.8	1.1 1.8 0.2 2.8 0.9	4.6/4.1 7.8/11.0 0.5/0.5 6/5.9 2.8/1.7	6.8
Aspen and Mixed Aspen/Conifer Forest	Aspen/Conifer Aspen Dry Aspen/Conifer	10.3 3.6 1.0	3.6 1.2 0.3	14.9/10.4	5.1
Mountain Brush/Montane Shrub	Mountain Brush Sagebrush	4.5	1.7	4.5/18.5 2.3	1.7
Grass/Forb	Grass/Forb	0.4	0.2	0.4/0.1	.2
Disturbed		0.1	0	0.1	
TOTAL		41.6	13.9	41.6	13.9

3.9 Wildlife including Threatened, Endangered, and Sensitive Species

3.9.1 Analysis Area and Methods

Analysis areas for wildlife vary and are based on species-specific seasonal and space use requirements, such as home range size and dispersal capability. For most species, the general wildlife analysis area encompasses Dry Ridge and the surrounding valleys shown on **Figure 33**, which was delineated using topographical features, watersheds, and other natural barriers (e.g., the Blackfoot River) as boundaries. This analysis area encompasses the lands that would be affected by H1NDR, including potential selenium transport through surface waters, and the surrounding lands that are similar habitat. The analysis area is sufficiently broad to capture local wildlife movement in and around H1NDR and population-level processes for a variety of species, including potential effects from adjacent mines and other disturbances. The greater sage-grouse analysis area is a 10-mile buffer around the H1NDR disturbance footprint and is based on sage-grouse Guideline 2 in the 2003 RFP. The Columbian sharp-tailed grouse analysis area is a 2-mile buffer around the H1NDR disturbance footprint and is based on sharp-tailed grouse Guideline 2 in the 2003 RFP. The big game analysis area is the IDFG Diamond Creek Game Management Unit 76 (**Figure 45**).

The issues for analyzing impacts on wildlife and the indicators that will be used to discuss them are shown in **Table 41**. Threatened/endangered and sensitive species that were dismissed from detailed analysis are described in **Table 66**.

Table 41. Issues and Indicators for Wildlife

Issue	Analysis Method
Wildlife habitat that would be lost or permanently altered, including loss of mature forest habitat	GIS calculations based on disturbance footprint to show acres of each habitat type disturbed or altered and whether the loss/alteration would be short term, long term, or permanent.
Risk of wildlife experiencing selenium toxicity, due to reclaimed vegetation selenium uptake or selenium contamination of wildlife water sources	Although there are other COPCs in the analysis area, selenium is the focus for the wildlife analysis because high levels can have adverse effects on wildlife and investigations of other constituents in the analysis area have found selenium to be the major COPC (IDEQ, 2004). The following will be completed as part of the analysis: Toxicity risk to wildlife foraging on reclaimed areas will be qualitatively assessed using existing literature. The potential for release of selenium to surface waters will be evaluated, taking into consideration mine design and BMPs, the results of the selenium fate and transport model, and the amount that would be released, if any. Wildlife access to potentially contaminated waters will be evaluated. Effects of selenium toxicity on terrestrial wildlife will be evaluated based on existing literature.
Threatened/endangered species that would be affected by habitat loss or alteration, or from mining noise/disturbance/human activities.	Canada Lynx: Loss of linkage habitat on the Caribou National Forest will be quantified. Connection of Dry Ridge to core/occupied habitat on adjacent forests will be discussed. Grizzly Bear: Loss of suitable habitat (currently unoccupied).
Sensitive species that would be affected by habitat loss and alteration, and mining noise/ disturbance/ human activities	Species occurring on the Caribou National Forest per the 2016 Region 4 Sensitive Species List will be identified, habitat loss will be quantified, and effects of disturbance will be evaluated. North American Wolverine: Habitat loss will be quantified, including loss or disturbance of any denning habitat, if present. Greater Sage-grouse: H1NDR is not within a greater sage-grouse habitat management area. No habitat would be directly affected and no active leks are present within 2 miles. Effects (noise/disturbance) to active leks within 10 miles of H1NDR will be evaluated per the 2003 RFP. Northern Goshawk: Habitat loss will be quantified and loss or disturbance of any Nest Areas and Primary Foraging Areas will be evaluated.
Mule deer and elk that would be affected by habitat loss or alteration and from mining noise/ disturbance/human activities	Following IDFG recommendations, mule deer and elk habitat suitability models will be used to identify suitable habitat and quantify habitat loss (winter and summer range) relative to suitable habitat available in Game Management Unit 76. Effects to any important areas (e.g., wallows, licks, hiding cover/security habitat, and fawning/calving habitat) will be discussed. Effects of increased human activity and noise will be evaluated.
Migratory birds that would be affected by habitat loss or alteration, and mining noise/ disturbance/ human activities	The analysis will focus on U.S. Fish and Wildlife Service Birds of Conservation Concern, priority bird species identified by Idaho Partners in Flight, and Idaho Species of Greatest Conservation Need. Species that occur in the analysis area (refer to baseline surveys/report) will be identified and discuss how they would be affected by the above issues. Number of nests affected and acres of habitat loss will be quantified. Displacement and potential for nest abandonment will be evaluated. Conservation measures to reduce impacts will be discussed.

3.9.2 Affected Environment

Wildlife Habitat

The wildlife analysis area is shown on **Figure 33** and encompasses 65,418 acres. According to the Gap Analysis Project land cover map (USGS, 2011), wildlife habitat in the wildlife analysis area consists primarily of forests (63%), including coniferous, aspen, and aspen-mixed conifer forest (see **Table 42**). Other habitat types include riparian forest/woodland, montane sagebrush, mountain brush, basin sagebrush, mesic meadows, grassland, and rock outcrop. Field studies indicated that mountain brush dominates the mid-elevation slopes on the east and west side of Dry Ridge and is characterized by chokecherry (*Prunus virginiana*), serviceberry (*Amelanchier alnifolia*), Woods' rose (*Rosa woodsii*), currant (*Ribes* spp.), snowberry (*Symphoricarpos* spp.), and bitterbrush (*Purshia tridentata*) with sagebrush often mixed in. The GAP map shows only 347 acres of mountain brush communities in the analysis area, but based on field mapping (Tetra Tech, Inc., 2014e) much of the montane sagebrush mapped by GAP is dominated or intermixed with mountain brush species. Therefore, the montane sagebrush and mountain brush GAP cover types were combined for analysis purposes.

Human-modified cover types, each comprising less than 1% of the wildlife analysis area, include agricultural, developed (mostly roads), logged/burned, and mines. The reclaimed mine areas are dominated by non-native vegetation that has been seeded, and typically are wheatgrass species and alfalfa.

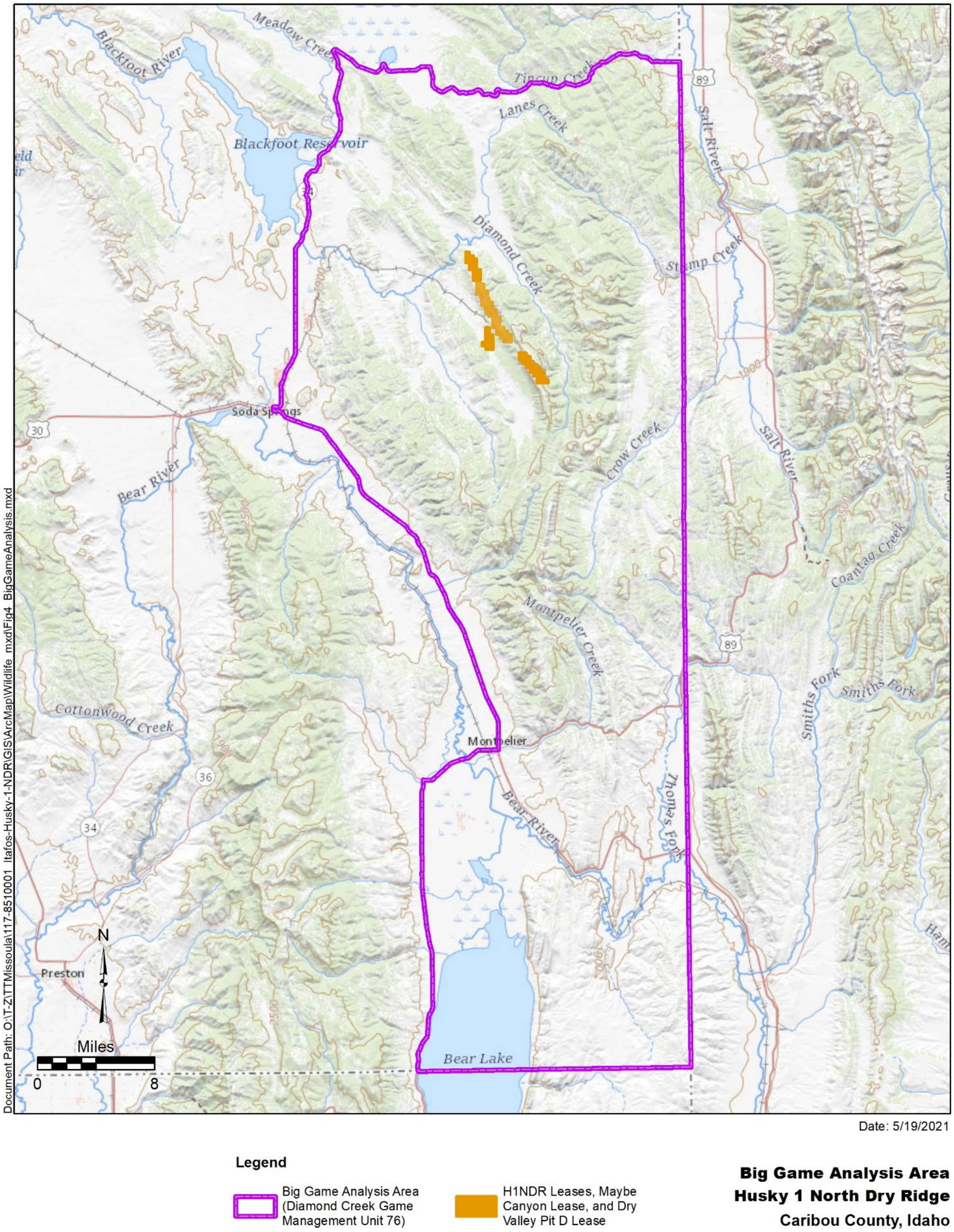
The forests on Dry Ridge are mostly mature, with the average age of trees in older stands ranging from 73 years to 257 years (Tetra Tech, Inc., 2014e; Arcadis, 2020h). There is one 11-acre stand of Douglas-fir that meets the USFS Region 4 definition of old-growth. The remainder of the forest stands are young to mid-age classes, with a few sapling areas (less than 1%) that typically are aspen clones.

Table 42. Habitat Types in Wildlife Analysis Area

Habitat/Cover Type	Acres (Percent of Analysis Area)
Coniferous Forest Douglas fir Lodgepole pine Spruce fir	34,003 ac (52%) 11,015 ac 16,294 ac 6,694 ac
Mountain brush/montane sagebrush	11,127 ac (17%)
Aspen	6,972 ac (11%)
Basin sagebrush-steppe	4,111 ac (6%)
Mesic meadow	4,107 ac (6%)
Riparian forest/woodland	2,221 ac (3%)
Human modified/disturbed	1,342 ac (2%)
Grassland	1,088 ac (2%)
Mixed aspen-conifer	280 ac (<1%)
Rock outcrop	136 ac (<1%)
Riparian marsh	31 ac (<1%)

Source: Gap Analysis Project land cover map (USGS, 2011)

Figure 45. Big Game Analysis Area



Of the vegetation types in the wildlife analysis area, aspen communities support the highest biodiversity (IDFG, 2017). The diverse understory of shrubs and herbaceous plants provides high-quality forage for big game and other wildlife. Aspen stands also support migratory tree-roosting bats and cavity-nesting birds due to the common presence of snags and decaying trees that are excavated by woodpeckers.

Existing land uses in the wildlife analysis area include phosphate mining, logging, roads, recreation, and domestic livestock grazing. Phosphate mining has occurred since the early 1900s (Lee, 2000). Historic phosphate mines in the wildlife analysis area include the Champ Mine, Maybe Canyon Mine (comprising the North Maybe Canyon and South Maybe Canyon mines), Dry Valley Mine, and a small portion of Smokey Canyon Mine. The Maybe mines, which are between the H1 Lease and the NDR Lease, are currently undergoing investigation and remediation activities through CERCLA (see Section 3.2.1).

Selenium

Certain overburden layers that are removed from phosphate mines contain high levels of selenium (Mebane, et al., 2015). Historic mining practices resulted in leaching of selenium into the environment, which has been detected in surface water, groundwater, sediments, soils, vegetation, and animal tissue in the wildlife analysis area, both at the mine sites and downstream (Southeast Idaho Phosphate Mine Site Trustee Council, 2015). Selenium is a naturally occurring element that is an essential micronutrient for various life forms but is toxic at high concentrations. Studies on selenium levels in bird eggs have found elevated selenium concentrations in eggs from bird nests around eight phosphate mines near H1NDR, portions of which overlap with the wildlife analysis area (Skorupa, et al., 2002; Ratti, et al., 2006). However, no mortality or measurable effects to reproduction were found (Ratti, et al., 2006).

Selenium concentrations in vegetation from portions of the wildlife analysis area, including at the Maybe mines, exceed Idaho's selenium removal action level of 5 mg/kg dry weight (IDEQ, 2004). Selenium concentrations in elk tissue and liver collected were correlated with distance from phosphate mine sites in southeast Idaho, with 50% of elk harvested within 2 miles of a historic mining area having elevated selenium concentrations in their organs. This indicates big game are likely accessing seleniferous forage at reclaimed mine sites. The concentrations were approaching but did not exceed levels that would result in toxicity to the elk based on established large mammal risk thresholds for liver concentrations (Southeast Idaho Phosphate Mine Site Trustee Council, 2015). Selenium concentrations in deer or moose have not been studied. Selenium levels in small mammal prey exceeded background levels, but were not found to be a bioaccumulation risk for carnivores (IDEQ, 2004).

Threatened and Endangered Species Habitat

Canada lynx use the wildlife analysis area occasionally during dispersal or exploratory movements, but no resident population is present, and no regular or long-term use of the analysis area is expected due to the limited suitable habitat. The wildlife analysis area is considered unoccupied based on the 1999-2003 National Lynx Survey (Interagency Lynx Biology Team, 2013), and Canada lynx were not detected in baseline snow-track surveys (Tetra Tech, Inc., 2014f). Analysis of habitat linkages was accomplished during the 2003 RFP revision, and several specific pathways were identified as important for connecting the Caribou National Forest to other mountain ranges. H1NDR is not located in any of the identified important pathways (USFS, 2002). The Caribou National Forest is considered general linkage habitat that connects to occupied habitat and core areas (USFS, 2007). Management direction is provided in the 2003 RFP for maintaining general linkage habitat for Canada lynx, including vegetation, wildlife, and lands goals, objectives and standards (USFS, 2003a).

Grizzly bear currently do not occupy the wildlife analysis area but the mosaic of forest mixed with grasslands/meadows is suitable habitat. There are recent occurrences of individuals outside the wildlife analysis area but within the species' dispersal capabilities (30 miles to the north and 20 miles to the east). As grizzly bear range continues to expand, individuals may occur in the analysis area during the life of H1NDR.

Sensitive and Management Indicator Species

Northern Goshawk (Sensitive and Management Indicator)

Northern goshawks occur throughout the Caribou National Forest. According to the USFS GIS database, there are no known nests or territories in the wildlife analysis area. The edge of one post-fledgling family area intersects the eastern boundary of the analysis area near Smoky Canyon. Northern goshawks were detected (seen and heard) in the wildlife analysis area in 2013 in South Stewart Canyon and again in 2019 in this same area (Stewart Canyon and South Stewart Canyon). Intensive nest searches were conducted in this area during both survey years, but no nests were found (Tetra Tech, Inc., 2014f; Arcadis, 2020i). These sightings could be of a non-breeding “floater” goshawk that is waiting for a territory vacancy, or it possibly has a nesting area that is outside the surveyed area. There are 41,255 acres of forest in the wildlife analysis area that are suitable goshawk habitat.

Bald Eagle (Sensitive)

A few bald eagles are known to use the Blackfoot River Narrows to the north of H1NDR, and they are occasionally observed on Diamond Creek (USFS, 2003b; IDFG, 2020). The sightings have been of 1 or 2 individuals, and mostly during the spring and fall when eagles are migrating. No nests or large winter congregations occur in the wildlife analysis area.

Flammulated Owl (Sensitive)

Flammulated owls occur in the wildlife analysis area. They were detected in the southern portion of the H1 Lease in 2010 (BLM and USFS, 2010), near East Mill Creek in 2011 (IDFG, 2020), north of Kendall Canyon in 2013 (Tetra Tech, Inc., 2014f), and in an aspen stand on the west slopes of Dry Ridge in 2019 (Arcadis, 2020i). No nests were identified in intensive nest searches around detection locations. There are 41,255 acres of aspen and coniferous forest in the wildlife analysis area that are suitable habitat for flammulated owl.

Boreal Owl (Sensitive)

There is one historic record of boreal owls on the Soda Spring District of the Caribou National Forest, which was in the Aspen Range in a 70- to 100-year-old stand of lodgepole pine-Douglas-fir with aspen patches (IDFG, 2017). In the wildlife analysis area, there was also one more recent detection north of East Mill Creek canyon during the 2013 baseline survey (Tetra Tech, Inc., 2014f). No nests were identified in intensive nest searches around the detection location. There are 34,283 acres of conifer and aspen-conifer mixed forest in the analysis area that are suitable habitat for boreal owl.

Great Gray Owl (Sensitive)

Great gray owls have been documented in the wildlife analysis area during several different years, including north of East Mill Creek Canyon, and to the south of H1NDR on Freeman Ridge and in the upper portion of the Diamond Creek drainage (IDFG, 2020). H1NDR baseline surveys conducted during 2013 also detected great gray owls north of East Mill Creek Canyon and north of Stewart Canyon (Tetra Tech, Inc., 2014f). No nests were identified in intensive nest searches around detection locations. However, breeding was confirmed during the 2019 H1NDR baseline surveys when an adult and two juvenile great gray owls were observed south of South Stewart Canyon (Arcadis, 2020i). There are 46,450 acres of conifer and aspen forests and meadows in the wildlife analysis area that are suitable habitat for great gray owl.

Greater Sage-Grouse (Sensitive)

The H1NDR disturbance footprint is not in priority, general, or important habitat management areas and there is no suitable habitat present. Within 2 miles of the proposed H1NDR mine disturbance footprint, there are no active leks. In the 10-mile greater sage-grouse analysis area, there is one inactive lek (3C040) 1.2 miles to the west of H1NDR on private land, and one active lek (3C028) 7.6 miles to the west. In 2017 and 2018, one to four greater sage-grouse were observed at lek 3C040 over two consecutive years, and the site was temporarily classified as a pending lek. No greater sage-grouse have been observed at the site since 2018. As of 2021, IDFG classified lek 3C040 as inactive.

Columbian Sharp-tailed Grouse (Sensitive and Management Indicator)

The analysis area for Columbian sharp-tailed grouse is a 2-mile buffer around the H1NDR disturbance footprint. There are two Columbian sharp-tailed grouse occupied leks in the analysis area, both of which were active in 2019 (IDFG, 2020). These leks are 3CT100 and 3CT100a in Dry Valley. Columbian sharp-tailed grouse are also known to use the northern portion of the analysis area in the Blackfoot River Wildlife Management Area during other times of the year (IDFG, 2020). In the analysis area, there are 3,811 acres of breeding habitat (basin sagebrush, grasslands, agricultural areas) in the valleys and foothills and 12,412 acres of winter habitat (mountain brush and aspen stands) on adjacent mountain slopes.

American Three-toed Woodpecker (Sensitive)

There are several records of American three-toed woodpeckers occurring to the southeast of the wildlife analysis area on Webster Ridge (IDFG, 2020). During the 2013 H1NDR baseline surveys it was detected at multiple locations in the northern portion of the Dry Ridge, including Kendall Canyon, East Mill Canyon, and in and around the NDR Lease boundary (the northern and eastern slopes of Dry Ridge) (Tetra Tech, Inc., 2014f). One instance of nesting was documented in an aspen snag. There are 34,283 acres of suitable conifer and conifer-aspen mixed forest in the wildlife analysis area.

Gray Wolf (Sensitive)

There are no known gray wolf packs in southeastern Idaho (Husseman & Struthers, 2016). Although lone wolves have been observed, there are currently no known packs, dens, or rendezvous sites in the wildlife analysis area. The entire 65,410-acre wildlife analysis area is suitable wolf habitat and ungulate prey (deer, elk, and moose) are plentiful.

Trumpeter Swan (Sensitive)

There have been several recent winter sightings on the Blackfoot River and near Diamond Creek of two to eight trumpeter swans per sighting (IDFG, 2020). These streams are the only suitable trumpeter swan habitat in the analysis area.

North American Wolverine (Sensitive)

There are no known North American wolverine occurrences in the wildlife analysis area, although there are recent occurrence records in all of the surrounding mountains, the closest of which is 4.2 miles to the east near Smoky Canyon (IDFG, 2020). In 2018, the USFS completed a GIS analysis to identify potential natal denning habitat on the Caribou National Forest, and according to the model there is no denning habitat in the wildlife analysis area (USFS, 2018). Denning habitat is not present in the wildlife analysis area due to the lack of steep, high-elevation rocky areas and persistent, stable snow cover into spring. The limited rocky areas in the wildlife analysis area consist of isolated rock outcrops and rubble fields of moderate slopes but do not contain large boulders (Tetra Tech, Inc., 2014e).

The wildlife analysis area is at the southern limits of this species' range and is not within one of the major habitat blocks identified in the wolverine state management plan (IDFG, 2014a). Southeastern Idaho is predicted to support only one or two wolverines based on modeling. Furthermore, suitable habitat (elevations higher than 7,050 feet) in the 102-square mile analysis area comprises only 58 square miles, which is less than half the size of an average female home range. Based on this information and habitat conditions on Dry Ridge, the analysis area likely functions as a dispersal linkage to the major wolverine habitat blocks in Idaho but is unlikely to support breeding wolverines. The analysis area is within a predicted high use dispersal corridor (IDFG, 2014a).

Townsend's Western Big-eared Bat (Sensitive)

Townsend's big-eared bat has been found in caves and abandoned mines in various mountain ranges on the Caribou National Forest but no large concentrations are known (USFS, 2003b). There are no occurrence records in the wildlife analysis area, but acoustic surveys detected this species 10 miles to the west in the Aspen Range and, therefore, H1NDR is within this species' range (IDFG, 2020). There are hibernacula to the south and west, but these are more than 25 miles away from the analysis area (IDFG, 2020). Townsend's big-eared bat was not detected in the H1NDR baseline acoustic survey (Tetra Tech, Inc., 2014f). There is suitable foraging habitat and water sources throughout the wildlife analysis area, but there are no known underground mines or caves that would provide roosting habitat or support large congregations of bats.

Mule Deer

The population in the analysis area has been on a declining trend over the past 10-15 years, possibly due to disease (IDFG, 2019). Mule deer range in the big game analysis area is identified by IDFG models of mule deer summer and winter habitat in Idaho. The models link deer GPS locations with habitat variables influencing the probability of deer occurrence during each season. There is no mule deer winter range on Dry Ridge and limited range in lower elevations. Mule deer use most of the habitat types in the analysis area during summer, but some are more valuable than others. Therefore, to account for variation in habitat conditions in the analysis area, the IDFG habitat suitability model of mule deer summer range was used to identify the portions of the analysis area that are of similar suitability as Dry Ridge (i.e., model values > 0.1), which is known to be highly productive. This method filters out the lowest suitability areas. There are 376,722 acres of habitat in the analysis area that have similar suitability as the mule deer summer range on Dry Ridge. Within the local watershed area (i.e., the general wildlife analysis area) there are 50,933 acres of suitable habitat. There are no well-defined migration routes in the area, although some deer do make east-west migratory movements across Dry Ridge to reach winter range.

Elk

The IDFG modeled elk summer and winter habitat and migration corridors in Idaho by linking elk GPS locations with habitat variables influencing the probability of elk occurrence during these seasons. Elk use most of the habitat types in the analysis area, but some are more valuable than others. Therefore, to account for variation in habitat conditions, the IDFG habitat suitability models of elk summer and winter range were used to identify the portions of the analysis area that are of similar suitability as Dry Ridge (i.e. model values greater than 0.1), which is known to be highly productive summer range for elk and also used as winter range. There are 890,120 acres of habitat in the analysis area that have similar suitability as the elk summer range on Dry Ridge and 767,141 acres that have similar suitability as elk winter range on Dry Ridge. There are no well-defined elk migration routes in the area, though some migratory movements likely occur based on snow depths.

Migratory Birds

A variety of migratory birds that are associated with coniferous, aspen, or mixed aspen-coniferous forest, mountain brush, montane sagebrush-steppe, and forest riparian habitat occur on Dry Ridge. These include generalist species that are not limited to specific habitat types (e.g., American robin), common forest species such as mountain chickadee, and specialist species (e.g., cavity-nesting birds). A list of birds observed in the analysis area is provided in the baseline wildlife reports (Tetra Tech, Inc., 2014f; Arcadis, 2020i). Aquatic/wetland species observed during baseline surveys include sandhill crane, mallard, and American coot (Arcadis, 2020i). There are many other waterfowl and shorebird species that are known to occur in the lower elevations of the analysis area, such as at the Blackfoot River Wildlife Management Area, but do not commonly occur on Dry Ridge (IDFG, 2014c). Emergent wetland and aquatic habitat is limited on Dry Ridge. There are a few ponds and groundwater-fed wetlands, but most of this habitat is in the valley basins. Migratory birds reach their greatest abundance in the analysis area during the breeding season, which is May through August for most species.

3.9.3 Environmental Consequences

3.9.3.1 Proposed Action and Alternative Sequence

Habitat Loss

Re-disturbance of the 255 acres of existing disturbed areas would not be a habitat loss during H1NDR mining activities because these areas do not currently provide wildlife habitat. The total amount of wildlife habitat removed would be 891 acres (see **Table 39** for breakdown by habitat type). Itafos has committed to offset the habitat loss through a compensatory mitigation program, described in detail in **Appendix A**.

Approximately 98% of the ground disturbance would be reclaimed to the existing use of wildlife habitat following reclamation. Reclamation in the existing disturbed areas would restore 255 acres of wildlife habitat. The reclamation seed mix is predominantly grass species, but some forbs would be included as well as bitterbrush and other shrubs that would benefit browsers, such as big game. The reclaimed areas would be predominantly grassland in the short-term, but over the long term are expected to be a grass-shrub mix community. Species that use grasslands, grass-shrub mix, and forest/grassland ecotones would benefit from the habitat that would exist post-reclamation. Some pit walls would remain and may be beneficial if it is suitable roosting habitat for bats and nesting habitat for cliff-nesting birds.

While the loss of 823 acres of forest habitat would be a small percentage of the wildlife analysis area, these forest habitat types support a high diversity of wildlife species, and the existing mature conifer stands and aspen clones are of high value to many species, such as big game, tree-roosting bats, and numerous migratory birds (detailed discussion on specific species is given below). In addition, the conversion of forested habitat to a more grass dominated habitat would be permanent due to the need to prevent tree growth on the cap and cover areas and, therefore, would permanently reduce the number and diversity of forest wildlife species that can inhabit the wildlife analysis area. Given these factors and the additional cumulative impacts occurring from other phosphate mines, the permanent loss is considered a moderate effect overall to wildlife habitat in the wildlife analysis area. The loss of mature conifer, aspen, and mixed aspen-conifer forest in the cap and cover areas from maintaining them without trees would be an irreversible effect. The compensatory mitigation program (Appendix A) would reduce the cumulative loss of forest habitat by phosphate mining in the region.

Selenium Toxicity Risk to Wildlife

Selenium-bearing material would only be exposed on the surface for a limited time due to concurrent reclamation practices and fugitive dust would be controlled through BMPs. Therefore, wildlife exposure to selenium in overburden or fugitive dust during mining would be limited. The risk of selenium toxicity in wildlife foraging in reclaimed areas would be negligible because the seed mix would contain low selenium-accumulating and shallow-rooted species, and the thickness of the proposed covers would minimize selenium uptake in reclamation vegetation. Vegetation monitoring would ensure selenium concentrations are below BLM performance standards.

The greatest potential for wildlife selenium exposure is from water sources. Groundwater flow modeling has indicated that selenium loading in concentrations above 3.1 µg/L would occur in seeps discharging to Stewart Creek, Maybe Creek, and East Mill Creek from 12 to 52 years after mine closure (see Section 3.7.3.1). The change in water quality is expected to be local to the headwaters of these streams, as the groundwater would mix with the existing surface water and rapidly dilute the concentrations as the water moves downstream. Wildlife that are most sensitive to selenium toxicity (i.e., waterfowl, shorebirds) do not breed in these waters. Furthermore, because wildlife are mobile and likely use more than one water source, the risk is reduced. Selenium levels in wildlife could increase above current levels but are not expected to have measurable effects to survival or reproduction. However, given the existing high levels of selenium in other surface waters in the wildlife analysis area (**Table 27**), adding even negligible amounts of selenium to these streams, and the cumulative impact of introducing a new source of selenium loading to streams that currently do not have high selenium levels, adversely affects water quality in the wildlife analysis area and increases wildlife exposure to selenium.

Threatened and Endangered Species

Canada Lynx

Canada lynx dispersing through the area are likely to avoid the mine disturbance areas during the 13 years of mining and 2 years of reclamation. However, H1NDR would not preclude movement of lynx across Dry Ridge during mining or after reclamation because the forested habitats below the mine would provide connectivity to other blocks of lynx habitat and continue to function as linkage habitat. In addition, Dry Ridge is not identified as one of the important linkage areas on the Caribou National Forest. Therefore, effects to Canada lynx movement through the linkage habitat would be negligible.

There would be a permanent loss of 823 acres of forested habitat due to reclamation and maintenance as grassland. This loss would affect 2% of the forested habitat in the wildlife analysis area. Of the forested habitat removed, 11 acres are of high suitability for lynx (7 acres of spruce-fir and 4 acres of aspen-spruce-fir mix). The removal of forest habitat would result in an adverse effect on Canada lynx linkage habitat because of the loss of stalking cover and shelter and reductions in prey populations. However, no resident lynx are present and dispersing lynx that wander through the wildlife analysis area can make long-distance movements and would be expected to travel to an area with higher quality habitat. Therefore, the loss of forest habitat is a minor but permanent adverse effect to linkage habitat.

The risk of exposure to selenium-contaminated waters after reclamation is low due to the transitory nature of lynx using the wildlife analysis area. Because there would be no long-term or regular use of such water, toxicosis is not expected and the effect of potential selenium releases on lynx would be negligible.

HINDR may affect a small number of individual Canada lynx that occasionally travel through the wildlife analysis area but would not affect populations. Due to minor permanent effects to the suitability of linkage habitat, negligible effects on lynx movement, and negligible effects from disturbance and potential selenium releases, H1NDR may affect but is not likely to adversely affect Canada lynx. The Proposed Action and Alternative Cover would have no effect on critical habitat because none is present in the wildlife analysis area.

Grizzly Bear

Approximately 891 acres of suitable grizzly bear habitat would be removed. This would be additive to habitat loss from other past and current phosphate mines in the wildlife analysis area. The loss of habitat would be temporary until the disturbed areas are reclaimed. Progressive mining and concurrent reclamation would reduce the amount of time that the habitat is disturbed and unsuitable. Reclaimed areas would provide suitable habitat as grasslands/shrublands adjacent to forest cover, and grizzly bears are known to use reclaimed mine sites. For these reasons, the effect on grizzly bear habitat in the wildlife analysis area would be minor.

If grizzly bear range expands into the wildlife analysis area, noise and other mining disturbance could displace grizzly bears to adjacent suitable habitat during the 13 years of mining and 2 years of reclamation. However, grizzly bears have shown tolerance of mining disturbance even during active mining. Grizzly bears are unlikely to be affected by selenium toxicosis because the selenium concentration in surface waters would not reach levels that would cause adverse effects, and grizzly bears are wide ranging, using multiple water sources, which further reduces the risk to negligible.

Noise, disturbance, and habitat loss could temporarily change the behavior of individual grizzly bears in the local mine area but is unlikely to affect reproduction or survival. The Proposed Action may affect but is unlikely to adversely affect grizzly bear. No critical habitat has been designated for this species.

Sensitive Species

Because mining would occur 24 hours per day, noise and other mining disturbance could interfere with breeding by both nocturnal (flammulated owl, boreal owl, great gray owl) and diurnal (three-toed woodpeckers) sensitive bird species in the adjacent forest habitat by masking vocalizations used to establish territories and locate mates. Light pollution extending beyond the mine site would reduce the area available for foraging because nocturnal owls are likely to avoid lighted areas. Lighting and noise could alter behavior or distribution but would not affect reproduction or survival.

Northern Goshawk

The Proposed Action would permanently remove 823 acres of conifer, aspen, and mixed conifer-aspen forests that are suitable northern goshawk habitat, affecting 2% of the forested habitat in the wildlife analysis area. Habitat would be removed within 300 feet of where a goshawk was observed in upper South Stewart Canyon in 2014. However, the majority of habitat would remain intact in Stewart Canyon and South Stewart Canyon where goshawks were observed during 2014 and 2019. No nests/nest areas are known in the wildlife analysis area and no habitat in the known post-fledgling family area would be removed. A pre-construction nest clearance survey would be conducted to ensure no new nests have been constructed since the baseline surveys. Noise and disturbance from mining would not be detectable at the post-fledgling family area that intersects the wildlife analysis area because it is 3.5 miles from the H1NDR disturbance footprint and is not within line-of-sight due to the intervening topography and vegetation. Noise and mining disturbance would be detectable in Stewart Canyon and South Stewart Canyon and other habitat adjacent to H1NDR. This could interfere with goshawk communication during the breeding season for the individual goshawk(s) using these canyons during mining and until reclamation is complete.

Overall, because no nest areas or post-fledgling family areas would be affected, a small percentage of the habitat in the wildlife analysis area would be permanently lost, and a small number of goshawks would be disturbed by mining/reclamation activities, the Proposed Action and Alternative Sequence would have a moderate effect on northern goshawks. The Proposed Action may impact individuals and habitat but would not likely contribute to a trend towards federal listing or cause a loss of viability in the population or species.

The Proposed Action and Alternative Sequence would be consistent with the northern goshawk standards and guidelines in the 2003 RFP because no habitat would be removed or altered in active or historic nesting territories.

Bald Eagle

There would be no effect on nests or roost sites. There would be a negligible increase in selenium exposure. The Proposed Action and Alternative Sequence may impact individuals and habitat but would not likely contribute to a trend towards federal listing or cause a loss of viability in the population or species.

Flammulated Owl

The Proposed Action and Alternative Sequence would permanently remove 823 acres of conifer, aspen, and mixed conifer-aspen forests that are suitable flammulated owl habitat, affecting 2% of the forested habitat in the wildlife analysis area. The habitat that would be removed includes areas in and near where flammulated owls were detected during 2014 near East Mill Creek Canyon and north of Kendall Canyon. The aspen clones on the west slopes of Dry Ridge where the owl was detected during 2019 would not be removed. No known nests would be removed. However, the loss of mature forests would result in large the removal of trees and snags that are potential nesting sites.

The Proposed Action and Alternative Sequence would have a moderate effect on flammulated owls due to the permanent removal of a small percentage of habitat and the 24-hour-per-day disturbance adjacent to occupied habitat that would occur over 15 years. The Proposed Action may impact individuals and habitat but would not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.

The Proposed Action and Alternative Sequence would be consistent with Flammulated Owl Habitat Guideline 1 in the 2003 RFP as no nest sites are known to occur in the wildlife analysis area and, therefore, no habitat around nests would be affected.

Boreal Owl

The Proposed Action and Alternative Sequence would permanently remove 710 acres of conifer and aspen-conifer mixed forests that are suitable boreal owl habitat, affecting 2% of these forest types in the wildlife analysis area. The habitat that would be removed includes an area where the boreal owl was detected in 2013 north of East Mill Creek Canyon. No known nests would be removed. However, the loss of mature forests would result in the removal of large trees and snags that are potential nesting sites.

The Proposed Action and Alternative Sequence would have a moderate effect on boreal owls due to the permanent removal of a small percentage of habitat and the 24-hour-per-day disturbance adjacent to occupied habitat that would occur over 15 years. The Proposed Action may impact individuals and habitat but would not likely contribute to a trend towards federal listing or cause a loss of viability in the population or species.

The Proposed Action and Alternative Sequence would be consistent with Boreal Owl Habitat Guideline 1 in the 2003 RFP because no nest sites are known to occur in the wildlife analysis area and, therefore, no habitat around nests would be affected.

Great Gray Owl

The Proposed Action and Alternative Sequence would permanently remove 823 acres of conifer, aspen, and mixed conifer-aspen forests that are suitable great gray owl habitat, affecting 2% of these vegetation types in the wildlife analysis area. The forested habitat that would be removed includes an area where a great gray owl was detected in 2013 north of East Mill Creek Canyon. Habitat in the area where an adult with juveniles was detected around Stewart Canyon and South Stewart Canyon would not be impacted. No known nests would be removed. Disturbed areas would be reclaimed as grassland/shrubland, which could benefit great gray owls because meadows adjacent to forested areas are important hunting habitat.

The Proposed Action and Alternative Sequence would have a moderate effect on great gray owls due to the permanent loss of a small percentage of habitat and the 24-hour-per-day disturbance adjacent to occupied habitat that would occur over 15 years. The Proposed Action may impact individuals and habitat but would not likely contribute to a trend towards federal listing or cause a loss of viability in the population or species.

The Proposed Action and Alternative Sequence would be consistent with Great Gray Owl Habitat Guideline 1 in the 2003 RFP because no nest sites are known to occur in the wildlife analysis area and, therefore, no habitat around nests would be affected.

Three-toed Woodpecker

The Proposed Action and Alternative Sequence would permanently remove 710 acres of conifer and conifer-aspen mixed forests that are suitable three-toed woodpecker habitat, affecting 2% of these forest types in the wildlife analysis area. The forested habitat that would be removed includes an area where the species was detected in 2013 in the IDI-008289 (NDR) Lease area. Habitat would not be removed in several other areas where the species was detected on the north and east slopes of Dry Ridge. The Proposed Action and Alternative Sequence would remove mature forests that have abundant decaying trees and snags. The removal of this critical habitat feature would be a loss of both foraging and breeding habitat, as dying trees and snags are needed for foraging on insects and excavating nest cavities each year.

Due to the permanent removal of mature forest and decaying trees/snags affecting a small percent of the forest in the wildlife analysis area, and disturbance adjacent to occupied habitat that would occur over 15 years, the Proposed Action and Alternative Sequence would have a moderate effect on three-toed woodpeckers. The Proposed Action may impact individuals and habitat but would not likely contribute to a trend towards federal listing or cause a loss of viability in the population or species.

Greater Sage-Grouse

There would be no effect to priority, general, or important habitat management areas, or other suitable habitat. Noise and other mining disturbance would have no effect on the one active lek (3C028) in the greater sage-grouse analysis area because it is more than 2 miles from H1NDR. H1NDR would have no impact on greater sage-grouse.

Columbian Sharp-tailed Grouse

The two occupied leks in the Columbian sharp-tailed grouse analysis area, Lek 3CT100a and Lek 3CT10, are 1.4 miles and 1.8 miles west of the proposed H1NDR mine disturbance footprint, respectively. H1NDR is on top of Dry Ridge; therefore, visibility at these leks in Dry Valley is reduced due to the steep slopes on the west side of Dry Ridge. While mining noise and disturbance could be detectable at these leks, it is unlikely to occur at a level that would interfere with breeding behavior because the noise would attenuate over the distance and terrain. Therefore, noise and disturbance would have a negligible effect on Columbian sharp-tailed grouse.

The Proposed Action and Alternative Sequence would result in the loss of 151.3 acres of mountain brush and aspen (winter habitat), which is 1.2% of the winter habitat in the Columbian sharp-tailed grouse 2-mile-buffer analysis area. No basin grasslands or sagebrush would be removed and, therefore, no breeding habitat would be affected. The removal of aspen would be permanent because tree growth would be prevented in the cap and cover areas. The reclaimed areas would be primarily grassland initially; however, the reclamation seed mix would include some native shrub species, such as bitterbrush, and is expected to be a shrub-grass mix over the long term, which could be suitable habitat for Columbian sharp-tailed grouse. Overall, because of the small percentage of the Columbian sharp-tailed grouse analysis area that would be affected and because the habitat would be restored over the long term, effects to Columbian sharp-tailed grouse from the loss of winter habitat would be minor. The Proposed Action may impact individuals and habitat but would not likely contribute to a trend towards federal listing or cause a loss of viability in the population or species.

Trumpeter Swan

The Proposed Action and Alternative Sequence may impact trumpeter swan individuals and habitat but would not likely contribute to a trend towards federal listing or cause a loss of viability in the population or species. Trumpeter swans would be exposed to a negligible increase in selenium.

Gray Wolf

The Proposed Action and Alternative Sequence would remove 891 acres of habitat, affecting 1.4% of the habitat in the wildlife analysis area. The habitat loss would be temporary (less than 5 years after the initial impacts) because the pit would be backfilled and disturbed areas would be reclaimed to grassland and grass-shrubland habitat, which would be suitable habitat for gray wolf. However, because the permanent removal of forested habitat would have an adverse effect on ungulate prey (see big game section below), the quality of the habitat for wolves would be reduced. No den sites or rendezvous sites are present and, therefore, none would be removed or affected by the Proposed Action and Alternative Sequence. The mining disturbance and temporary habitat loss may displace individual wolves to other areas of Dry Ridge or change their behavior but would not affect survival. Furthermore, because no resident packs occupy the analysis area there would no disruption in breeding or population-level effects. Wolves dispersing through the area would likely avoid the mine disturbance areas during the 13 years of mining and 2 years of reclamation. However, the Proposed Action and Alternative Sequence would not impede wolf movement across Dry Ridge during mining or after reclamation because the forested habitats below the mine would remain and this species can move long distances and avoid the mine pits. Therefore, effects to wolf dispersal movements would be negligible.

The temporary loss of habitat and mining disturbance may affect a small number of individual gray wolves that occasionally move through the wildlife analysis area but would not affect populations or dispersal movements. For these reasons, the Proposed Action and Alternative Sequence would have negligible effects on gray wolf. The Proposed Action and Alternative Sequence may impact individuals and habitat but would not likely contribute to a trend towards federal listing or cause a loss of viability in the population or species.

North American Wolverine

The Proposed Action and Alternative Sequence would result in the permanent loss of 823 acres of forest that is wolverine linkage habitat, affecting 2% of these forest types in the wildlife analysis area. Relative to the wolverine home range size, the acreage that would be disturbed is negligible (1% of the female average home range size, and less than 1% of the male average home range size). No denning habitat is present; therefore, no den sites would be removed or affected. No resident wolverines or breeding populations occur in the wildlife analysis area, but the mining disturbance and loss of forest could disrupt movement/dispersal. This may alter an individual's behavior or space use but is unlikely to affect survival, as this species easily moves long distances and could navigate around the mining disturbance. Furthermore, the effect would be short-term because wolverines would be able to travel through the impacted area following mine closure and reclamation, after the pits have been backfilled and reclaimed as grassland and grass-shrubland. Based on this analysis, the Proposed Action and Alternative Sequence would have negligible effects on wolverine. The Proposed Action may impact individuals and habitat but would not likely contribute to a trend towards federal listing or cause a loss of viability in the population or species.

Townsend's Western Big-eared Bat

The Proposed Action and Alternative Sequence would result in the temporary loss of 891 acres of foraging habitat for Townsend's western big-eared bat, affecting 1.4% of the wildlife analysis area. Progressive mining and concurrent reclamation would reduce the area impacted at any one time. The disturbance areas would be reclaimed to grassland over the short term and over the long term are expected to be a grass-shrub mix, both of which would be suitable foraging habitat for this generalist species. No roosting habitat or hibernacula would be impacted because none are present in the analysis area. Because mining would occur 24 hours per day, lighting, noise, and other mining activities could disturb bats foraging in the area. This could alter individual behavior or make it more difficult to forage but it is not expected to affect survival or reproduction.

Over the long term, effects to Townsend's western big-eared bat would be negligible because habitat loss would be temporary and would be reclaimed to suitable foraging habitat, individual bats may be present but large concentrations of this species do not occur, and no sensitive habitats (i.e., winter hibernacula or maternity roosts) would be disturbed. The Proposed Action and Alternative Sequence may impact individuals and habitat but would not likely contribute to a trend towards federal listing or cause a loss of viability in the population or species.

The Proposed Action and Alternative Sequence would be consistent with bat guidelines in the 2003 RFP because no caves or underground mines are known in the wildlife analysis area and, therefore, no protection of these areas would be required.

Management Indicator Species

Effects on Management Indicator Species (greater sage-grouse, Columbian sharp-tailed grouse and northern goshawk) are described previously under the sensitive species section. The Proposed Action and Alternative Sequence is consistent with Management Indicator Species Standard 1 in the 2003 RFP as the wildlife resources report assesses impacts to habitat and populations for the Management Indicator Species (Tetra Tech, Inc., 2021h).

Big Game

Mule Deer Habitat

The Proposed Action and Alternative Sequence would remove 891 acres of suitable mule deer summer range, affecting 0.1% of the suitable summer habitat in the big game analysis area (game management unit 76). At a more local scale (i.e., the wildlife analysis area), the removal would affect 1.8% of the suitable summer habitat in the local watershed (including Dry Ridge, surrounding valleys, and slopes of adjacent mountains). At both the local and the game management unit scale, the loss would affect a small proportion of the habitat. However, the aspen habitat (111.9 acres removed) and mountain shrub habitat (39.4 acres removed) are disproportionately valuable to mule deer compared to other habitat types. Removing forest and shrub habitat would result in a loss of forage, cover needed for security and thermoregulation, and important areas such as some fawning habitat. There would be a permanent loss of coniferous and aspen forest because the reclaimed areas would be grassland over the short term and grass-shrub over the long term; trees would not be permitted to grow in the cap and cover areas. The reclamation seed mix would have some shrub species, including bitterbrush and snowberry, which are favored browse species and, therefore, would provide some value as forage over the long term (post-reclamation). However, the loss of forest habitat would reduce cover and habitat diversity and quality on Dry Ridge, reducing the number of deer that can be supported (carrying capacity).

H1NDR in combination with the Maybe mines would remove habitat across a nearly continuous 10-mile length of Dry Ridge. While mining would be progressive and concurrent reclamation would occur, the cumulative habitat loss/alteration and disturbance are likely to alter migration patterns of deer moving west across Dry Ridge to winter habitat near Soda Springs, Idaho. Based on studies conducted at the Maybe mines (Hemker, et al., 1984), deer are able to navigate around mines but the disturbance slows migration. The delay increases the risk of deer being caught in sudden autumn snow storms that result in rapid, deep snow accumulations that are difficult for deer to negotiate (Hemker, et al., 1984). Dry Ridge is not a major mule deer migration corridor and, therefore, a relatively small proportion of the population would be affected. Once pits are backfilled and reclamation is complete, there would be no impedance of migration movements.

Elk Habitat

The Proposed Action and Alternative Sequence would remove 891 acres of suitable elk summer range, affecting 0.2% of the suitable summer habitat in the big game analysis area (game management unit 76). At a more local scale (i.e., the wildlife analysis area), the removal would affect 1.6% of the suitable summer habitat in the local watershed (including Dry Ridge, surrounding valleys, and slopes of adjacent mountains). At both the local and the game management unit scale, the loss would affect a relatively small proportion of the elk summer habitat. However, the aspen habitat (111.9 acres removed) and mountain shrub habitat (39.4 acres removed) are disproportionately valuable to elk compared to other habitat types. Removing habitat would result in a loss of forage and cover needed for security and thermoregulation, and important areas such as some calving habitat. Habitat removal would be limited in the known elk calving areas (aspen and mountain brush) on the southwest slopes of Dry Ridge because H1 is primarily in higher-elevation coniferous forest, but some loss of calving habitat would occur elsewhere.

There would be a permanent loss of coniferous and aspen forest because the reclaimed areas would be grassland over the short term and grass-shrub over the long term; trees would not be permitted to grow in the cap and cover areas to maintain cover effectiveness and protection of water quality. The agency approved reclamation seed mix would include native and non-native grass and native shrub and forb species and, therefore, would provide some value as forage in the long term (post-reclamation). However, the loss of forest habitat would reduce habitat diversity and quality on Dry Ridge, reducing the number of elk that can be supported (carrying capacity). Declines in the quality of summer forage affect elk body condition, calf growth, and winter survival rates (IDFG, 2014b).

The Proposed Action and Alternative Sequence would remove 209 acres of suitable elk winter range, affecting 0.03% of the suitable winter habitat in the big game analysis area (game management unit 76). At a more-local scale (i.e., the general wildlife analysis area), the removal would affect 0.8% of the suitable elk winter habitat in the local watershed. At both the local and the game management unit scale, the loss would affect a relatively small proportion of the winter habitat. Based on the IDFG model, there is limited suitable winter habitat on Dry Ridge; most suitable winter range near Dry Ridge is at lower elevations.

Effects on elk migration would be negligible as there are no major elk migration corridors in the big game analysis area, and some elk remain on Dry Ridge through the winter.

The Proposed Action and Alternative Sequence would remove 0.03 acre of the wetland (AB-092712-1052) where an elk wallow occurs along East Mill Creek. It is not known if the wallow itself would be impacted. Even if the wallow is not directly impacted, elk are unlikely to use any part of this drainage while mining activity is occurring due to noise and disturbance. No known licks would be affected as none have been identified in the big game analysis area.

Noise and other mining disturbance could cause mule deer and elk to leave otherwise suitable habitat to avoid disturbance and potentially be displaced into poorer quality habitat. This could also reduce elk feeding and resting time and increase elk movement, resulting in higher energy expenditure (IDFG, 2014b). Past studies conducted around the Maybe mines indicated that for mule deer, displacement is generally temporary and localized, and that deer habituate to regular disturbance occurring at mines (Merrill, 1984). Deer and elk are frequently observed at reclaimed areas of active phosphate mines. However, disturbance is likely to have a greater effect during fawning/calving season (because productivity and fawn/calf growth can be reduced) and winter when elk are under greater stress. When exposed to simulated mining disturbance, elk on Dry Ridge abandoned traditional calving areas in favor of more coniferous forest, and moved calves further, increasing energy expenditure although no calf abandonment or mortality was documented (Kuck, et al., 1984). H1NDR disturbance would be adjacent or within 0.25 mile of aspen and mountain shrub habitat on west slopes. Much of the aspen and mountain brush habitat at lower elevations would not be affected.

There could be increased big game mortality from motor vehicle collisions, particularly because mining would occur 24 hours per day. Vehicles and mining trucks would be traveling at low speeds, which would reduce the risk of collision.

Selenium Toxicity

Selenium or other COPCs are not anticipated to be elevated in reclamation vegetation, but under the Proposed Action and Alternative Sequence concentration would increase in Stewart Creek, Maybe Creek, and East Mill Creek. By backfilling and reclaiming portions of the existing mine areas, there would be less exposure to selenium in vegetation. Big game are not confined to a small area like livestock, and foraging over a larger area reduces the potential for toxicosis compared to concentrated use or chronic exposure (Southeast Idaho Phosphate Mine Site Trustee Council, 2015) in the localized mine area. No big game mortalities have been documented from selenium toxicosis at phosphate mines in southeast Idaho and no mortalities are expected under the Proposed Action.

Conclusions – Big Game

Big game would be affected by mining disturbance adjacent to important fawning/calving and summer habitat, disruption of migration of small numbers of deer, permanent removal of high-value aspen habitat, and long-term removal of high-value mountain brush. Big game have also been affected by past habitat loss from other mines in the big game analysis area. Given that reclamation would return some shrub habitat over the long term, mining noise/disturbance would be temporary, and substantial areas of aspen and mountain shrub would remain intact on the west slopes of Dry Ridge, the effect would be moderate and localized to Dry Ridge. Additional impacts from H1NDR would have a moderate adverse effect to the overall mule deer population. The elk numbers are stable to increasing and, therefore, more resilient, but given the level and long-term nature of the impact, H1NDR would have a moderate adverse effect on the elk population in game management unit 76.

The Proposed Action and Alternative Sequence would result in removal of 1.48 acres of Prescription 2.7.2(d) areas (Elk and Deer Winter Range). These areas would return to grass, forbs, and shrubs post-reclamation and, therefore, over the long term the Proposed Action and Alternative Sequence would be consistent with the management direction for this prescription. This prescription emphasizes management for vegetation and security habitat that provide quality big game winter range but does not exclude other uses.

The Proposed Action and Alternative Sequence would be consistent with Guideline 1 in Prescription 8.2.2(g) - Phosphate Mine Areas (Biological Elements – Wildlife). Although mule deer migration could be slowed by construction of new pits, mining in phases and concurrent reclamation would reduce the effect to a smaller area affected at any one time. Reclamation (pits filled and vegetation reseeded) would restore migration habitat. Migration would also be improved because historic open pits would be backfilled, increasing the area available for migration on Dry Ridge compared to baseline conditions.

Migratory Birds

The Proposed Action and Alternative Sequence would remove 891 acres of migratory bird habitat, primarily coniferous, aspen, and mixed conifer-aspen forests and mountain shrub types that are used by a variety of migratory birds, including bird species of management concern or conservation concern. The loss of mature forest would be a permanent loss as these areas would be reclaimed to grassland and grass-shrub community and maintained to prevent tree growth. The Proposed Action and Alternative Sequence would also remove important nesting and foraging structure for birds that are present only in mature forests, such as snags and dying trees that are crucial for cavity nesters, large diameter trees, and possibly existing raptor stick nests, which are often used over multiple years and by different species.

No take of nesting birds would occur because either disturbance would take place outside of nesting season, or if that is not possible, a nest clearance survey would be conducted 7 to 10 days prior to initiating timber removal or other ground clearing during the migratory bird breeding season to identify active nests. Avoidance measures (e.g., nest buffers) would be identified in coordination with the USFS and USFWS if active nests are present to avoid disturbing nesting birds or the taking of eggs or young.

Disturbance from noise and mining activity occurring 24 hours per day could interfere with breeding behavior as noise can mask bird songs, making it difficult for females to locate singing males and males may sing louder to compensate and use more energy. Mining would be progressive and reclamation would occur concurrently, which would reduce the area affected by disturbance at any one time. In addition, mining disturbance would end once reclamation is complete.

Overall, due to minor effects from disturbance and selenium, measures to reduce the likelihood of mortality, and the permanent removal of mature forest habitat in a small area, the Proposed Action and Alternative Sequence would have a moderate effect on birds.

The Proposed Action and Alternative Sequence would be consistent with Land Bird Guideline 1 in the 2003 RFP because no stands of mature trees next to wet meadows would be removed (i.e., no wet meadows are in or adjacent to the proposed impacted area).

3.9.3.2 No Action

Habitat Loss

The existing 891 acres of mature conifer, aspen, and mixed aspen-conifer forest, mountain brush/shrub, and riparian shrub habitat would not be removed under this MRP and, therefore, the wildlife habitat would continue to function as a large block of mature forest intermixed with mountain shrub and montane sagebrush. There would be no direct, indirect, or cumulative effect on wildlife habitat.

Disturbance

By not implementing this MRP, wildlife would continue to forage and breed at current levels of disturbance, primarily from dispersed recreational activities (e.g., camping, hiking, fishing, hunting, and road use). There would be no direct, indirect, or cumulative displacement effect because disturbance levels would not change.

Selenium Toxicity

There would be no additional selenium releases from this MRP beyond what is currently occurring from historic mines. Wildlife would be exposed to selenium in soil, vegetation, surface water, and groundwater at current concentrations, which exceed IDEQ and BLM thresholds in some water bodies and vegetation.

Threatened and Endangered Species

Canada Lynx

By not implementing this MRP, Canada lynx would continue to use the area as linkage habitat during dispersal or exploratory movements. There would be no direct, indirect, or cumulative effect on Canada lynx or its linkage habitat because disturbance levels would not change, and linkage habitat would not be lost or altered.

Grizzly Bear

There would be no direct, indirect, or cumulative effect on grizzly bear habitat because disturbance levels would not change, and suitable habitat would not be lost or altered.

Sensitive Species and Management Indicator Species

By not implementing this MRP, these species would continue to breed and forage in the 891 acres of suitable habitat on Dry Ridge. The 255 acres of existing mine disturbance at the Maybe mines would remain unsuitable habitat until addressed by another process. No sensitive species or Management Indicator Species would be affected because no habitat would be lost and there would be no direct, indirect, or cumulative change to current levels of disturbance.

Big Game

The 891 acres of big game habitat would remain in its current condition: mule deer would continue to use the area as summer range and fawning habitat, and during migration; and elk would continue to use the area as summer range, calving habitat, and winter range. The 255 acres of existing mine disturbance at the Maybe mines would remain unsuitable habitat. Mule deer would continue to migrate across Dry Ridge at their current rate. Calving and fawning habitat would be relatively undisturbed, except for possible impacts from dispersed recreational activities. There would be no direct, indirect, or cumulative effect on big game.

Migratory Birds

By not implementing this MRP, the 891 acres of suitable habitat would remain in its current condition and migratory birds would continue to forage and breed in the mature forests and mountain shrub habitat at their current population densities. Snags/decaying trees, woody debris, large trees, and understory would continue to provide important forest structure for a diversity of wildlife and their foraging and breeding needs. The 255 acres of existing disturbance would remain unsuitable habitat. There would be no direct, indirect, or cumulative effect on migratory birds.

3.9.3.3 Alternative Cover

The effects to wildlife from the Alternative Cover would be the same as the Proposed Action with the following important exceptions:

- Surface water would not be contaminated by selenium because groundwater daylighting downstream of the pits would be reduced to negligible amounts (within the measure of error in the groundwater flow model) and, therefore, selenium concentrations released into streams would be none to negligible (below the limits of detection), and never above IDEQ aquatic life criteria. The direct, indirect, or cumulative risk of wildlife selenium toxicity would be negligible.
- Habitat types removed and reclaimed would be similar under the Alternative Cover, but with 49 additional acres (total of 68 acres) of pit highwalls left exposed. Additional highwalls could provide more habitat for species that use cliff habitat (certain raptor and bat species). The acres of habitat reclaimed would be reduced to 611 acres compared to 705 acres in the Proposed Action. Direct, indirect, or cumulative effects to wildlife from changes to habitat would be the similar to the Proposed Action.

3.9.3.4 Alternative Stream Routing

The alternative stream routing of Stewart Creek would have the same direct, indirect, or cumulative effects to wildlife as the Proposed Action routing of Stewart Creek, except an additional 5 acres of habitat (coniferous forest and mixed aspen-conifer forest) would be temporarily removed. This is because the Alternative Stream Routing temporarily relocates Stewart Creek to the east into undisturbed habitat during mine operations, whereas the Proposed Action routing of Stewart Creek is within the mine operational zone (disturbance footprint). The post-reclamation condition of wildlife habitat and riparian function would be the same as that expected under the Proposed Action; however, the stream restoration would occur at a different location (i.e., back to Stewart Creek's original location) compared to the Proposed Action.

3.9.3.5 Alternative Access 1 and Alternative Access 2

In addition to the habitat removed under the Proposed Action, the Alternative Access 1 would permanently remove another 42 acres of wildlife habitat, including coniferous forest, aspen forest, mixed aspen-forest, mountain brush, and grass/forb for the road option or 14 acres for the ATV trail option. Approximately 11.4 acres of the new road or ATV trail would be in areas already disturbed that are currently not wildlife habitat. Alternative Access 2 would remove 55 acres of wildlife habitat. **Table 40** shows the acres of each habitat type that would be removed to build the Alternative Access 1 road or ATV trail, and Alternative Access 2. The Alternative Access 1 would result in removal of an additional 7.5 acres of habitat in Prescription 2.7.2(d) areas (Elk and Deer Winter Range) and Alternative Access 2 would remove 15.4 acres of habitat in Prescription 2.7.2(d) areas. The road would be outside of active and historic northern goshawk nesting territories.

The Alternative Access would replace a portion of the current NFS Road 134 that accesses Dry Ridge from Stewart Canyon. Disturbance to wildlife from vehicles and recreational access currently occurs along NFS Road 134. Construction of Alternative Access 1 road or ATV trail, or Alternative Access 2 would permanently shift this disturbance to a different location, as the old road (portions of NFS Road 134) would be removed by mining. The disturbance from recreational use on Alternative Access 1 (road or ATV trail options) or Alternative Access 2 would be additive to the mining-related disturbance during mine operation. Once the mine is reclaimed, the amount of human disturbance would be similar to pre-mining levels. Due to the topography requiring deep cuts for the road, Alternative Access 2 could result in long sections of tall cliffs along the road that may be impassable to big game and migration could be delayed as animals navigate around these areas.

3.10 Soils

3.10.1 Analysis Area and Methods

The soil analysis area (direct, indirect, and cumulative) is defined as the area where soil would be disturbed or salvaged, including H1NDR mine pits and other surface disturbance such as ancillary facilities and haul roads.

The issues for analyzing impacts on soils and the indicators used to discuss them are own in **Table 43**.

Table 43. Issues and Indicators for Soil

Issue	Analysis Method
Acres of soil by type that would be disturbed	GIS soil type analysis with disturbed areas
Potential for trace elements, including selenium, to be mobilized from OSAs to contaminate on-site or adjacent soil resources	Qualitative discussion of potential sources and impacts
Loss of soil productivity	Qualitative discussion of impacts
Soil loss	Qualitative discussion of impacts
Soil available to meet reclamation requirements	Calculated inches based on disturbance, soil type, depth, and reclamation needs.

3.10.2 Affected Environment

The soil baseline study report documented soil physical and chemical properties pertinent to the issues listed above (Tetra Tech, Inc., 2020). Data for comparison to a series of U.S. Department of Agriculture (USDA) reclamation suitability criteria were also collected (USFS, 2014). These data were evaluated in conjunction with volumetric calculations to determine the amount of each soil mapping unit and soil component that would be affected and the volume of soil meeting USDA suitability ratings available for reclamation.

Changes to the proposed disturbance boundary made after publication of the soil baseline study report necessitated extrapolating soil boundaries beyond the original analysis area based on vegetation, slope, and aspect as identified on aerial photos and topographic maps. An area in Section 15 was also identified as a location for a tipple and other support facilities and was not included in this analysis. The tipple area will undergo an Order 2 soil survey as a condition of permit approval.

The soil baseline survey identified and described 24 soil map units comprising 37 soil components or series (Tetra Tech, Inc., 2020). These soils typically had loamy textures (i.e., loam, sandy loam, and silt loam), although subsurface horizons encountered in concave swales at the toe of alluvial fans in map unit F had clay concentrations great enough to be considered limiting (**Table 44**). The percentage of clay within a soil profile increased with increasing depth throughout the analysis area. Generally, soil textures became increasingly silty and sandy further south in the analysis area.

Coarse fragment content generally increased with depth in all map units across the analysis area. For most map unit components, coarse fragments were gravel less than 3 inches in diameter, although cobbles ranging from 3 to 10 inches diameter were encountered. Subsurface horizon cobble content is limiting (**Table 44**) in some soil components in map units B1, H2, J2, and L.

Many of the soils had loamy surface textures with relatively high organic matter and high gravel content, which protects the undisturbed soils against wind erosion. However, if disturbed (cleared of vegetation) and in the absence of moisture, these soils may begin to erode and may be difficult to stabilize. Soil determined to have limiting suitability due to high susceptibility to wind erosion was the 12-inch to 30-inch depth in some portions (around 5%) of map units H1 and H2 having fine sandy textures. Wind erodibility presented no suitability limitations for other soil components or map units.

A soil's susceptibility to water erosion is often evaluated using a soil-erodibility factor (K-factor) (**Table 44**). Sixteen soil components or series had somewhat limiting suitability based on the K-factors. These soils were located on ridge crests and steep slopes originating from sandstones and siltstones. No soil components had limiting suitability based on their K-factor.

Table 44. Soil Salvage Suitability Criteria

Suitability Criteria	Limiting to Soil Suitability	Somewhat Limiting to Soil Suitability	Not Limiting
Inches to Bedrock or Cemented Pan	Less than 20	20 to 40	Greater than 40
Percent Clay	Greater than 40	30 to 40	Less than 30
Percent Sand	Greater than 85	70 to 85	Less than 70
Cobble Content (3 to 10 inches) (% by weight)	More than 50	25 to 50	Less than 25
Percent by weight of Stone (more than 10 inches)	Greater than 15	5 to 15	Less than 5
K-Factor	Greater than 0.7	0.35 to 0.7	Less than 0.35
Calcium Carbonate (%)	Greater than 40	15 to 40	Less than 15
Sodium Adsorption Ratio	Greater than 13	4 to 13	Less than 4
Organic Matter Content (%)	0	Between 0 and 1	Greater than 1
pH	Less than 5.5 or greater than 8.4	5.5 to 6.0 or 8.0 to 8.4	6.0 to 8.0
Electrical Conductivity (millimhos/centimeter)	Greater than 16	8 to 16	Less than 8
Inches of water per inches of soil (Available Water Holding Capacity)	Less than 0.05	0.05 to 0.1	Greater than 0.1
High susceptibility to wind erosion	Natural Resources Conservation Service Wind Erodibility Group 1 and 2[a]	Not Applicable	Not Applicable

Source: (USFS, 2010).

a Wind Erodibility Groups are based on soil texture and other factors as defined in sections 618.77 and 618.95 of the Natural Resources Conservation Service Soil Survey Handbook. Group 1 has the highest erodibility, with an index of 310 tons/acre/year. Group 2 has an index of 134 tons/acre/year (NRCS, 2019, p. B.29).

Much of the study area consists of slopes of sufficient steepness to produce landslides or other instabilities if severe precipitation or seismic events were to occur. Despite this potential, no indications of recent landslides were observed during field activities, and only one test pit location was present in an area where historic landslide activity was apparent and one where soil creep was observed. The landslide activity was observed on a very steep, east-facing slope in Map Unit B3. Soil creep in the form of deformed tree trunks was observed on a north-facing slope within Map Unit E3.

The soil baseline survey sampling found through laboratory testing that the average concentrations of antimony, cadmium, selenium, thallium, and zinc were elevated above ranges typical for soils in the U.S. (Kabata-Pendias, 2001). Other trace elements were present in concentrations that were within typical ranges, either for all samples or for most samples with occasional excursions above the typical range for certain elements.

Based on soil horizon depth, soil mapping boundaries, salvage methods, and the disturbance area, the volume of soil rated as "Not Limiting" or "Somewhat Limiting" was calculated for use as growth media (**Table 45**). Soil rated as limited would not be salvaged for reclamation use.

Table 45. Cubic Yards of Soil by Salvageable Suitability Criteria

Salvageable	Cubic Yards Available
Not Limiting	684,284
Somewhat Limiting	1,351,525
Total	2,035,809

Notes: The calculations were made using the acres of each map unit, % of each soil component comprising a map unit, thickness of each component horizon, and converted to cubic yards.

3.10.3 Environmental Consequences

3.10.3.1 Proposed Action, Alternative Cover, and Alternative Sequence

A total of 3.36 million cubic yards of soil are available for salvage from 1,076 acres to obtain growth media for reclamation. This acreage and soil volume do not include the approximately 61-acre tipple area and 8 acres of associated access road which would undergo an Order 2 soil survey prior to any disturbance. Construction of the Alternative Access 1 road would disturb an additional 42 acres and construction of the Alternative Access 2 road would disturb an additional 55 acres, which would not be reclaimed.

Salvage would result in direct, indirect, and cumulative degradation of soil structure and microbial activity, which are key factors affecting soil-water interactions, erosion, nutrient cycling, susceptibility to compaction, and the support of plant life (i.e., soil productivity) (Bronick & Lal, 2004). The resulting growth media would be susceptible to erosion during handling and storage, and would exhibit decreased productivity upon placement in reclaimed areas. These effects would be long term; however, soil salvage and growth media placement activities are designed to minimize the loss of functionality through direct placement of growth media upon being salvaged whenever possible. Growth media not directly hauled for use in reclamation would be temporarily stockpiled until needed for reclamation. Erosion prevention BMPs such as seeding soil stockpiles and implementing run-on and run-off control measures would minimize loss of stockpiled soil and replaced growth media through erosion. This would subsequently conserve growth media thickness and minimize impacts to other resources.

Soil trace element total concentrations would be unaffected by soil handling operations. Trace element mobility would also be unaffected, as the existing near-surface soil is currently subjected to the same atmospheric weathering processes as the resulting growth media placed for reclamation. The excavation would not cause a change in the oxidation state of trace element-containing minerals and subsequent increases in trace element mobility. The general trend is for trace element concentrations to be higher in soils located directly over the Phosphoria Formation. Mixing soils during salvage, storage, and replacement will dilute elevated trace element concentrations in Phosphoria Formation soils.

Growth media would be placed on disturbed areas as part of reclamation (Itafos, 2020a; Arcadis, 2021a). Only growth media identified as "Not Limiting" or "Somewhat Limiting" would be used to construct the cap and cover system on areas of backfilled overburden (Arcadis, 2021j). Within the disturbance boundary, 3.6 million cubic yards are "Not Limiting" or "Somewhat Limiting". Equal distribution of this growth media across the 1,076-acre disturbance would allow 25 inches of "Not Limiting" and "Somewhat Limiting" growth media to be placed for reclamation, indicating that growth media will be available to meet the 20 inches required in Section 2.2.9.12.

Separate salvage and handling of nutrient-rich upper soil horizons (topsoil) and less fertile subsoil is not proposed. Mixing of these materials during salvage operations would simplify salvage operations but would result in an overall degradation of topsoil quality due to dilution of organic matter and microbial biomass.

In the 61-acre tipple area and 8 acres of associated access road, covering the tipple with a limestone cap without removing native soil would result in compaction and loss of soil microbial activity, and an irretrievable and irreversible reduction in the functionality of the upper portion of the soil profile. These impacts may or may not be more severe or of longer duration compared to mixing upper and lower soil horizons and storing in a stockpile, as would occur at other areas where soil is salvaged. However, reclamation standards must be met.

3.10.3.2 No Action

By not implementing this MRP, the No Action Alternative would produce no change from current conditions. Direct, indirect, and cumulative effects on soil would not occur.

3.10.3.3 Alternative Stream Routing

Direct and indirect effects on soil would be the same as those described for the Proposed Action, although an additional 4.9 acres of soil would be disturbed (total of 1,082 with the Proposed Action or Alternative Cover). Within this 4.9-acre area, 8,357 cubic yards of soil are available for salvage which does not include 3.2 acres of soil that fall outside of the existing soil mapping boundary. Soil trace element total concentrations would be unaffected by stream routing or reconstruction activities.

3.10.3.4 Alternative Access 1 and Alternative Access 2

Direct and indirect effects on soil would be the same as those described for the Proposed Action, although an additional 42 acres of soil for the Alternative Access 1 road or 14 acres for the Alternative Access 1 ATV trail would be disturbed and not reclaimed, as the relocated road would be permanent. Within the 42-acre area of the Alternative Access 1 road, 150,549 cubic yards of soil are available for salvage, which does not include 13.5 acres of soil that either fall outside of the existing soil mapping boundary or are already disturbed by existing roads. The 14 acres of the Alternative Access 1 ATV trail would make 45,767 cubic yards of soil available for salvage (30.4% of the ATV trail based on acres). Alternative Access 2 would result in a total of 55 disturbed acres that would not be reclaimed. Within this 55-acre area of the Alternative Access 2 road, 121,086 cubic yards of soil are available for salvage which does not include 28 acres of soil outside of the existing soil mapping boundary.

Soil trace element total concentrations would be unaffected by the access alternatives.

3.11 Grazing

3.11.1 Analysis Area and Methods

The analysis area for grazing consists of the grazing allotment permit boundaries that contain the project footprint. The grazing analysis area is shown on **Figure 46**. The issues for analyzing impacts on grazing and the indicators that will be used to discuss them are shown in **Table 46**.

Table 46. Issues and Indicators for Grazing

Issue	Analysis Method
Acres of change in suitable rangeland	Quantify the acres of suitable rangeland impacted during and after mining.
Estimated reduction in head months	Based on vegetation type, capability, and suitability conversions calculate the estimated change in Head Months.
Areas where the mining activities split an allotment or reduce movement to or between feed and water.	Qualitative discussion of effects and proposed EPMs and BMPs based on GIS mapping considering mining progression and time until reclaimed.

3.11.2 Affected Environment

The project footprint is located within three sheep grazing allotments and one cattle grazing allotment. From north to south the sheep grazing allotments include Kendall Canyon, Maybe Canyon, and Stewart Canyon. The Dry Valley lease, where the Tipple site is proposed, is within the North Division of the Dry Valley cattle grazing allotment, which is subdivided into units 10, 11, and 12. The allotment areas and boundaries for the Dry Valley North Division units are shown on **Figure 46**.

The Term Grazing Permits outline the permitted number of animals, season of use, head months, and grazing rotation (**Table 47**). The 2003 RFP (Appendix B-49) was used to determine suitable rangelands. For consistency with the 2003 RFP, Appendix B-60 was used to calculate sheep and cattle head months. The USFS determined tentative carrying capacity for each allotment (**Table 48**). The rangeland suitability identifies the appropriateness of grazing livestock. Acres not suitable for grazing are not considered in the tentative carrying capacity. Existing phosphate mine areas are considered unsuitable for grazing and were not included in the tentative carrying capacity in the USFS analysis of suitable areas.

Pond #8 and stock water rights on the border between the Kendall Canyon and Maybe Canyon allotments are used when grazing the west side and in the lower western corner of the allotment, respectively (**Figure 46**).

Table 47. Summary of Grazing Allotments

Allotment Name	Season of Use	Head Months Authorized	Improvements
Kendall Canyon	June 25 to September 20	2,864	9 ponds, 1 trough
Maybe Canyon	June 20 to September 20	2,859	1 corral, 4 troughs, 3 ponds
Stewart Canyon	June 20 to September 15	2,633	Water tank
Dry Valley	June 6 to September 20	5,298	7 cattleguards, 17 fences (25.7 miles), 39 ponds, 10 troughs, 6 pumps, 6 wells, 1 distribution pipeline

Source: (USFS, 2020b; USFS, 2020c; USFS, 2020d).

Figure 46. Grazing Analysis Area

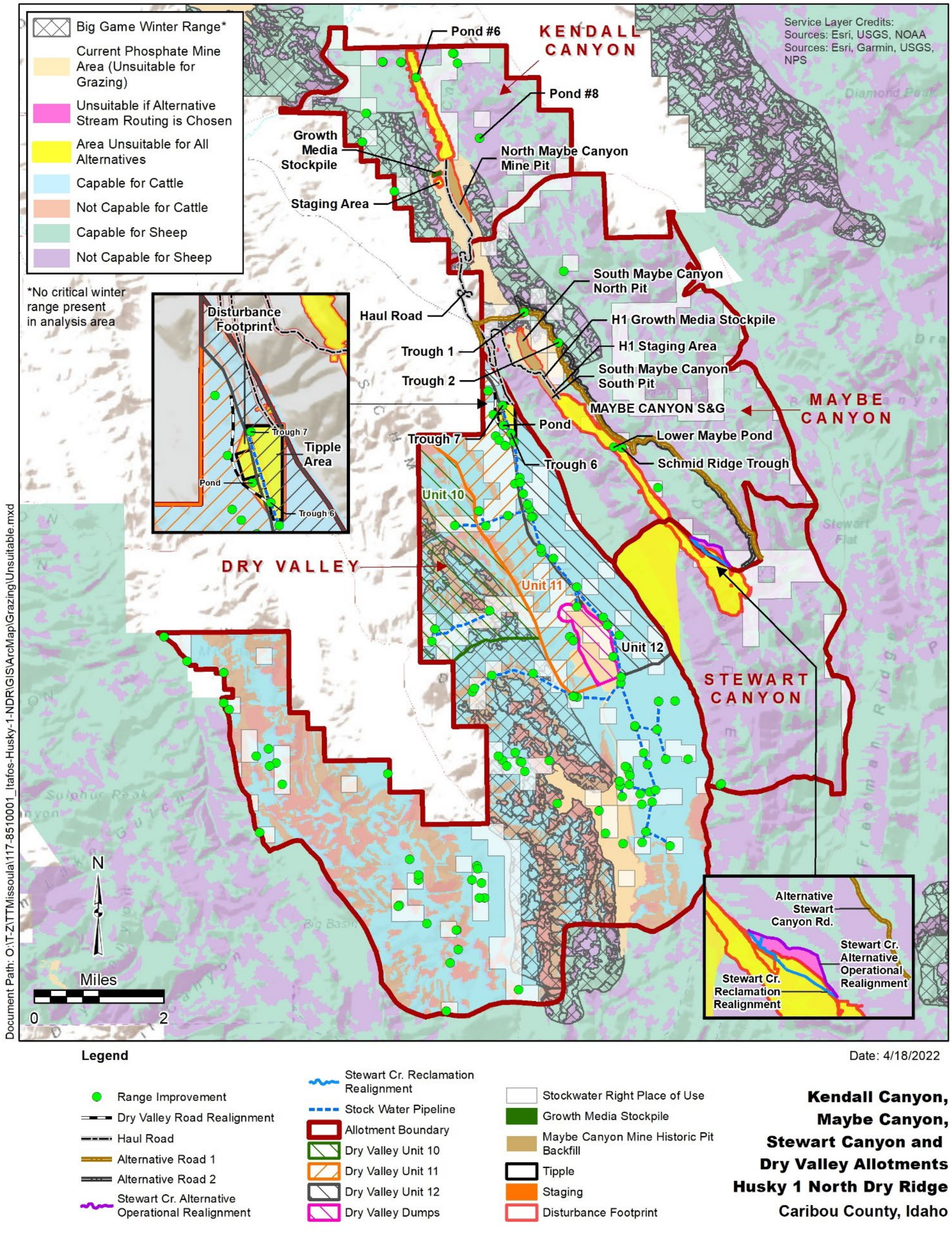


Table 48. Tentative Carrying Capacity by Allotment

Allotment	Suitable Acres[1]	Head Months Available
Kendall Canyon	5,183	Sheep 4,702
Maybe Canyon	11,873	Sheep 10,554
Stewart Canyon	6,476	Sheep 4,731
Dry Valley Unit 11	1,985	Cattle 888
Dry Valley Unit 12	1,973	Cattle 667

Source: (Tetra Tech, Inc., 2022b)
1 GIS Analysis

3.11.3 Environmental Consequences

3.11.3.1 Proposed Action and Alternative Cover

The Proposed Action would disturb areas shown in **Figure 46**. These areas would become inaccessible and unsuitable for sheep/cattle grazing until the restoration criteria identified in the MRP have been met and the area can be reopened to grazing, according to the 2003 RFP. EPMs are included in Section 2.2.9.17 to address the loss of access to surface water sources and range improvement water sources available for livestock use due to mining operations. Livestock grazing would be prohibited from accessing mine areas, including haul roads, during the life of the mine (Section 2.2.9.3).

The effects on head months are based on a tentative capacity analysis (Tetra Tech, Inc., 2022b).

Selenium Toxicity

Selenium-bearing material would only be exposed on the surface for a limited time due to concurrent reclamation. With livestock restricted from all mine areas and fugitive dust controlled through BMPs and air permit requirements, livestock would not be exposed to selenium in overburden or fugitive dust. Pursuant to the 2003 RFP, reclamation vegetation shall be monitored for bioaccumulation of hazardous substances prior to release for grazing (USFS, 2003a). Therefore, there would be no risk of selenium toxicity in livestock foraging in reclaimed areas. Additionally, the seed mix would contain low-selenium-accumulating and shallow-rooted species, and the thickness of the proposed covers would minimize selenium uptake in reclamation vegetation.

The change in surface water quality described in Section 3.4.3.3 is expected to be localized to the headwaters of Stewart, Maybe, and East Mill creeks, as the groundwater would mix with the existing surface water and rapidly dilute the concentrations as the water moves downstream. Selenium levels in the sheep allotment could increase above current levels but are not expected to measurably affect survival or reproduction. Pursuant to the 2003 RFP, loss of available surface water sources for uses as a consequence of mining operations would be replaced or mitigated by the mine operator (Section 2.2.9.17). This includes the loss of water quality sufficient to maintain post-mining uses (USFS, 2003a).

To avoid loss of grazing areas west of the disturbance area, Itafos would provide supplemental water to these areas at five locations associated with these points of diversion and the point of use water rights as described in Section 2.2.9.17 and **Table 8**.

Similarly, to avoid completely cutting off access between the eastern and western grazing areas and adding complexity to the counterclockwise livestock rotation on both the Kendall Canyon and Maybe Canyon allotments (**Figure 46**), Itafos would facilitate moving livestock across the active mining area/reclamation area with 3-days' notification (Section 2.2.9.3) before the move and after consultation with the permittee and USFS.

To avoid losing the entire west side for grazing because two of the current water sources are entirely within the mining area (the Lower Maybe Pond and the Schmid Ridge Trough), Itafos would provide supplemental water to all four diversions and the point of use water rights as described in Section 2.2.9.17 and **Table 8**.

With the implementation of the EPMs and BMPs, livestock would have access to feed and water on all allotments during mining and reclamation. Once reclamation monitoring determines that vegetation and surface water conditions are suitable for grazing, as projected in Sections 3.8.3 and 3.5.3, grazing would return to pre-mining levels.

Kendall Canyon Allotment

Mining and reclamation activities would occur within the Kendall Canyon Allotment, shown in **Figure 46**. The NDR staging area, NDR growth media stockpile, North Maybe Mine pit backfill, and the majority of the NDR haul road would be in areas already classified as unsuitable for grazing and would not reduce head months. The mine pits and NDR haul road would disturb suitable acres, which would become unsuitable for sheep grazing and result in a reduction of available head months in Phases 10, 11, and 12. **Table 48** indicates the permitted head months. **Table 49** shows the reduction in tentative carrying capacity and reduction in head months (4.0%). The effects on the Kendall Canyon Allotment would be minor and long term.

Maybe Canyon Allotment

All mine areas, including haul roads would become unsuitable for sheep grazing beginning with H1 mining Phase 1 and continuing throughout the reclamation process until the USFS determines the area is once again suitable for sheep grazing, which could be many years post-reclamation.

The Lower Maybe Pond and Schmid Ridge Trough (**Figure 46**) would be lost to livestock during H1 mining phases and required to be replaced per **Table 8**. The permanent realignment of Maybe Creek and Stewart Creek may result in a short-term loss of access to the Maybe Creek and Stewart Creek stock water right place of use during the construction of the permanent stream beds. The loss of these watering sources may result in a slight reduction in the grazing time these stock water rights would be available and in full use for grazing during the life of the mining and reclamation.

The loss of available head months within the mining disturbance footprint area are shown in (**Table 49**). When compared to **Table 48,** which shows available head months during a permitted season indicates a reduction of 1.8%. The effects to the Maybe Canyon Allotment would be minor and long term.

Stewart Canyon Allotment

Access restrictions due to mining activities at H1 would begin in Phase 6 and last through Phase 9. There would be no impact to the range improvements with known locations. The Stewart Canyon Allotment would not be completely bisected by the mining disturbance area; therefore, the deferred grazing rotation would increase in complexity but not be as difficult as Maybe Canyon and Kendall Canyon allotments. One area on the west side has a water source on the east side of the mine (**Figure 46**). Although the Stewart Canyon Allotment would not be completely split, the distance sheep would have to travel between feed and water would be greater than one mile, and result in this area becoming temporarily unsuitable for grazing and reduce available head months of 20.8% (**Table 49**).

The stock water rights within the disturbance footprint area are used when grazing the northwest corner of the Stewart Canyon Allotment. The permanent realignment of Stewart Creek may result in a short-term loss of access to the Stewart Creek stock water right place of use during the construction of the permanent stream bed. However, since Stewart Creek is an intermittent stream in this location and Itafos is willing to haul water to the adjacent grazing areas adjacent and to the north of the Stewart Creek realignment area (Section 2.2.9.3). The loss of this watering source may result in a slight reduction in grazing time.

Because water would be replaced, the allowable use would not exceed the estimated reduced tentative carrying capacity, which indicates there would be sufficient suitable acres. The effects to the Stewart Canyon Allotment would be moderate and long term.

Dry Valley Allotment

Total suitable acres disturbed in Dry Valley Allotment Unit 11 and Unit 12 are shown in **Table 49**. The disturbance would result in a reduction of cattle head months of 1.6% and 11.2%, respectively. The tipple would isolate the northernmost portion of Unit 12 from the majority of the unit and a small portion of Unit 11 east of the proposed Dry Valley Road realignment. This area would become unusable during the life of the mine. The tipple would be on an underground water distribution pipeline (a range improvement). Itafos has agreed to relocate the underground watering line outside of the tipple area and provide two troughs along the alignment to replace troughs 6 and 7 shown in **Figure 46**. The replacement troughs would minimize the reduction of available head months.

The effects to the Dry Valley Allotment would be minor and long term (**Table 49**).

Table 49. Changes in Carrying Capacity Under the Proposed Action and Alternative Cover

Allotment	Total Suitable Acres Disturbed	Reduction in Head Months
Kendall Canyon	101	Sheep 187
Maybe Canyon	109	Sheep 187
Stewart Canyon	105	Sheep 985
Dry Valley Unit 11[a]	39	Cattle 14
Dry Valley Unit 12[a]	191	Cattle 75

Source: (Tetra Tech, Inc., 2022b)

a Includes Area Unsuitable for All Alternatives shown on **Figure 46**.

Notes: Rounding may cause numbers to total differently than the table.

3.11.3.2 No Action

By not implementing this MRP, there would be no effects to current grazing practices. There are no other foreseen new activities within the grazing analysis area. Grazing analysis area uses would remain restricted in the current phosphate mine areas and CERCLA activities from the historic Maybe Canyon leases would continue (see Section 3.2.1), as would the frequency of recreation, grazing and resource management currently existing. Ten-year grazing permits would continue to be issued. Because existing, unreclaimed mine disturbance areas would not be reclaimed further by H1NDR backfill and cover, the No Action Alternative would not eventually convert areas currently unsuitable for grazing due to mining disturbance to suitable and the subsequent addition of head months.

3.11.3.3 Alternative Stream Routing

The impacts on the Kendall Canyon and Dry Valley allotments would be the same as the Proposed Action.

Maybe Canyon Allotment

The Stewart Creek alternative operational realignment would temporarily occupy 5 acres of the allotment, 4 acres of which are classified as suitable for grazing which results in a reduction in available head months (shown in **Table 50**). The operational realignment of Stewart Creek may result in a short-term loss of access to the Stewart Creek stock water right place of use during the construction of the operational stream bed. Itafos would replace water source for livestock during mining (Section 2.2.9.3, **Table 8**). The effects on the livestock rotation and access to feed and water would be the same as the Proposed Action.

After reclamation, the Stewart Creek alternative reclamation realignment would permanently occupy 5 acres of the Maybe Canyon Allotment, less than 1 acre of which is classified as capable/suitable for grazing. The post-reclamation tentative carrying capacity is shown in **Table 50**.

Stewart Canyon Allotment

The Stewart Creek alternative operational realignment would not occupy any portion of the Stewart Canyon Allotment; therefore, the short-term reduction in capable/suitable acres and annual reduction of head months would be the same as the Proposed Action.

The reclamation realignment of Stewart Creek alternative operational realignment may result in a short-term loss of access to the Stewart Creek stock water right place of use during the construction of the reclaimed stream bed. An EPM is included in Section 2.2.9.2 to address livestock access to surface water sources. Therefore, the effects on the livestock rotation and access to feed and water would be the same as the Proposed Action. The post-reclamation tentative carrying capacity is shown in **Table 50**.

Table 50. Alterative Stream Routing Post-Reclamation Tentative Carrying Capacity

Allotment	Total Suitable Acres Disturbed	Reduction in Head Months
Maybe Canyon	4	8
Stewart Canyon	0.1	0

Source: (Tetra Tech, Inc., 2022b)

Notes: Rounding may cause numbers to total differently than the table.

3.11.3.4 Alternative Access 1 and Alternative Access 2

The impacts to the Kendall Canyon S&G and Dry Valley C&H allotments would be the same as the Proposed Action.

Maybe Canyon Allotment S&G

The Alternative Access 1 road would disturb 25 suitable acres and result in the permanent loss of head months in addition to the Proposed Action (**Table 49**). The Alternative Access 1 ATV trail would affect 13 acres of the Maybe Canyon Allotment. Although the Alternative Access 1alternative road would permanently split the Maybe Canyon Allotment, the grazing allotment permittee would be able to access the eastern portion of the allotment without crossing mine areas and sheep would be afforded the same crossing privileges they currently have on NFS Road 134. Therefore, the effects on the livestock rotation and access to feed and water would be the same as the Proposed Action. **Table 50** shows the effects on carrying capacity. The Alternative Access 1 ATV trail minimal acres would not cause a loss of head months.

While Alternative Access 2 would disturb 13 suitable acres of the Maybe Canyon Allotment, reducing the impacts on grazing compared to the Alternative Access 1 road or Alternative Access 1 ATV trail. Alternative Access 2 would permanently convert 13 suitable acres to unsuitable in addition to the acres affected by the Proposed Action. Final field verification of the Alternative Access 2 road location would avoid impacts on range improvements or impacted range improvements would be relocated for no net loss. Alternative Access 2 would also permanently split the Maybe Canyon Allotment much like Alternative Access 1; however, like Alternative Access 1 the grazing allotment permittee would be able to continue to access the eastern portion of the Maybe Canyon Allotment without crossing mine areas and the sheep would be afforded the same crossing privileges they currently have on NFS Road 134. Therefore, much like Alternative Access 1, the effects on livestock rotation and access to feed and water would be the same as the Proposed Action.

Stewart Canyon Allotment

The Alternative Access 1 road or ATV trail or Alternative Access 2 road would permanently occupy less than one acre of the Stewart Canyon Allotment, less than half an acre of which is classified as capable/suitable for grazing. When combined with the Proposed Action, the short-term reduction in capable/suitable acres and annual reduction of head months would be the same as the Proposed Action.

Although a small portion of the alternative access would permanently occupy the Stewart Canyon Allotment, it would allow grazing allotment permittees access to the allotment without crossing mine areas and sheep would be afforded the same crossing privileges they currently have on NFS Road 134. Therefore, the effects on the livestock rotation and access to feed and water would be the same as the Proposed Action. The post-reclamation tentative carrying capacity is shown in **Table 49**.

Table 51. Alterative Access Post-Reclamation Carrying Capacity

Allotment	Total Suitable Acres Disturbed	Reduction in Head Months
Maybe Canyon		
Alternative Access 1 Road	25	43
Alternative Access 2 Road	13	22
Stewart Canyon		
Alternative Access 1 or Alternative Access 2	0.4	1

Source: (Tetra Tech, Inc., 2022b)

Notes: Rounding may cause numbers to total differently than the table.

3.11.3.5 Alternative Sequence

Kendall Canyon Allotment

Impacts in the Kendall Canyon Allotment under the Alternative Sequence would be the same as the Proposed Action, except they would occur in earlier production years than under the Proposed Action (USFS, BLM, Tetra Tech, 2022, 2022).

Maybe Canyon Allotment

Impacts on the Maybe Canyon Allotment under the Alternative Sequence would be the same as the Proposed Action, except they would occur in later production years than under the Proposed Action (USFS, BLM, Tetra Tech, 2022, 2022).

Stewart Canyon Allotment

Impacts on the Stewart Canyon Allotment under the Alternative Sequence would be the same as the Proposed Action except they would begin in later production years than the Proposed Action (USFS, BLM, Tetra Tech, 2022, 2022).

Dry Valley Allotment

The impacts on the Dry Valley Allotment would be due to the mine facilities and ore transport, therefore the Alternative Sequence would not affect the timing of the impacts on the Dry Valley Allotment (USFS, BLM, Tetra Tech, 2022, 2022).

3.12 Recreation, Access, and Roadless Areas

3.12.1 Analysis Area and Methods

The analysis area includes the H1NDR disturbance area and the major access roads and recreation infrastructure (roads, trails, campgrounds, rental cabins, etc.), an area of 36,636 acres (**Figure 47**).

The issues are listed in **Table 52** along with the indicators used to evaluate the measure of change between the current affected environment and the effects on recreation, access, and roadless areas.

Table 52. Issues and Indicators for Recreation, Access, and Roadless Areas

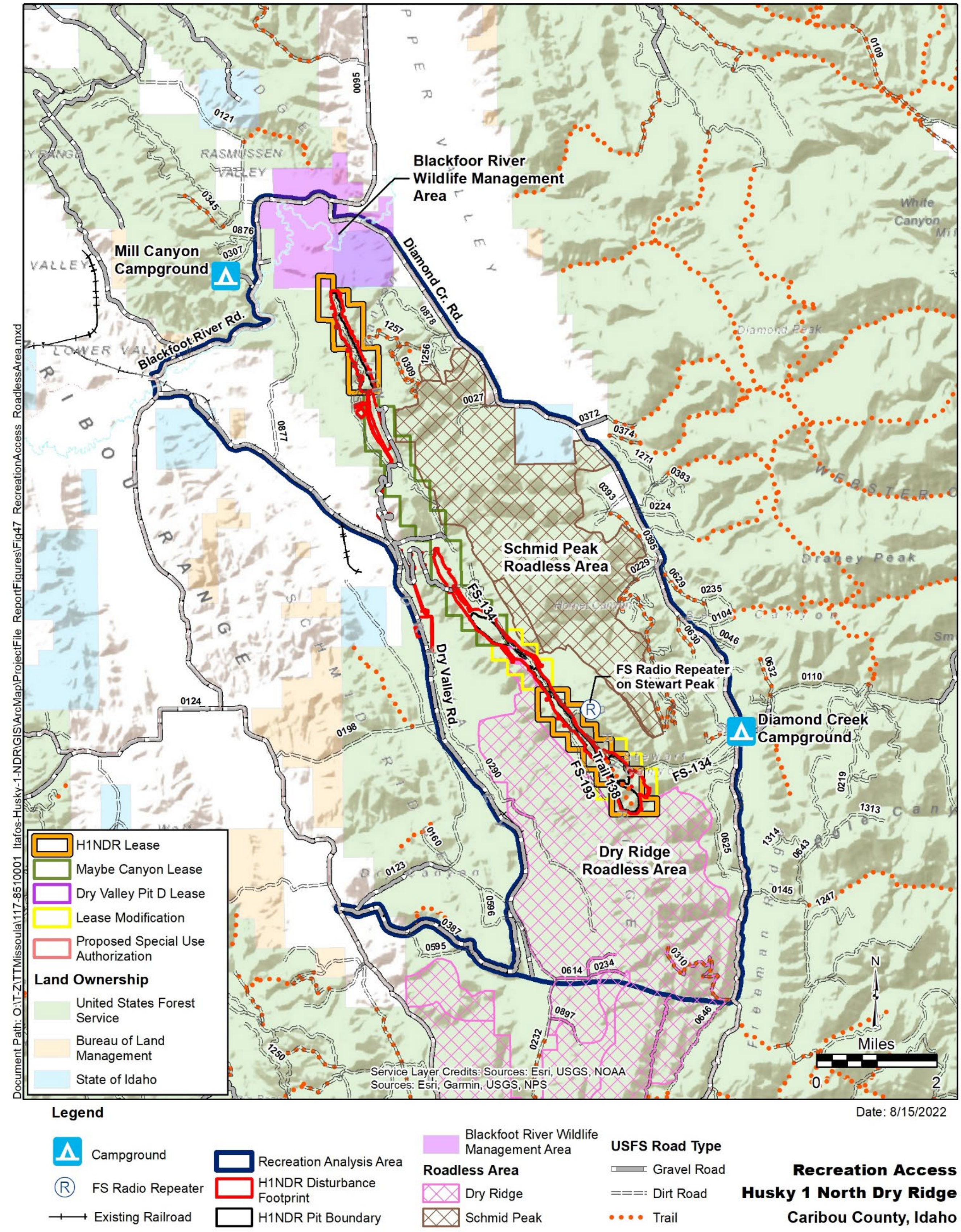
Resource	Issue	Analysis Method(s)
Recreation	Mining activities may change the existing Recreation Opportunity Spectrum.	Acres of disturbance affecting Recreation Opportunity Spectrum classification.
	Loss of acreage available for short-term or long-term recreation uses, including hunting.	Changes in acreage available for dispersed (both motorized and non-motorized) recreation activities particularly hunting.
Access	Public access to recreational opportunities may be limited or prevented by mining activities.	Acres of public lands closed to public use during mining and reclamation. Miles of primary access roads closed to public use by mining and reclamation activities. Changes in the number of miles of NFS roads and trails open to motorized travel.
Roadless Areas	The project may result in new roads and other infrastructure within a designated Inventoried Roadless Area	Acres of disturbance including roads and other infrastructure within a designated Inventoried Roadless Area

3.12.2 Affected Environment

Recreation

Recreation is a common activity in the analysis area, including camping at developed USFS campgrounds and dispersed camping, hiking, biking, scenic driving, hunting, horseback riding, fishing, OHV use, snowmobile use, and cross-country skiing. Recreational use on NFS lands within the analysis area is managed based on Recreation Opportunity Spectrum guidelines.

Figure 47. Recreation, Access, and Roadless Area Analysis Area



Recreation Opportunity Spectrum

The Recreation Opportunity Spectrum (USFS, 1979) is used to classify recreation settings. The categories include Primitive, Semi-Primitive, Non-Motorized, Semi-Primitive Motorized, Roaded Modified, Roaded Natural, and Urban (USFS, 1979). **Figure 48** shows the Recreation Opportunity Spectrum classifications and **Table 53** shows the acres in each category in the analysis area.

Table 53. Estimated Acres by Recreation Opportunity Spectrum Category in the Analysis Area

Legend	Analysis Area Acres
Road Natural/Road Modified	18,455
Semi-Primitive Motorized	3,608
Semi-Primitive Non-Motorized	8,322

Dispersed Recreation

Dispersed recreation includes hiking, biking, scenic driving, hunting, horseback riding, fishing, OHV use, snowmobile use, and cross-country skiing. The dominant types of dispersed recreation in the vicinity are big game hunting for elk, moose, and deer; fishing; and camping (Transtrum, 2020). Hunting largely occurs in the analysis area from August 15 to June 7, with most occurring during the late summer and fall from mid-August to mid-November. Other dispersed recreation occurring in the area include snowmobiling, cross-country skiing, horseback riding, upland bird hunting, picnicking, driving for pleasure/sight-seeing, and off-road vehicle use. Popular dispersed use areas include the Blackfoot River, Diamond Creek and the canyons connecting Diamond Creek Road to Dry Ridge (such as Stewart Canyon and Kendall Canyon), and the Blackfoot River Wildlife Management Area.

The Blackfoot River Wildlife Management Area, which borders the north end of the IDI-008289 (NDR) Lease, is managed with a focus on the fisheries in the headwaters of the Blackfoot River and provides habitat for big game, upland game, and waterfowl. It is a popular fishing, hunting, and wildlife viewing area. Access to the site is provided by the Blackfoot River Road and Lanes Creek Road. Motorized vehicle use is restricted to public roads and parking areas. There are 0.6 miles of non-motorized trails in the Blackfoot River Wildlife Management Area.

In total, there are 31,933 acres managed by the BLM, USFS, and the State of Idaho available for recreation in the analysis area.

Hunting

The analysis area is within GMU 76 (Diamond Creek). Hunting is allowed depending on species from a few weeks per year to all year, but it is concentrated from late summer to late fall in the analysis area. Hunting is the primary recreational activity in the analysis area.

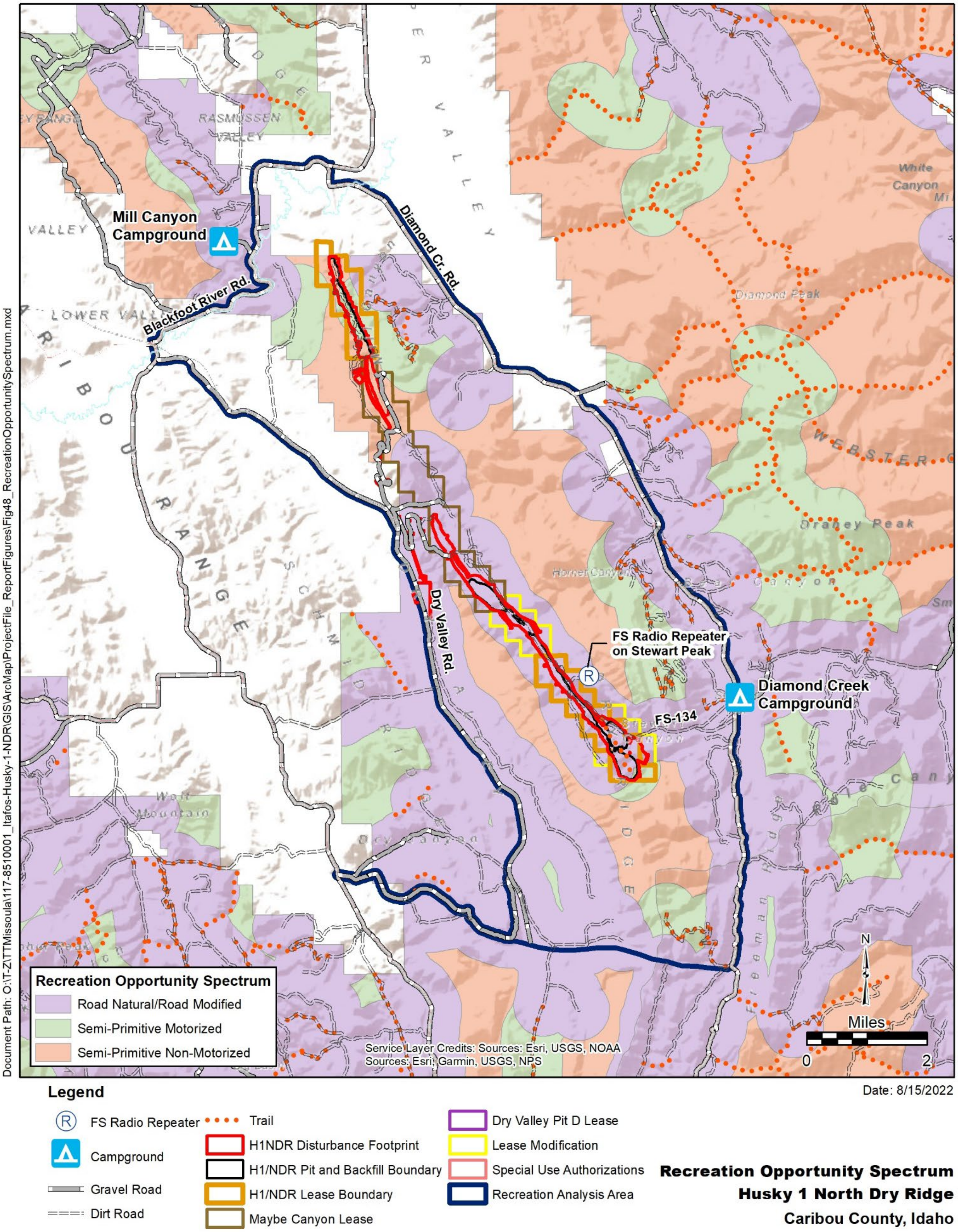
Access

Non-Motorized Access

Non-motorized snow-free recreation activities include hiking, wildlife viewing, horseback riding, and mountain biking. Hunting may involve travel by motorized vehicle or by non-motorized means.

Hiking and stock travel are unrestricted on the forest with a few exceptions including special use and mine areas. There are no USFS trailheads but there are two IDFG trailheads located on the Blackfoot River Wildlife Management Area. Trails partially or completely within the analysis area are shown in **Figure 47**.

Figure 48. Recreation Opportunity Spectrum Categories in the Analysis Area



Use of the NFS lands for winter activities such as skiing, snowboarding, snowshoeing, and dog-sledding is unrestricted with a few exceptions including special use and mine areas. There are many opportunities for these types of use; however, some non-motorized winter travelers prefer a non-motorized setting for reasons of noise, fumes, safety, and wildlife disturbance (USFS, 2005).

Motorized Access

Primary access to the NDR lease is from the west (Dry Valley). Primary public access to the H1 lease from the Dry Valley (western) side is via the Dry Valley Road which connects to NFS Road 134, and primary access from the Diamond Creek (eastern) side is via the NFS Road 134 off the Diamond Creek Road (**Figure 47**). The USFS Stewart communication site is on a ridgetop 680 feet east of the H1 lease boundary (**Figure 48**). The site is accessed for site maintenance by a road partially within the H1 lease.

There are approximately 81 miles of NFS-designated roads open to full-sized vehicles (greater than 50 inches width) in the analysis area, 54 of which can be traveled in low-clearance two-wheel-drive vehicles, with the remaining 27 miles restricted to high-clearance four-wheel-drive vehicles.

ATVs, snowmobiles, motorcycles, and motorized trail bikes use approximately 15 miles of NFS trails in the analysis area and approximately 1 mile in the project footprint. Snowmobiling is a popular activity in southeast Idaho in general. The NFS lands outside of the current mining lease in the analysis area are currently open to cross-country snowmobile use.

Traffic

There are no traffic count data for any of the NFS or Caribou County roads near the proposed mine. However, the traffic on Blackfoot River Road, Dry Valley Road, and Diamond Creek Road could be characterized as comparatively “heavy” given the overall rural environment (Spencer, 2021). Dry Valley Road and Diamond Creek Road are currently unmaintained during the winter. Traffic on the Blackfoot River Road includes Rasmussen Valley Mine workers plus vendor vehicles (Spencer, 2021). Recreational traffic near the proposed mine is heaviest in the late summer and fall during hunting season (Transtrum, 2020).

Inventoried Roadless Areas

The Idaho Roadless Rule recommends Idaho Roadless Areas be managed as wild land recreation; primitive; special areas of historic and tribal significance; backcountry/restoration; and general forest, rangeland, and grassland (USFS, 2008). Small portions of the Dry Ridge and Schmid Peak Inventoried Roadless Areas occur within the analysis area. These Inventoried Roadless Areas do not contain recommended wilderness under the 2003 RFP and are classified as Backcountry/Restoration and General Forest, Rangeland and Grassland management themes (USFS, 2008).

Dry Ridge Inventoried Roadless Area

The Dry Ridge Inventoried Roadless Area comprises 23,307 acres (USFS, 2003a). The major access roads are the Diamond Creek Road which parallels the northern portion of the eastern border, the Georgetown Canyon Road along the southern portion of the east border and the south, and the Slug Creek Road on the west. Other roads to the area are the Left Fork of the Georgetown Canyon Road from the southwest, and the Dry Canyon Road from the west (USFS, 1984).

There are 8,600 acres under the backcountry restoration theme and 14,900 acres under the general forest, rangeland, and grassland theme.

Schmid Peak Inventoried Roadless Area

The Schmid Peak Inventoried Roadless Area comprises 7,116 acres (USFS, 2003a). It is north of the Dry Ridge Inventoried Roadless Area and is separated from that Inventoried Roadless Area by NFS Road 134 extending across Dry Ridge. Access is largely from NFS Road 134 to the west and several NFS roads above Diamond Creek Road to the east.

3.12.3 Environmental Consequences

The impacts below are irretrievable during the period when access is prohibited. The affected environment reflects past and present activities. The cumulative impacts are the same as the direct and indirect effects on recreation, access, and Inventoried Roadless Areas.

3.12.3.1 Proposed Action, Alternative Cover, Alternative Stream Routing, and Alternative Sequence

Recreation

Recreation Opportunity Spectrum

Under the Proposed Action, Alternative Cover, and Alternative Stream Routing alternatives, the project footprint would disturb 817 acres of Road Natural/Road Modified, 112 acres of Semi-Primitive Motorized, and 201 acres of Semi-Primitive Non-Motorized lands (**Table 54**).

Table 54. Recreation Opportunity Spectrum Classes in the Analysis Area and the Project Footprint

Recreation Opportunity Spectrum Classification	Analysis Area Acres	Project Footprint Acres
Road Natural/Road Modified	18,455	817
Semi-Primitive Motorized	3,608	112
Semi-Primitive Non-Motorized	8,322	201

A total of 1,130 acres currently available for dispersed recreation on NFS lands would be incrementally closed to the public during operations and then reopened during or following reclamation. Recreationists, including hunters and campers, may choose not to use adjacent lands within approximately 0.5 mile of the proposed mining given noise, dust, etc., although these lands would remain open. Hunters or wildlife viewers that had used the analysis area previously could continue to pursue game on tens of thousands of acres of nearby public and private lands (where permitted) to which these species would likely migrate.

There would be no change in developed recreation acreage; however, the Mill Canyon Campground may see increased use as more Forest visitors travel the Blackfoot River Road given the closure of NFS Road 134. Though the NDR lease extends onto the Blackfoot River Wildlife Management Area, no portion of the mine footprint would.

Access

Acres available to the public for dispersed non-motorized recreation including hunting and winter motorized recreation (snowmobiling) would decrease by 1,130 acres. While approximately 98% of the 1,130 acres disturbed would be reclaimed and re-opened for recreation, highwall areas may not be desirable for some recreational uses such as hiking and scenic driving because of the altered topography and vegetation resulting in long-term adverse impacts. Conversely, hunters may find these areas desirable, as the revegetated areas may supply early successional forage for game species attracting them to the area, resulting in long-term beneficial impacts.

Miles of Primary Access Roads Closed to the Public

Public access to NFS Road 134 would be closed for 4.6 miles from approximately the intersection of the Simplot slurry pipeline to Dry Valley Road for the duration of mining and reclamation. During mining and reclamation, the Blackfoot River Road would be used as the primary means for the public to access Diamond Creek Valley and Dry Valley. After mining and reclamation is completed, and as part of mine reclamation, a new public access road in approximately the old location of NFS Road 134 would be re-established through the reclaimed mining area.

Most newly proposed access and haul roads would be decommissioned by pulling fill materials back into the road cuts. However, portions of the main haul road in Maybe Canyon and Stewart Canyon may be used to re-establish permanent access through the area. Intermittent access may be required for environmental monitoring, site inspections, and other post-closure activities at various sites throughout the project after mine closure. Simple two-track alignments would be allowed to accommodate needed access, but these would not be open to the public. The mine would allow occasional access to the USFS repeater site on the ridge 680 feet east of the H1 lease for maintenance.

The Proposed Action would result in adverse effects on recreation opportunities by temporarily reducing the miles of publicly accessible NFS roads. New roads would be built specifically to accommodate the mining activity; they would not be part of the USFS's Revised Travel Plan and would not be open to the public.

Changes in the Miles of NFS Roads and Trails Open to Motorized Travel

The NFS miles of roads and trails open to motorized travel would not change over the long term. The 1.2 miles of ATV Trail #138 in the proposed mine footprint would be open as long as possible and then closed when needed. It would then be opened again when mining has ceased in the immediate area and reclamation has been completed. There would be a reduction in NFS Open Motorized Route Density. The current Open Motorized Route Densities in 2003 RFP Prescriptions 5.2 (b) and 6.2 (b) are 1.34 and 1.21 miles per square mile which is below the standard of 2.0 miles per square mile for both prescriptions. Alternative Access 1 would reduce the densities to 1.30 and 1.12 miles per square mile, respectively, and Alternative Access 2 would reduce them to 1.31 and 1.16 miles per square mile, respectively. The density standard in Prescription 3.2 (b) is 0.5 miles per square mile and the density is currently 0.03 miles per square mile. Alternative Access 1 would increase the Prescription 3.2 (b) density to 0.06 miles per square mile and Alternative Access 2 would maintain the density at 0.03 miles per square mile. Both Alternative Access scenarios result in an Open Motorized Route Density below the 2003 RFP standard for all prescriptions.

Traffic

The H1NDR Mine would employ approximately 239 workers. These workers would be roughly divided into four equal shifts traveling daily from nearby communities such as Soda Springs. There may be a transitional period as the Rasmussen Valley Mine is reclaimed and the H1NDR mine opened where traffic would travel to both sites. Mine worker and vendor traffic currently seen on the Blackfoot River Road would shift to the Dry Valley Road as the H1NDR Mine opens. This would likely result in a moderate increase in traffic along the Dry Valley Road, which historically has supported the Maybe mines (i.e., North Maybe Mine and South Maybe Canyon Mine), Champ Mine, Mountain Fuel Mine, and the Dry Valley Mine. The Dry Valley Road would be plowed if the mine were to open, increasing traffic considerably during the winter months.

A minor increase in average daily traffic, including large delivery trucks going to and from the H1NDR Mine, would occur under the Proposed Action, Alternative Cover, and Alternative Stream Routing. The average daily traffic would increase along an approximately 2.9-mile segment of Dry Valley Road between the H1 and NDR pits and the proposed ore stockpile and train loading facility (tipple) and Dry Valley shop (Itafos, 2020d). With the closure of NFS Road 134, the Blackfoot River Road would serve as the primary route between Dry Valley and Diamond Valley and would see a minor increase in vehicles per day largely during the fall hunting season. Ore haul trucks and other mine traffic would be on roads closed to public, which would result in no increase to traffic on public roads. Movement of mine equipment between the H1NDR Mine and the Dry Valley shop for maintenance and repair would occur along approximately 1 mile of the Dry Valley Road. This section of the Dry Valley Road would be closed to public traffic during these movements. These movements would each take about 10 minutes and the frequency would be expected to be approximately twice a day (Itafos, 2020a). Increased traffic from commuting mine employees and other mining-related traffic such as service trucks, and fuel trucks, would occur along this length of Dry Valley Road (Itafos, 2020a). This traffic would not require closing this section of Dry Valley Road to the public.

Roadless Areas

There are 19 acres of the Dry Ridge Inventoried Roadless Area within the mine footprint in a lease modification area; 18 acres would be used for the permanent OSA. Roads are permissible in the lease modification area in both the 2003 RFP Special Management Area and the General Forest, Rangeland, and Grassland theme (Fuell, 2021) .

Worksheets detail impacts on the Dry Ridge Inventoried Roadless Area wilderness attributes including recreation opportunities, special features, and manageability (Tetra Tech, Inc., 2021g). The ground disturbance, changes to vegetation communities, noise, and visual disturbances would impact all of these attributes except for manageability. The Proposed Action, Alternative Cover, and Alternative Stream Routing would not affect manageability because it would neither bisect or otherwise fragment it into smaller pieces that would not meet the size criteria (5,000 acres or more) nor reduce access. The affected attributes would be degraded during project activities and generally return to a stable condition post-reclamation. The worksheets also detail impacts to the roadless characteristics of soil, water, and air resources; sources of public drinking water; diversity of plant and animal communities; habitat for special status species and species dependent on large undisturbed areas of land; primitive and semi-primitive classes of recreation; reference landscapes for research study or interpretation; landscape character and integrity; traditional cultural properties and sacred sites; and other locally unique characteristics.

3.12.3.2 No Action

Recreation, Access, and Roadless Areas

By not implementing this MRP, recreational opportunities would continue as currently seen; there would be no direct, indirect, or cumulative impacts on recreation.

Access, including traffic, would continue as currently seen; there would be no direct, indirect, or cumulative impact on access.

There would be no direct, indirect, or cumulative impacts on wilderness qualities or attributes and roadless area characteristics.

3.12.3.3 Alternative Access 1 and Alternative Access 2

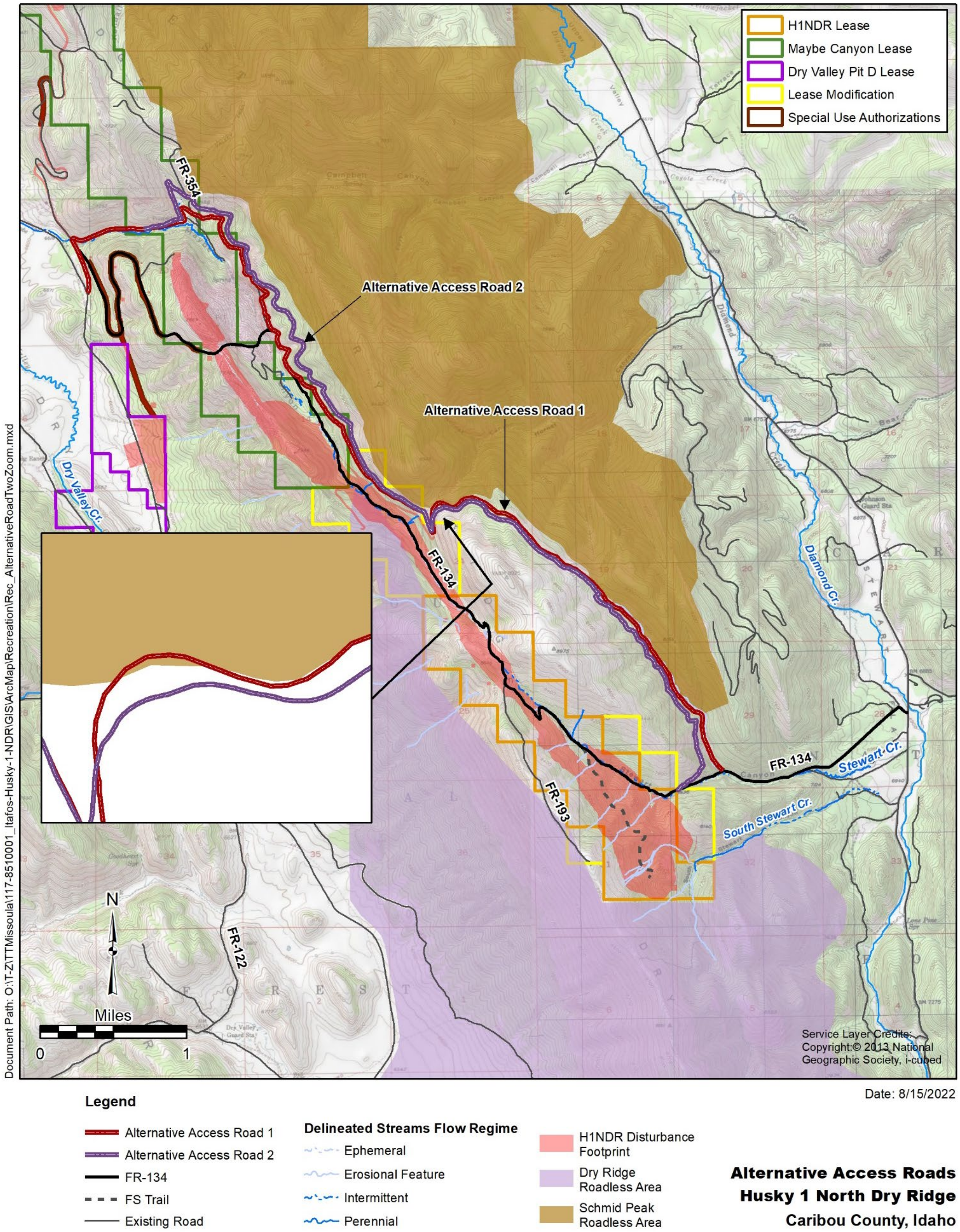
Recreation, Access, and Roadless Areas

The Mill Canyon Campground may not see increased use, as NFS land visitors would not have to travel the Blackfoot River Road to reach Diamond Creek given the construction of a new route crossing Dry Ridge.

Because public access to 4.6 miles of NFS Road 134 would be prohibited from approximately the intersection of the slurry pipeline to Dry Valley Road for the duration of mining and reclamation, under Alternative Access 1 a new road over Dry Ridge, including 6.1 miles (46 acres) of new road or trail, would be constructed to maintain access between Dry Valley and Diamond Creek over the approximately 13-year life of the mine. Alternative Access 2 was developed to avoid construction on the Cross Valley Fill CERCLA site and to address Simplot's concern regarding potential risk to their slurry pipeline. Under Alternative Access 2, 7.6 miles (55 acres) of new road would be constructed over Dry Ridge to maintain access between Dry Valley and Diamond Creek. The access ultimately selected would become the new permanent NFS route, and closed portions of NFS Road 134 would remain closed during mining and subsequently reclaimed following mining activities. The mine would allow occasional access on NFS Road 134 to the USFS repeater site on the ridge above the H1 lease for maintenance. Effects on traffic would be the same as the Proposed Action, except the Blackfoot River Road would not need to serve as the primary route between Dry Valley and Diamond Creek after the Alternative Access 1 road or Alternative Access 2 road is constructed. The Blackfoot River Road would see an increase in vehicles per day for approximately 1 year until the new route is ready to use. A sub-alternative or option for Alternative Access 1 between Dry Valley and Diamond Creek over Dry Ridge is a 50-inch-wide ATV trail rather than a road suitable for motor vehicles; if this option was to be selected, there could be a minor increase in vehicular traffic along the Blackfoot River Road. There are no reasonably foreseeable actions that would contribute additional cumulative effects.

Alternative Access 1 would include 0.45 acres of road construction in the Schmid Peak Inventoried Roadless Area, including 0.27 acres in the Backcountry Restoration theme, 0.18 acres in the General Forest, Rangeland, and Grassland theme, and 0.1 acres in the2003 RFP Special Area (**Figure 49**). An ATV trail option for Alternative Access 1 would include 0.29 acres of ATV trail construction, including 0.18 acres in the Backcountry Restoration theme, 0.09 acres in the General Forest, Rangeland, and Grassland theme, and 0.04 acres in the 2003 RFP Special Area, but would avoid the Dry Ridge Inventoried Roadless Area. Both the road and ATV trail options under Alternative Access 1 would not impact the Dry Ridge Inventoried Roadless Area. Alternative Access 2 would be constructed outside of both the Dry Ridge and Schmid Peak Inventoried Roadless Areas, thus there would be no direct impacts (**Figure 49**). There are no reasonably foreseeable actions that would contribute additional cumulative effects on the Inventoried Roadless Areas.

Figure 49. Alternative Access 1 and Alternative Access 2 and Inventoried Roadless Areas



3.13 Social and Economic Conditions

3.13.1 Analysis Area and Methods

The social and economic analysis area is Caribou, Bear Lake, and Bannock counties, Idaho. While a small percentage of the workforce resides in Franklin County, this county is not considered in the analysis area because the percentage is small. The issues for analyzing impacts on social and economic conditions and the indicators that will be used to discuss them are shown in **Table 55**.

Table 55. Issues and Indicators for Social and Economic Conditions

Issue	Analysis Method
Change in employment and income for workers and community, short-term and long-term.	Number of employees for mining and the processing plant, average salaries, compared to community employment and salary from the most recent U.S. Census.
State and local tax revenue and federal payments change in the short-term and long-term.	Annual royalties and state taxes paid.
Recreation Economy	Change in recreation employment and earnings based on U.S. Census data.

3.13.2 Affected Environment

The economy in Caribou County and southeastern Idaho is heavily dependent on phosphate mining and processing. Surrounding counties primarily rely on agriculture. Itafos is a major employer in Caribou County, with more than15% of the workforce in that county.

Employment and Income

It should be noted that the information provided in the existing conditions are largely from data collected before the effects of the 2020 Covid-19 pandemic were realized. Overall employment in the State of Idaho and/or the U.S. may be reduced at the time of the FEIS publication. The 3-county analysis area, with the economy based in natural resource use and agriculture, did not see significant declines.

Table 56 shows the employment and unemployment rates for the 3-county analysis area, Idaho, and the U.S. for 2019 and 2020. One can assume the differences between 2019 and the end of 2020 are a result of the pandemic. The calendar year 2019 is shown as a more likely baseline to use for comparison of the impacts from the Proposed Action and other action alternatives. **Table 57** shows the annual income in the 3-county analysis area, Idaho, and the U.S.

Table 56. 2019 and 2020 Employment

Analysis Method	Caribou County	Bear Lake County	Bannock County	Idaho	U.S.
2019 Unemployment[1]	2.7%	2.9%	2.8%	2.9%	3.7%
December 2020 Preliminary Unemployment[2]	2.7%	3.3%	4.5%	4.4%	6.7%
December 2020 Preliminary Workforce[2]	4,433	3,369	40,119	907,552	161 million

Sources:

1 (Headwaters Economics, 2021)

2 (Idaho Department of Labor, 2021)

Table 57. 2019 Annual Income

Analysis Method	Caribou County	Bear Lake County	Bannock County	Idaho	U.S.
Per Capita Income	$42,527	$43,103	$39,246	$45,632	$56,490
Median Household Income	$59,611	$54,265	$49,739	$53,089	$60,293
Average Earnings Per Job 2019	$58,164	$31,739	$41,961	$49,818	$64,180

Data Source: (Headwaters Economics, 2021)

Itafos indicated that employment from mining would be about the same as has occurred at the Rasmussen Ridge and subsequent Rasmussen Valley mines, about 239 workers, paying an average annual salary plus benefits of approximately $91,100 (Gilmer, 2021), resulting in an annual payroll and benefits from mining of approximately $22 million.

Revenue

In Fiscal Year 2020 (October 2019 through September 2020), 4.75 total million tons of raw phosphate ore were produced from federal lands (DOI, 2021a). Gross Revenue to the U.S. from Idaho was $5.5 million (DOI, 2021a).

The Federal Mineral Leasing Act of 1920 directs that half of all federally collected rents and royalties be distributed to the individual states where production occurred. Phosphate royalties are based on 5% of the value of the ore mined.

Ten percent of the rents and royalties amount is earmarked to be given to the county where production occurred. In calendar year 2020, the federal government distributed money from the natural resource revenues to state and local governments. The amount Idaho received is shown in **Table 59**.

Table 58 shows the federal revenue collected from phosphate mining within Caribou County in calendar year 2020.

Table 58. Calendar Year 2020 Federal Revenue Collected from Caribou County

Royalty	Other Revenue	Rents	Total
$9.9 million	$137,119	$14,351	$10.0 million

Source (DOI, 2021b)

Table 59. Disbursements to State and Local Governments in Idaho Calendar Years 2015-2020

	2015	2016	2017	2018	2019	2020
Total	$7.0 million	$5.5 million	$5.2 million	$4.4 million	$3.7million	$4.6 million

Source: (DOI, 2021c)

A mine license tax of 1% is collected by the state for the value of ores mined or extracted. In Fiscal Year 2020, the state collected revenues of $116,862, up from $34,556 in 2019 from the mine license tax) (Idaho State Tax Commission, 2021, p. 6). Property taxes are levied by Caribou County on facilities and improvements constructed by companies. The average 2020 tax rate for rural areas in Caribou County was 1.045% (Idaho State Tax Commission, 2021, p. 13).

Recreation Economy

Because the impacts on the recreation economy from H1NDR are limited to the area of the project, the analysis of impacts on the recreation economy are based on Caribou County only. Impacts would not be detectable in Bear Lake or Bannock counties. While recreation is not an industry that the U.S.

Census Bureau measures on its own, some measures can be interpreted to assist with understanding the recreation economy in Caribou County. **Table 60** shows the change in industry employment in Caribou County in 2001, 2010, and 2018, which is used to indicate the trend of the recreation economy.

Table 60. Recreation Economy Employment and Earnings 2001-2018

Socioeconomic Measure	2001	2010	2018
Employment			
Arts, entertainment, and recreation	39	57	59
Accommodation and food service	173	170	182
Earnings			
Arts, entertainment, and recreation	$105,000	$604,000	$1,169,000
Accommodation and food service	$2,050,000	$2,364,000	$4,841,000

Source: (Headwaters Economics, 2021)

3.13.3 Environmental Consequences

3.13.3.1 All Action Alternatives

H1NDR would allow Itafos to continue to produce phosphate for fertilizer important to agriculture in Idaho, the U.S., and globally.

Employment and Income

No changes in employment or income would occur with the Proposed Action and other action alternatives, except that over the life of the project wages would likely increase at about the same rates as inflation or the cost of living. Itafos has stated that the workforce and equipment currently mining the deposits at the Rasmussen Valley Mine would be used at H1NDR when Rasmussen Valley is complete. The Proposed Action and other action alternatives would maintain the 480 direct employment positions and associated wages and benefits.

It is expected that operations under the Proposed Action and other action alternatives would begin as the Rasmussen Valley Mine deposits are exhausted. Businesses that currently provide goods and services in support of activities are expected to continue to provide those goods and services during operation of the Proposed Action or other action alternatives.

Direct employment and income from mining and manufacturing would be extended for another 13 years of active mining and 2 years during reclamation. The Proposed Action and other action alternatives would result in the continued generation of $33 to $35 million in personal income and benefits per year. Based on this annual income, over the life of proposed mining activities the Proposed Action and other action alternatives would generate up to $490 million in personal income and benefits.

Once H1NDR closes and reclamation is complete, employment and income supported by the project would end. This would result in a decline in the economy (employment, income, revenue, indirect business support) unless additional reserves are proposed and permitted for mining.

Revenue

Federal lease royalties are paid on any production from a lease in accordance with the terms specified by the BLM in the lease. Royalty rates are typically 5% of the gross value of production. Royalties and other revenues collected from federal phosphate leases would be split equally between the state where the activity occurs and the federal government by federal law. The 50% received by the state is placed in the general fund and a special revenue fund for mineral impacts. Caribou County usually receives 10% of the general fund revenues from the state. Based on the August 1, 2019 through July 31, 2020 values (Guedes, 2021) the equation is:

$$Royalty\ Per\ Ton = 5\% \times [2020\ P_2O_5\ Unit\ Value] \times [\frac{\%\ P_2O_5}{Wet\ Ton} \times \frac{Wet\ Ton}{0.9\ Dry\ Ton} \times 100]$$

$$0.05 \times [\$1.357] \times \left[\frac{0.26\ P_2O_5}{Wet\ Ton} \times \frac{Wet\ Ton}{0.9\ Dry\ Ton} \times 100\right] = \frac{\$1.5278}{Dry\ Ton}$$

In total, H1 and NDR would mine approximately 27.5 million wet tons (**Table 5**) or 2.3 million wet tons per phase. At 10% water, each phase would mine an average 2.07 million dry tons. Phases are planned to be roughly one year. Based on the equation and a royalty of $1.5278 per dry ton, the royalty would be $3.15 million per phase. Over all 12 phases, the total royalty would be approximately $37.8 million. Approximately $18.9 million would be returned to the State of Idaho.

Each year the State of Idaho Tax Commission would collect 1% of the net value of ore production as a mine license tax. The funds would be added to the general fund at 66% and 34% to the abandoned mine reclamation fund. The value of the mine license tax would change with changes in the price of phosphate ore and the cost of mining. In 2013 and 2014, Idaho collected mine license taxes of $959,166 and $842,686, respectively. Phosphate mining accounts for 12% of the value of mineral production in Idaho. The state would also collect sales taxes from the mine and employees. Changes in revenue from sales and mine license taxes due to the Proposed Action and other action alternatives would be negligible because they maintain the current status for about 15 years.

Overall, changes in employment and income, revenue, and contributions from the action alternatives would be short-term because they last until the end of the project, and negligible because they maintain the current status for about 15 years. The important direct, indirect, and cumulative contributions to the economy would continue with little change.

Recreation Economy

Because mining has been ongoing in the analysis area for decades, the impacts from past and present mining operations on the recreation economy as described in Section 3.13.2 can be used to project the likely impacts from the action alternatives. Employment in the recreation economy has been fairly stable over the last 20 years, slowing some between 2010 and 2018 as compared to 2001 to 2010 (**Table 60**). As phosphate mining was ongoing during this period, it appears that mining has not had a detrimental impact on employment in the recreation economy. The earnings have increased dramatically over this same period, more than doubling. Based on this information, phosphate mining in Caribou County has not had a negative impact on the earnings in the recreation economy in the past and is not likely to in the future. Mining is required by the 2003 RFP to protect surface resources to the extent possible and to reclaim areas so as not to diminish surrounding land uses. Direct, indirect, and cumulative impacts on the recreation economy would be negligible.

3.13.3.2 No Action

Overall direct, indirect, and cumulative impacts of the No Action Alternative to social and economic conditions would be long-term and major.

Employment and Income

By not implementing this MRP, the No Action Alternative would result in the loss of the jobs from the currently operating Rasmussen Valley Mine, approximately 239 workers. Mine employees would not have a new deposit to mine and these mining positions would be eliminated. Some displaced employees may find employment at other mines, although it is assumed that other operating mines are fully staffed and unlikely to be able to accommodate all the current miners employed by Itafos. The Conda Plant is likely to remain open, but may not stay open, depending on whether Itafos can obtain a source of ore for the processing facility in Soda Springs (purchase or alternative mining area), there could be a reduction in employment at the fertilizer manufacturing facilities in Soda Springs. Indirectly, purchases from businesses that support the mining and processing industries would be reduced. The reductions would be proportional to the reduction in overall phosphate mining and processing under the No Action Alternative. Should the processing facilities close due to a lack of available phosphate, losses to businesses throughout the economy could be major.

Revenue

The No Action Alternative would cause sales, use, and property tax revenues generated by phosphate mining operations discussed in Section 3.13.2 to be reduced once existing operations at the Rasmussen Valley Mine end and reclamation is complete. This would result in a decrease in revenues for Caribou County and in other analysis area counties from the circulation of payroll dollars.

The federal government would not receive royalty payments and would realize a decrease in the corporate income tax paid. These impacts would be negligible. Under the No Action Alternative, the State of Idaho and Caribou County would not receive royalty proceeds dispersed to the state by the federal government. Further, the state would not collect the mine license tax of 1% of the value of ores mined or extracted and would realize a decrease in the corporate income tax paid. These impacts would be negligible to minor when compared to the overall annual operating budgets of these entities.

Recreation Economy

It is not known whether the recreation economy would be harmed or improved under the No Action Alternative. A reduction in employment could mean that fewer people would recreate in Caribou County, or the measures noted in **Table 60** could be supported by out-of-town visitors, that may or may not increase. Impacts on the recreation economy would be negligible.

3.14 Tribal Treaty Rights

The federal government has a unique relationship with American Indians and Alaska natives as set forth in the Constitution of the U.S., treaties, statutes, Executive Orders, judicial decisions, and agreements. Indian treaties are negotiated contracts made pursuant to the Constitution of the U.S. and take precedence over any conflicting state laws. Treaties are considered the ‘supreme law of the land’.

Unlike the federal government’s relationship with state and local governments, the U.S. government has a trust responsibility to federally recognized American Indian tribes that covers lands, resources, and other assets. As part of this trust responsibility, the federal government has an obligation to protect and preserve treaty rights on unoccupied federal lands. Specifically, the federal government and represented federal agencies have a responsibility and obligation to consider and consult on potential effects to natural resources related to the tribal treaty rights or cultural use.

3.14.1 Analysis Area and Methods

The analysis area for tribal treaty rights and interests includes the surface disturbance footprint, leases, lease modifications, and special use authorization areas which total 4,293 acres (**Figure 50**). Approximately 99% (4,246 acres) of the analysis area consists of NFS lands, and as the Fort Bridger Treaty of July 3, 1868 (15 Stat. 673) reserves rights for the Shoshone and Bannock Tribes to hunt, fish, gather, and exercise other traditional uses and practices on unoccupied federal lands, the analysis area is appropriate. 'Unoccupied' denotes public domain lands free of residence or settlement by non-Indians." Herrera v. Wyoming 139 S. Ct 1686, 1701 (2019)). The federal mineral leases provide the contractual rights to occupy lands and mine the deposit. The lease lands and surrounding facilities constitute a "temporary occupation" of the public domain, not subject to treaty rights for the practical duration of mining. The issues for analyzing impacts on tribal treaty rights and interests and the indicators that will be used to discuss them are shown in **Table 61**.

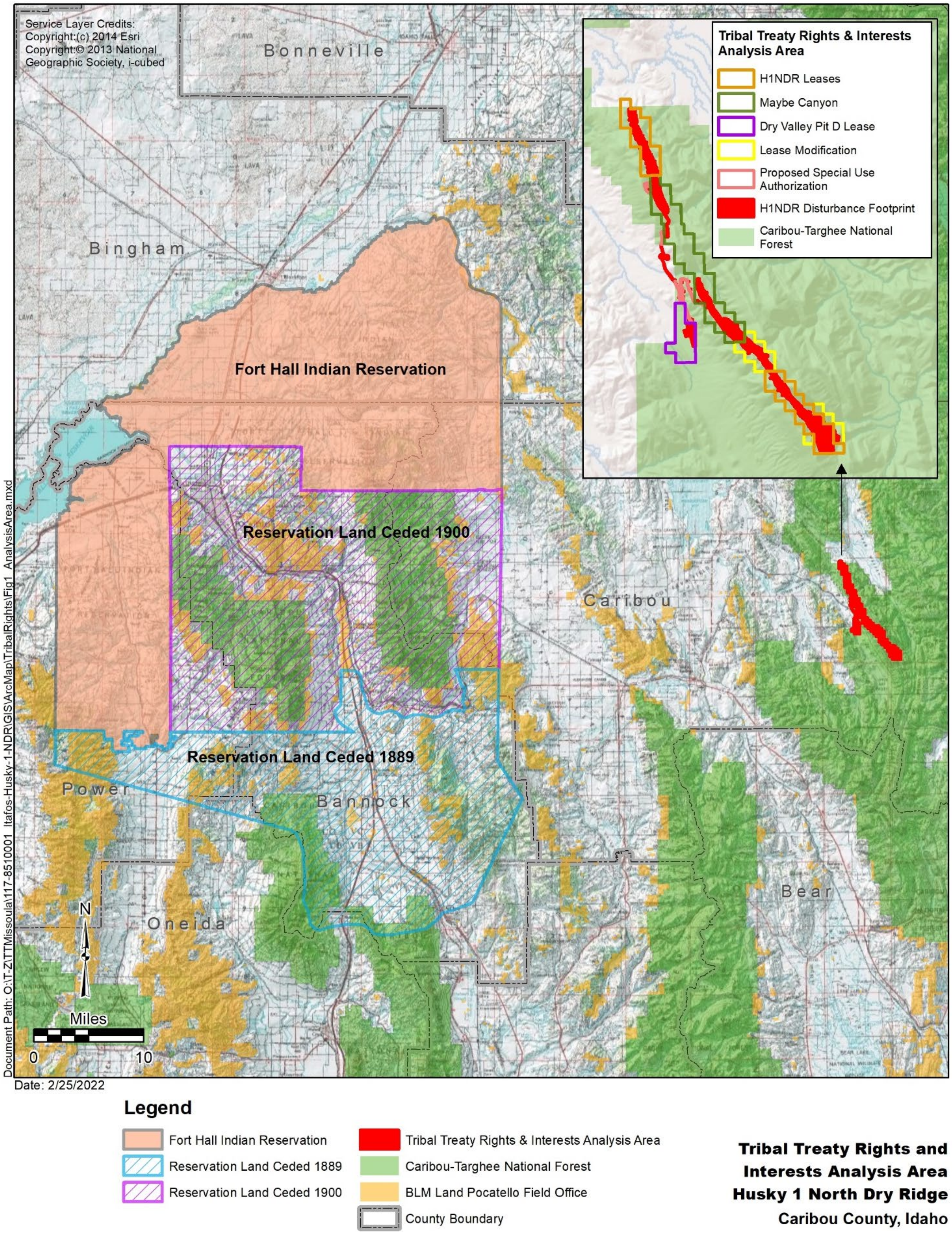
Table 61. Issues and Indicators for Tribal Treaty Rights and Interests

Issue	Analysis Method
The Shoshone-Bannock Tribes' ability to access unoccupied lands of the U.S. where they may exercise treaty-reserved rights in accordance with the terms of the Fort Bridger Treaty of 1868.	Acres of unoccupied lands available or unavailable during mining activities and the Shoshone-Bannock Tribes' ability to access these acres.
Effects on fisheries, water, grazing rights, vegetation, wildlife, cultural resources, traditional cultural properties, and visual resources that are important to the Shoshone-Bannock Tribes and those effects on traditional practices.	Changes in the quality and quantity of valued resources on unoccupied public lands including water, fisheries, vegetation, wildlife, cultural resources, traditional cultural properties, and visual resources and the effect of these changes on the Shoshone-Bannock Tribes. Changes in the uptake of COPCs by wildlife and vegetation in mining disturbed areas and areas that are reclaimed.

The identified issues draw from two letters from the Shoshone-Bannock Tribes. The first, dated November 9, 2012, presents preliminary tribal scoping comments in response to the original H1NDR project and government-to-government consultation (Small, November 9, 2012). Although the original H1NDR represents a different project, it is similar to the current proposed project. The 2012 letter discusses the Shoshone-Bannock Tribes' ties to their ancestral homeland and continuing visits to sacred sites and traditional gathering locations outside the Fort Hall Reservation boundaries. Tribal members exercise their treaty rights as they hunt, fish, and gather wild resources to maintain cultural ties to the land and continue a subsistence lifestyle. The Shoshone-Bannock Tribes have concerns about potential impacts to natural resources, the degradation of federal lands, and the consequential potential impacts to treaty rights.

The second letter, submitted to the BLM on April 7, 2021, discusses additional tribal comments made in response to the public scoping notice for the proposed project (Boyer, 2021). Comments include a list of resource studies and reclamation work the Shoshone-Bannock Tribes consider necessary to preserve their treaty rights to conduct traditional activities on unoccupied lands. In addition, the Shoshone-Bannock Tribes consider approval of the H1NDR project as a negation of treaty rights guaranteed in the Fort Bridger Treaty of 1868.

Figure 50. Tribal Treaty Rights and Interests Analysis Area



The Shoshone-Bannock Tribes have long been concerned about the direct, indirect, and cumulative impacts of phosphate mineral exploitation and, accordingly, the Tribes established the Shoshone-Bannock Tribes policy for management of Snake River Basin resources (Shoshone-Bannock, 1994). The policy states the following:

> *The Shoshone-Bannock Tribes (Tribes) will pursue, promote, and where necessary initiate efforts to restore the Snake River systems and affected unoccupied lands to a natural condition. This includes the restoration of component resources to conditions which most closely represents the ecological features associated with a natural riverine ecosystem. In addition, the Tribes will work to ensure the protection, preservation, and where appropriate the enhancement of rights reserved by the Tribes under the Fort Bridger Treaty of 1868 (Treaty) and any inherent aboriginal rights.*

The BLM and the Caribou-Targhee National Forest recognize rights granted to the Shoshone-Bannock Tribes by the Fort Bridger Treaty of 1868. Measures are included in the action alternatives to provide for and facilitate use of tribal treaty rights and interests on unoccupied public lands and meet federal trust responsibilities. To that end, this EIS examines the acres of unoccupied federal land and temporary mining occupation in the analysis area and the effects to fish, water, vegetation, wildlife, and cultural and visual resources on these lands and therefore the affected acres in this analysis are based on lease, lease modifications, and special use authorization boundaries. Information on these resources, including project effects, is taken from baseline reports dating from 2013 to 2020. These technical reports can be found in the project record. Additionally, the Shoshone-Bannock Tribes have concerns about habitat conversion, mine reclamation work, and access to study area lands. This document will address these concerns with a discussion on how the effected natural and cultural resources affect tribal treaty rights and interests.

The U.S. government recognizes that the Shoshone-Bannock Tribes have a unique perspective concerning the natural resources being analyzed. The analysis in this section is concerned with effects as experienced by the Shoshone-Bannock Tribes. As such direct, indirect, or cumulative effects on resources may be different than other sections in this EIS.

3.14.2 Affected Environment

The H1NDR phosphate mine project is in southeast Idaho. The Shoshone-Bannock Tribes have used the analysis area for subsistence, traditional cultural practices, ceremonial, and social purposes from time immemorial. The Shoshone and Bannock Tribes gathered a variety of plants for food, medicine, domestic purposes, ceremonial purposes, and adornment. Some of these traditionally important plants occur in the analysis area, including elderberries, chokecherries, gooseberries, currants, grouse whortleberries, black currants, serviceberries, and huckleberries. Most native plants in the area have cultural utility to the Shoshone-Bannock Tribes (reference tribal native plant reference provided to the phosphate CERCLA project). Big game and bird hunting along Dry Ridge and vicinity, along with fishing in the Blackfoot River, Diamond Creek, and feeder streams that flow from Dry Ridge down into Dry Valley and Diamond Creek are important activities that are included in treaty rights granted to the Shoshone-Bannock Tribes. The Shoshone-Bannock Tribes have indicated that the Tribes have utilized the area for hunting, gathering, and visiting the mountainous Dry Ridge and associated high places since before recorded history. They point to lithic fragments and other physical evidence at the proposed mine site as confirmation the region has been utilized by native people. Additionally, the area serves as an important travel corridor to access the Bear River and other areas in Utah and Wyoming, not just by the Shoshone-Bannock Tribes, but also their relatives, the Eastern Shoshone Tribe.

While the analysis area is outside the Fort Hall Reservation boundary, Article 4 of the Fort Bridger Treaty of 1868 states Shoshone and Bannock tribal members “will make said reservations their permanent home, and they will make no permanent settlement elsewhere; but they shall have the right to hunt on the unoccupied lands of the United States so long as game may be found thereon, and so long as peace subsists … on the borders of the hunting districts." (Shoshone-Bannock Tribes, 1869). The term “hunt” has been subsequently interpreted to also include fishing and gathering activities. Article 2 states, “they [the Tribes] will and do hereby relinquish all title, claims, or rights in and to any portion of the territory of the United States, except such as is embraced within the limits aforesaid.”

Federal lands in the BLM Pocatello Field Office area and the Caribou-Targhee National Forest total 530,305 acres and over 3 million acres of land, respectively (see **Figure 43**). The majority of the 4,293-acre analysis area is on NFS lands and represents about 0.1% of the forest area within the Caribou-Targhee National Forest. Most of the acres are undeveloped and, as such, these acres are considered unoccupied lands, subject to tribal treaty rights. Phosphate mining, directed by Congress under the Mineral Leasing Act of 1920, is considered a temporary surface use, and would temporarily change the occupancy of the federal lands where mining activities occur. According to the Fort Bridger Treaty of 1868, occupied lands are not subject to hunting (and other activities) rights normally allowed on unoccupied federal lands.

For the original H1NDR project, tribal consultation between the BLM and the Shoshone-Bannock Tribes began in February 2012 and extended through September 2014. Although this consultation work represents a different mine project, similarities with the current proposed Project suggest the identification of previous consultation work is justified.

Consultation for the current H1NDR Project began in January 2021 when the BLM and USFS staff met with the Shoshone-Bannock Tribes to discuss the proposed mine project. Further meetings held included May 20, 2021 government-to-government, January 14, 2022 staff-to-staff meeting and March 3, 2022 government-to-government consultation. The Shoshone-Bannock Tribes participated in field tours on August 27, 2021 and September 29, 2021.

On April 7, 2021, the Shoshone-Bannock Tribes submitted another letter to the BLM that discusses comments on the public scoping notice for the current proposed project (Boyer, 2021). The letter states the Shoshone-Bannock Tribes view approval of H1NDR as an abrogation of their treaty rights, guaranteed in the Fort Bridger Treaty of 1868. Additionally, the letter discusses resource studies and reclamation work the Shoshone-Bannock Tribes consider necessary to preserve their ability to exercise traditional and treaty-reserved rights on unoccupied lands.

As part of the resource study requests, the Shoshone-Bannock Tribes inquired about an extension of study timelines to span several seasonal and annual cycles to help understand mine project impacts on surface water, groundwater, vegetation, and wildlife. Itafos would be required to continue groundwater and surface water monitoring during the life of the mine, and groundwater monitoring wells would be installed per IDAPA 37.03.09 Well Construction Rules (see Section 2.2.9.7).

Subsequent seasonal or annual surveys for wildlife and vegetation resources have not been conducted. The purpose of the original surveys was to identify species within the study area and evaluate each species for mine project impacts. Multi-year surveys tend to examine population increases or decreases, and this intent does not align with the purpose of the original surveys. Additional tribal concerns discussed in the 2021 scoping letter include the following:

- Protection of Blackfoot River corridor and surrounding habitat.
- Protection of groundwater as a potable water source for future users.
- Possible contamination of groundwater from interconnecting core holes created by exploratory drilling, the exposure of transmissive rock formations during mining, and other geologic events. Groundwater contamination may exit through seeps and drainage into surface waters that connect to the Blackfoot River.
- The possibility of encountering groundwater during pit excavation should be considered; the Shoshone-Bannock Tribes consider this an unacceptable practice.
- The Shoshone-Bannock Tribes request that the permanent OSAs and ore stockpile near the tipple must be lined with impermeable materials to prevent leachate infiltration into the subsurface.
- The Shoshone-Bannock Tribes request overburden backfilled into the mine pits be sealed with impermeable capping materials to prevent leachate production and infiltration into the subsurface.
- BLM must be immediately notified of all spills, leaks, and accidental disposal of hazardous materials and chemicals. Spill/leak containment must be applied on all containers that exceed 5 gallons of liquid.
- Any wells/core holes to be used for groundwater monitoring will comply with IDAPA 37.03.09 Well Construction Standards Rules.
- Importance of the mine area as a traditional location for hunting mule deer and elk.
- If mule deer/elk fawning and calving occurs in the mine area, the Shoshone-Bannock Tribes request mining activities be delayed until after the fawning/calving season is completed.
- Additional surveys for Columbia spotted frogs, American three-toed woodpeckers, great gray owls, and boreal owls.
- Shoshone-Bannock Tribes tribal verification of documented archaeological and ethnographic resources, as the Tribes have an expanded definition of cultural resources.
- Compliance with Section 106 of the National Historic Preservation Act and assessment of any significant findings by a representative of the Shoshone-Bannock Tribes. Additionally, the Shoshone-Bannock Tribes request a stop work order be implemented for inadvertent discoveries, and immediate tribal notification should occur regarding any such discoveries.
- The Shoshone-Bannock Tribes request a viewshed analysis be completed with participation from the Shoshone-Bannock Tribes tribal cultural resources staff, as adverse impacts to the visual landscape are a possibility.
- Restoration of existing native plant communities in the mine area, and the control/management of noxious or invasive species by Itafos during the life of the mine.
- Mitigation on the 1,146 acres of disturbance should include the preparation of a watershed management plan, and continued groundwater and surface water monitoring during the life of the mine.

- Mine reclamation plan should include full restoration of overland routes and timber cleared areas; the decommissioning of temporary roads; the capping/abandonment of core holes, boreholes, and wells; and the mitigation of impacts from mine facilities followed by the decommissioning of all mine facilities.
- The Shoshone-Bannock Tribes request access to timber cut during mining activities for use as poles, posts, and firewood.

A portion of the above Shoshone-Bannock Tribes tribal study requests are met by work that has already been completed (i.e., baseline studies of surface water, groundwater, vegetation [including a culturally sensitive plant survey], wildlife, Section 106-compliant cultural resource surveys, a viewshed analysis, and the preparation of a surface water management plan). Because the Shoshone-Bannock Tribes have a unique perspective concerning the identification of cultural resources and visual impacts, their 2021 letter requested tribal participation for these resource studies. Consultation for the original H1NDR project, which began in 2012, included discussions about and offers to the Shoshone-Bannock Tribes to participate in resource-related fieldwork; however, tribal involvement in resource data collection did not occur before work on the original H1NDR project ceased in December 2014.

Several of the above Shoshone-Bannock Tribes tribal requests are already in place and include the utilization of native plants for revegetating the site, and the use of liners at the permanent OSA and the tipple area to prevent transport of any contaminants. The request to seal backfilled mine pits with an impermeable cap is not feasible (see Section 2.7.3.2); however, a liner that prevents pollution would be employed, and use of this liner is described in the project groundwater model. Itafos would also be required to control and manage the spread of noxious or invasive species during the life of the mine.

Regarding wildlife concerns, surveys for Columbia spotted frogs, American three-toed woodpeckers, great gray owls, and boreal owls were included in the original 2012-2013 winter survey. All the bird species were found to occur in the area, but the amphibian survey did not locate frogs of any species. The Columbia spotted frog is listed as a sensitive species on the Caribou National Forest, but no occurrences have been noted near the mine area, and the species is not known to occur anywhere in Caribou County.

Consultation between the BLM and the Shoshone-Bannock Tribes is an ongoing process, and details of the tribal resource study and reclamation requests still need to be finalized. As a result, this section continues with an examination of issues expressed in the Shoshone-Bannock Tribes' 2021 letter (Boyer, 2021) to the BLM.

3.14.3 Environmental Consequences

3.14.3.1 Proposed Action, Cover Alternative, and Alternative Sequencing

The impacts below are irretrievable during the period when access is prohibited. The Shoshone-Bannock Tribes have indicated tribal members utilize the affected NFS lands for engaging in camping, hiking, picnicking, hunting, foraging, family outings, and other traditional activities.

Access

Phosphate ore recovery is considered a temporary surface use and occupancy would slightly change the amount of unoccupied federal land in the analysis area while active mining and reclamation activities occur. Mining in the action alternatives would disturb approximately 1,146 acres and a local, short-term, temporary loss of access to these lands for exercising tribal treaty rights would occur. During mining, public and tribal access to the active areas of the mine would be restricted to protect the safety of the public and tribal members per Mine Safety and Health Administration regulations. Reclamation would take place incrementally but concurrent with mining operations. The areas within the mine footprint are not disturbed all at once and most areas would still be accessible to tribal members to exercise treaty rights. Only a portion of the mine would be active at a given time. However, the unreclaimed highwall within the H1 pit and partially reclaimed haul roads would result in the permanent long-term loss of 124 acres of vegetative habitat, which represents 2.8% of the 4,293-acre analysis area.

Approximately 148 acres of the historic North Maybe Mine and South Maybe Canyon Mine pits would be backfilled and reclaimed. These lands, previously unsuitable, would become available for implementation of treaty rights following reclamation.

Under the Proposed Action, a portion of NFS Road 134 would be decommissioned by the mine, eliminating access over the top of Dry Ridge between Dry Valley and Diamond Creek for several years.

Although loss of access would be short-term and temporary, the BLM recognizes that even a small, short-term loss of access is considered to be a significant direct, indirect, and cumulative impact by the Shoshone-Bannock Tribes.

Grazing

The H1NDR mine area is outside of the ceded land boundary of the Fort Hall Reservation, so tribal grazing rights would not be affected.

Fisheries and Water Quality

The analysis area is not known as a desirable place to fish because the size of the streams and their associated drainage basins do not appear to support large fish numbers. Additionally, some streams lack a persistent year-round flow regime and connectivity to larger fish-bearing streams. The Blackfoot River, north of the analysis area, has the most robust fishery in the region because it has the stream and watershed size to support large fish numbers, especially Yellowstone cutthroat trout. There would be no effects on tribal treaty rights for fishing in the Blackfoot River, as this waterbody is not affected by the H1NDR mine. Therefore, there would be no effects on tribal treaty rights for fishing in the analysis area. Also, predicted water quality impacts to streams would be within the cold water biota standard. Consequently, mine work would not affect the fishery or fish populations in the analysis area.

Historic phosphate mines in southeast Idaho are known to be a source of selenium in streams, and Maybe Creek, East Mill Creek, and the Blackfoot River likely contain some Yellowstone cutthroat trout and Brook trout with elevated selenium levels. The Bureau of Community and Environmental Health and the Agency for Toxic Substances and Disease Registry investigated trout species in the Blackfoot River, Salt River, and Bear River watersheds to determine if selenium levels in these fish posed a health risk (IDHW, Idaho Dept. of Health and Welfare, 2013). They found that fish selenium levels fell below levels of health concern and concluded that eating trout harvested from the subject watersheds was not expected to harm people's health.

The IDEQ is applying the Clean Water Act to this mining proposal, which does not allow additional selenium loading to the Blackfoot River from this project. The environmental measures described in Section 2.2.9 are designed to prevent additional loading of COPCs to surface water at the site, including the Blackfoot River. If there is no selenium loading to surface water, there should be no loading of other COPCs. Additionally, non-COPC impacts to surface water would be below Clean Water Act levels by appropriate implementation of BMPs (Sections 3.4, 3.5, and 3.6)).

No impacts to fish or water quality are anticipated, as project activities are expected to meet all surface water quality standards and no mining would occur below the present-day water table. Areas that currently have cumulative health issues with consumption of water would not experience worsening conditions and, in the long term, filling and covering the existing pits would improve groundwater quality.

Vegetation and Wildlife

Direct impacts to vegetation from mining would occur with vegetation removal from 1,146 acres. In consideration of the time required for the vegetation cover to re-establish itself after reclamation, mine disturbance would decrease available acreage for exercising tribal treaty gathering rights by 1,146 acres on a long-term basis.

The vegetation at the site would also be indirectly impacted by overburden removal, as the vegetation types re-establish following reclamation, they would differ compared to the vegetation from pre-mine disturbance conditions. Currently, vegetative types in the disturbance footprint include 39 acres of non-forest/shrubland, 823 acres of forest, and 285 acres of disturbed, mine, or barren cover. The non-forest/shrubland community would initially re-establish as a grassland type and then return to a grass/shrubland community mix over the long term. Alternatively, the forest acres would not return due to changes in soil properties and removal of the existing aspen root system. These 823 acres (72% of the disturbance area) would permanently change from forest to grassland/shrubland cover. The remaining 285 acres of disturbed, mine, or barren cover would re-establish as a grassland or grassland/shrubland mix community, an increase over existing conditions.

The Shoshone and Bannock Tribes have expressed concern over habitat conversion, and the replacement of 823 forest acres to grassland/shrubland acres would represent a permanent, adverse effect to tribal treaty rights for gathering resources commonly found in a forest environment. Alternatively, the expansion of grassland/shrubland acres over the long term would increase gathering opportunities for resource collection in this type of habitat.

Primary large game species available in the analysis area include elk and mule deer, and the mine area has been a traditional location for tribal members to hunt these animals. Elk and mule deer favor aspen and mountain shrub habitats for forage, thermoregulation, and calving/fawning areas. The mine area appears suitable for calving and fawning, and this topic is discussed in the wildlife section (Section 3.9.3).

The Proposed Action would result in the permanent conversion of 823 forest acres to grassland/shrubland, which would reduce habitat diversity and quality on Dry Ridge, thus likely decreasing big game fawning/calving carrying capacity in the analysis area. The combined H1NDR and Maybe mines would also remove mule deer habitat across a nearly continuous 10-mile length of Dry Ridge. This habitat loss would likely alter patterns of deer movement west across Dry Ridge to winter habitat near Soda Springs, Idaho but not prove a barrier to general migration. However, Dry Ridge is not a major mule deer migration corridor, so only a relatively small percent of the population could be affected. Overall, the mining action alternatives would have a moderate direct, indirect, and cumulative adverse effect to elk and mule deer populations in the analysis area.

Small game species observed in the analysis area that may be subject to hunting include Columbian sharp-tailed grouse and some migratory birds. Two occupied Columbian sharp-tailed grouse leks occur between 1.4 miles and 1.8 miles west of the proposed mine disturbance footprint. Mining noise and disturbance would be muted at these distances so the Proposed Action would have a negligible effect on Columbian sharp-tailed grouse breeding behavior. Additionally, no basin grasslands or sagebrush are slated for removal so no breeding habitat would be affected. Winter habitat, which consists of mountain brush and aspen, would be impacted with the removal of the forested acres. However, the reclamation seed mix would include some native shrub species which could be suitable habitat for Columbian sharp-tailed grouse. Overall, the Proposed Action would have a minor effect on Columbian sharp-tailed grouse habitat, and it appears unlikely this effect would cause a direct, indirect, and cumulative loss of species viability in the analysis area.

Migratory bird habitat primarily includes coniferous, aspen, and mixed conifer-aspen forests and mountain shrubs. This habitat would be impacted in the disturbance footprint with the permanent removal of 823 forest acres and the subsequent conversion to grassland/shrubland cover. Additionally, forest removal would eliminate nesting and foraging structures for birds that only occur in mature forests. To reduce the chances of mortality during the migratory bird breeding season, timber removal or ground clearing activities would be undertaken outside the migratory bird nesting season. However, there may be limited occasions when this is infeasible. In this case, activities including a nest survey would be undertaken and coordinated with the USFS to avoid impacts to migratory birds. Lastly, mining activity can affect migratory bird breeding behavior when mine noise masks bird songs, making it difficult for females to locate singing males. However, this would be a short-term effect, as mine noise would cease once reclamation work is complete. Given the loss of forest acres, the measures to reduce bird mortality, and the minor effect from mine noise, the Proposed Action would have a moderate direct, indirect, and cumulative effect on migratory birds in the analysis area.

Vegetation growth post-reclamation would be protected from accumulating contaminants like selenium and other COPCs (see Section 3.8.3), thus ensuring safety for both big game animals grazing the site and Shoshone-Bannock Tribes members resuming their traditional hunting and gathering practices. With the mitigation of possible vegetative contamination, a risk assessment concerning traditional Native American subsistence lifeways in the reclaimed mine area is not necessary.

Cultural Resources and Traditional Cultural Properties

Six cultural resource inventories that cover the analysis area have identified 13 prehistoric and historic sites (Greiser, et al., 2013), (Herbel & Greiser, 2013), (Herbel, et al., 2014) (Herbel, et al., 2015), (Larsen, 2014), (Barclay, 2020). These inventories examined high site probability zones as defined by the Caribou National Forest. Low site probability zones and previously disturbed mine areas were not surveyed, as the chance of cultural resource identification in these areas is poor. High site probability zones include areas with slopes of 0 to 20 percent in association with water sources, saddles, ridgetops, benches, alluvial fans, rock outcroppings, open meadows, and areas of known lithic materials. Low site probability zones include heavily vegetated slopes of less than 20 percent and all slopes over 20 percent not associated with high site probability criteria.

Of the 13 sites identified within the survey area, 9 have been determined as not eligible for listing in the NRHP, and the eligibility of the remaining four sites is undetermined. However, BLM has determined one of these four sites is not eligible for NRHP listing; Idaho State Historic Preservation Office has not yet concurred with this determination. Sites determined to be ineligible for listing in the NRHP would not be affected by project activities. Sites with an undetermined eligibility status should be treated as an eligible site until a final determination is made. Eligible sites would require avoidance or additional work to mitigate adverse effects.

No NRHP-eligible sites were found within the 1,146-acre disturbance footprint, so there would be no direct impact to significant cultural resources. The three sites with no NRHP eligibility determination represent prehistoric lithic scatters located about one-quarter mile to over one-half mile in distance from the nearest proposed mine feature, a haul road. Given this distance, indirect project impacts appear unlikely.

Traditional cultural properties refer to locations associated with the beliefs, customs, and practices of a living community of people that have been passed down from generation to generation. These properties are rooted in a traditional community's history and are important in maintaining the continuing cultural identity of the community. Because of their significance, they are generally eligible for listing in the NRHP (Parker & King, 1998).

In their 2012 letter to the BLM, the Shoshone-Bannock Tribes discuss the importance of their ancestral homeland and their ability to continue to hunt, fish, and gather wild resources on unoccupied lands. By exercising their treaty rights, tribal members can maintain ties to their homeland and continue to practice the subsistence lifestyle of their ancestors (Small, November 9, 2012).

Neither the Agrium H1NDR phase of consultation (2012-2014) or the current H1NDR consultation work between the BLM and the Shoshone-Bannock Tribes identified any traditional cultural properties in the analysis area. The Shoshone-Bannock Tribes did mention them in their January 2021 DEIS comment letter. In a subsequent meeting with tribal cultural and natural resources staff, BLM asked for clarification about the existence of the defined traditional cultural properties (i.e., important sites or locations where the Shoshone-Bannock Tribes have historically performed tribal ceremonies or other spiritual practices with special significance) that would be affected by proposed mine work. Tribal staff identified historic and intermittent dispersed uses in and around Dry Ridge, but did not identify any specific traditional cultural properties s and thus, it is anticipated that no project impacts would occur. BLM and USFS will continue to consult with the Shoshone-Bannock Tribes to identify traditional cultural properties s and appropriately manage any relevant proposed land uses.

If any undocumented cultural resources are discovered during mining activities, operations in the immediate area of the discovery would halt. Itafos would contact BLM or USFS, and agency staff or authorized representatives would coordinate with the Shoshone-Bannock Tribes to document and evaluate the discovery. If necessary, a treatment plan would be developed and implemented.

Additional Topics of Tribal Concern

The following topics of tribal concern do not fall within the parameters of the previous resource discussions, so they are individually addressed below.

- To comply with the tribal request regarding spills, leaks, and accidental disposal of hazardous materials and chemicals, all spills would be remediated/addressed and reported per the SPCC Plan (see Section 2.2.9.6) and other relevant state and federal regulations.
- The tribal request for access to timber cut during mining activities was considered by the federal agencies and determined it was not feasible due to safety and material handling considerations.
- The tribal concern that work to mitigate mine impacts includes the restoration of overland routes and timber cleared areas, the decommissioning of temporary roads and mine facilities, and the

capping/abandonment of core holes, boreholes, and wells is addressed in the MRP. Additionally, mine impacts are considered and analyzed throughout this EIS document.

3.14.3.2 No Action

Under the No Action Alternative, the federal leases would not be subject to phosphate mining under this MRP, and there would be no impacts to identified resources that affect tribal treaty rights and interests. Loss of access would not occur at the 1,146 acres slated for mine development. No mining or exposure of selenium-bearing materials would occur and there would no potential for sediment and selenium releases into streams from the H1NDR Mine area. Fish would continue to inhabit streams and ponds in the vicinity, some of which are impaired due to elevated levels of sediment and selenium from historic phosphate mines, but the amount of these pollutants would not increase. Vegetation would not be removed from 1,146 acres and there would be no loss of forest habitat or forest-dwelling plants and animals. Cultural resources would not be subject to disturbance from phosphate mining activities. The historic North Maybe Mine and South Maybe Canyon Mine pits would not be backfilled or reclaimed until they are addressed under CERCLA, at some time in the future.

The current H1NDR project would not mine the subject leases and cause any impacts to resources important to the Shoshone-Bannock Tribes under the No Action Alternative. However, the mine leases under the current project may be mined in the future under the auspices of another project.

3.14.3.3 Alternative Stream Routing

The alternative routing of Stewart Creek would not impact tribal fishing rights or alter fish habitat because no fish occur in this portion of the creek. Additionally, water quality would not degrade, as a liner would be used in the backfilled mine pits to eliminate contact with seleniferous material and prevent seepage into backfill. In the long term, water quality and quantity would be maintained, as Stewart Creek's natural flow would be restored during reclamation. A temporary creek alignment would be in place during the mine years, but reclamation would create a permanent channel that roughly follows the pre-disturbance alignment of Stewart Creek. Both plant and animal habitat would return to Stewart Creek over the long term.

3.14.3.4 Alternative Access 1 and Alternative Access 2

The Shoshone-Bannock Tribes have requested that overland routes impacted by mining be restored and that full-sized vehicle access between Dry Valley and Diamond Creek over Dry Ridge be maintained. Construction of the Alternative Access as described in Section 2.5 would maintain access to the area for exercising the treaty rights of the Shoshone-Bannock Tribes. The alternative access would ensure access for tribal members to exercise their treaty rights to hunt, fish, and gather resources within unoccupied public lands.

3.15 Environmental Justice Populations

Executive Order 12898 as amended by Executive Order 14008, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (1994)" requires determining whether minority or low-income populations would experience disproportionately high and adverse impacts.

3.15.1 Analysis Area and Methods

The analysis area for environmental justice is Caribou, Bear Lake, and Bannock counties, Idaho. This is a suitable analysis area to identify and characterize environmental justice populations as defined by CEQ's 1997 EJ [environmental justice] Guidance: "The minority population of the affected area exceeds 50 percent, or the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis." (CEQ, 1997).

The issues for analyzing impacts on environmental justice populations and the indicators that will be used to discuss them are shown in **Table 62**.

Table 62. Issues and Indicators for Environmental Justice Populations

Issue	Analysis Method
Disproportionately high and adverse impacts on environmental justice populations	The 2021 U.S. Census Bureau block demographics will be used to determine whether environmental justice populations occur in the analysis area. Then, based on the location of the populations and impacts, a determination will be made as to whether the impacts on the population would be disproportionately high and adverse.

3.15.2 Affected Environment

The U.S. Census provides data (U.S. Census, 2019) on demographics and income for Caribou, Bear Lake, or Bannock counties. There are 29 census blocks in the analysis area.

For the analysis area as a whole, the combined minority populations in the analysis area in 2019 data (not "White alone") are highest in Bannock County with 9.4%, compared to 7.0% of Idaho. Low-income population (percent of people below the poverty level) in 2019, is highest in Bannock County at 12.5%, compared to the Idaho total of 11.2%, and American Indian populations are again highest in Bannock County at 3.8% compared to the Idaho total of 1.7%. None of these metrics indicate an appreciably higher minority, low income, or American Indian population. An EJSCREEN Report using EPA's tool was run for block group 160299602001 where the project is located. With the exception of the population over 64 years of age (which is 1% higher), all of the demographic indicators measured by the screen for this census block are lower than the state, EPA region, and national indicators (EPA, 2021). The proximity to CERCLA sites discussed in Section 3.2.1 are mentioned in the EJSCREEN.

Of the 29 census blocks in the analysis area, one census block, 160059400001, contains an American Indian population that makes up 65% of the total population of the block. This block is located on the most northern and western boundary of the analysis area. Most of the residences for this block are west of Interstate-15.

3.15.3 Environmental Consequences

3.15.3.1 All Action Alternatives

The census block with a minority population would not experience disproportionately high or adverse effects from H1NDR:

- The project is located where it is due to the phosphate resource to be mined, not because the proponent selected that specific area for any other reason. The project cannot be located elsewhere.
- While there is one census block with a minority population, the census block closest to the project, which would be affected the most, does not contain a minority or low-income population.
- None of the predicted impacts on groundwater, surface water, or air would reach the area of census block 160059400001, which is 60 miles to the west of the project area (see **Figure 21** through **Figure 32** and **Figure 37** through **Figure 39**). The census block is "upwind" of H1NDR.

Because there would be no disproportionately high or adverse direct or indirect effects on environmental justice populations, there would be no cumulative impacts.

The BLM and Forest Service have worked closely with the Shoshone-Bannock Tribes to try to understand and document Tribal issues stated in their comments on the DEIS that they consider impacts on the Tribes as environmental justice impacts, and will continue to do so. The BLM and Forest Service have conducted government to government consultation, met with tribal staff, and facilitated field tours to identify and resolve tribal concerns (Section 3.14.2). EIS alternatives and mitigation have been developed to facilitate continued, productive exercising of tribal treaty rights. These are addressed separately in Section 3.14. To the extent possible while meeting the Purpose and Need (Section 1.4) the Alterative Cover addresses groundwater and surface water impacts and the Access Alternatives address access concerns. The protection of the ability to exercise treaty rights is of the utmost importance. Protection and conservation of surface resources is a key aspect of protecting treaty rights. EIS alternatives and mitigation have been developed to facilitate continued, productive exercising of Tribal Treaty Rights. These are addressed separately in Section 3.14.

As discussed in consultation and with Tribal Staff, the potential loss of access, in particular motorized access, is significant to the Tribes. The Access Alternatives (part of the Preferred Alternative) were specifically developed to address this issue. Since under the Proposed Action the existing National Forest Road will be removed for the duration of mining, this alternative would construct a new National Forest Road around the mine area providing access to NFS lands during the proposed mining in order to maintain access to exercise treaty rights.

To protect treaty rights, all disturbance would be reclaimed to the greatest extent practical. The reclamation seed mix is composed mainly of native seeds to restart natural succession and provide habitat for game to support hunting, gathering and other uses. The Alternative Stream Alignment (part of the Preferred Alternative) will reclaim Stewart Creek back to a more natural environment than the Proposed Action. This would allow the steam to function more naturally and would in turn provide more natural habitat for hunting and gathering. Through the increased use of synthetic liners, the Alternative Cover (part of the Preferred Alternative) is predicted to reduce impacts to surface water and groundwater such that there would be no measurable change in surface water quality and impacts to groundwater would be compliant with regulations. By protecting surface water quality, the Preferred Alternative would also protect vegetation and wildlife.

Lastly, as part of the Proposed Action and all action alternatives, Itafos has committed to providing additional habitat mitigation to address the fact that reclamation, even at its best, does not fully restore natural habitats that support wildlife and other treaty related resources (Section 2.2.9.18). To address the residual loss, as fully described in Appendix A, and to sustain productive Treaty rights uses in the area, Itafos has committed to provide funding to support habitat creation and improvement projects in the region. The amount of funding, approximately $687,000, is based on a wildlife habitat equivalency analysis specific to the Husky 1 North Dry Ridge project.

3.15.3.2 No Action Alternative

By not implementing this MRP, there would be no direct, indirect, or cumulative impacts on environmental justice populations from the No Action Alternative.

3.16 Air Quality

3.16.1 Analysis Area and Methods

The issues for analyzing impacts on air quality and the indicators that will be used to discuss them are shown in **Table 63**.

Table 63. Issues and Indicators for Air Quality

Issue	Analysis Method
Emissions of criteria pollutants, when combined with background levels, could exceed the Idaho Ambient Air Quality Standards.	Increased emissions of fugitive dust from proposed mining activities and increased emissions of criteria pollutants, including contribution to background levels.

3.16.2 Affected Environment

Idaho management air pollution control through IDAPA 58.01.01

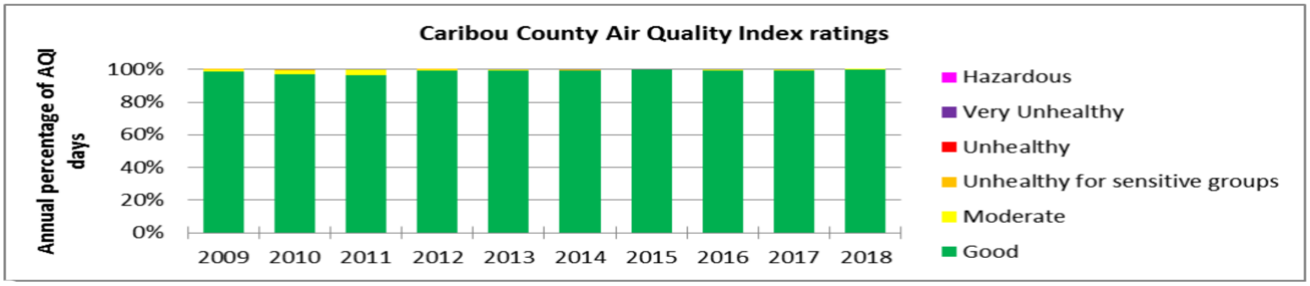
The project is in a rural area where gaseous pollutant concentrations are low. Sources of air emissions are mining, ranching, and recreation. **Figure 16** shows, among others, current mining operations in the area, Itafos' Conda Phosphate Operations Fertilizer Manufacturing Plant, and other phosphate processing occurs near Soda Springs. Emissions from mining includes fugitive mining, dust from roads, and gaseous emissions from vehicles.

Sections 575 through 587 of IDAPA 58.01.01(2021) establish air quality standards which define acceptable ambient concentrations consistent with established air quality criteria. Air quality standards were developed by the State of Idaho for six criteria pollutants considered harmful to public health and the environment. The criteria pollutants include carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter 10 microns or less in diameter (PM_{10}), particulate matter 2.5 microns or less in diameter ($PM_{2.5}$), and sulfur dioxide (SO_2) (IDEQ, 2020).

The current mining, processing plants, and other activities in the airshed are monitored by the IDEQ:

- Regional background concentrations of criteria air pollutants for the Soda Springs, Idaho airshed is characterized by IDEQ's 2020 5-year assessment (IDEQ, 2020) "[t]he monitoring objective changed from population-based to a hot spot determined by dispersion modeling, and in 2013, the short-term SO_2 concentrations remained well below the level of the new 1-hour SO_2 NAAQS [National Ambient Air Quality Standard] of 75 ppb [parts per billion]." **Figure 51** illustrates the background air quality trend in Caribou County, which includes emissions from the Soda Springs processing plants and operations mines.

Figure 51. Air Quality Index Ratings, Caribou County, 2009 through 2018



Air quality for Caribou County

Source: (IDEQ, 2019, p. 50. Figure 40.)

- The quality of the ambient air is indicated by there being no nearby non-attainment areas (areas that have or are violating the National Ambient Air Quality Standards) in Idaho. The closest maintenance area (former non-attainment area) is Portneuf Valley (Pocatello, Chubbuck and surrounding areas) for CO and PM_{10} particulates. The area was redesignated by the EPA to maintenance in 2002 and 2003, respectively.
- There are no hazardous/toxic air pollutants of significant concern. EPA rates air quality using the Air Quality Index. Air Quality Index ratings below 50 are considered good, 51-100 are moderate. The Caribou County Air Quality Index rating has been rated good in 2005, meaning that air quality is satisfactory, and air pollution poses little or no risk to public health or the environment". The average number of days with an Air Quality Index above 10 in the 2020 assessment was zero (IDEQ, 2020, p. 12).

3.16.3 Environmental Consequences

The Rasmussen Valley Mine is approximately 3 miles north of HINDR (see **Figure 16**). The Rasmussen Valley FEIS (BLM, USFS, USACE, IDEQ, 2016) documents the impacts on air quality from operations that would be quite similar to the nearby H1NDR mining operations. The analysis concluded: "The impacts from the Proposed Action to air resources would be short-term and negligible" (BLM, USFS, USACE, IDEQ, 2016, pp. 4-20).

3.16.3.1 All Action Alternatives

Fugitive dust and gaseous emissions would occur during drilling, blasting, excavation, material handling, vehicle operations, ore screening, haul road usage, ore transportation, wind erosion, and generators. The equipment used for H1NDR would come from the Rasmussen Valley Mine as operations there gradually conclude. The location of the emissions would move approximately 3 miles to the southeast, and haul distances would affect the emission levels. Generally, the air resource impacts from H1NDR would be similar to the operations at the Rasmussen Valley Mine. The same operating equipment would be used and, therefore, the emissions would be comparable. Most of the air quality would be from fugitive dust and emissions from both mobile and stationary equipment. Emissions from these types of operations are controlled by a fugitive dust control plan (see Section 2.2.9.1) and equipment manufacturers' emission control standards.

An air permit to construct would be required. Section 651 of the Rules for the Control of Air Pollution in Idaho (IDAPA 58.01.01) requires reasonable precautions to minimize fugitive dust. Fugitive dust emissions would be controlled as described in Section 2.2.9.1 (Itafos, 2020a, pp. 5-14). Because selenium is part of the particulate matter (PM_{10} and $PM_{2.5}$) emissions, selenium dispersal would be managed with implementation of the fugitive dust controls. A conservative model of the selenium in dust from a similar mine (directly adjacent to H1NDR) found negligible effects on selenium concentrations in surface water in the nearby Caldwell Canyon Mine project (NewFields, 2018d). IDEQ will review an air quality permit application submitted by Itafos and may require air dispersion modeling.

An "estimated worst-case annual controlled emissions" was disclosed in the Rasmussen Valley Mine FEIS (BLM, USFS, USACE, IDEQ, 2016, pp. 4-23 Table 4.2-1, 4-29 Table 4.2-4) based on the Rasmussen Ridge Mine's air permit application using published EPA air pollutant emission factors known as AP-42 (EPA, 1995) and stationary combustion emissions. The hours of operations and equipment fleet for the Rasmussen Valley Mine are nearly identical to what would be used at H1NDR; therefore, the same methodology was used to calculate the estimated worst-case annual controlled emissions shown in **Table 64**. Worst-case emissions would be generous enough to account for the transition from Rasmussen Valley Mine to H1NDR and both of the Alternative Access alternatives (these would not occur at the same time). The levels indicate that a construction permit will be required.

Table 64. Tons Per Year of Emissions from Stationary and Mobile Sources, H1NDR Proposed Action

PM_{10}	$PM_{2.5}$	SO_2	Nitrogen Oxides	Carbon Dioxide	Volatile Organic Compounds
471	131	92	2,406	1,230	129

Source: (Arcadis, 2021l).

H1NDR would impact the existing environment at similar levels compared to the existing Rasmussen Valley Mine with the exception that the air impacts would shift approximately 3 miles southeast because the equipment fleet and operations from the Rasmussen Valley Mine would essentially be reassigned and used for H1NDR. The impacts on air resources would be short-term and negligible.

Reasonably foreseeable impacts from H1NDR emissions are not expected to have adverse impacts on air quality. The cumulative impacts of current mining and the processing plants are demonstrated in the existing condition (**Figure 51**). H1NDR would replace the Rasmussen Valley Mine in the airshed.

No increase in any COPCs in air, soil, or surface water are anticipated from dust. The effects would be minor and short-term and would meet IDEQ permitting standards.

3.16.3.2 No Action Alternative

By not implementing this MRP, there would be no direct, indirect, or cumulative impacts on air quality from the No Action Alternative.

3.17 Climate Change and Greenhouse Gases

3.17.1 Analysis Area and Methods

The analysis area for climate change and greenhouse gas emissions is the disturbance area. This is a suitable analysis area to consider the impacts that climate change would have on H1NDR and that H1NDR would have on the climate due to the level of emissions and impacts compared to natural conditions. The impacts of climate change beyond H1NDR are not relevant to the decision and will not provide information to the decision-makers.

Executive Orders EO 13990 and EO 14008, published in the Federal Register in January 2021, both provide updated policy related to greenhouse gases and climate change. This analysis is consistent with those policies. The issues for analyzing impacts on climate and greenhouse gas and the indicators that will be used to discuss them are shown in **Table 65**.

Table 65. Issues and Indicators for Climate Change and Greenhouse Gases

Issue	Analysis Method
Predicted long-term changes in climate may affect H1NDR reclamation and closure.	Independently modeled climate predictions through 2099 are disclosed. (This information is used in other resource sections, such as Vegetation Section 3.8.3 and Groundwater 3.4.3 among others).
Greenhouse gas emissions from mining and the effect the change in vegetation types may have on carbon sequestration.	Greenhouse gas emissions inventory and calculated changes in carbon storage based on trees versus grass and shrubs (pre-mining compared to reclamation cover types).

3.17.2 Affected Environment

Overall, the steep and rugged topography of the mountain ranges provides conditions with 60 to 80 inches of annual precipitation in higher elevations and as little as 15 inches of precipitation at lower elevations. This translates to heavy snowfall at high elevations throughout the subregion, with prevailing winds dispersing snow accumulations on exposed ridges and slopes.

Increases in annual and seasonal minimum and maximum temperatures are expected in the area where H1NDR is located, based on climate models. Two model scenarios are reported in Joyce and Talbert (2018), which places the southern portion of the Caribou-Targhee National Forest and H1NDR in the Southern Greater Yellowstone sub-region. Increases in median minimum temperature above freezing occur in the more extreme of the modeling scenarios, but not the other. Annual precipitation projections are highly variable with no discernible trend over time or between the two scenarios. Seasonal temperatures are projected to increase and may cross biologically meaningful thresholds in particular seasons. Minimum seasonal temperatures are projected to rise in all seasons under both model scenarios, as is the maximum seasonal temperatures. Thus, the frequency of days with extreme heat in summer is likely to increase (Joyce & Talbert, 2018). **Figure 52** provides some details on the two model outcomes[7]. Model uncertainty, similar to the groundwater model discussed in Section 3.4.3 (simplicity, assumptions, data availability, and timeframe) apply to climate models, only to a greater degree, because climate models are more complex. Modelling climate includes more complex systems

7 The two models were RCP 4.5 and RCP 8.5. (RCP stands for representative concentration pathways). RCP 4.5 is "Two intermediate stabilization pathways in which radiative forcing is stabilized at approximately 4.5 W m2 after [year] 2100." and RCP 8.5 is "One high pathway for which radiative forcing reaches greater than 8.5 W m2 by 2100 and continues to rise for some amount of time." The emphasis was on adding different amounts of energy to the climate system over time. Scientists reviewed current estimates (which are also based on models) on radiative forcing, the total amount of extra energy entering the climate system throughout the 21st century and beyond. The report states that "These scenarios capture a moderate and a high future warming." When estimating the future temperatures "Probabilistic estimates of temperature increase above preindustrial levels based on representative equilibrium climate sensitivity distribution" (see Table 3.2 in Joyce and Talbert, 2018).

with more variability and inputs, and broader assumptions about how the system works and what affects it.

Figure 52. Summary of Climate Projections for Southern Greater Yellowstone Zone

Subregion	Temperature	Precipitation	Seasonality
Southern Greater Yellowstone	By 2100, median maximum temperature is projected to rise about 5 °F under RCP 4.5 and about 11 °F under RCP 8.5; projections for the two RCPs begin to diverge around 2040. By 2100, median minimum temperature is projected to increase about 6 °F under RCP 4.5 and about 12 °F under RCP 8.5. Median minimum temperatures are projected to remain below freezing under RCP 4.5. However, minimum temperatures are likely to rise to just under freezing by 2100 under RCP 8.5.	Annual precipitation projections are highly variable with no discernible trend under RCP 4.5 and a slight increasing trend under RCP 8.5.	Maximum temperature is projected to increase in all seasons, with winter temperatures rising about 3 °F and all other seasons rising about 5 °F under RCP 4.5 by the end of the 21st century. Under the warmest scenario, seasonal temperatures increase about 10 °F in winter, spring, and fall, but by more than 12 °F in summer by the end of the 21st century. Median minimum temperatures for all seasons by the 2080s are projected to be outside of historical ranges in the warmest scenario. Median minimum spring and fall temperatures are projected to increase, such that some projections rise above freezing by the end of the 21st century under the RCP 8.5 scenario.

Source (Joyce & Talbert, 2018, p. 41 Table 3.3).

3.17.3 Environmental Consequences

3.17.3.1 All Action Alternatives

The total annual emissions of carbon dioxide equivalent from stationary and mobile sources for H1NDR are estimated as 17,668 metric tons per year (Arcadis, 2021g). The emissions inventory considered mobile and stationary equipment, operating time and activities, fuel type, type and age of equipment (newer equipment produces fewer emissions), number of employees, waste generation and disposal, and project location. EPA estimates that "in 2019, U.S. greenhouse gas emissions totaled 6,558 million metric tons of carbon dioxide equivalents, or 5,769 million metric tons of carbon dioxide equivalents after accounting for sequestration from the land sector" (EPA, 2019). H1NDR annual emissions would be 0.00031% of the U.S. emissions.

The projected slightly warmer winter temperatures could shift the average timing of snowmelt and surface water runoff to earlier in the year, which may result in runoff and infiltration to increase during the winter and early spring and be lower during the late spring and summer. Climate change would increase the average volume of runoff and infiltration generated by individual storms, but it is uncertain if the total volume of runoff and infiltration during an average year would be greater or less than currently predicted (BLM, USFS, USACE, IDEQ, 2016). Because these trends would begin several decades in the future and extend to the end of the century, the impacts would not affect the active H1NDR project, but could affect the cover performance after reclamation. This anticipated change in timing of the runoff is accounted for in the sensitivity tested for the groundwater fate and transport model and disclosed in Section 3.4.3. The sensitivity testing included higher-than-average infiltration of 1.5 times base rate.

Because the Rasmussen Valley Mine is currently operating and would be replaced by H1NDR, the emissions would not increase but would be extended by about 15 years. Effects of H1NDR on climate would continue after the mine is closed because of the long (estimated 100 years) residence time for certain greenhouse gas in the atmosphere.

Due to the nature of the climate and the relatively low level of continuing emissions over the mining and reclamation period, there would be no cumulative impacts on the climate from the project. While it may be possible to calculate cumulative emissions, the atmospheric levels of emissions from H1NDR and past, present, and reasonably foreseeable actions would be below detectible. While vegetation would be removed, vegetation will also be reclaimed on Rasmussen Valley Mine and concurrently on H1NDR as the project progresses. Carbon sequestration in timber would switch from trees to carbon sequestration in grasses and shrubs after reclamation. Grasses store carbon underground. Project emissions would be indistinguishable compared to the No Action Alternative.

3.17.3.2 No Action

Climate change would be the same as anticipated and described under the action alternatives except that there would be no direct, indirect, or cumulative effects on climate change.

3.18 Resources Considered but not Studied in Detail

This EIS was prepared under the CEQ regulations for implementing NEPA, which at §1502.1 states, “Agencies shall focus on significant environmental issues and alternatives and shall reduce paperwork and the accumulation of extraneous background data. Statements shall be concise, clear, and to the point, and shall be supported by evidence that the agency has made the necessary environmental analyses. An environmental impact statement is a document that informs Federal agency decision making and the public.” Questions on impacts raised in scoping were considered and, although not discussed in detail in the EIS, have been summarized in **Table 66**. Some of the impacts have been addressed in other documents or do not distinguish between alternatives.

Table 66. Resource Impacts Not Discussed in Detail in the EIS

Resource	Impacts or Rationale for Not Discussing in Detail
Noise	There are no sensitive noise receptors near H1NDR. There would be no impacts on sensitive noise receptors. Impacts on wildlife from noise are discussed in Section 3.9.3.
Scenery	Visual quality was reviewed from several key observation points and considered the 2003 RFP Visual Quality Objectives. The mine would not be visible from several viewpoints, is in the distance at others and, in all cases, the 2003 RFP forest-wide standards and guidelines for scenic resources would be met (Tetra Tech, Inc., 2021f). The Proposed Action and action alternatives would be consistent with the 2003 RFP standards and guidelines. Reclamation would reduce adverse effects on visual quality in Partial Retention Visual Quality Objective areas by grading the disturbed areas to blend in with the surrounding landscape topography and revegetating with an applicable native seed mix. In the Alternative Cover, a small area of highwall left after reclamation of NDR Pit 2 and Pit 3 (on the west side of the pits) may be visible from Viewpoint 9 In the Smid Ridge Inventoried Roadless Area, and Viewpoint 42 in the Blackfoot River Wildlife Management Area. 1.1 acres of the highwall would be in partial retention Visual Quality Objective within the NDR Phosphate Lease. Impacts on scenery would be minor and long-term.
Cultural Resources	Six cultural resource inventories that examined 100% of the NDR, Maybe Canyon, and H1 Leases and the Off-Lease Area were completed from 2012 to 2019 by Historical Research Associates (Greiser, et al., 2013), (Herbel & Greiser, 2013), (Herbel, et al., 2014) (Herbel, et al., 2015); Sundance Consulting, Inc. (Larsen, 2014); and Arcadis (Barclay, 2020). The inventories identified 20 sites and 1 isolate within the analysis area; 5 of these cultural

Resource	Impacts or Rationale for Not Discussing in Detail
	resources occur within the H1NDR disturbance footprint. Of the 21 sites/isolates, 15 sites and the 1 isolate have been determined not eligible for listing in the NRHP, and the remaining five sites have an undetermined or unevaluated status. Although the Idaho State Historic Preservation Office lists Site 24CU292 as unevaluated, the BLM has determined this site does not qualify for NRHP eligibility. To date, Idaho State Historic Preservation Office has not concurred with this determination (Barclay, 2020). All 5 sites located within the H1NDR disturbance footprint have been determined not eligible for listing in the NRHP. The route for Alternative Access 1 and the corridor for Alternative Access 2 has not been surveyed. Once a location has been identified for either of the routes, a field survey would be completed following an approved study plan. Due to the topography, it is unlikely that resources will be identified, however, if resources are found, the route would be adjusted to eliminate impacts to any identified sites. There would be no impact on cultural resources from the access route alternatives. There would be no impacts on cultural resources because no historic properties occur within the H1NDR disturbance footprint. However, the potential exists for the discovery of cultural resources during mining operations, and an EPM included in Section 2.2.9 discusses the management of discovered cultural or historical resources. H1NDR is a federal undertaking and compliance with Section 106 of the National Historic Preservation Act is required. As such, the project lead federal agency would consult with the Idaho State Historic Preservation Office about the Area of Potential Effect and NRHP eligibility for sites with an undetermined/unevaluated status. Tribal treaty rights, including tribal cultural resources, are addressed in Section 3.14.
Threatened, Endangered, Sensitive Plants and State Ranked Plants	Surveys in 2012-2013 and 2019 (Tetra Tech, Inc., 2014e; Arcadis, 2020h) (Arcadis, 2020h) found no threatened or endangered plants, plants designated by the IDFG with a State Rank of 1, 2, or 3, or plants included on the USFS Intermountain Region Sensitive Species List. There would be no impact on threatened, endangered, or sensitive plants.
Threatened, Endangered Fish	No federally listed fish occur and would therefore not be affected. No threatened, endangered, or proposed fish or amphibians occur in the analysis area. See official species list from USFWS (U. S. Fish and Wildlife Service, 2021). The Proposed Action would not jeopardize the continued existence of any listed species. There would be no impact on threatened or endangered fish.
Threatened, Endangered Wildlife	Threatened and endangered wildlife are discussed in the Biological Assessment. Monarch Butterfly - H1NDR is considered low suitability for monarchs. H1NDR is not likely to jeopardize the continued existence of the monarch butterfly because neither individual monarchs nor its breeding habitat are likely to occur in the analysis area. No critical habitat has been proposed as the butterfly is a candidate species.
Sensitive Wildlife	Boreal Toad - The Idaho Fish and Wildlife Information System does not have records of the species in the analysis area but boreal toads have been found in streams to the north (Lanes Creek, Landers Creek) and southeast (South Fork Sage Creek) (Tetra Tech, Inc., 2014d). Baseline surveys did not detect boreal toads, tadpoles, or egg masses in the analysis area (Arcadis, 2020f). Suitable habitat for boreal toads in the analysis area is primarily found in the forested areas of Dry Ridge and its eastern slopes. Columbia Spotted Frog - This species does not occur in the analysis area. There are no records of this species in Caribou County (IDFG, 2020), and none were encountered during baseline amphibian surveys (Tetra Tech, Inc., 2014d; Arcadis, 2020f) or in previous amphibian surveys on the Caribou National Forest (Burton & Peterson, 1998). According to current range maps (IDFG, 2020), H1NDR is not within this species' geographic range. Northern Leatherside Chub - Surveys were conducted in the Salt River drainage and the Upper Blackfoot River drainage in 2017, including some streams in the analysis area, and were focused on streams with occurrence records or suitable habitat. Northern leatherside

Resource	Impacts or Rationale for Not Discussing in Detail
	chub was not detected in the analysis area (Kikkert, et al., 2020), and is not found anywhere in the Upper Blackfoot River basin. Harlequin Duck, Pygmy Rabbit, and Spotted Bat are dismissed from further review because they are unlikely to occur in the wildlife analysis area due to the lack of suitable habitat and lack of known occurrences or range mapped in the area. Peregrine Falcon - No occurrences of peregrine falcon have been documented in the wildlife analysis area and breeding is not expected due to the lack of cliff sites for nesting. There would be no loss of habitat or disturbance effects to this species. There are no nests within 2 miles.
Paleontological Resources	Areas to be disturbed are classified as having moderate potential for vertebrate fossils or scientifically significant invertebrate fossils (Erathem-Vanir Geological Consultants, 2009) or unknown fossil potential (Park City Formation) (McKelvey, 1959). Fossils may be damaged or destroyed or H1NDR may unearth vertebrate fossils that would otherwise remain undiscovered. None of the fossils are unique as they can be found throughout the region. Impacts on paleontological resources would be local, long-term, and minor. An EPM is included in Section 2.2.9 stating that if intact vertebrate fossils are exposed during mining activities, the locations would be recorded and, if possible, the fossil may be tentatively identified. Notification would be provided to the BLM and USFS.
Bioaccumulation in Vegetation	Reclaimed areas would be reseeded with an agency-approved seed mix predominantly of native species, with three non-native grass species to assist in soil stabilization. The potential for COPC uptake by vegetation would be minimized by the proposed post-closure cover design and by use of the agency-approved seed mix, which would avoid the use of selenium-accumulating plants and deep-rooted species. No trees or legumes would be included, and plant roots would not extend below the cover, to reduce the potential for bioaccumulation of COPCs (including selenium) in the reclaimed vegetation and ensure that tree roots do not compromise the cover effectiveness. Selenium would not accumulate in concentrations in excess of the stated ARMP guidance level of 5 mg/kg plant dry weight. Reclamation would be monitored to ensure performance.
Geologic Hazards (earthquakes causing landslides)	Earthquake - Historical earthquake and Quaternary faults were identified from U.S. Geological Survey (USGS, 2020). Moderate to high earthquake hazard, with small to moderate earthquakes in the past, indicates a potential for future earthquakes. Historical evidence by (Keefer, 1984) indicates that localized rockfall can occur with a local magnitude 4.0 earthquake and rock slope instability for earthquakes above magnitude 5.0 (Day, 2002). Potential for a ground motion earthquake strong enough to cause structure damage or landslides during operations is low. Landslide - Historical landslide evidence from the Idaho Geological Survey, Landslides in Idaho map (Adams, et al., 1991) did not identify any recent landslide activity near the project site. The area is at low landslide risk. Mining would gradually (one or two truckloads at a time) reduce the overburden surcharge on faults. Any adjustment of earth stresses would be gradually relieved as the surcharge is removed, not via an earthquake. The surcharge would be reasserted as the pits are backfilled. The gradual nature of the change in surcharge, it is not predicted to result in increased earthquake activity. No increases in earthquake activity have been observed that were attributable to mine activity in the region (Tetra Tech, Inc., 2017). Backfill and road reclamation fill slopes would be reshaped to a 3H:1V minimum slope. Slopes designed in the H1NDR open pits would be based on experience at nearby mining operations in similar formations. The required maximum 3:1 slope has historically been effective as a safe slope stability to be used. Although natural slopes in the area are steeper, man-made slopes following reclamation would not exceed 3H:1V and are considered geotechnically stable to meet USFS standards. No impacts are anticipated from geologic hazards.

Chapter 4
Preparers and Reviewers

The EIS and the baseline on which it is based was prepared and reviewed by an interdisciplinary and interagency review team of professionals and consultants.

Table 67. Agency Reviewers

Name	EIS Review Responsibility	Education (Degrees) and Years of Work Experience
James M. Joyner	Clean Water Act (Section 404) Permitting, Wetlands, Surface Water	M.S. Biology, B.S. Biology, 26 years' experience
Stan Christensen	State of Idaho Department of Environmental Quality	B.S. Geology, 5 years work experience
Dell Transtrum	Recreation, Inventoried Roadless Area, Access	B.S. Rangeland Management, 13 years' experience
Thomas E. Brown, P.E.	Engineering	B.S. Civil Engineering, 21 years' experience
Scott A. Miller, P.G.	Groundwater, Surface Water, Geochemistry	M.S. Hydrology, B.S. Fisheries and Wildlife Management, 25 years' experience
Mariah Radue	Minerals Special Uses	M.S. Quaternary and Climate Studies, B.A. Geology, 2 years' experience
Rose Lehman	Botany and Climate Change	B.A. Botany, 27 years' experience
Dominique Brough, P.G.	USFS Geologist	B.S. Geological Sciences, 13 years' experience
Brian T. Deeken	CERCLA	B.S. Geology, 26 years' experience, State level Clean-up (including CERCLA): 10 years' experience, and CERCLA 11 years' experience
Kevin P. Parker	Grazing	B.S. Range Science, 30 years' experience
Lindsay D. Johansson	Cultural Resources	Ph.D. Anthropology (Archaeology), M.A. Anthropology, B.A. Anthropology, 15 years' experience
Lee Mabey	Fisheries	M.S. Fisheries, B.S. Fisheries, 28 years' experience.
Steve Armstrong	Cultural Resources	M.A. Anthropology, B.S. Sociology, 34 years' experience
Gary Billman, P.G.	IDL	B.S. Geology, 15 years' experience
Wesley Gilmer, P.E.,	BLM Project Lead	B.S. Mining Engineering; 2 years' regulatory experience, 30 years' total experience
Marde Mensinger	Entire Document	B.S. Business Management, 3 years' experience
Dave Marr	Soil	B.S. Soil Science, 18 years' experience
Bill Stout	Programmatic Phosphate Support and Review	M.S. Natural Science, 20 years' experience
Louis Wasniewski	Hydrology and Water Resources	M.S. Forest Hydrology, B.S. Water Resources, 27 years' experience
Nathan Yorgason	Wildlife	B.S. Wildlife and Range Management, 23 years' experience

Table 68. EIS Prepares

Name	EIS Responsibility	Education (Degrees) and Years for Work Experience
Amy L Hudson, Ph.D.	Geology and Minerals, Groundwater	Ph.D. Geoscience (Hydrogeology and Geochemistry), M.S. Environmental Science and Engineering, B.S. Geology and Environmental Science, 22 years' experience
Guy Roemer	Groundwater	M.S. Nuclear Engineering, B.S. Nuclear Engineering, 24 years' experience
Keith Steven Thompson	Geology and Minerals	B.S. Geology, M.S. Geology, 41 years' experience
Richard P. Dombrouski, P.E., P.G.	Geologic Hazards	M.S. Engineering Geology, B.S. Engineering Geology, 35 years' experience.
Lynn M. Peterson	Cultural Resources and Tribal Treaty Rights & Interests	M.S. Anthropology, B.A. Anthropology, Geo-Technology Certificate, 30 years' experience
Wendy Rieth	Fisheries/Amphibians, Wildlife	M.S. Wildlife Biology, B.S. Wildlife Ecology and Conservation, 18 years' experience
Shane Matolyak	Soil Resources	M.S. Land Reclamation, B.S. Environmental Science and Biology, 18 years' experience
Cameo Flood	Social and Economic	B.S. Forestry, 36 years' experience
Michele Weidner	Vegetation, Wetlands and Riparian	M.S. Vegetation Ecology, B.S. Forestry, 20 years' experience
Audrey Crockett	Groundwater	M.S. Hydrogeology, B.S. Environmental Science, 5 years' experience
Molly Baron	Groundwater	B.S. Geological Engineering, 5 years' experience.
Kristin McClure	Grazing	B.S. Environmental Engineering, 6 years' experience
Tim Reeves	Surface Water	M.S. Range Management (water resources), B.S. Range Management, 35 years' experience.
Keith Pohs	Recreation and Access	M.S. Earth Science, B.A. Geology, 22 years' experience
Sonya Cadle	Water Modeling	M.E. Geological Engineering, B.S. Geology, 18 years' experience

Table 69. Baseline Preparers

Name	Baseline Responsibility	Education (Degrees) and Years of Work Experience
Amy Hudson, Ph.D., C.P.G.,	Geochemistry Study Plan	Ph.D. Geoscience (Hydrogeology and Geochemistry), M.S. Environmental Science and Engineering, B.S. Geology and Environmental Science, 22 years' experience
William Craig, L.G., L.H.G.	Groundwater Model and Data Collection	M.S. Geology (Hydrogeology) B.S. Geology, Trinity University, 25 years' experience
James Maus	Surface Water Data Collection	M.S., Hydrogeology, B.A. Environmental Geology (Hydrogeology and Geography), 22 years' experience

Name	Baseline Responsibility	Education (Degrees) and Years of Work Experience
Shane Matolyak	Soil Survey and Baseline Report	M.S. Land Reclamation, B.S. Environmental Science and Biology, 18 years' experience
Paul Spillers	Soil	B.S. Geology, 34 years' experience
Weber Greiser - H.R.A.	Cultural Resource Inventory and Class I Survey	M.A. Anthropology, 45 years' experience
Thad Jones	Vegetation & Wetlands Data Collection and Reporting	M.S., Forestry, B.S. Forestry, 11 years' experience
Corey Sandow	Fish & Wildlife Data Collection and Reporting	B.S. Biology, 3 years' experience
Hillary Heist	Fish & Wildlife Collection and Reporting	B.S. Wildlife & Wildlands Management, 19 years' experience
Dulaney Barclay	Lead author on the Cultural Resources Baseline Study Report Addendum	M.A. Anthropology, B.S. Geology, 30 years' experience
Mike Hay	Lead author on the Geochemical Baseline Characterization Study Report	Ph. D., Environmental Engineering and Water Resources, B.S. Engineering Physics, 17 years' experience
Mishal Al-Johar	Groundwater Technical Lead	M.S. Geological Sciences (specialized in Hydrogeology), B.S. Geological Sciences, 10 years' experience:
Paige Cowley	Lead author on the Riparian and Wetland Baseline Study Report Addendum	M.S. Biology, B.S. Wildlife Management 2007, 38-hours USACE Wetland Delineation Training, 10 years' experience:
Jesse Hemmen	Lead author on the Surface Water Baseline Study Report Addendum; Lead author on the Groundwater Baseline Study Report	B.A. Geology, M.S. Geology, 16 years' experience:
Cynthia Nicely	Lead author on the Vegetation Baseline Study Report Addendum	M.S. Biology (Ecology and Systematic Biology), B.S. Biology (Botany), 16 years' experience
Khua Moua	Lead author of the Wildlife Baseline Study Report Addendum and the Boreal Toad Baseline Study Report Addendum	B.S. Wildlife Biology, 10 years' experience

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Appendix A
Itafos Submitted Compensatory Mitigation Plan

Introduction

The H1NDR MRP proposes to disturb 1,146 acres (**Table 4**). Alternatives would disturb different acres, as shown in **Table 11**. Itafos has proposed offsetting the predicted impacts on wildlife and wildlife habitat. Section 3.9.3 discloses impacts on wildlife and wildlife habitat.

As described in Section 2.2.9.18, BLM recently changed their policy on compensatory mitigation. Appendix A in the DEIS was a framework for mitigation plan to offset the impacts on wildlife habitat which was submitted by Itafos. The framework was included in the DEIS to obtain public comment. Itafos has since completed the Habitat Equivalency Assessment (HEA) as proposed in the framework for the selected MRP and stream routing alternatives (the selected access alternative is not included in the HEA for the reasons explained in the H1NDR Compensatory Mitigation Technical Memo below) and which is included as Appendix A of the FEIS.

The mitigation will be required as part of the selected alternative and a condition of approval in the Records of Decision.

Compensatory mitigation for any remaining effects is consistent with the BLM's management responsibilities under the Federal Land Policy and Management Act and P.L. 103-64, the Department of Interior, Public Lands Policy: Implementing Mitigation at the Landscape Scale (600-DM-6) issued on 10/23/2015 (DOI, 2015); and the NEPA (40 CFR 1508.1(s)) and/or any applicable BLM policy or regulation in place at the time of BLM's decision. The CEQ regulations provide the following definition: *Mitigation* means measures that avoid, minimize, or compensate for effects caused by a proposed action or alternatives as described in an environmental document or Records of Decision and that have a nexus to those effects. While NEPA requires consideration of mitigation, it does not mandate the form or adoption of any mitigation. Mitigation includes: (1) Avoiding the impact altogether by not taking a certain action or parts of an action; (2) Minimizing impacts by limiting the degree or magnitude of the action and its implementation; (3) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (4) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; (5) Compensating for the impact by replacing or providing substitute resources or environments (CEQ, 2020).

Compensatory Mitigation

The compensatory mitigation would include implementation of wildlife habitat creation or enhancement. Itafos may elect to pay for and conduct or contract the work themselves or may make an in-lieu contribution to a third party organization. The in-lieu fee to a third party would be used for the benefit of wildlife habitat. Mitigation activities would occur in southeastern Idaho. The HEA resulted in a compensatory mitigation in-lieu fee payment of $686,694 to offset the wildlife impacts.

In the recent past, the FEIS for the Rasmussen Valley Mine (BLM, USFS, USACE, IDEQ, 2016) proposed by Agrium included compensatory mitigation. BLM's Record of Decision provided a detailed description of the analysis used to determine an appropriate amount of mitigation and the required process to provide that mitigation. Agrium was required to provide approximately $1.2 million dollars for activities through the Sagebrush Steppe Land Trust. Funds contributed by Agrium were matched and in-kind contributions were made, so the total project funding over 2019 and 2020 was increased substantially. Projects included multiple stream and watershed enhancement projects within the Blackfoot River watershed, conservation easements, as well as numerous aspen restoration projects. **Table A-1** shows the projects funded, who implemented the project and the initial cost from the funding Agrium provided.

Table A-1. Projects funded through the Sagebrush Steppe Land Trust 2019/2020

Project Name	Applicant Name	Amount Funded from Trust	Total Project Funding
IDFG- Blackfoot River Watershed Restoration	IDFG	$250,000	$727,000
TU- North Fork Tincup Process-based Restoration	Trout Unlimited	$50,000	$156,000
SSLT- Weaver Little Valley Conservation Easement	Sagebrush Steppe Land Trust	$63,656	$525,884
USFS- Stauffer Creek Restoration	USFS	$75,000	$799,000
USFS- Hubler Creek Aspen Restoration	USFS	$83,000	$166,000
USFS- Strawberry Aspen Restoration	USFS	$64,000	$128,000
USFS- John Wood Forest Management	USFS	$57,000	$114,000
Blackfoot River Watershed Restoration	IDFG	$510,000	$727,000
Tincup Creek Restoration Phase II	Trout Unlimited	$50,000	$156,000
Blackfoot River Fisheries Habitat Improvement	Trout Unlimited	$39,090	$525,884
Ephraim Aspen Enhancement	USFS	$30,000	$799,000
Totals		$1,271,746	$4,870,377

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Memo

SUBJECT H1NDR Compensatory Mitigation Technical Memo	**TO** Chris Guedes, Itafos
DATE 3/23/2022	**OUR REF** 30086097
COPIES TO Wes Gilmer, BLM	**NAME** Carolyn Meyer, Arcadis Doug Anderson, Arcadis

Introduction

On behalf of Itafos Conda, LLC (Itafos), Arcadis U.S., Inc. (Arcadis) prepared this Compensatory Mitigation Technical Memo (Memo) for the Husky 1 North Dry Ridge Mine (H1NDR; the Project), located approximately 16 miles northeast of Soda Springs, in Caribou County, Idaho. This Memo expands upon Appendix A (Framework for Compensatory Mitigation) to the 2021 Draft Environmental Impact Statement (DEIS) for the Project (2021 DEIS; Bureau of Land Management [BLM] 2021). A central component of the proposed compensatory mitigation framework is the scaled application of the comprehensive wildlife habitat equivalency analysis (HEA) completed at Rasmussen Valley Mine (RVM; Arcadis 2015a, 2016a), another phosphate mine site located approximately 2 miles north of the Project (Figure 1).

A HEA is a method for quantifying interim and permanent losses and gains of wildlife habitat function and other natural resource services. The HEA was completed during the National Environmental Policy Act (NEPA) Environmental Impact Statement analysis for RVM with participation from several resource agencies including the BLM, U.S. Forest Service, Idaho Department of Fish and Game, and the U.S. Fish and Wildlife Service, and was used to determine required compensatory mitigation for actions for that site.

As described in Appendix A of the 2021 DEIS, Itafos proposes to use a scaled version of the RVM HEA as a template to calculate compensatory mitigation for the Project. In a HEA, the habitat services lost or gained as a result of construction, restoration, and mitigation are expressed quantitatively as discounted service acre years (DSAYs) using project-specific variables as inputs (e.g., acreage of impact by habitat type, timing of impacts). Under the proposed mitigation outlined in the 2021 H1NDR DEIS, the DSAY calculations (both losses and gains) used during the RVM NEPA analysis would be scaled as necessary and applied to the H1NDR site. The H1NDR Project-specific variables implemented to scale the DSAY calculations from RVM to this Project include disturbance and reclamation start dates by project phase, disturbed and reclaimed acreage of each habitat type present on site, and timing and sequencing of the disturbance and reclamation of each habitat type. Two of the most important input variables for calculating a HEA are Baseline Habitat Service Level metrics and Habitat Recovery Curves. Neither of these variables required scaling or changing between the RVM and the H1NDR analysis, as discussed in the HEA Model Inputs Section below.

This Memo summarizes the methods and results of the HEA developed for the Project including a brief discussion of the services of wildlife habitat resources lost as a result of the Project and the services of wildlife habitat resources gained as a result of reclamation associated with the Project. Certain project-specific assumptions were made, and to streamline the process, some necessary deviations from the RVM HEA methods are summarized in this Memo. The HEA process, including full equations and model inputs, is defined and described in detail in the

RVM HEA Reports (Arcadis 2015a, 2016a). The H1NDR HEA model is developed in a Microsoft Excel worksheet, and summarized results of the model and spreadsheet are provided in Attachment A.

HEA Development

HEA Model Inputs

As described in the introduction, the Project proposes to use a scaled version of the comprehensive HEA developed for the RVM focused on losses and gains in DSAYs in 15 non-overlapping zones called phases rather than by facility as was done in the RVM HEA (Figure 2). Phase numbers correspond to the start years of the phases in the life of the mine. These mining sequences were different from those used for RVM and were scaled to match H1NDR and account for the different mine plans. Several steps are required to develop a full site-specific HEA model (see Table 2-1 in the final RVM HEA report [Arcadis 2016a] for a detailed description of the HEA process) including determining initial inputs for the model. The following seven primary inputs are required to calculate residual DSAYs lost from mining:

- *Disturbance and reclamation acres.* For the purposes of developing the HEA, the disturbance and reclamation footprint consists of the following components:
  - Husky 1 and North Dry Ridge mine pits;
  - Areas of backfill into existing Maybe Canyon Mine pits;
  - Alternative reclamation cap and cover design (i.e., DEIS Preferred Alternative);
  - Alternative realignment of Stewart Creek (i.e., DEIS Preferred Alternative);
  - Temporary and permanent Overburden Storage Areas;
  - Haul roads;
  - Tipple and ore stockpile area;
  - Stormwater ponds;
  - Growth media stockpile areas;
  - Ready line.

  The resulting Project HEA footprint differs from the footprint analyzed in the H1NDR DEIS by approximately 243 acres. These acreage discrepancies are due to the following reasons:

  - The HEA footprint does not include the Operational Zone analyzed in the DEIS. This is because NEPA will analyze potential impacts for disclosure to the public, while compensatory mitigation is limited to actual impacts.
  - The HEA footprint includes the Alternative cap and cover design (i.e., DEIS Preferred Alternative) rather than the Proposed Action cap and cover design, resulting in a smaller reclaimed area in the HEA.
  - The HEA does not include the permanent realignment of Stewart Creek (i.e., DEIS Proposed Action).
  - The HEA does not include certain ditches that were included in the DEIS.

  The Project HEA footprint does not include an alternative alignment for access road NF-134. The Proposed Action is to temporarily close portions of NF-134 during mining operations and then reconstruct NF-134 within the reclamation footprint in an alignment similar to the existing alignment. The reclamation of the existing NF-134 was also not included in this HEA analysis. The existing NF-134 is within an Aquatic Influence Zone (AIZs). By establishing the post-reclamation NF-134 on disturbed backfill, the result would be a net gain in

DSAYs, thereby reducing the residual DSAYs. Not including this in the analysis results in a more conservative analysis.
An alternative for the Proposed Action NF-134 was presented in the Draft EIS. In response to comments from the Draft EIS, Itafos has submitted another alternative for NF-134. As of the writing of this Memo, no preferred alternative has been selected; therefore, there is no alternative alignment to analyze in the HEA at this time.

- *Disturbance and reclamation start dates.* The start date for project disturbance and the HEA present year was set to the year 2023 as the anticipated start of ground disturbance. Reclamation is scheduled to commence in 2029, beginning with the existing South Maybe Canyon Mine open pit in Phase 1b. These mining sequences were different from RVM and were scaled to match H1NDR to account for the different mine plans.
- *Annual discount rate.* The annual discount rate was set to 3 percent, consistent with the RVM HEA. This rate is based on historical evidence supporting that this rate falls within the range of normal variation of the social rate of time preference (National Oceanic and Atmospheric Administration [NOAA] 1999). This is consistent for most HEAs and was not adjusted between RVM and H1NDR.
- *Baseline habitat service levels.* Baseline habitat service is the relative quality of the habitat types on the Project. The service was quantified using two metrics developed for the RVM HEA. The richness-cover-wetness (RICHCOVWET) metric incorporates vegetation species richness, percent cover, and wetness of a habitat to quantify losses and gains for shrub and herbaceous layers of all the habitat types on the sites. The within-aspen overstory (WAO) metric quantifies losses and gains for habitats having a tree overstory. Habitat services measured with the WAO metric are converted to RICHCOVWET using the conversion factor of 0.76 used in the RVM HEA. Both metrics are scaled to baseline conditions observed in the RVM study area, where the maximum on-site value is 1.0 for each metric. The RVM Baseline Metrics Report (Arcadis 2014) describes in detail the rationale and method for development of the two metrics. RICHCOVWET values for all habitat types present in the Project area (Table A1-4) were taken directly from values developed for the RVM HEA for equivalent habitat types (Table 4-1 in Arcadis 2016a) consisting of:
  - Aspen woodlands with RICHCOVWET of 0.76 (Appendix A-1 and A-2 in Arcadis 2016a), assumed to be functionally equivalent to aspen woodlands at RVM;
  - Conifer forests with WAO of 0.50, calculated using the pure conifer value in the mitigation recovery curves of treated aspen returning to pure conifer at RVM (Great Ecology 2016). The WAO was then converted to a RICHCOVWET value of 0.38 (Table A3 in Appendix A). Conifer forests at H1NDR are determined to be functionally equivalent to conifer in Great Ecology (2016);
  - Mountain shrub with RICHCOVWET of 0.61, determined to be functionally equivalent to the high-elevation rangeland at RVM;
  - Riparian shrub with RICHCOVWET of 1.0 representing a high-value wetland habitat;
  - Barren/previously disturbed land with RICHCOVWET of 0.0, the same as for RVM.

  Because the habitats listed above are functionally equivalent and found throughout the montane zone of the southeast Idaho region, these service values were not changed between RVM and H1NDR.

- *Disturbed and restored acreage of each habitat type.* Areas planned for disturbance by phase are shown on Figure 2. Table 1 indicates facilities associated with each phase. Vegetation was assumed to be completely removed from these areas at the onset of mining for a phase. To calculate the acreage of habitat disturbance that would occur for each project component and for each habitat type, the project footprint was overlaid on baseline vegetation mapping layers in ArcGIS. The resulting acreage of disturbance by habitat is shown in Table 1. Habitat types within the project footprint are shown on Figure 3. Acreage reclaimed by habitat is also shown in Table 1 and was calculated by including all acres planned for reclamation that were disturbed in each habitat by project phase, except those areas identified as unreclaimed (e.g., pit walls or permanent access roads). These acres were entered into the HEA model and are different for H1NDR than for RVM because of the different mine plans. Areas planned for reclamation by year are shown on Figure 4.

- *Timing and sequencing for disturbance and restoration of each habitat type.* Timing and sequencing details for each phase of mining and subsequent reclamation are summarized in Table 1. These were different than those for RVM and were changed to match H1NDR sequencing to account for the different mine plans.
- *Recovery trajectories for each habitat type.* A recovery curve defines the assumptions regarding the rate and trajectory of recovery for each habitat type to a specified maximum service value in the post-project scenario. Several recovery trajectories were used in the RVM HEA models (Arcadis 2015b, 2016b). To streamline the HEA for H1NDR, the single recovery trajectory modeled for a high-elevation rangeland seed mix on northeast-aspect for the RVM HEA developed for the proposed action at RVM (Table 2-1 in Arcadis 2015b) was selected for all habitat types present in the project area (Table A1-3 in Appendix A). Shrublands present in the project area are high-elevation mountain shrub, and the seed mix for the Project (consisting of native grass/forb mix with some shrubs; Table 2) is expected to recover to mountain shrub across all disturbed habitat types. This RVM trajectory recovers to the vegetation type expected for H1NDR but overestimates the time until recovery for H1NDR, resulting in more mitigation required than if a detailed study was undertaken to adjust the recovery curves to H1NDR's specific seed mix and planned types of reclamation cover. The recovery curve selected was not changed between RVM and H1NDR, and the effect of that deviation is described in more detail in the section on Project Assumptions and Deviations from the RVM HEA.

HEA Model Results

The HEA debit spreadsheet in Table A1-1 provided in Appendix A calculates total DSAYs lost from mining for each phase of the Project. Table A1-2 calculates the DSAYs gained from reclamation for each phase of the Project. The difference in these two totals represents the residual DSAYs lost associated with the Project. The results are summarized in Table 3, indicating that the Project will result in a net residual DSAY deficit of 1,688 DSAYs. Applying the compensatory mitigation rate (cost in dollars per DSAY) calculated in the RVM HEA of 347.22 dollars per DSAY (Table A2 in Appendix A) results in an estimated cost of 586,209 dollars, which, adjusted for inflation since 2016, is 686,694 dollars.

Project Assumptions and Deviations from the RVM HEA

As previously described, the HEA model developed for the Project uses model inputs derived during development of the RVM HEA in addition to Project-specific inputs. Accordingly, assumptions were made regarding the application of RVM inputs to the Project, and certain deviations from the RVM HEA were undertaken in order to streamline the process and adapt and scale the model to project specifics. The assumptions are outlined below.

- Habitat types in the Project HEA (Figure 3) provide the same level of wildlife service (ranges between 0 and 1) as assigned to the habitat types in the RVM HEA. As part of the streamlined HEA for the Project, habitats present in the project area were compared to those evaluated as part of the RVM HEA to identify similar habitat types across the sites. These comparisons, described in point 4 (Baseline habitat service levels) of the HEA Model Inputs section above, were used to identify the habitat service metric values developed at RVM that apply to the habitat types in the HEA model for the Project.

- The cost of mitigation per DSAY calculated in the development of mitigation projects at RVM is a close approximation of projected costs for mitigation projects that would offset losses of the Project. The 1,169,073 dollar cost for the RVM compensatory mitigation was the average cost of four projects in the Southeast Phosphate Mining District in 2016; one to restore sagebrush and three to restore aspen using three different management techniques (Great Ecology 2016). These projects and cost can easily apply to the current Project because they occur in the same area, if adjusted for inflation.
- A deviation from the RVM HEA that was a result of streamlining the HEA is that the time step for the HEA of the Project is calculated by year, whereas for RVM, they were calculated by day. This streamlined approach is conservative (i.e., potentially overestimating the DSAYs lost) because DSAY credits begin the year following reclamation, and annual accounting does not account for potential DSAYs gained during the initial year of vegetative growth immediately following seeding. The service assigned at 1 year matches observed habitat service in seeded habitats recovering on mines in the Southeast Mining District after 1 year (see Arcadis 2016b), but before the 1-year mark, no service is credited because of the annual time step.
- A second deviation from the RVM HEA that was a result of streamlining the HEA is that the non-overlapping acreage units for the Project are calculated for zones within the mining footprint called phases (Figure 2), whereas for RVM, they were calculated by individual facility. The phases generally correspond to the start year for disturbance. As a result, acreages for facilities in the Project are grouped together into phases (Table 1) that occupy acres slated for disturbance or reclamation at approximately the same time. At RVM, DSAYs were calculated more precisely by individual facility. This phasing approach for the Project resulted in the entirety of the haul road being associated with Phase 1 (Figure 2), although actual construction of the road is expected to follow a sequential disturbance associated with each phase over time; therefore, this streamlining assumption overestimates DSAYs lost. In contrast, sediment ponds are assumed to be reclaimed within the Phase in which they occur but are actually expected to be reclaimed 1 year later for the pit-associated sediment ponds and at the end of the Project for road-associated sediment ponds. This results in a slight overestimate of DSAYs gained. In general, acreages were grouped to result in a balanced estimate of disturbance and reclamation sequences that approximate expectations. However, considering that the conservative haul road assumptions outweigh the slightly less conservative sediment pond assumptions, the Project HEA approach is more conservative than the RVM analysis by facility.
- The recovery trajectory for the seeded reclaimed areas of the Project, a critical input for the HEA model, is the same as the recovery trajectory developed for the original proposed seed mix planned for RVM reclaimed slopes with northeast aspects. This trajectory was considered appropriate for the following reasons:
    - Arcadis (2016b) indicated that this northeast aspect seed mix was appropriate for recovering pre-mining high-elevation rangeland habitat, regardless of its aspect.
    - H1NDR reclaimed areas will mostly be at higher elevations with the same high-elevation rangeland habitat as RVM, also referred to as mountain shrubland.

  Therefore, the most appropriate recovery trajectory for H1NDR pre-mining mountain shrublands is an RVM trajectory that recovers to mountain shrubland. This recovery curve also is assumed to apply to all other pre-mining cover types including conifer and aspen forests within the Project area. An assumption of this RVM trajectory is that the store and release reclamation cover used at RVM would be too dry and rocky be able to support trees but could support grasses and shrubs such as the species planned in the RVM seed mix. The same assumption applies to the H1NDR covers, which are also likely too dry and rocky to support trees but could support grasses and shrubs in the H1NDR seed mix. Therefore, all pre-mining habitats that are seeded, including conifer and aspen forest, are expected to recover to mountain shrubland. Notably, the RVM trajectory was based on results of monitoring the recovery on reclaimed habitats of nearby southeast Idaho

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mines and information in the mountain shrubland habitat literature. As such, that trajectory should be generally applicable to the H1NDR mine, which occurs in the same mining district with comparable habitats to RVM.

- RVM used several recovery curves to match different seed mixes and planned cover. To further evaluate the potential effect of the single recovery curve selected on projected mitigation costs, two other RVM recovery curves from the RVM Predictive Metrics Report (Arcadis 2016a) were substituted into the HEA. These curves, referred to as the RV seed mix curve and P4 seed mix curve (Section 2.1.1 in Arcadis 2016a), differed from the selected RVM northeast aspect recovery curve because of varying species richness (number of species) in the planned seed mixes (26 and 16 native species instead of 13 species) and varying transpiration rates (4 to 5 percent higher) associated with the different RVM planned reclamation covers. By comparison, the species richness in the H1NDR seed mix is 21 species (Table 2), which is much higher than the richness of seed mix that the curve used (13) and actually falls within the range of the two substituted recovery curves. The transpiration rate for the covers for H1NDR proposed mine also are more similar to these substituted curves because the H1NDR rate is 8 percent higher than the recovery curve used (6.7[1] vs. 6.2 inches per year, respectively, Table 4), even higher than the substituted curves (6.4 and 6.2 inches per year for RV seed mix and P4 seed mix).

  With these substituted curves, the HEA for the Project produced fewer compensatory mitigation DSAYs lost than the selected recovery curve. Specifically, the residual DSAYs lost were 387 and 1,292, using the RV seed mix and the P4 seed mix, respectively. The average of the two at 840 DSAYs lost may be closer to true losses that would be obtained using a Project-specific recovery curve than the 1,688 DSAY estimate using the selected curve. The increased species richness increases the richness portion of the RICHCOVWET metric, and the increased transpiration rate increases plant biomass and the cover portion in the RICHCOVWET metric, resulting in more DSAYs gained more quickly from reclamation. Thus, the cost presented in this memo probably represents a conservative estimate of the recovery trajectory of the plant community on the Project area, and correspondingly a conservative estimate of the mitigation and cost required. Rather than develop a more project-specific recovery curve, requiring a more detailed analysis of the seed mix and covers planned on the mine area, in the interests of expediency, Itafos is willing to use the original curve and cost estimate for compensatory mitigation of the Project.

Mitigation

The logistical details and ultimate method of mitigation to be implemented have not yet been determined. Itafos proposes one of the following options: 1) a mitigation project approved by the agencies and implemented directly by Itafos or 2) an in-lieu fee for the dollar amount specified in this Memo to a local land trust with a proven track record of implementing similar mitigation projects in southeast Idaho (e.g., Sagebrush Steppe Land Trust).

Summary

Itafos proposes applying the compensatory mitigation rate (cost per DSAY) calculated for the HEA developed at RVM, together with required project-specific inputs, to develop the compensatory mitigation requirement for the Project. The scaled HEA presented in this Memo predicts that impacts to wildlife habitat services associated with

[1] Transpiration rate represents an average of modeled transpiration rates weighted by mine acres occurring within each area of the site (Husky 1, North Dry Ridge, and Maybe Canyon) under the agency-preferred Alternative Cover proposed action (see BLM [2021] for further details on the Alternate Cover preferred alternative at H1NDR).

disturbance and corresponding reclamation of disturbed lands will result in a net residual DSAY debit of 1,688 DSAYs. Applying the compensatory mitigation rate from RVM, if an in-lieu fee is the selected option, an in-lieu fee payment of 686,694 dollars would be required to offset the wildlife impacts of the Project.

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Appendix B
Geochemical Characterization Tables

Table B-1. Husky Geochemical Characterizations (Laboratory Results) by Rock Type and Constituent

Lithology	Category	Aluminum (mg/kg)	Antimony (mg/kg)	Arsenic (mg/kg)	Cadmium (mg/kg)	Copper (mg/kg)	Iron (mg/kg)	Manganese (mg/kg)	Nickel (mg/kg)
Alluvium	Average	8,068	0.439	7.54	9.01	27.6	14,473	323	67.4
Alluvium	Maximum	27,200	1	18.1	16.4	57	27,400	2,210	180
Alluvium	Minimum	4,100	0.0946	3.8	5.4	13	7,020	150	28.2
Dinwoody	Average	-	-	-	-	-	-	-	-
Dinwoody	Maximum	-	-	-	-	-	-	-	-
Dinwoody	Minimum	-	-	-	-	-	-	-	-
Foot-Wall Mud	Average	5,858	1.05	11.32	50.8	34.7	8,291	139	129
Foot-Wall Mud	Maximum	12,800	3	22.7	90	62	13,600	333	241
Foot-Wall Mud	Minimum	1,990	0.293	4.9	27.5	17	3,070	23.1	64
Hanging-Wall Mud	Average	10,603	0.348	14.118	11.9	29.1	17,068	235	127
Hanging-Wall Mud	Maximum	22,100	1	42.8	94.9	61	25,200	759	283
Hanging-Wall Mud	Minimum	5,600	0.0946	5.2	1.6	15	10,500	86.2	43.7
Limestone	Average	1,212	0.34	2.482	7	7.47	3,657	130	32.4
Limestone	Maximum	8,080	3	22.3	97.3	67	20,200	3,180	481
Limestone	Minimum	308	0.0946	0.568	0.935	0.229	1,040	59	5.2
Rex Chert	Average	3,221	0.225	4.0097	2.94	18.8	11,705	190	55.3
Rex Chert	Maximum	23,200	2	26.1	25.1	76	49,600	714	223
Rex Chert	Minimum	516	0.0946	1.03	0.481	8	4,700	50.5	9.7

Table B-1 (continued). Husky Geochemical Characterizations (Laboratory Results) by Rock Type and Constituent

Lithology	Category	Selenium (mg/kg)	Thallium (mg/kg)	Uranium (mg/kg)	Zinc (mg/kg)
Alluvium	Average	7.02	-	9.6	291
Alluvium	Maximum	27.0	0.472	17.0	722
Alluvium	Minimum	1.89	-	5.00	150
Dinwoody	Average	-	-	-	-
Dinwoody	Maximum	-	-	-	-
Dinwoody	Minimum	-	-	-	-
Foot-Wall Mud	Average	17.1	2.03	27.2	825
Foot-Wall Mud	Maximum	32.0	4.09	176	1,380
Foot-Wall Mud	Minimum	10.0	0.656	9.00	392
Hanging-Wall Mud	Average	19.3	0.689	10.6	522
Hanging-Wall Mud	Maximum	65.0	2.25	35.0	1,130
Hanging-Wall Mud	Minimum	4.57	0.340	2.00	111
Limestone	Average	1.58	-	4.00	220
Limestone	Maximum	34.0	8.86	81.0	2,290
Limestone	Minimum	0.308	-	1.00	32.1
Rex Chert	Average	2.71	-	4.26	212
Rex Chert	Maximum	60.0	0.992	56.0	1,140
Rex Chert	Minimum	0.632	-	2.00	43.6

Table B-2. NDR Geochemical Characterizations (Laboratory Results) by Rock Type and Constituent

Lithology	Category	Aluminum (mg/kg)	Antimony (mg/kg)	Arsenic (mg/kg)	Cadmium (mg/kg)	Copper (mg/kg)	Iron (mg/kg)	Manganese (mg/kg)	Nickel (mg/kg)
Alluvium	Average	14,092	0.956	11.297	8.3	39.5	17,898	276	75
Alluvium	Maximum	33,400	4	33.9	35.6	132	37,600	4,690	405
Alluvium	Minimum	5,230	0.0946	3.1	1.3	9	8,000	121	13.8
Dinwoody	Average	21,037	-	4.744	0.26	21.7	30,122	4,908	27.8
Dinwoody	Maximum	33,400	0.0945	6.7	0.406	32	39,000	13,500	33.9
Dinwoody	Minimum	14,200	-	3.2	0.102	15	24,000	1,730	22.4
Foot-Wall Mud	Average	11,251	4.47	11.32	114	55.5	9,197	127	260
Foot-Wall Mud	Maximum	14,400	5	22.7	116	56	12,100	240	308
Foot-Wall Mud	Minimum	8,790	4	4.9	113	55	6,990	67.1	219
Hanging-Wall Mud	Average	22,890	0.347	22.433	24.4	49.9	23,319	141	108
Hanging-Wall Mud	Maximum	27,200	2	30.8	76.1	67	31,600	475	208
Hanging-Wall Mud	Minimum	20,500	0.122	16.4	16.5	43	14,900	67.4	71.8
Limestone	Average	2,063	0.252	3.684	3.73	8.89	3,811	151	36.8
Limestone	Maximum	21,800	2	24.4	94.3	46	17,300	776	485
Limestone	Minimum	316	0.0946	0.775	0.182	0.229	550	64	6.8
Rex Chert	Average	8,528	-	6.701	1.78	37.8	16,642	134	66.2
Rex Chert	Maximum	21,700	0.348	18.8	20	90	38,000	2,210	215
Rex Chert	Minimum	2,530	-	3.2	0.358	17	6,780	27.6	27.6

Source: (Arcadis, 2020a, p. Table 14)

Table B-2 (continued). NDR Geochemical Characterizations (Laboratory Results) by Rock Type and Constituent

Lithology	Category	Selenium (mg/kg)	Thallium (mg/kg)	Uranium (mg/kg)	Zinc (mg/kg)
Alluvium	Average	9.2	0.610	9.6	312
Alluvium	Maximum	115	1.15	36.0	1,800
Alluvium	Minimum	1.44	0.340	2.00	47.8
Dinwoody	Average	0.523	-	0.692	74.5
Dinwoody	Maximum	1.31	0.565	0.880	124
Dinwoody	Minimum	0.346	-	0.504	25.0
Foot-Wall Mud	Average	159	8.38	49.6	2,879
Foot-Wall Mud	Maximum	261	9.37	56.0	3,250
Foot-Wall Mud	Minimum	97.0	7.49	44.0	2,550
Hanging-Wall Mud	Average	46	1.40	22.4	567
Hanging-Wall Mud	Maximum	2,400	6.50	54.0	1,940
Hanging-Wall Mud	Minimum	9.00	0.670	14.0	354
Limestone	Average	6.17	-	2.19	183
Limestone	Maximum	206	7.01	28.0	6,900
Limestone	Minimum	0.296	-	0.389	14.3
Rex Chert	Average	8.6	-	6.69	225
Rex Chert	Maximum	48.0	1.17	17.0	890
Rex Chert	Minimum	3.08	-	2.00	63.1

Table B-3. Pit Backfill/OSA Unsaturated Source Term Concentration (µg/L)

Constituent	Pore Volume[1]	South Maybe Canyon Mine-S	South Maybe Canyon Mine-N	H1-N	H1-X	H1-L	H1-E	H1-S	North Maybe Mine	NDR
Total Selenium	0.5-1	1.739	1.691	2.086	3.077	2.859	3.117	3.163	6.757	4.966
	0.5-2	0.0089	0.0088	0.0099	0.0131	0.0124	0.0127	0.0133	0.5966	0.4206
	1	0.909	0.884	1.091	1.61	1.494	1.629	1.654	3.842	2.787
	2	0.0065	0.0066	0.0072	0.0094	0.0105	0.0112	0.0109	0.0514	0.0425
	3	0.0039	0.0045	0.0039	0.0056	0.0063	0.0066	0.0066	0.0281	0.0249

Constituent	Pore Volume[1]	South Maybe Canyon Mine-S	South Maybe Canyon Mine-N	H1-N	H1-X	H1-L	H1-E	H1-S	North Maybe Mine	NDR
	4	0.0039	0.0045	0.0037	0.0047	0.0051	0.0053	0.0052	0.0274	0.0244
Dissolved Selenium	0.5-1	1.6216	1.5746	1.9467	2.8698	2.6733	2.9163	2.9558	7.1465	5.1526
	0.5-2	0.0082	0.0081	0.0092	0.0119	0.0113	0.0116	0.0121	0.5873	0.4062
	1	0.8487	0.8239	1.0189	1.5019	1.398	1.5244	1.5459	4.0429	2.8796
	2	0.0089	0.0087	0.0099	0.0132	0.0137	0.0142	0.0144	0.0516	0.0429
	3	0.0032	0.0037	0.0032	0.0045	0.0052	0.0056	0.0054	0.0228	0.0203
	4	0.0029	0.0035	0.0027	0.0037	0.0041	0.0043	0.0042	0.0248	0.0224
Total Antimony	0.5-1	0.0037	0.0036	0.0042	0.0059	0.0057	0.0059	0.0062	0.0048	0.0049
	0.5-2	0.0013	0.0012	0.0014	0.0019	0.0019	0.0018	0.002	0.0042	0.0041
	1	0.0025	0.0024	0.0029	0.004	0.0039	0.004	0.0042	0.0045	0.0045
	2	0.0016	0.0016	0.0019	0.0024	0.0022	0.0024	0.0024	0.0026	0.0025
	3	0.0014	0.0014	0.0016	0.002	0.0019	0.0021	0.0021	0.0012	0.0012
	4	0.0011	0.0011	0.0012	0.0014	0.0014	0.0015	0.0014	0.001	0.0011
Total Arsenic	0.5-1	0.0019	0.0022	0.0018	0.0023	0.0024	0.0024	0.0025	0.0052	0.0046
	0.5-2	0.0026	0.0029	0.0026	0.0035	0.0038	0.0038	0.0039	0.0062	0.006
	1	0.0022	0.0026	0.0022	0.0028	0.0031	0.0031	0.0032	0.0056	0.0053
	2	0.0028	0.0031	0.0028	0.0038	0.0043	0.0044	0.0045	0.0108	0.0121
	3	0.0021	0.0026	0.0018	0.0024	0.003	0.003	0.003	0.0108	0.0139
	4	0.0015	0.0018	0.0014	0.0017	0.0022	0.0021	0.0022	0.0106	0.015
Total Cadmium	0.5-1	0.0023	0.0024	0.0024	0.0032	0.0034	0.0036	0.0036	0.1349	0.1196
	0.5-2	0.0003	0.0003	0.0003	0.0004	0.0004	0.0004	0.0004	0.0002	0.0004
	1	0.0013	0.0014	0.0014	0.0018	0.0019	0.0021	0.0021	0.0711	0.062
	2	0.0003	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
	3	0.0004	0.0005	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
	4	0.0004	0.0005	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0002
Total Copper	0.5-1	0.002	0.0027	0.0015	0.0017	0.0017	0.0015	0.0017	0.0057	0.0038
	0.5-2	0.0014	0.0022	0.0009	0.0009	0.0009	0.0009	0.0009	0.0023	0.0009
	1	0.0017	0.0025	0.0012	0.0013	0.0013	0.0012	0.0013	0.0041	0.0024

Constituent	Pore Volume[1]	South Maybe Canyon Mine-S	South Maybe Canyon Mine-N	H1-N	H1-X	H1-L	H1-E	H1-S	North Maybe Mine	NDR
	2	0.0011	0.0013	0.0009	0.0009	0.0009	0.0009	0.0009	0.0012	0.0009
	3	0.0012	0.0015	0.0009	0.001	0.0011	0.0011	0.0011	0.0017	0.0015
	4	0.0011	0.0015	0.0009	0.0009	0.001	0.001	0.001	0.0019	0.0015
Total Iron	0.5-1	0.082	0.114	0.069	0.1	0.128	0.145	0.133	0.125	0.085
	0.5-2	0.102	0.139	0.088	0.129	0.158	0.179	0.166	0.213	0.169
	1	0.092	0.126	0.078	0.114	0.142	0.161	0.148	0.167	0.126
	2	0.106	0.113	0.118	0.172	0.176	0.195	0.19	0.27	0.189
	3	0.088	0.1	0.091	0.125	0.136	0.151	0.144	0.462	0.308
	4	0.05	0.055	0.051	0.069	0.07	0.076	0.075	0.509	0.339
Total Manganese	0.5-1	1.53	1.493	1.758	2.368	2.608	2.923	2.756	2.036	1.762
	0.5-2	1.471	1.419	1.751	2.511	2.337	2.549	2.573	1.228	1.074
	1	1.497	1.453	1.751	2.435	2.473	2.737	2.664	1.649	1.429
	2	1.994	1.925	2.389	3.477	3.242	3.535	3.577	1.368	1.285
	3	1.876	1.833	2.237	3.281	3.074	3.352	3.391	1.683	1.408
	4	1.647	1.603	1.972	2.904	2.706	2.949	2.991	1.176	0.906
Total Nickel	0.5-1	1.013	0.979	1.216	1.778	1.631	1.775	1.807	1.263	1.071
	0.5-2	0.646	0.623	0.778	1.141	1.024	1.114	1.141	0.66	0.57
	1	0.837	0.808	1.006	1.473	1.34	1.457	1.488	0.977	0.83
	2	0.501	0.484	0.604	0.889	0.797	0.867	0.889	0.464	0.406
	3	0.362	0.35	0.435	0.639	0.574	0.623	0.639	0.417	0.331
	4	0.288	0.278	0.347	0.509	0.458	0.498	0.51	0.234	0.172
Total Thallium	0.5-1	0.0004	0.0004	0.00041	0.00045	0.00047	0.00043	0.00047	0.00131	0.00137
	0.5-2	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.00111	0.00093
	1	0.0004	0.0004	0.0004	0.00043	0.00044	0.00042	0.00044	0.00122	0.00116
	2	0.0004	0.0004	0.00041	0.00052	0.00058	0.00048	0.00058	0.00114	0.00118
	3	0.00041	0.00043	0.00041	0.00045	0.00047	0.00043	0.00047	0.00069	0.00072
	4	0.00041	0.00043	0.00041	0.00045	0.00047	0.00043	0.00047	0.00069	0.00068
	0.5-1	0.0213	0.0212	0.0241	0.0329	0.0317	0.0342	0.0343	0.0294	0.0272

Constituent	Pore Volume[1]	South Maybe Canyon Mine-S	South Maybe Canyon Mine-N	H1-N	H1-X	H1-L	H1-E	H1-S	North Maybe Mine	NDR
Total Uranium	0.5-2	0.0202	0.0203	0.0228	0.0312	0.0295	0.0321	0.0321	0.02	0.018
	1	0.0208	0.0208	0.0235	0.0321	0.0306	0.0332	0.0333	0.0249	0.0228
	2	0.0163	0.0163	0.0184	0.0251	0.0236	0.0257	0.0257	0.0172	0.0169
	3	0.0116	0.0117	0.013	0.0176	0.0169	0.0185	0.0183	0.0179	0.0138
	4	0.0089	0.0088	0.0101	0.0133	0.0126	0.0138	0.0137	0.0093	0.0067
Total Zinc	0.5-1	1.0165	0.9765	1.231	1.814	1.6476	1.7987	1.8329	2.8263	2.3122
	0.5-2	0.2731	0.2626	0.329	0.4805	0.4282	0.4649	0.4775	1.1836	0.9859
	1	0.6607	0.6347	0.7992	1.1757	1.0635	1.1597	1.1838	2.0489	1.6738
	2	0.5993	0.5755	0.725	1.0659	0.9483	1.0308	1.0592	0.5998	0.4365
	3	0.5868	0.5659	0.7079	1.0406	0.9263	1.007	1.0345	0.2306	0.189
	4	0.4879	0.4705	0.5881	0.8636	0.7685	0.8352	0.8581	0.1629	0.1196
Total Sulfate	0.5-1	1140.2	1108.3	1330	1853.7	1961.4	2171.1	2095.7	1181	1163.4
	0.5-2	1000.3	961.8	1206.3	1764.8	1631.3	1785.4	1805.9	861.4	894.9
	1	1069.8	1034.7	1267.8	1810	1800.1	1982.6	1954.4	1027.8	1035.2
	2	865.5	830.6	1041.7	1513.8	1348.9	1466.9	1503.4	819.1	827.9
	3	709.2	681.1	848.9	1220.3	1091.2	1187	1213.1	722.4	610
	4	686.3	659.2	821.9	1183.1	1054.6	1146.5	1173.5	459.4	311.6
Total Dissolved Solids	0.5-1	1929.2	1948.3	2144.4	2909.5	3211.8	3477.7	3376.4	3663.6	3730.4
	0.5-2	1763.3	1714.2	2071.4	2922.6	2726.8	2969.7	2992.9	1909.9	1909.1
	1	1843.1	1828.9	2104.1	2914.7	2975	3228.3	3189.5	2828	2853.7
	2	1552.6	1504.6	1830.7	2590	2337.2	2533.4	2584.6	1626.3	1636.1
	3	1300.6	1260	1525.3	2132.3	1932.8	2094.3	2130.9	1420.9	1216.8
	4	1156.2	1117.4	1360.8	1912.3	1729.9	1871.5	1909.3	742.6	574.6

Source: (Arcadis, 2020b, p. Table 9)

Appendix C
Responses to Comments on DEIS

Responses to Comments on DEIS

DEIS Comment Period

The BLM made the DEIS available for public review on October 22, 2021. The EPA published the notice of availability in the Federal Register that day (EPA, 2021) and the BLM and USFS published a notice of availability in the Federal Register (BLM and USFS, 2021). USFS and BLM placed a legal notice in the Idaho State Journal on December 4, 2021 announcing the availability. The comment period ended December 6, 2021. Comments were submitted by mail, on the BLM's ePlanning website, and by email.

BLM mailed or emailed an announcement that the DEIS was available for review along with information on how to access the electronic document or request a hard copy. Letters and emails were sent to people on the mailing list, those who commented during scoping, and others on the USFS and BLM NEPA mailing list. The DEIS was made available via the BLM's ePlanning website and USFS project website.

To establish standing and ensure that substantive comments have a response in this appendix, comments had to be submitted by December 6, 2021. Approximately 2,250[8] comments were received or postmarked by that date. About 1,284 comments were emailed, printed, and mailed as hard copies. Of those, 912 emails arrived in a BLM inbox. The remaining 372 that were mailed but not received by email were due to an erroneous email address or duplicate printings. Sixty-nine post cards were received, mostly in support but four that were not, and mostly postmarked after the December 6, 2021 deadline. They were mailed to the incorrect address and not received at the official address until well after the comment period closed.

The number of comments received is an indicator of public interest, but an exact number is not necessary as long as the comments are appropriately characterized and responded to.

Comment Summary

An analysis of content of all letters and comments was completed to identify substantive comments. Substantive comments were determined by considering the CEQ NEPA implementing regulations direction on responding to comments on the DEIS according to 40 CFR 1503.4. Appropriate responses to comments are:

Modifying alternatives including the Proposed Action.

(2) Developing and evaluating alternatives not previously given serious consideration by the agency.

(3) Supplementing, improving, or modifying its analyses.

(4) Making factual corrections.

(5) Explaining why the comments do not warrant further agency response, recognizing that agencies are not required to respond to each comment.

Substantive comments received responses; however, many comments were received that were important but did warrant a response. These comments are considered by the decision makers in

8 Some of the comments received via mail did not have postmarks or dates but came in a bundle where the date could be reasonably estimated from the postmarks on the rest of the bundle.

the Records of Decision. These types of comments include statements of support or opposition, and statements of benefits or adverse effects that did not require additional analysis or corrections in the FEIS.

Summary of Comments that Did Not Get Individual Responses

The overwhelming majority of comments received stated support for H1NDR, most of them local residents and elected officials. The Idaho State legislature passed a resolution in support of H1NDR. Their reasons were:

- Support due to the economic impact (local and regional employment, high-paying jobs, employee benefits, contractors, support for businesses)
- Proponent's support of non-profit organizations
- Importance of the proponent to the economy and lifestyle in the local area
- Support of sourcing important agricultural chemicals (phosphate fertilizer) within the U.S. to support U.S. agriculture, particularly food production
- Proponent's long track record in the area
- Recreational opportunities

Some called out concerns, while stating support. Concerns included:

- Time consumed in the permitting process
- Maintaining wildlife habitat
- Take care of the land
- Protect the environment
- Ensure water protected
- Protect fish
- Complete reclamation
- Removing contaminants

Opponents' reasons stated:

- People or companies do not take responsibility for their actions
- Selenium, cadmium, and arsenic are destructive to the environment and they aren't controlling the releases of these heavy metals into the environment
- Processing plant causes contamination
- "Protect every inch of public land"
- No management (grazing, mining, prescribed burning)
- Not enough regulations
- Opinions do not matter
- Mining companies do not take responsibility for their damage
- Do not want to look at it

- Not sustainable

Comments and Responses

The substantive comments were identified and addressed by subject matter experts based on the CEQ direction.

Comment 1 **Bond/Dan Kline**

The last sentence of section 2.2.11—Financial Assurance, states the performance bond and information forming its basis would be available for public inspection. This could imply a public participation process with review and objection periods. I do not believe establishing financial assurance is a public process and recommend additional clarification of this statement.

Response:

Section 2.2.11 of the FEIS has been clarified. The method for developing the bond is explained and does not include public participation.

Comment 2 **Access/Governor's Office of Energy and Minerals**

The DEIS should analyze the difficulty of reclaiming and opening some motorized trail routes that have been shut down for long periods of time, including ATV trail #138.

Response:

No difficulties providing public access along NFS Road 134 are anticipated following the cessation of mining activities. The 1.2 miles of ATV Trail #138 in the proposed mine footprint would be open as long as possible and then closed when needed; this particular closure would be considerably shorter than the duration of the entire project. Reclamation seeding difficulties in re-establishing ATV Trail #138 are not anticipated.

Comment 3 **Socioeconomics/Governor's Office of Energy and Minerals**

The DEIS should evaluate and describe the recreational economic impacts of snowmobiling as it related to Tri-County, not only Caribou County.

Response:

The EIS Section 3.14.3.1 explains why Caribou County is considered an adequate analysis area. The positive economic impacts from the recreational sector are important, and the analysis shows they have remained relatively steady while phosphate production has also remained relatively steady. The EIS does not predict that the positive economic contributions from recreation would be affected.

Comment 4 **Socioeconomics/Governor's Office of Energy and Minerals**

Based on the results of this study [Economic Impact and Importance of Snowmobiling in Idaho. June 2017], the state recommends a more comprehensive economic evaluation be completed on the economic benefits of winter and summer OH use.

Response:

The action alternatives are not predicted to affect the positive economic benefits of recreation. Therefore, an evaluation of all the economic benefits on all winter and summer off-highway use is outside the scope of a project-level analysis given the area available compared to the project impacts.

Comment 5 **Wildlife/Governor's Office of Energy and Minerals**

The DEIS should analyze potential project effects on these [existing habitats, particularly aspen communities] and wildlife habitat.

Response:

The DEIS describes wildlife habitat (including high-value aspen) and productive big game habitat in Section 3.9.2 on p. 136-138 and p. 141-142, respectively. Effects on aspen and other wildlife habitat and high-value big game habitat is included in the DEIS Section 3.9.3.1on p.142-143 and p. 148-150.

Comment 6 **Grazing/ Mitigation/Governor's Office of Energy and Minerals**

The State encourages close coordination and cooperation with the permittees of the allotments to assure that their livelihoods are not negatively impacted with the implementation of this project. If there are plans to discontinue grazing in the west or east sides of the mentioned allotments, please consider a planned alternate allotment for the permittees that are being displaced.

… the proposed action lists that the Kendall Canyon Allotment will be split from north to south. The change in rotation may affect the attainability of the resource objectives of the area and may make livestock grazing rotation more difficult. The applicants, USFS, and permittees should work together to create a plan to address the effects of the rotation in order to reach resource management goals for all areas of the Kendall allotment

Response:

Section 3.11.3.1 has been clarified. A measure stating the need for cooperation was included in the EPM and BMP Section 2.2.9.3.

Comment 7 **Grazing – Selenium/Governor's Office of Energy and Minerals**

The DEIS should thoroughly evaluate the potentially toxic effects on livestock that would have a more concentrated use of the area after reclamation. Please conduct further investigation to the areas of the allotment that grazing domestic livestock would be subjected to for a more comprehensive assessment of this proposal.

Response:

Section 3.11.3.1 has been revised to specify the risk of selenium toxicity in livestock foraging in reclaimed areas.

Comment 8 **Grazing/Governor's Office of Energy and Minerals**

Section 3.11.2.1. Tentative Carry Capacity states "Tentative carrying capacity analysis is used by USFS to determine if current stocking rates are in line with forage production for the allotment." This statement is incorrect, the USFS does not do this as a common practice. The USFS bases permits off of occupancy instead of forage production, therefore the data presented is not in a consistent unit for comparison by measuring AUM loss. The data needs to be presented in a way that is consistent to the on-the-ground management practices, so that the full effects are clearly apparent to those whom it affects most. The USFS permits grazing based on Head Month (HM), therefore presenting the data is a consistent manner with this practice, instead of trying to present pieces of both HM and AUM strategies, will be clearer.

…the use of carrying capacity to analyze effects on grazing is inaccurate…the data presented in Table 47 is using forage availability as a demonstration of carrying capacity. The USFS neither holds nor accounts for forage use. The analysis of the effects of the project in the DEIS should be done in a consistent manner with the USFS.

Response:

Tentative carrying capacity analysis was used in the South Soda Sheep Environmental Assessment, South Soda Sheep Allotment Range Specialist Report, and is referenced in the Kendall Canyon, Maybe Canyon, and Stewart Canyon allotments management plans. Therefore, the analysis methodology is consistent with previous grazing actions. Section 3.11 has been revised to include head months in all tables.

Comment 9 **Grazing/Governor's Office of Energy and Minerals**

… the east side of the proposed action does not appear to have Range Improvement water resources available. The State suggests further analysis on the availability of water in the eastern side of the allotment to assure continued use would be feasible during the life of the project.

Response:

Section 3.11.3 has been revised to account for reduction of available head months from loss of range improvement water resources available.

Comment 10 **Grazing/Governor's Office of Energy and Minerals**

The map provided does not delineate the units within the allotment to provide a comprehensive account of the percentage of the unit that is to be affected by the proposal. This information is extremely pertinent to determine the remaining availability of water resources for both Unit 11 and Unit 12.

Response:

Figure 46 has been revised to include units 10, 11, and 12 for the Dry Valley North Division.

Comment 11 **Grazing Mitigation/Governor's Office of Energy and Minerals**

…the applicant indicated intent to provide three troughs to replace the water sources affected within the allotment. Collaboration among all participants will assure proper placement of these troughs with resource management objectives in mind.

Response:

A measure stating the need for cooperation was in the EPM and BMP Section 2.2.9.3.

Comment 12 **Tribal/Shoshone-Bannock Tribes**

…identification and evaluation of historical and cultural locations and sites that may be impacted by this proposed project must be conducted in consultation between the Federal archaeological manager/consultant and the Tribal HeTO staff. Without Tribal cultural and historical knowledge included in archaeological reports or historical accounts specific for H1NDR, then direct, indirect, and cumulative impacts to resources cannot be prevented.

Response:

Government to Government consultation with the Shoshone-Bannock Tribes continues.

Comment 13 **Tribal/Shoshone-Bannock Tribes**

Approval of this project constitutes and abrogation of treaty rights by the federal government under the Fort Bridger Treaty.

Response:

BLM and USFS understand that the Shoshone-Bannock Tribes are fundamentally opposed to phosphate mining on these NFS lands, lands on which the Tribes maintain certain rights pursuant to the 1868 Fort Bridger Treaty. Treaty provisions in article four state that the tribes "…will make said reservations their permanent home, and they will make no permanent settlement elsewhere; but they shall have the right to hunt on the *unoccupied* lands of the United States *so long as game may be found thereon*, and so long as peace subsists... on the borders of the hunting districts." The term "hunt" has been subsequently interpreted to also include fishing and gathering activities. Article two states, "they [the Tribes] will and do hereby relinquish all title, claims, or rights in and to any portion of the territory of the United States, except such as is embraced within the limits aforesaid." The treaty was written consistent with how the U.S. and Congress disposes of and/or manages federal lands outside of the Fort Hall Reservation according to Congressional direction (laws enacted) and direction given to the federal land management agencies such as the BLM and USFS.

In the case of the federal lands encompassing the H1NDR project, the U.S. Congress has enacted the Mineral Leasing Act of 1920 – "an Act to promote the mining of…phosphate…on the public domain", mineral leases have subsequently been issued that allow this site to be occupied by the lessee's mining activities. Pursuant to agency decisions made by the authorized officer of the Department of the Interior in 1950, 1951, 1956, and 1983, phosphate leases I-04, I-0678, I-05549, and I-8289 were issued. These lease contracts grant rights to mine and "construct such works…and [occupy] so much of the surface of the lands…, which may be necessary and convenient in the exercise of the rights and privileges granted".

The affected lands analyzed in the DEIS are not Indian trust lands within the boundaries (or the ceded boundaries) of the Fort Hall Reservation. They are public lands subject to certain specific non-exclusive utilization rights, including hunting, fishing, and gathering, granted to the Shoshone-Bannock Tribes by the treaty.

The treaty does not preclude federal government approval of use and occupancy of federal lands outside the Fort Hall Reservation, nor does it preclude approval of this project. Federal mineral leasing and approval of subsequent mining activities occupying lands outside of the Fort Hall Reservation do not constitute an abrogation of treaty rights. That said, it is the agencies' objective to ensure that mining activities at the site do not unnecessarily diminish or interfere with the Shoshone-Bannock Tribes' desire to hunt, gather, and access the unoccupied federal lands along Dry Ridge. It is our desire to maintain and conserve wildlife populations, backfill pits and reclaim the mine with native vegetation, and restore the natural visual character of the affected lands, the extent practical, to support productive and satisfying experiences by tribal members as they exercise their protected treaty rights. We are also committed to ensuring the mining activities are conducted in a fashion that will meet clean water and other established environmental requirements. These are some of the purposes for preparing this comprehensive EIS and consulting directly with the Shoshone-Bannock Tribes.

The Preferred Alternative allows for recovery of the valuable phosphate resource and provides for stabilization of the disturbed site and protection or restoration of the viewshed, surface resources and groundwater, and provides access between Dry Valley and Diamond Creek over the top of Dry Ridge for the Tribes and public. Before any mining could be approved, BLM would first determine that mine plans comply with all applicable environmental and other related established requirements. All these considerations are made, all or in part, to support treaty rights.

Further, it is disclosed and understood that reclamation alone cannot bring disturbed lands back to their original state in a short time frame. Along with some social and economic benefits associated with phosphate recovery, there are some adverse impacts to the Tribes, including wildlife and their habitat. As part of this proposal, and consistent with current BLM policy, the Proposed Action contains a commitment from Itafos to provide additional mitigation beyond mine reclamation. This mitigation will address the residual impacts that remain even after mine reclamation. Itafos has proposed to use the Habitat Equivalency Assessment (HEA) process developed for use in the Rasmussen Valley, Dairy Syncline, and East Smoky EISs. As disclosed in the DEIS and more thoroughly discussed in the FEIS (Appendix A), the Husky EIS will use HEA to estimate a level of meaningful mitigation to offset the residual impacts to wildlife habitat that remain after reclamation. This mitigation may be in the form of projects implemented by Itafos to improve wildlife habitat or could be in the form of cash donated to the established wildlife fund which would be put toward valuable wildlife projects. The federal agencies invite the Tribes to identify relevant projects to enhance fish and wildlife habitat on their properties along the upper Blackfoot River and in the vicinity of the mine project.

Phosphate recovery is a reasonable and important use of public land that is consistent with law and land use plans. The Preferred Alternative protects and minimizes impacts to the habitats that support treaty rights and provides continued, vehicular access to the area for tribal members. Disrupted habitats would be restored to the fullest extent possible to support productive tribal uses related to their treaty rights. The additional wildlife mitigation that is described in Appendix A would be required if BLM approves an action alternative in its Record of Decision. This mitigation would further replace valuable habitat to support wildlife and treaty rights and reduce related cumulative residual impacts in the region. This would sustain productive uses and access for the Shoshone-Bannock Tribes to exercise their treaty rights on these federal lands over the long-term.

Comment 14 **Cultural Resources/Shoshone-Bannock Tribes**

Please provide a complete inventory of all cultural resources, rather than a majority, as listed. Provide in a format so the reader can clearly differentiate how many cultural resources were evaluated.

Response:

Section 3.14.3 has been revised to include information on the completeness of the inventories.

Comment 15 **Cultural Mitigation/Shoshone-Bannock Tribes**

The Tribes request that a stop work order be implemented for inadvertent discoveries (specified in the scope of work) and that immediate notification is provided to the Tribes regarding such discoveries.

Response:

Section 2.2.9.2 will be included in the USFS, BLM, and USACE permit and required in the Records of Decision.

Comment 16 **Tribal and Visuals/Shoshone-Bannock Tribes**

The Tribes request that a view shed analysis be done with full participation and input from the Tribal Cultural Resources staff. … It appears from provided documentation that visual resources for this area have not been evaluated or classified. If they were, please indicate what type of Tribal input and participation was done.

Response:

A Visual Resource study was completed, and the impacts were disclosed in Table 63 of the DEIS, now **Table 66** of the FEIS.

Comment 17 **Tribal/Shoshone-Bannock Tribes**

The Tribes request that existing native plant communities in the project area (including those defined during the culturally sensitive plant survey, please reference the Shoshone-Bannock Exposure Scenario for Use in Risk Assessment: Traditional Subsistence Lifeways, February 2016) be restored after exploration activity is completed.

Response:

Native plant species are specified. See Section 2.2.9.17. Consultation is an ongoing process, and if additional or different species are desired by the Shoshone-Bannock Tribes, BLM may be able to accommodate specific requests either at the time of the BLM Record of Decision or in the future. The analysis in the EIS is not a risk assessment. It is a disclosure of anticipated impacts from implementation of the Proposed Action and other action alternatives. The intent of the proposed reclamation is to provide a stable reclaimed surface, use native species to promote natural succession, minimize impacts to other resources such as surface water and groundwater, and provide for post-mining land uses according to the BLM ARMP and USFS 2003 RFP. This includes providing habitat to support the exercise of tribal treaty rights.

Comment 18 **Mitigation/Shoshone-Bannock Tribes**

Mitigation:

- Preparation of a watershed management plan
- Continual groundwater and surface water monitoring during all mining activities and for at least 10 years after mining activities cease.
- …reclamation plan shall specify full restoration of overland routes and timber-cleared areas associated with the project. This reclamation shall include the use of native plant species for revegetation, decommissioning temporary roads/travel routes, capping/abandoning core holes,

boreholes, and wells, mitigating impacts from office and sanitation facilities, decommissioning of all office and sanitation facilities and their associated impacts, and other transportation/use corridors.

- Allow access to downed timber that is cut during the project and offered for use as poles, posts, or firewood by Tribal members

Response:

All mitigation and monitoring that is needed to meet regulations are included in the EIS or will be included in future permits (such as the Section 404 permit). Continued Government to Government consultation may further refine requests and responses, including access to timber, in conjunction with Itafos.

Comment 19 **Mitigation/Shoshone-Bannock Tribes**

The Tribes request that the timeline for the EIS be extended to allow for sampling over several seasonal and annual cycles for surface water, groundwater, vegetation, and wildlife impacts studies.

Response:

An extension of time is not necessary. Many resources have been monitored since before 2012. Extensive baseline data was collected between 2012 and 2015, and again in 2019 and 2020. The EIS uses approximately 6 years of data collected over an 8-year period. There is adequate seasonal and annual information available to support the analysis and predictions addressed in the EIS.

Comment 20 **Mitigation/Shoshone-Bannock Tribes**

Groundwater must be protected as though it were a potable water source for future users.

Response:

Groundwater would be protected by complying with the Idaho Groundwater Rule, which sets forth an anti-degradation requirement to protect future beneficial uses such as drinking water. IDEQ will implement and enforce this requirement and IDEQ is a cooperating agency providing water quality direction to the agencies as we assess this mine application. As disclosed in the EIS, some degradation of groundwater is predicted to occur if either of the mining alternatives are approved. Both mining and drinking water are identified as beneficial uses of groundwater in the Idaho Groundwater Rule. IDEQ is allowed to consider Itafos' application for a "point of compliance" that would allow limited degradation of groundwater from mining activities if IDEQ determines that all practical BMPs are being applied to ensure that future beneficial uses of the groundwater are accommodated. The Alternative Cover includes application of BMPs such as an infiltration cover designed to prevent effects on groundwater and surface water that would affect future potable drinking water sources. The BLM and USFS would not approve an action alternative unless IDEQ issues a Point of Compliance that requires application of BMPs to protect future beneficial uses and also allow the limited degradation predicted by the EIS. Extensive groundwater monitoring would also be required to assess compliance and to undertake any future adaptive management that might be necessary to meet the Point of Compliance and protect future beneficial uses.

Comment 21 **Mitigation/Shoshone-Bannock Tribes**

Permanent overburden storage areas must be lined underneath and on the upper surface of the waste rock pile after mining is completed with impermeable materials to prevent leachate infiltration into the subsurface.

Response:

The temporary and permanent OSAs are proposed with cover systems designed to reduce both infiltration and generation of any hazardous leachate. Further, the Alternative Cover considered deployment of cover systems with addition reduction in infiltration. Liners below the overburden were not considered, as they are generally redundant and are not necessary because the Alternative Cover would be in compliance with applicable state statutes. The temporary and permanent OSAs are incorporated in the EIS water model, which did not indicate that leachate from these facilities would contaminate subsurface water (see Section 2.2.3. Water that infiltrates through the permanent OSA will enter the H1-N Pit.

Comment 22 **Mitigation/Shoshone-Bannock Tribes**

The ore stockpile area near the tipple must be lined underneath with impermeable materials to prevent leachate infiltration into the subsurface.

Response:

See Section 2.2.3. The entire tipple area, including the ore stockpile, would be lined with 60 mils HDPE.

Comment 23 **Mitigation/Shoshone-Bannock Tribes**

Overburden that is backfilled into the pits shall be capped with impermeable capping materials to prevent leachate production and infiltration into the subsurface.

Response:

Covers were considered in the groundwater modeling that predicts infiltration. Approximately 22 acres would be covered with a synthetic liner in the Proposed Action and 315 acres in the Alternative Cover. The additional synthetic liner as described in the comment or thicker liners are not warranted because the water quality impacts from the Alternative Cover are predicted to be in compliance with state statutes.

Comment 24 **Mitigation/Shoshone-Bannock Tribes**

The BLM and Forest Service must be immediately notified of all spills, leaks, and accidental disposal of hazardous materials/chemicals. Spill/leak containment must be applied on all containers that exceed 5 gallons of liquid.

Response:

See Section 2.2.9.6. All hazardous materials will be handled according to the SPCC Plan, and reporting will be done as required by the plan and the regulations the plan follows.

Comment 25 **Mitigation/Shoshone-Bannock Tribes**

Any wells/core holes to be used for groundwater monitoring will comply with IDAPA 37.03.09 Well Construction Standard Rules.

Response:

See Section 2.2.9.7 where this measure is stated.

Comment 26 **Groundwater Model/Shoshone-Bannock Tribes**

All modeling shall include and consider pre-existing contamination from legacy mining projects in the project area.

Response:

The existing backfill was included in the source term for the open pits at the North Maybe Mine and South Maybe Canyon Mine (Arcadis, 2020d). Existing contamination is being addressed under CERCLA by the USFS.

The approach taken to analyze the potential impacts to groundwater and surface water quality is consistent with the requirements specified by NEPA. The analysis measures the direct impacts to groundwater from the Proposed Action and other action alternatives using a quantitative, numeric model. The analysis considers the cumulative impacts using both a quantitative approach where mixing with existing conditions is anticipated (pits), and a qualitative approach where no mixing with existing conditions (other historic site sources) is predicted.

This approach is consistent with the NEPA analyses for other phosphate mine sites where the existing condition is one where groundwater quality is already impacted. It is the federal and state agency standard in the region. It is also consistent with the understanding that IDEQ will assess compliance of the MRP with Idaho statutes independently from the existing conditions. The MRP would still have to comply with the Idaho Groundwater Rule and no measurable load could be added to Section 303(d) listed streams.

The impacts stemming from the historic mine operations and facilities are being addressed through the CERCLA. There is a legal obligation for the Potentially Responsible Parties at the historic mine site to remediate the site as determined by the CERCLA process. These remedial actions will continue during mining. The USFS is the lead agency for the CERCLA remediation efforts, and the respective USFS Remedial Project Manager participated in both the groundwater model development and the H1NDR NEPA Interdisciplinary Team. All available CERCLA groundwater quality data was disclosed in the Affected Environment.

The MRP developed by Itafos is specifically designed to reduce the sources of surface and groundwater impacts from the existing historic facilities; this includes the Cross Valley Fill and the East Mill Dump. Additionally, existing Maybe Canyon pits, which are only partly backfilled and reclaimed, are mostly open and unreclaimed, and the Proposed Action and other action alternatives would backfill the existing open pits and reclaim them with an infiltration-reducing cover system. Since the backfill would co-mingle with the existing backfill (i.e., mix with), the existing backfill was sampled and the samples were characterized, run through the leaching tests, and incorporated into the source term used in the groundwater model for the backfilled pits as described in Section 3.4 and **Table 18** and supported in the *Geochemical Baseline Characterization Study Report,* (Arcadis, 2020a, p. 16 Sec. 3.2.2). The impacts of both the historic and proposed backfill are combined in the numeric model. The groundwater quality analysis plume maps, shown in Chapter 3 of the EIS (**Figure 21** and **Figure 22** and **Figure 27** and **Figure 28**) include the H1NDR backfill combined with the existing historic backfill.

Currently, there is not sufficient background information to populate the H1NDR groundwater model to illustrate existing plumes from the pits or other sources at the site because the historic plumes have not been fully investigated. The existing groundwater data is sufficient to identify local exceedances of standards, and sources and concentrations of COPCs in some areas, but there is not enough data to fully define the nature and extent of all of the historic impacts. Although it is theoretically possible to model plumes from the existing facilities, there is no source term available to do so. Since neither the historic sources nor associated plumes would be affected, and because mixing with those historic plumes is not predicted, it would be inconsistent with NEPA requirements (too time consuming and costly) to collect the data needed to analyze historic plumes that would not be affected by the proposed mining alternatives. It is out of the scope of NEPA, and it would be inefficient to spend valuable agency and proponent resources to assess a historic impact that is not predicted to be affected by this project because the information is not essential to the reasoned choice among alternatives, per the CEQ regulations 40 CFR 1502.21.

Additionally, because the CERCLA process has been ongoing at the site and several remedial actions have been implemented, background conditions at the site are not static. Surface water and groundwater impacts stemming from the Cross Valley Fill have declined significantly since 2016 due to attenuation and remediation. It would be arbitrary to select background data groundwater concentrations given the remedial actions that have been completed and those that are currently scheduled to be completed.

The impact analysis clearly describes that the predicted leachate plumes stemming from H1NDR operations would not mix with those originating from the Cross Valley Fill or the East Mill Dump. The conceptual flow model indicates that local leachate generally travels eastward and down dip along bedding planes until at depth, groundwater moves westward with the regional groundwater system. The historic facilities are up-dip, and any leachate stemming from those sources would travel along different flow paths than leachate from the H1NDR operations. They would not mix.

The approach taken with the H1NDR analysis is consistent with NEPA. It meets regulatory agency decision-making needs, it combines direct impacts from proposed and historic sources where warranted, and avoids directing agency resources to assess issues that are beyond the scope of this analysis.

Comment 27 — Mitigation/Shoshone-Bannock Tribes

Do not leave an external overburden storage area (dump) after mining ends. If you leave an external dump after mining ends, that dump should be constructed up front with an impermeable liner underneath with a leachate collection system and an impermeable liner placed over the dump when it is completed. Install monitoring and collection of leachates with surrounding monitoring wells to determine if the liner retains its integrity and if it is leaking contaminated leachate into the surface water.

Response:

The suggestion to eliminate all external overburden storage areas is considered but eliminated in Section 2.7.3.1. The Preferred Alternative mine design incorporates measures to assure that contaminants and leachate are not discharged into surface water.

Comment 28 **Mitigation/Shoshone-Bannock Tribes**

All impermeable HDPE liners shall have heat-sealed seams and those seams shall be verified as sealed without flaws.

Response:

To ensure effectiveness, liners will be installed according to manufacturer's specifications, which may or may not include heat-sealing.

Comment 29 **Mitigation/Shoshone-Bannock Tribes**

All capillary break materials, limestone, etc., shall be properly sorted and engineered to be appropriate capillary break material. It is unacceptable to just dig Dinwoody material from one location and place it, un-engineered, into another location as part of an engineered cap and cover system.

Response:

The FEIS has been corrected (Section 2.2.4) to indicate that what was called a capillary break is a drainage layer. It would not be engineered to act as a capillary break. Dinwoody is not proposed to be used in the capillary break layer.

Comment 30 **Mitigation/Shoshone-Bannock Tribes**

Before any such water [perched water encountered] is used for any purpose such as dust suppression or placed in basins open and accessible to wildlife, those waters must be fully tested for the entire suite of contaminants of concern that are common at legacy mines, including radionuclides.

Response:

Perched water encountered during mining will drain into the pit. This contact water is assumed to be impacted by COPCs and would be handled according to established requirements to prevent adverse impacts to the environment and therefore does not need to be tested.

Comment 31 **Mitigation/Shoshone-Bannock Tribes**

Mining in groundwater is illegal in Idaho. Perched water is considered to be groundwater. As was predicted in the 2010 EIS hydrologic analyses, the H1NDR pits will accumulate groundwater. This is completely unacceptable.

Response:

The definition of groundwater was added to Section 3.4.1. There is no prohibition against mining in groundwater. The groundwater model indicates that the Alternative Cover could meet groundwater quality rules if a Point of Compliance is granted by IDEQ.

Comment 32 **Mitigation/Shoshone-Bannock Tribes**

There are several Traditional Cultural Properties that have been identified in the project area. At least one property has not received SHPHO confirmation. No mining will occur if it is determined that this property is not cleared by the SHPHO and the Shoshone-Bannock Tribes.

Response:

The EIS has been updated to more fully explain our understanding of tribal traditional uses in the southeast Idaho region and the project area (see Section 3.14 in the FEIS. The BLM and USFS have consulted with the Fort Hall Business Council on numerous occasions and met with tribal staff on several more occasions. The Shoshone-Bannock Tribes' members have long used the Dry Ridge and the adjacent valleys for hunting big game and other animals; gathering chokecherries, berries and utilization of other native plants; ceremonial use and spiritual renewal; and other purposes in accordance with rights granted to them in the 1868 Fort Bridger Treaty. Lithic fragments that were encountered in surveys along Dry Ridge and other physical evidence confirm that the Shoshone-Bannock Tribes have been using the area since prehistoric times. The region has been an important travel corridor for connecting with areas along the Bear River and in Utah as well as in Wyoming, not just by the Shoshone-Bannock Tribes, but also their relatives, the Eastern Shoshone Tribe. The importance to the Shoshone-Bannock Tribes of these areas and their uses are acknowledged in the FEIS. Although extensive use occurs, in various meetings and continued consultation with the tribal staff and the Fort Hall Business Council no specific, particular locations, sites, or a property that are eligible for inclusion in the NRHP as a traditional cultural property based on its associations with their cultural practices, traditions, beliefs, lifeways, arts, crafts, or social institutions of their community have been identified. The long-standing and traditional tribal uses are considered to be culturally important and are included in this FEIS. See also response to Comment 13.

Comment 33 **Mitigation/Shoshone-Bannock Tribes**

All [cap and cover systems] shall incorporate impermeable 80 ml HDPE lining into the design.

… cap and cover ALL of the tops of pit backfills.

Response:

See response to Comment 23.

Comment 34 **Mitigation/Shoshone-Bannock Tribes**

Highwall lay backs shall be employed at all remaining highwall areas after mining is complete.

Response:

The pits will be mostly backfilled and only slivers of highwall would remain. Topography would not allow laying back the highwall without extensive additional disturbance. Some existing highwall in the Maybe mines' pits will be eliminated. The residual highwalls would be in compliance with the 2003 RFP. There is no environmental reason to create the additional disturbance.

Comment 35 **Mitigation/Shoshone-Bannock Tribes**

…earthen store and release cap/cover material shall be sorted and engineered appropriately to adequately provide storage capacity. Digging from one place and depositing in another place without engineered manipulation of the material is unacceptable.

Response:

Earthen covers presented have various engineered layers that are processed and selected to perform as designed. The proposed designs were analyzed in the groundwater model and would meet water quality standards.

Comment 36 **Mitigation/Shoshone-Bannock Tribes**

Financial assurance should be calculated to be the most expensive assurance.

Response:

See Section 2.2.11. Financial assurance will be calculated per agency policy that requires surety bonds and sets bond amounts for phosphate mines as actual cost to reclaim the site if the mineral lessee is unable or unwilling to do so. This amount is typically considerably higher than the cost to reclaim the site by the mineral lessee.

Comment 37 **Editorial/Shoshone-Bannock Tribes**

Section 2.4.1.1 should be “exercising” not “excising” Treaty Rights.

Response:

This edit has been made.

Comment 38 **Groundwater Model/Shoshone-Bannock Tribes**

Section 2.6.1.1. Please recheck this statement for accuracy and truth. It seems very unlikely that a crappy model would predict that the entire pit will fill with water if a store and release cover were to be placed on a backfilled pit.

Response:

Details of the results of this preliminary modeling have been added to Section 2.7.1.1.

Comment 39 **Groundwater Model/Shoshone-Bannock Tribes**

Section 3.4.2. Contamination from previous mining activities in the project area must be considered and affects from the proposed mine must be considered an additive affect.

Response:

Please refer to the response to Comment 26.

Comment 40 **Groundwater Model/Shoshone-Bannock Tribes**

Section 3.4.3.2. It is unacceptable that existing plumes were not included in modeling predictions of new impacts of H1NDR.

Response:

Please refer to the response to Comment 26.

Comment 41 **Resources/Shoshone-Bannock Tribes**

Section 3.16. Suggest supplemental DEIS to address all the resource impacts not studied in detail in the DEIS for each resource Listed in Table 63.

Response:

See response to Comment 42. Because the determination of effects did not change, no supplemental EIS is warranted.

Comment 42 **Environmental Justice/Shoshone-Bannock Tribes**

Environmental Justice. This section must be corrected. … The Shoshone-Bannock Tribes are an American Indian population, considered a minority population. Tribal members will be affected to a greater extent than the general population by this mine. Tribal members will lose their Treaty Protected Rights to hunt, fish, gather and perform cultural and customary activities at this site. The Treaty Protected Rights cannot be compared to other groups that hunt, fish, gather or recreate. Other groups do not have Treaty Protected Rights, and whether they rely solely on their hunting for subsistence is not a measure to be compared here. It is the BLM's responsibility to educate and inform their employees and contractors the difference. Remove any reference to the comparison of the Tribal members rights, and loss of those rights vs a group or recreational users.

Response:

The analysis has been moved from Table 63 of the DEIS and made its own section (Section 3.14.3.4) in the FEIS, and the effects on environmental justice populations are included there. The Shoshone-Bannock Tribes are considered a minority population in the analysis. Shoshone-Bannock Tribes are located in one census block 16005940001 in the far northern portion of the analysis area. The conclusion that there are no disproportionally high or adverse effects on low-income or minority populations did not change; however, additional rationale is provided.

The language about treaty rights in Table 63 of the DEIS, now **Table 66** of the FEIS has been removed from the EIS.

Comment 43 **Resources/Environmental Justice/Shoshone-Bannock Tribes**

With the current administration focus on environmental justice, we respectfully request that a supplemental DEIS be prepared to study and discuss in detail all issues listed in Table 63 of the current DEIS.

Response:

See response to Comment 42. The environmental justice analysis and the analysis for other resources are compliant with current BLM policy. The change in administration and implementation of new policies is not cause to supplement the analysis and do not meet the requirements for supplementing in 40 CFR 1502.9.

Comment 44 **Grazing – Mitigation/Simplot – Vic Conrad**

<u>Fencing</u>: The fencing requirements of Itafos does not address the fencing obligations for livestock control around the mine site. The second bullet of Section 2.2.9.3 of the DEIS should be amended as follows:

Itafos would place a fence around the tipple area to restrict public and livestock access. In addition, and at the sole expense of Itafos, Itafos shall place fencing that may become necessary for controlling livestock around any mine features Itafos determines worthy of protection from livestock. All such fencing shall provide gates allowing livestock continued access along reasonable routes for crossing the mine to reach either side of each grazing allotment including, but not limited to the Kendall Canyon S&G, Maybe Canyon S&G, and Stewart Canyon S&G allotments. Where haul roads cross existing livestock trailing routes, trails over any road fills or cuts will be constructed by Itafos to allow for safe passage at these locations.

Response:

Itafos has proposed measures to eliminate or effectively reduce impacts on livestock grazing in the mine area. To ensure success of reclamation efforts, permittees will be required to keep livestock from the active mine to avoid collisions with equipment and other impacts, and to protect planted vegetation in reclamation areas.

Comment 45 **Grazing – Mitigation/Simplot – Vic Conrad**

Livestock Water: The timing of replacing all livestock watering sources and improvements that become unavailable to livestock during the life of the mine needs clarification, together with confirming the obligation of Itafos to haul and/or pump water for use by livestock during any period such substitute sources and improvements are under construction. The 4th bullet of Section 2.2.9.3 of the DEIS should be amended as follows:

- Prior to commencing any mine activity that may result in removal and/or the alteration of any livestock watering source or improvement, Itafos, at its sole expense, shall~~will~~ relocate or replace all such existing livestock water sources and improvements ~~as identied in the Grazing Permit Annual Operating Instructions (AOI) that are~~ that may be damaged, diminished or destroyed by mining activities. Any substitute source or improvement will be installed as near as practicable to the original source or improvement. During any interim period of developing substitute sources or improvements, Itafos shall haul or pump water to troughs for use by livestock during all seasons permitted for livestock use. Such water hauling, pumping and troughs shall be provided at the sole expense of Itafos.

Response:

BLM has reviewed options for replacing water and Itafos has made a proposal, which has been included in the EIS in Section 2.2.9.17 as measures required to meet the 2003 RFP.

Comment 46 **Grazing – Mitigation/Simplot – Vic Conrad**

Livestock Access through Mine: Reasonable access through the mine shall be provided at all times by Itafos during the permitted grazing season of use. This is especially important for the Maybe Canyon S&G and the Stewart Canyon S&G Allotments allowing for livestock movement between the western and eastern areas of each allotment. Without providing such access, the diminution in AUMs available for livestock will be much greater than the “Reduction in Short-Term AUMs” stated in Table 48 of the DEIS. In addition, the “Post Reclamation AUM’s Available Per Year” also contained in Table 48 do not hold Itafos accountable for any schedule for the length of time of the “short-term” reductions or for providing the additional AUM’s noted in Table 48.

The 5th bullet of Section 2.2.9.3 of the DEIS should be amended as follows:

- Prior to disrupting Additional mitigation for disruption to grazing patterns or access for livestock to water will be discussed between Itafos, at its sole expense, shall and the USFS when those impacts are more imminent. Additional mitigation for impacts to grazing could include, but not be limited to: fully mitigate such disruption to the satisfaction of the USFS and Permittee. Such mitigation shall achieve the following:

- Updating the AOI(s) to provide for clockwise grazing;
- Coordination between Itafos, USFS, and permit holder for Continuous controlled access for livestock through and migration over the mine site;
- Itafos provisioning completing substitute water sources and improvements in as near to the pre-existing location of any altered, degraded or damaged source and improvement, and the obligation to provide of continuous temporary water to specific locations during replacement operations; and/or
- Updating the Grazing Permit(s) to suspend insuring grazing continues to be available on either both the east and or west sides of the mine during operations.

- Itafos shall be responsible for the fair market value of livestock injured or killed by mine related traffic.

Response:

The analysis on the impacts on grazing in Section 3.11 has been revised. The analysis of potential grazing impacts is based on the action alternatives, and the impacts are disclosed in Section 3.11. Itafos has proposed measures to minimize impacts and meet the 2003 RFP standards, which have been incorporated into Section 2.2.9.17.

Comment 47 **Cultural Resources/Portneuf Resource Council**

1. The DEIS states "six cultural resource inventories that cover the majority of MDR, Maybe Canyon and HINDR leases and the off- lease Area were completed from 2012- 2019. Please provide a complete inventory of all cultural resources, rather than a majority, as listed. Provide in a format so the reader can clearly differentiate how many cultural resources were not evaluated.

Response:

See response to Comment 14.

Comment 48 **Groundwater/Portneuf Resource Council**

3. Groundwater: Groundwater must be protected as though it were a potable water source for future users. It is unacceptable to assume that protection measures are not needed because of pre-existing groundwater contamination or an assumption that mining will always contaminate groundwater.

Response:

See response to Comment 20.

Comment 49 **Surface Water and Groundwater/Portneuf Resource Council**

4. The interconnecting core holes from exploratory drilling and the exposure of transmissive rock formations during mining excavation, coupled with a natural fracture system associated regional faulting during Basin and Range deformation and other geologic events, creates an unacceptable risk of spreading contamination throughout the entire groundwater system and that may exit through springs and drainages into surface waters that connect to the Blackfoot River.

Response:

See response to Comment 26.

Comment 50 **Groundwater/Portneuf Resource Council**

6. All modeling shall include and consider pre-existing contamination from legacy mining projects in the project area.

Response:

See response to Comment 26.

Comment 51 **Alternatives/Portneuf Resource Council**

7. Do not leave an external overburden storage area (dump) after mining ends.

Response:

See response to Comment 27.

Comment 52 **Mitigation/Portneuf Resource Council**

8. If you leave an external dump after mining ends, that dump should be constructed up front with an impermeable liner underneath with a leachate collection system and an impermeable liner placed over the dump when it is completed. Install monitoring and collection of leachates with surrounding monitoring wells to determine if the liner retains its integrity and if it is leaking contaminated leachate into the subsurface.

Response:

See response to Comment 21.

Comment 53 **Mitigation/Portneuf Resource Council**

9. All center waste shale waste rock placed in pits shall have a complex cap and cover, on top of backfill, that includes an impermeable membrane liner.

Response:

See response to Comment 23.

Comment 54 **Mitigation/Portneuf Resource Council**

11. All impermeable HDPE liners used should be 80 ml instead of 60 ml to reduce the likelihood of tears during placement and degradation of liner integrity with time.

Response:

See response to Comment 23.

Comment 55 **Mitigation/Portneuf Resource Council**

12. All impermeable HDPE liners shall have heat-sealed seams and those seams shall be verified as sealed without flaws.

Response:

See response to Comment 28.

Comment 56 **Mitigation/Portneuf Resource Council**

14. All capillary break materials, limestone, etc., shall be properly sorted and engineered to be appropriate capillary break material. It is unacceptable to just dig Dinwoody material from one location and place it, unengineered, into another location as part of an engineered cap and cover system.

Response:

See response to Comment 29.

Comment 57 **Water Quality/Portneuf Resource Council**

15. Any perched water encountered that flows into the pit during mining has a high likelihood of containing contaminants. Before any such water is used for any purpose such as dust suppression or placed in basins open and accessible to wildlife, those waters must be fully tested for the entire suite of contaminants of concern that are common at legacy mines, including radionuclides.

Response:

See response to Comment 30.

Comment 58 **Groundwater/Portneuf Resource Council**

16. Mining in groundwater is illegal in Idaho. Perched water is considered to be groundwater. As was predicted in the 2010 EIS hydrologic analyses, the H1NDR pits will accumulate groundwater. This is completely unacceptable.

Response:

See response to Comment 31.

Comment 59 **Cultural/Portneuf Resource Council**

17. There are several Traditional Cultural Properties that have been identified in the project area. At least one property has not received SHPHO confirmation. No mining will occur if it is determined that this property is not cleared by the SHPHO and the Shoshone-Bannock Tribes.

Response:

See response to Comment 32.

Comment 60 **Alternatives/Portneuf Resource Council**

18. Cap and cover systems: All of them shall incorporate impermeable 80 ml HDPE lining into the design.

Response:

See response to Comment 23.

Comment 61 **Mitigation/Portneuf Resource Council**

19. To be fully protective of groundwater and surface water and demonstrate a genuine, not cheap and haphazard effort, cap and cover ALL of the tops of pit backfills.

Response:

See response to Comment 23.

Comment 62 **Mitigation/Portneuf Resource Council**

20. Highwall lay backs shall be employed at all remaining highwall areas after mining is complete.

Response:

See response to Comment 34.

Comment 63 **Mitigation/Portneuf Resource Council**

21. Section 2.2.4: Any earthen store and release cap/cover material shall be sorted and engineered appropriately to adequately provide storage capacity. Digging from one place and depositing in another place without engineered manipulation of the material is unacceptable.

Response:

See response to Comment 35.

Comment 64 **Financial Assurance/Portneuf Resource Council**

23. 2.2.11: Financial assurance should be calculated to be the most expensive assurance because we all know that this mine stands a high likelihood of becoming just another legacy CERCLA site. Unless the mine decides to not go on the cheap to take best measures to prevent contamination generation spread and migration.

***Respons**e:*

See response to Comment 36.

Comment 65 **Editorial/Portneuf Resource Council**

24. Section 2.4.1.1: Should be "exercising" not "excising" Treaty Rights.

Response:

See response to Comment 37.

Comment 66 **Proposed Action Description/Portneuf Resource Council**

25. Section 2.6.1.1: Please recheck this statement for accuracy and truth. It seems very unlikely that a crappy model would predict that the entire pit would fill with water if a store and release cover were to be placed on a backfilled pit.

Response:

See response to Comment 38.

Comment 67 **Groundwater/Portneuf Resource Council**

27. Section 3.4.2: Contamination from previous mining activities in the project area must be considered and affects from the proposed mine must be considered an additive affect.

Response:

See response to Comment 26.

Comment 68 **Groundwater/Portneuf Resource Council**

28. Section 3.4.3.2: It is unacceptable that existing plumes were not included in modeling predictions of new impacts of H1NDR

Response:

See response to Comment 26.

Comment 69 **Resources/Portneuf Resource Council**

29. Section 3.16: Suggest supplemental DEIS to address all of the resource impacts not studied in detail in this DEIS for each resource listed in Table 63. Cultural resources of extreme concern, as described in Table 63.

Response:

See response to Comment 42.

Comment 70 **Environmental Justice/Portneuf Resource Council**

30. Section 3.16: Environmental Justice. This section must be corrected. As stated, low- income population is highest in Bannock County at 12.5% compared to an Idaho total of 11.2%; American Indian populations highest in Bannock County with 3.8% vs. an Idaho total of 1.7% and the report findings that none of these metrics indicate an appreciably higher minority, low income or American Indian population. This is incorrect. The Shoshone-Bannock Tribes are an American Indian population, considered a minority population. Tribal members will be affected to a greater extent than the general population by this mine. Tribal members will lose their Treaty Protected Rights to hunt, fish, gather and perform cultural and customary activities at this site. The Treaty Protected Rights cannot be compared to other groups that hunt, fish, gather or recreate. Other groups do not have Treaty Protected Rights, and whether they rely solely on their hunting for subsistence is not a measure to be compared here. It is the BLM's responsibility to educate and inform their employees and contractors the difference.

Response:

See response to Comment 42.

Comment 71 **Cultural Resources, Environmental Justice, NEPA Adequacy/Portneuf Resource Council**

The Portneuf Resource Council disagrees that this DEIS, prepared under the 2020 CEQ regulations, is adequate to address cultural resources and environmental justice issues that will be negatively affected by the proposed H1NDR mine. With the current federal administration focus on environmental justice and to avoid future litigation, we respectfully request that a supplemental DEIS be prepared to study and discuss in detail all issues listed in Table 63 of the current DEIS.

Response:

See response to Comment 42.

Comment 72 **Groundwater/Environmental Protection Agency**

The DEIS does not describe the current extent or magnitude of groundwater exceedances (concentrations are not provided). This information is necessary to provide a meaningful description of the current affected environment, which is the baseline for groundwater impact predictions. While this information may be available in reference documents, the reference documents do not appear to be publicly available. EPA recommends that the FEIS:

Add tables or figures that provide the range of detected concentrations for each of the COPCs for the wells in the project area and within the geographic extent of potential impacts. This information could be provided in an appendix.

Response:

Table 21 and **Figure 19** provide this information. A description of the current condition of groundwater can be found in the baseline Groundwater Flow and Transport Modeling Report (Tetra Tech, Inc., 2021c). A description of the backfill is located in Section 3.4.2

Comment 73 **Groundwater/Environmental Protection Agency**

…the DEIS notes that current groundwater conditions may be impacted by mining. It is unclear if these groundwater conditions include exceedances of groundwater quality standards that are authorized/permitted. It is also unclear where the Point of Compliance for groundwater quality standards will be for the HINDR project. EPA recommends the FEIS:

Identify the points of compliance for groundwater quality standards (if any) for existing mining activities, and any overlap with the proposed points of compliance for groundwater quality standards for the proposed H1NDR.

Response:

As described in the EIS Section 3.2.1, historic operations at the mine site have led to groundwater quality exceeding applicable standards in some locations. These exceedances are being addressed through the CERCLA.

Setting the points of compliance is an important part of the State of Idaho's role in determining compliance with water quality statutes. IDEQ will set the points of compliance for H1NDR. While there are no points of compliance set for the historic operation, there is a legal obligation to reduce existing impacts to the levels determined through the CERCLA process.

Comment 74 **Groundwater Model/Environmental Protection Agency**

It is very concerning that adequate baseline groundwater data was not collected and that the model does not represent existing conditions. Current groundwater data is directly relevant to the evaluation of environmental impacts. If the groundwater model does not include the current levels of COPCs and plume extents, then it is not representative of the current affected environment and the output, therefore,would not accurately reflect impacts of mining H1NDR. The model may be useful for comparing alternatives, but it is not accurate for describing impacts.

EPA therefore recommends that the FEIS: Revise the groundwater model to reflect current groundwater conditions, including current concentrations and plume extents. Alternately, identify this as incomplete or unavailable information, describe why the costs of obtaining it are unreasonable, and describe the relevance of this incomplete information to the evaluation of adverse impacts to groundwater and surface water (40 CFR 1502.1(c)). In addition, if the groundwater model is not revised, then add the current groundwater concentrations to the model outputs for the alternatives in order to provide estimates of predicted groundwater and surface water concentrations.

Response:

There is adequate baseline groundwater data to accurately describe the groundwater conditions and, more importantly, how the current conditions will interact with the effects of the alternatives analyzed. There is not, however, sufficient data available to use in the flow and transport model to illustrate the current conditions. The current levels of COPCs are included in the EIS. Please see responses to Comment 26 and Comment 73. Because the model cannot be used to develop a plume, the EIS (see Section 3.4.2) has been updated to include a discussion of the unavailable information and why it is not necessary to collect it to display a reasoned choice among alternatives, as required by the CEQ 40 CFR 1502.21.

Comment 75 **Groundwater/Environmental Protection Agency**

Table 21 compares the extent of groundwater impacts for three of the COPCs. The magnitude and duration of impacts is also important, and not described. EPA recommends that the FEIS:

- Include information on how long (number of years) this extent of contamination will last.
- Provide the ranges of predicted groundwater concentrations for the three COPCs and the other COPCs, considering current groundwater conditions.

Response:

Sections 3.4.3.3 and 3.4.3.5 provide this information at 20-year intervals for the first 100 or 150 years, depending on the alternative. After this date the predictions become more uncertain, as is consistent with other modeling efforts in the phosphate district.

Comment 76 **Groundwater/Environmental Protection Agency**

The DEIS identifies significant adverse impacts to groundwater, yet no mitigation is proposed. This is a significant information gap since NEPA requires that the means to mitigate adverse impacts be described (40 CFR 1502.16). EPA recommends the FEIS:

Identify additional mitigation to minimize adverse impacts to groundwater, such as revision of mining and waste management procedures to reduce groundwater impacts, more extensive use of the Alternative Cover, more protective covers or liners, and groundwater containment, control, and treatment. If additional mitigation is not feasible, describe why this is the case.

Response:

An alternative cover was proposed that reduces leachate-related groundwater impacts and essentially eliminates impacts to surface water. This alternative was identified as part of the agency Preferred Alternative in the EIS. Surface water and groundwater impacts associated with this alternative are expected to comply with applicable requirements. See Section 2.4.3.

Comment 77 **Groundwater Model/Environmental Protection Agency**

EPA believes the groundwater model is not useful for estimating impacts to the groundwater and surface water. Corrections in the groundwater model to accurately disclose the predicted magnitude and extent of the impacts are necessary and we strongly recommend that the model be revised.

EPA noted that:

- Releases of contaminants of concern during mining are not simulated.
- Releases from historic materials at the site are not simulated nor are they qualitatively used to calibrate the solute transport function of the model.
- Calibration by adjusting hydraulic conductivity of the alluvial and Lower Wells Formation aquifer to levels that are less than measured values (rather than adjusting other parameters to achieve a match of observed groundwater levels) results in an underestimation of spatial impacts from leaving mine waste beneath proposed covers.
- Saturated backfill (mine waste) material properties are not realistically simulated (only half of the saturated porosity is assumed).

Given these issues, and that the model does not account for existing contamination, there is very low confidence in statements of the spatial extent and magnitude (concentration in groundwater and surface water) of the proposed mining activities impacts.

Response:

To the contrary, the groundwater model is a well-developed tool to predict impacts on groundwater and surface water. The model was developed over years of discussions with modeling experts and regulating agencies, including the BLM, IDEQ, and USFS. The bullets are addressed in order below:

- See added text to Section 5.0 of the groundwater modeling report.
- See the response to Comment 26.
- Section 3.4 of the groundwater modeling report describes the numerous model parameters adjusted for model calibration.
- The backfill effective porosity is a reasonable estimate of effective porosity and has been used in other southeastern Idaho phosphate projects (Whetstone, 2009). Sections 4.0 and 6.0 of the groundwater modeling report have been revised.

Comment 78 **Groundwater/Environmental Protection Agency**

EPA is concerned the project will result in significant impacts through contamination of groundwater which will remain higher than groundwater and surface water quality standards for COPCs and could contribute to existing surface water quality impairment. As these impacts may result in violation of federal environmental standards and BLM and USFS own environmental objectives, EPA recommends that the FEIS include actions to avoid, minimize, and mitigate impacts.

Response:

The results of the groundwater model, which was done specifically to estimate impacts for regulatory compliance, do not support EPA's concern.

Comment 79 **Mitigation/Groundwater/Environmental Protection Agency**

The reduction of infiltration through the Alternate Cover option reduced the groundwater mounding in backfilled materials and the impacts were correspondingly decreased. EPA recommends other engineering controls at these areas be considered to further reduce groundwater mounding in backfilled materials to further reduce mining impacts.

Response:

Further reduction of groundwater mounding is not necessary considering the conservative nature of the model and the model results indicating water quality requirements would be met. The very purpose of the model was to determine what would be needed to avoid or minimize impacts.

Comment 80 **Groundwater Model/Environmental Protection Agency**

GW Model report Section 1.3 Purpose and Objectives - The stated objective of the model is, “The model was designed to provide output that would allow evaluation of: (1) predicted groundwater quality compared to Idaho groundwater quality standards in IDAPA 58.01.11.200, (2) predicted COPC groundwater concentrations discharging into surface water, and (3) predicted changes in groundwater levels and surface water flow and their effects on groundwater and surface water rights and beneficial uses.” The model does not account for surface water and groundwater quality impacts from historical mining activities at the site or mine waste currently stored at the site or impacts from the mining process. Impacts from current sources and the mining process are known to impact groundwater quality at similar sites. The model only simulates impacts from post-closure backfill and cover of mine wastes on the property. EPA recommends that the model be revised to incorporate the existing groundwater and surface water quality impacts plus impacts that are expected to occur during mining of H1NDR.

Response:

Sections 1.4 and 1.5 of the groundwater modeling report have been clarified. See response to Comment 26.

Comment 81 **Ground and Surface Water/Environmental Protection Agency**

GW Model Report Section 3: Model calibration - Calibration was achieved by adjusting recharge rate and lowering hydraulic conductivity of the (alluvial and Lower Wells Formation) aquifers to levels that are less than values measured at the site.

EPA recommends the reliability of the model to forecast the impacts of mining be improved by quantifying the flow through the general head boundaries, accounting for runoff in streamflow calibration measurements and adjusting recharge accordingly, and guiding evapotranspiration calibration with consideration of soil type and vegetative cover.

Response:

See the response to Comment 93 and Comment 77. Section 3.3.1 of the groundwater modeling report has been clarified.

Comment 82 **Groundwater Model/Environmental Protection Agency**

GW Model Report Section 3: Model calibration - Calibration measures for … transient groundwater fluctuations were not well matched in some areas and transient water-level fluctuations in Wells Formation wells were not discussed. Resulting calibrated hydraulic conductivity of the alluvium and Wells Formation were relatively low compared with median measured values, and as a result the forecast of distance of impacts from mining also are correspondingly low compared to actual impacts. One of the most important calibrated parameters for the model, the hydraulic conductivity of the Lower Wells Formation, was less than any of the measured values for the unit. As a result, the model forecast of mining impacts can be expected to be correspondingly lower than impacts that will be measured in the future. For example, the forecast that the selenium plume could extend 1 mile for the Proposed Action or 0.7 miles for the Alternative Cover options underestimate the groundwater quality impacts. The level of confidence on streamflow measurements is more difficult to estimate since calibration metrics were not presented. As groundwater inputs to streams are the source of selenium impacts to streams the forecast distance for impacts in surface water also are probably underestimated because of the relatively low model estimates of hydraulic conductivity of the alluvium and Wells Formation in the model. EPA recommends BLM and USFS consider using median values hydraulic conductivity for the alluvial aquifer and Wells Formation and calibrating to existing conditions by varying recharge and evapotranspiration within reasonable ranges and including calibration metrics for streamflow.

Response:

As explained in Section 4.0 of the groundwater modeling report, which has been revised to explain the porosity used and why, boundary conditions in the transport model were modified in areas with mine impacts. Faults and stream cells in the calibrated flow model were removed in the mined areas. The backfill replaced the native materials so the existing faults were removed within the pit shell. The streams were re-routed in the vicinity of multiple pits to reflect the final revised stream alignment.

The groundwater flow velocity is based on effective porosity, not total porosity; therefore, the effective porosity must be and was used to calculate the COPC flow velocities because the effective porosity represents mass transport through the rock.

Sections 2.3.3.2 and 3.4.3 in the groundwater modeling report have been clarified.

Comment 83 **Groundwater Model/Environmental Protection Agency**

GW Model Report Section 4: Transport - Changes made to the calibrated model to simulate post-mining conditions are not well described in the report. The following statement is made in the introduction to Section 4.

“Boundary conditions were implemented or modified to simulate changes to recharge when reclaimed mine backfill would replace the native geologic materials, and when mining would remove segments of some faults and streams within the mine pit areas.”

Based upon the information presented in the report, it is not possible to estimate the effects of such boundary conditions on the suitability of the model to forecast this mine impact.

Hydraulic parameters for backfill materials, presented in Table 4-1, are not based upon measurements from similar sites, and the use of effective porosity (approximately 15%) instead of saturated porosity (approximately 30%) in areas of groundwater mounding into backfill (mine waste) materials causes the mass and speed of impacts to groundwater and surface water to be underestimated. In particular, the mass flux of selenium from the saturated backfill to groundwater and surface water will be significantly greater from these areas of saturated backfill. EPA therefore recommends use of saturated porosity for such selenium mass flux.

Response:

Section 4.0 of the groundwater modeling report has been clarified. See also response to Comment 82.

Comment 84 **Groundwater Model/Environmental Protection Agency**

GW Model Report Section 4: Transport - Geochemical parameters from the existing waste rock could have been measured and used along with the measured source terms to calibrate to observed contaminant concentrations in groundwater and surface water at the site. Without some basis for the solute transport parameters assumed for the model construction, it is difficult to forecast post-closure mine impacts with any confidence. EPA recommends BLM and USFS collect this information or use another technique to improve the solute transport parameter assumption in the model construct.

Response:

Geochemical parameters of waste rock already in the pits was measured and used in calculating the source term (Arcadis, 2020b), as explained in Section 4.4 of the groundwater modeling report "…samples of the existing historic NMM and SMCM backfill were collected and geochemically characterized, column tests conducted, and the results mathematically combined with the results from the H1NDR backfill columns to develop source terms for the solute transport modeling." Section 3.2.2 of the EIS also explains how the geochemical testing was done, how it was proven to be representative of the geology, and how the source term was developed.

Table 4-1 in the groundwater modeling report indicates sources for the input parameters for the transport model. Section 6.3 of the groundwater modeling report has been revised.

Comment 85 **Groundwater Model/Environmental Protection Agency**

GW Model Report Section 4: Transport - Reduced infiltration rates from the various types of caps were simulated by reducing recharge rates, which is a serious limitation to the model. Depending on the type of cap, EPA recommends the reduced infiltration rates be simulated by some combination of increased evapotranspiration (for the store and release cap) and increased runoff (for the low permeability, FML and lateral drain caps) rather than reducing recharge. The uncertainty introduced by reducing the calibrated recharge to account for the decrease of infiltrating water from cap emplacement on groundwater and stream flow is unnecessary and further reduces the confidence of model forecasts.

Response:

The reduced recharge in the model is based on empirical data from lysimeters measuring infiltration rates through caps at nearby sites and a thorough study of nearby sites (Arcadis, 2021b) and, therefore, is not a limitation of the model. Section 4.4 in the groundwater modeling report has been revised to indicate that the model accounts for effects of real-world evapotranspiration and runoff rates and provides a good approximation of the infiltration through the covers as implemented at similar mines in the district.

Comment 86 **Groundwater Model/Environmental Protection Agency**

Section 5: Predictive simulations - Experience at other sites shows that the release of selenium during mining, waste storage and prior to capping is significant. EPA therefore recommends predictive simulations incorporate this period of rapid release of selenium for estimate of impacts.

Response:

The groundwater model predicts impacts starting as soon as mining is complete. The backfill would be "uncapped" for no more than 1 year. The model estimates it would take 20 years for such overtopping to occur. Section 5.0 of the groundwater modeling report has been revised to clarify.

Comment 87 **Groundwater Model/Environmental Protection Agency**

Section 5: Predictive simulations - EPA recommends that the modeling effort include a detailed analysis of the Alternate Cover for similar areas of groundwater mounding that can be considered in more detail for engineered solutions to avoid impacts to groundwater and surface water.

Response:

Predictive simulations demonstrate that the groundwater mounding under the Alternative Cover option is greatly reduced when compared with the Proposed Action. The sensitivity analysis cases demonstrate that there are no significant changes to the plume extents or COPC concentration within realistic ranges of varying parameters. Additional details on groundwater mounding were added to Section 5.2.2 in the groundwater modeling report and clarifying text added to Section 6.3 of the groundwater modeling report. Application of the Alternative Cover results in no additional measurable COPC loading to surface waters.

Comment 88 **Groundwater Model/Environmental Protection Agency**

Section 6 Sensitivity Analysis - The sensitivity analysis did not evaluate the hydraulic parameters of most interest for the model objective of forecasting mining impacts on groundwater and surface water. EPA recommends sensitivity analysis include the following parameters:

- Recharge – compare calibrated recharge rates to site specific estimates considering PRISM 4 Climate Group (2020) vegetation (ET), soil type and slope and adjust recharge rate to optimize groundwater elevations while maintaining realistic hydraulic conductivity of alluvial and Lower Wells Formation.
- Hydraulic Conductivity – constrain Lower Wells Formation hydraulic conductivity to measured values and consider a wide range of hydraulic conductivity for alluvium
- Evapotranspiration – use the ET rate to decrease infiltration through the store-and-release cap.
- Streambed Conductance – compare results from the gaining/losing stream calibration that was facilitated by increasing vertical hydraulic conductivity in layers 7 through 9 with results from varying streambed conductance.

Porosity of backfill (mine waste) – increase the porosity of backfill in areas of groundwater mounding in backfilled material to the saturated porosity.

Response:

See the response to Comment 77, Comment 83, and Comment 85.

Comment 89 **Groundwater Model/Environmental Protection Agency**

GW Model Report Section 3 (the calibration to existing conditions): Clarify if the average annual precipitation modeled by PRISM 4 Climate Group (2020) for each lease area (previously described in Arcadis 2020. Draft Modified Proposed Action Cap and Cover Evaluation Report. Husky 1 North Dry 6 Ridge Mine Project. Caribou County, Idaho. August 6) considered as the starting point for the steady state calibration. Consider presenting the difference between the recharge rate for each lease area with the model calibrated recharge rate.

Response:

The PRISM precipitation rates were used as the starting point. However, since not all precipitation infiltrates as recharge, recharge rates based on elevation were also used. Table 2-4 in the groundwater modeling report lists the estimated percent recharge based on elevation and annual precipitation. Section 3.3.1 of the groundwater modeling report has been revised.

Comment 90 **Groundwater Model/Environmental Protection Agency**

GW Model Report Section 3 (the calibration to existing conditions): Page 58, paragraph 2: Calibration of Maybe Creek by adjusting vertical hydraulic conductivity of the aquifer is unusual. Section 3.3.3 describes a typical calibration of streambed conductance to observed water levels. Clarify if the calibration to groundwater levels accomplished before the adjustment to hydraulic conductivity of layers 7 through 9. If so, disclose if the calibration to groundwater levels was affected.

Response:

In the model, vertical hydraulic conductivity was adjusted to better match field observations of flow across the weathered Wells Formation. This modification contributes to the uniqueness of the calibration but did not affect the calibration of the groundwater levels. Section 3.4.1 of the groundwater modeling report has been revised.

Comment 91 **Groundwater Model/Environmental Protection Agency**

GW Model Report Section 3 (the calibration to existing conditions): Page 59, paragraph 3: Describe how ET [evapotranspiration] values were calibrated and clarify if initial ET values were changed during transient calibration.

Response:

The National Weather Service station at Soda Springs, Idaho was the source for the evapotranspiration rates used. Clarifying text has been added to Section 3.4.2 of the groundwater modeling report.

Comment 92 **Groundwater Model/Environmental Protection Agency**

GW Model Report Section 3 (the calibration to existing conditions): Page 59, paragraph 4: Describe how GHB [general head boundaries] values were calibrated.

Response:

The general head boundary conductances and reference heads were adjusted to match hydraulic heads in the regional aquifer system. See Section 3.3.4 in the groundwater modeling report.

Comment 93 **Groundwater Model/Environmental Protection Agency**

GW Model Report Section 3 (the calibration to existing conditions): Section 3.4.2: Transient calibration for the hydraulic conductivity of the Wells Formation is of primary interest for forecasting selenium transport and area of impact for the cover and alternate cover. Consider adding a subsection to Section 3.4.2 discussing the observed and measured water levels in Wells Formation monitoring wells and present the calibration statistics for those wells.

Response:

The groundwater model addresses the local, intermediate, and regional flow systems together, consistent with other models in the phosphate district. The groundwater modeling report Figure 3-22 and Figure 3-24 graphically display simulated versus observed seasonal water level changes in the Wells Formation.

Comment 94 **Groundwater Model/Environmental Protection Agency**

GW Model Report Section 3 (the calibration to existing conditions): Table 3-6: Since the model objective of providing a forecast of the impacts of selenium transport in the alluvium and Wells Formation to surface water is a primary goal, consider constraining the modeled hydraulic conductivities to the midpoint of the reported range and adjusting other model parameters (GHB boundary, recharge, streambed conductance) for calibration. For example, constrain the Wells Formation to the observed range hydraulic conductivity (i.e., between 90 and 150 ft/day) and more modest vertical anisotropy (i.e., vertical hydraulic conductivity of 0.9 to 15 ft/day) and constrain the alluvium to the midpoint of the observed range of hydraulic conductivity (i.e., between 10 and 100 ft/day) and anisotropy between 1 and 10.

Response:

Clay layers and lenses in the alluvium drive the vertical to horizontal hydraulic conductivity ratios down and increase anisotropy. These clays are well-documented in borehole logs in both Dry Valley and Diamond Valley. Clarifying text has been added to sections 2.2.2 and 2.3.1 of the groundwater modeling report.

The 90 to 150 feet per day hydraulic conductivity values listed in the comment likely refers to the Lower Wells Formation (reported range of 86 to 153 feet per day from Table 3-6 in the groundwater modeling report). The Lower Wells Formation is not directly connected to surface water in the model domain and the modeled value of 55 feet per day is reasonable. Anisotropy in the Wells Formation on Dry Ridge was increased to match observed water-level elevations on Dry Ridge, which are more than 1,000 feet higher than in the regional flow system.

Comment 95 **Groundwater Model/Environmental Protection Agency**

GW Model Report Section 4: Transport Model Construction: Table 4-1: Solute transport parameters, listed in Table 4-1, are uniform for backfill materials, and estimates could be improved by considering geotechnical information from similar sites. Consider running the solute transport simulation with a range of backfill properties and presenting a corresponding range of impacts.

Response:

The backfill model input parameters are within the range used in other southeast Idaho phosphate mines, deemed appropriate for H1NDR, and are uniform to simplify the results of the comparisons among alternative covers, as described in Section 4.2 of the groundwater modeling report.

Comment 96 **Groundwater Model/Environmental Protection Agency**

GW Model Report Section 4: Transport Model Construction: Table 4-3: Compare the infiltration rate reductions from Table 4-3 to the calibrated recharge rates consider using the net percolation rates specified in the Table 1 of Arcadis, March 8, 2021 Cap and Cover Evaluation Report Addendum.

Response:

Additional information has been added to Table 4-3 in the groundwater modeling report to further explain the infiltration rates used in the model.

Comment 97 **Groundwater Model/Environmental Protection Agency**

GW Model Report Section 4: Transport Model Construction: Table 4-4: Consider calculating pore volume with saturated porosity value (such as 25%) for overburden areas subject to groundwater mounding or excessive infiltration (i.e., store and release covers).

Response:

See the response to Comment 82.

Comment 98 **Groundwater Model/Environmental Protection Agency**

GW Model Report Section 5: The following statement is made “Model results showed that there was a negligible increase in base flow and no simulated stream flow reduction at any of these surface water bodies due to the mining activities.” EPA recommends increase the streamflow because of runoff from the low permeability and lateral drain caps installed. If the caps were simulated by increasing evapotranspiration and routing runoff to streams, the streamflow increase metric would be useful for increasing confidence in model results and forecasting impacts to surface water.

Response:

Figure 3-19 in the groundwater modeling report displays the simulated stream flows which are in good agreement with the measured stream flows. Potential changes to spring discharge were not explicitly simulated since the accuracy of small changes in streamflow cannot be evaluated quantitatively.

Comment 99 **Groundwater Model/Environmental Protection Agency**

GW Model Report Section 5.2.2: Add a discussion of groundwater mounding at the locations shown in Figure 5-13. Describe the extent of groundwater mounding at these three locations. Consider other engineering controls that can be introduced to further decrease mounding at these locations and reduce impacts.

Response:

Information has been added to Section 5.2.2 in the groundwater monitoring report to discuss groundwater mounding. The predictive simulations demonstrate that the groundwater mounding in the Alternative Cover is greatly reduced when compared with the Proposed Action. Groundwater mounding does not occur in the backfill of the Alternative Cover except in the Wells Formation near Stewart Creek and Maybe Creek (Figure 5-15). Although present in the Wells Formation in the Alternative Cover, groundwater mounding occurs at about half of the magnitude of the groundwater mounding in the Proposed Action.

Comment 100 **Groundwater/Environmental Protection Agency**

GW Model Report Section 6: Sensitivity Analysis. EPA recommends the sensitivity analysis include the following parameters:

- Recharge – compare calibrated recharge rates to site specific estimates considering PRISM 4 Climate Group (2020) vegetation (ET), soil type and slope and adjust recharge rate to optimize groundwater elevations while maintaining realistic hydraulic conductivity of alluvial and Lower Wells Formation.
- Hydraulic Conductivity – constrain Lower Wells Formation hydraulic conductivity to measured values and consider a wide range of hydraulic conductivity for alluvium
- Evapotranspiration – use the ET rate to decrease infiltration through the store-and-release cap.
- Streambed Conductance – compare results from the gaining/losing stream calibration that was facilitated by increasing vertical hydraulic conductivity in layers 7 through 9 with results from varying streambed conductance.
- Porosity of backfill (mine waste) – increase the porosity of backfill in areas of groundwater mounding in backfilled material to the saturated porosity.

Section 6.2.2: Consider adding a discussion of the effect of modifying the recharge rate on the extent of groundwater mounding consistent with the discussion presented in the Proposed Cover section 6.2.1.

Response:

See the response to Comment 88.

Comment 101 **Geochemistry/Environmental Protection Agency**

Geochemistry Baseline Report …there are statements about water quality/characteristics …made without references, citations, or figures/tables showing data. There are several instances where geochemical statements are written with no explanation as to the basis/foundation of the information. Below are just a few examples in the Report, page 8:

"The chemistry of groundwater in the shallow, intermediate, and deep aquifers in the region is generally characterized as having a calcium-bicarbonate water type with neutral to slightly alkaline pH".

"Shallow groundwater in the alluvium tends to be highly oxic and may exhibit greater seasonal variability in pH and major ion concentrations."

"Although concentrations of dissolved oxygen in intermediate and deep groundwater may be low relative to alluvial water, deep groundwater is typically not strongly reducing under ambient conditions, and background concentrations of redox-active metals (including iron and manganese) and other trace metals are low."

EPA recommends that the above statements be reviewed and supporting documentation provided in the FEIS.

Response:

A detailed discussion of water quality conditions and the supporting data are presented in the *Groundwater Baseline Study Report* (Tetra Tech, Inc., 2014a), which is cited.

Comment 102 **Geochemistry/Environmental Protection Agency**

"Historically, leaching from shale units exposed during mining following placement in external storage piles has resulted in the release of dissolved constituents via the dissolution of soluble minerals and organic matter (see Section 3.2.1)." EPA believes the connection between organic matter and the mobility of dissolved constituents is unclear and not explained (or mentioned) in section 3.2.1. Clarify if the constituents bound to organic matter or if there is a different connection being described here. Also, elsewhere in this DEIS the term COPCs—contaminants of potential concern—is used. It's unclear if in this sentence the "release of dissolved constituents" refers to COPCs. Specify what "constituents" are being referred to, or instead use the term COPC to remain consistent with other sections of the DEIS. EPA recommends the FEIS include consistent terms.

Response:

USFS and Millennium Science & Engineering, Inc., 2011 referenced in Section 3.2.1 provides a discussion of the organic matter and its relation to other constituents.

The statement "release of dissolved constituents" is intended to be a general statement of all elements that may leach from a geologic material. COPCs are specific constituents that are leached at concentrations that exceed water quality standards.

Comment 103 **Geochemistry/Environmental Protection Agency**

"Selenium concentrations are generally lower in low-oxygen environments and may be further attenuated by biological activity." EPA recommends that the FEIS clarify if selenium is directly attenuated by biological activity or if the biologically activity impacts the overall redox conditions and the switch from oxic to anoxic conditions indirectly impacts selenium. Also, clarify what is considered selenium attenuation.

E.G. Does this mean that the selenium becomes bound in the solid phase and is less mobile in water, but that this only occurs under reducing conditions?

Response:

The low oxygen conditions are related to the depth below ground surface, not that the biological communities present are creating low oxygen conditions, as noted in the sentence following the one quote here.

A detailed discussion of selenium fate and transport is provided in Section 4.3 of the *Geochemistry Baseline Study Plan* (Tetra Tech, Inc., 2014a).

Comment 104 **Geochemistry/Environmental Protection Agency**

"Reduced selenium concentrations have been observed in deep zones of saturated backfilled pits and overburden storage areas where oxygen concentrations are low compared to more shallow zones." EPA recommends that the FEIS clarify if "reduced selenium" refers to forms of selenium that are reduced (as opposed to oxidized) or if"reduced selenium" refers to lower selenium concentrations.

Response:

In this sentence, "Reduced selenium concentrations" refers to lower selenium concentrations and has been revised in Section 3.3.2.1.

Comment 105 **Geochemistry/Environmental Protection Agency**

DEIS Section 3.3.2.1, p 72: "Dissolved metal and oxyanion (such as arsenic) concentrations can also be locally elevated where strongly reducing conditions are observed from either natural (e.g., wetland) or mining-related influence." EPA noted that earlier in DEIS, p. 70, the mobilityof selenium is discussed in terms of oxygen concentrations—with selenium mobility being lower during low oxygen conditions. On p. 72, the mobility of metals/metalloids are described as being higher when reducing conditions are observed. EPA recommends greater clarity on the connection between oxygen levels and reducing conditions. Presumably, there is strong correlation between oxygen levels and redox conditions. EPArecommends consistent use in the terminology to describe both the selenium dynamics and other metals/metalloids to better clarify the connection that the low DO conditions that may decrease selenium mobility, would be the same conditions that would promote the mobility of other COPCs.

Response:

A detailed discussion of selenium fate and transport under various redox conditions is provided in Section 4.3 of the *Geochemistry Baseline Study Plan* (Tetra Tech, Inc., 2014a), now cited. It should be noted that attenuation, including effects of low oxygen conditions, has not been accounted for in the fate and transport modeling to provide a conservative evaluation of COPC transport.

Comment 106 **Geochemistry/Environmental Protection Agency**

"The limestone unit does not typically exhibit leachable COPCs in concentrations exceeding water quality limits. The presence of leachable COPCs from limestone in H1NDR is believed to be primarily due to the collection of limestone samples in the transition zone between Footwall Mud and limestone lithologies based on X-ray fluorescence sampling." This statement indicates that the samples collected for geochemical testing are not believed to be representative of the material that will be mined. The issue of representativeness of the metals used in the geochemical testing needs to be addressed in the FEIS. EPA recommend that the FEIS clarify if this issue of biased samples in the geochemical analysis only impacts the limestone unit or if the samples from the other units were also biased/unrepresentative.

Response:

Samples collected and included in the geochemistry program are all representative of materials that will be mined and are not biased toward any particular unit. All samples were confirmed to be from boreholes within the pit boundaries, both laterally and vertically, as described in Section

5.1.1 (Sample Representativeness) of the *Geochemistry Baseline Study Plan* (Tetra Tech, Inc., 2014a). The statement noted here is pointing out that some of the samples collected at the transition from the Footwall Mud Unit to the limestone unit may not be geochemically representative of limestone outside the transition zone. The geochemistry program sample population includes more than 100 samples of limestone from the project site, as described in the "Evaluation of XRF Screening Data Representativeness and Completeness" and "Composite A Sample Population Development" memorandums for each pit (Tetra Tech, Inc., 2014a; Tetra Tech, Inc., 2019a)

Section 3.3.2.1 in the FEIS has been revised to clarify.

Comment 107 **Geochemistry/Environmental Protection Agency**

Given the above observations, EPA believes that to have confidence in the predicted water quality impacts, there needs to be confidence in the dataset from which this data is obtained and is provided by the geochemical evaluation. Thus, EPA recommends the FEIS include a table showing that the geochemical samples are representative. The table should also include information showing that the COPCs concentrations of the materials used in the geochemical evaluation are not significantly different from those identified from the orebody characterization.

Response:

See the Geochemical Baseline Study Report (Arcadis, 2020a) and documents referenced therein. All samples were confirmed to be collected from geologic materials from within the lateral and vertical extents of the H1 and NDR proposed pits, as described in Section 5.1.1 (Sample Representativeness) of the Geochemistry Baseline Study Plan (Tetra Tech, Inc., 2014a). Samples were carefully selected to be spatially representative, chemically representative, and volumetrically representative of the waste rock within the pit limits as shown in Table 1 of the initial data evaluation memorandum (Tetra Tech, Inc., 2019a; Tetra Tech, Inc., 2014a).

Comment 108 **Description/Environmental Protection Agency**

To adequately disclose how water will be managed, EPA recommends the FEIS include the following information:

- Flowsheet showing water balance for each project components that shows stormwater and contactwater flows from each component, water ponds, and discharge points (including infiltration areas).

A water balance flowsheet should be provided for both operations and closure.

Response:

Water balance flowsheets are not available or practicable. Rather, the Surface Water Management Plan, Appendix D of the MRP, includes design criteria, size, capacity, conceptual construction designs, catchment areas, and peak and average anticipated runoff volumes for each surface water protection facility. Figures are provided for both operations and closure. The EIS references the MRP and the surface management system is designed to be a zero-discharge system. There would be no direct impact to surface water from any run-on or run-off that has contacted the mine operations.

Comment 109 **Description – Air/ Environmental Protection Agency**

The DEIS should also identify any protection measures for chemical air emissions or explain why no environmental measures are being taken. EPA recommends the FEIS:

Describe environmental protection measures for air emission sources.

Response:

The EPMs for air listed in Section 2.2.9.1 explain the measures for dust control.

Comment 110 **Description/Environmental Protection Agency**

The DEIS states that "*Additional measures are in place to minimize the potential for bioaccumulation*."(section 2.2.9.4, pg. 24). However, the DEIS does not explain what these measures are or how effective they are expected to be.

Include a description of measures that will be used to minimize the potential for bioaccumulation and describe the level of effectiveness based on site-specific treatability studies or the use of the measures at other sites.

Response:

The FEIS has been revised to reference the additional measures described in sections 2.2.9.9, 2.2.9.17, 2.2.9.10, and 2.2.9.18. Some of these measures include minimizing external waste storage and maximizing backfill, a reclamation cover that is sufficiently thick to separate roots from seleniferous backfill and specifying a seed mix that does not bioaccumulate selenium in vegetation, and backfill and covers limiting exposure at the existing pits.

Comment 111 **Description – Water Management/Environmental Protection Agency**

The DEIS does not describe the criteria or procedures that would be used during operations to determine whether waste has a "higher potential of leachable COPCs." Without this information the success of waste segregation measure is unknown. Therefore, EPA recommends that the FEIS:

- Describe the threshold criteria and procedures that would be used to determine "higher potential of leachable COPCs" vs lower potential. These would include thresholds for selenium and any of the other COPPCs. The DEIS references the MRP, but this information is not found in the Mining and Reclamation Plan.

Response:

No quantitative criteria has been established to segregate the waste based on testing. The baseline geochemical study established which geologic units that will be mined are expected to have the highest potential to leach COPCs (Center Waste Shale, Hanging Wall Mud, Rex Chert, and transition zone of limestone) and those that are considered to be of limited concern (alluvium and Dinwoody) (see Section 3.3.2.1). The geologic units are readily identifiable on a mineable scale.

Comment 112 **Description – Water Management/Environmental Protection Agency**

…in the same section, P24, the DEIS also lists water types that would be classified as contact water. The list does not include runoff and seepage water from ore storage, which is also considered contact water. EPA recommends that the FEIS:

Add seepage and runoff from ore storage areas to the list of waters that are classified as contact water.

Response:

The ore stockpile has been added as a source of contact water to this list. The EIS describes how runoff from the ore stockpile will be managed as contact water. Section 2.2.8 also identifies the tipple area runoff as contact water.

Comment 113 **Description – Water Monitoring/Environmental Protection Agency**

Monitoring is critical to determine whether impacts are occurring (or not) as predicted in the DEIS. Because of that, EPA recommends the FEIS:

- Describe the groundwater and surface water monitoring that would occur during mining, reclamation, and closure.

Discuss the sufficiency of the monitoring system to detect changes due to mining activities.Further recommendations related to post-closure monitoring are provided below.

The DEIS is silent on monitoring or closure requirements pertinent to groundwater and surface water protection….describe the post-closure monitoring that would occur to track the extent of contamination and the actions that will be taken if contamination exceeds the DEIS predicted area and extends into surface waters.

EPA recommends that the FEIS:

- Describe the post-closure groundwater and surface water monitoring that would occur with a sufficient level of detail to verify that it would be able to track the extent and magnitude of groundwater contamination and any impacts to surface water.
- Disclose the length of time over which post-closure monitoring would occur.

Explain measures that will be taken if groundwater and surface water impacts are greater than predicted in the DEIS.

Response:

As described in Section 2.2.9.5, monitoring of surface water will be conducted per the approved SWPPP. Monitoring of groundwater would be consistent with the Point of Compliance determination. See also response to Comment 170.

Comment 114 **Water/Environmental Protection Agency**

The potential for water quality impacts from blasting residuals is not included in the DEIS and no explanation is provided for ignoring this issue. Therefore, EPA recommends that the FEIS:

- Disclose the potential for leaching of blasting residuals from pit walls, the ore stockpile, and overburden/waste rock.
- Include predictions of the amount of nitrates that could be released to groundwater and evaluate changes to concentrations of groundwater and surface water.
- Discuss potential impacts to water quality and beneficial uses, and how the impacts will be minimized.

Response:

Samples of blasted rock from the project site are not available and were not included in the baseline study. While there is a potential for residual nitrate to result from blasting, this contaminant has not been identified in the water quality testing associated with the CERCLA projects. Groundwater monitoring will include analysis of nitrate.

Comment 115 **Surface Water/Environmental Protection Agency**

The DEIS chapter on Surface Water Environmental Consequences includes figures 37 to 39 that show “simulated selenium” discharged into nearby creeks. The figures indicate that groundwater initially has a concentration of 0 ug/l which is not accurate and therefore these figures are not useful for evaluating impacts to surface water. EPA recommends that the FEIS:

- Revise figures 37-39 to accurately reflect the current groundwater concentrations and the additive concentrations as a result of the proposed action. Similar figures should be developed for the Alternative Cover.

Response:

Figure 37 through **Figure 39** show predicted discharge concentrations of selenium that would interact and mix with surface water in upstream reaches. The initial and leached concentrations are based on geochemical testing data applied to source terms in the model, which are conservatively applied.

See also response to Comment 26.

Comment 116 **Surface Water/Environmental Protection Agency**

Although the DEIS describes the expected surface water quality impacts for selenium, it does not provide an uncertainty analysis for the predicted discharges of selenium. Additional information is needed in this section to meaningfully disclose the potential impacts to surface water. EPA therefore recommends that the FEIS:

- Provide the selenium detection limit and the analysis upon which it was based.
- Following revision of the groundwater model to consider current conditions and the other shortfalls identified in our comments above, the discussion of changes to surface water in this section of the DEIS should be replaced with quantitative information for each alternative. For example, the Se concentrations are expected to increase by X%, from Y ug/l to Z ug/l.
- In addition, loading increases over time should be provided for both alternatives. Revise the loading discussion to more accurately estimate the current loading contributed by groundwater to the three creeks and the additional incremental loading that would occur under the Proposed Action and Alternative Cover during operations and post-closure. Quantitative estimates should be provided.
- Discuss the uncertainty and confidence level associated with the 0.2 ug/L or less predicted selenium discharge concentrations associated with the Alternative Cover.
- Describe how the extent of cover was determined to ensure selenium discharge levels are below 0.2 ug/L.

Even if the additional load to surface waters is small or negligible, they would represent a new source of loading of selenium to impaired streams, including East Mill Creek and the Blackfoot River, all of which are currently on the state of Idaho's 303(d) list of impaired waterbodies. The FEIS should describe the antidegradation considerations in the Idaho Water Quality Standards for the surface waters and describe whether additional actions could be required to reduce or offset the additional loading from the Project.

Response:

Clarifying text was added to sections 3.5.3.1 and 3.5.3.3 on the selenium reporting limits.

Impacts to surface water quality are based on groundwater model calculations of groundwater discharges to designated reaches of surface water drainages. Calibration and uncertainty analysis of the groundwater model are discussed in the supporting Groundwater Flow and Transport Modeling Report (Tetra Tech, Inc., 2021c).

The estimated 0.2 µg/L is the calculated discharge by the groundwater contaminant transport model for the Alternative Cover. The uncertainty is tied to the model. While a value is calculated, it is well below any practical quantification level and is therefore treated as 0 µg/L for the purposes of analysis.

See the last sentence of the first paragraph in Section 3.5.3.1 subsection Surface Water Quality from Groundwater.

Clarifications have been added to Section 6.2 of the groundwater modeling report.

An uncertainty analysis is not required under NEPA and would not help the decision maker select between alternatives. A reasonable impact analysis with some conservatism is provided that helps us determine compliance and compare between alternatives.

Comment 117 **Resources/Environmental Protection Agency**

The DEIS does not address the potential impacts of fugitive dust deposition containing selenium and other COPCs to surface water quality and wetlands. … Implementation of fugitive dust management plans can minimize impacts but since plans are not 100% effective there can be residual impacts. Because of that, EPA recommends that the FEIS:

- Include estimated amount and geographical extent of fugitive dust deposition from mining activities (blasting, hauling, ore and waste storage, etc.).
- Describe how deposition of fugitive dust will impact adjacent wetlands, surface water quality, andaquatic resources.

Response:

A measure has been included specifying the regulatory requirement for dust control as part of the Air Quality Permit to Construction (see **Table 1**). Additional information has also been included in Section 3.16 of the FEIS. Deposition of dust would not be at levels to result in a detectible effect on wetlands, water quality, and aquatic resources (BLM, USFS, USACE, IDEQ, 2016, pp. A-75 through A-76).

Comment 118 **Surface Water/Environmental Protection Agency**

Additionally, the DEIS also does not fully address potential sedimentation impacts and stream temperature impacts. As identified in Table 25, the upper, middle, and lower sections of Diamond Creek are listed on the state's 303(d) list of impaired waters for water temperature and Stewart Creek and Maybe Creek are listed for sediment. As a result, EPA recommends the FEIS:

- Address sedimentation impacts from high velocity flows and associated downstream erosion from the temporary and permanent channelized streams and address potential stream temperature impacts from lack of riparian cover to be cleared on nearly 1.5 miles.
- Identify mitigation measures for the temporary and final stream configurations to reduce stream warming and reduce higher flows that could contribute to downstream erosion, such as natural channel design and planting of riparian trees.
- Discuss how BLM and USFS will be working with Idaho Department of Environmental Quality (IDEQ) as existing TMDLs that affect impaired waters in the planning area are implemented and new ones are developed. It would also be important to indicate how BLM and USFS plan to work collaboratively with IDEQ to ensure compliance with Water Quality Management Plans that will function as the BLM and USFS share of the TMDLs implementation.
- Include information on tools used to predict sediment delivery to streams and determine measuresto take to minimize impacts associated with increased sediment loads in the streams, particularly in those that are fish-bearing or are impaired. Construction activities and roads could generate significant sediment input to streams where, for example, the roadside ditches drain near to or directly into perennial stream channels or rutting. EPA suggests that the GRAIP-lite model, whichis specifically designed to assess the road sediment impact to streams be used to the extent possible.[11] The DEIS indicates that sediment is a primary cause for streams on the patch to not meet beneficial uses and become listed as impaired by IDEQ.
- Include the most current information regarding the status of the Clean Water Act Section 401 certification and Section 404 permit application processes, and conditions to protect water quality in waterbodies in the planning area.
- Include up-to-date information on the National Pollutant Discharge Elimination System permit application processes including measures to protect water quality and development of Storm Water Pollution Prevention Plans, reporting, and monitoring. The DEIS indicates that project construction will disturb an area of more than 1 acre of land, which would subject the project to NPDES permitting requirements for discharges to waters of the United States and accompanying Stormwater Pollution Prevention Plans, and best management practices, may be required.

Provide information that demonstrates how water quality will be maintained or improved in streams that are currently meeting Water Quality Standards in accordance with the State of Idaho antidegradation policies to protect existing and designated beneficial uses of surface waters.

Response:

Potential sedimentation impacts are discussed in Section 3.5.3.1. As discussed in sections 2.2.9.4, 2.2.9.17, and 3.5.3.1, temporary and permanent channel realignments would incorporate BMPs, including energy dissipation to minimize or prevent sedimentation.

Final design of temporary and permanent channel realignments would incorporate provisions, prescriptive actions, and BMPs identified by the 2003 RFP (USFS, 2003) and by the Blackfoot River TMDL Implementation Plan and addendums, and identify appropriate construction stormwater controls and temperature BMPs.

Antidegradation and Clean Water Act Section 401 certification analysis would be conducted after identification of a chosen alternative.

SWPPPs for both construction and operations, and additional National Pollutant Discharge Elimination System permit applications, as required, would be developed after identification of a chosen alternative and issuance of the Records of Decision.

Comment 119 **Decisions to be Made and Wetlands/Environmental Protection Agency**

Revise the sections on Purpose and Need and Decision to be Made based on input from the Corps to describe the Corps decision-making framework and how/if it will use the EIS analysis to support the 404(b)(1) alternatives and aquatic resource impacts analysis and final decision.

Discuss plans or actions to be taken if the least environmentally damaging alternative identified by the Corps happens to be different than BLM and USFS preferred Alternative

EPA supports the use of a functional assessment of Waters of the US and recommends BLM and USFS consider using this method to characterize H1NDR impacts to aquatic resources and evaluate the functionslost and potential temporal lag from alterations to the original stream resources.

Response:

USACE determined the functional assessment data is not required in EIS analysis. The USACE reviewed and revised the Decision to Be Made (Section 1.5). A detailed discussion about how the USACE will conduct its permit evaluation is not appropriate for the Purpose and Need section. The USACE will utilize the EIS in its permit evaluation under Section 404 of the Clean Water Act. The Section 404(b)(1) analysis is a substantive part of our evaluation and is implied. It is also discussed in Section 3.6 of the EIS.

Comment 120 **Wetlands and Aquatics/Environmental Protection Agency**

- Discuss the alternation of baseflow to downstream waters.
- Consider using a natural channel design that includes establishment of mature riparian vegetation, particularly for rerouted streams that will remain in their rerouted locations permanently (i.e., Maybe Creek and Stewart Creek in the proposed alternative).
- Include an assessment of the indirect impacts on water quality of rerouting the streams onsite through channelized ditches as compared to a natural channel design and assessing the indirect and long-term impacts of realigning Stewart Creek over an HDPE liner which may preclude establishment of a mature riparian corridor.
- Include a mitigation plan with mitigation for aquatic resource impacts occurring within the project watershed to reduce and eliminate negative mining effects. We note that the proposed mitigation is not specific to the impacts for H1NDR and does not account for a functional assessment and replacement of lost functions from this project.

Response:

Impact analysis in the EIS focuses on significant issues as identified through the scoping process. These issues are described in Section 3.5.1 and Table 22 of the DEIS, now **Table 24** of the FEIS.

As identified in Section 2.2.9.5, BMPs for construction and operation are described in the MRP Surface Water Management Plan design for controlling surface water runoff and minimizing erosion, sedimentation (Itafos, 2020a, pp. D-1 Appendix D).

Comment 121 — Surface Water/Environmental Protection Agency

- Include sufficient Best Management Practices such as the Alternative Cover proposed alternative, liners, and buffer zones to ensure no discharges of pollutants of concern are discharged into waters of the US in amounts that would violate the Clean Water Act.

Further examine the cumulative impacts of mining in this project watershed (Blackfoot River Subbasin) with consideration for climate change.

Response:

As identified in Section 2.2.9, BMPs for construction and operation are described in the MRP Surface Water Management Plan design for controlling surface water runoff and minimizing erosion, sedimentation (Itafos, 2020a, pp. D-1 Appendix D). Potential Impacts from climate change are evaluated in Section 3.17.

Comment 122 — CERCLA/Environmental Protection Agency

Include specific information about which areas of the proposed mine plan overlap with sites at which State-lead or CERCLA response actions are occurring or have occurred. The language in the DEIS and the maps are not detailed enough to understand the intersection (including geographic extent, additivity, and timing) between the proposed mine and the mines being addressed under CERCLA and state cleanup laws.

Provide more information regarding the existing contamination. For example, is the existing contamination related to the North Maybe Mine Site or the South Maybe Mine Site, or any other phosphate mine at which response actions are being implemented under CERCLA or state cleanup laws? The applicant should be aware that it may be a potentially liable party under CERCLA as an owner of land with hazardous waste contamination and may also be apotentially liable party at adjacent mine sites if the Husky 1 mine operations impact the contamination or response actions at adjacent mine sites.

Response:

Specific descriptions and sources of contamination from the North Maybe Mine, South Maybe Canyon Mine, and other regional properties are discussed with additional detail in sections 3.2 and 3.4.2. including more information to better elucidate the interactions between new impacts and historic impacts. In addition, a section has been added to Chapter 1 which describes the overlapping jurisdictions of CERCLA and NEPA at the site.

Comment 123 — Groundwater/Environmental Protection Agency

Include the analysis that determined the proposed mining and reclamation activities will not cause contamination like that created by past phosphate mining in the phosphate patch. Section 2.6.2.4

(Eliminate Mining on the Maybe Canyon Lease) of the DEIS says, “This alternative was suggested because groundwater and surface water quality has been adversely affected by past mining of the Maybe Canyon Lease in the North Maybe Mine and South Maybe Canyon Mine. The past mines are now in remediation under the CERCLA. H1NDR would recover additional ore from the Maybe Canyon Lease that remains after previous mining activity. Analysis of the Proposed Action and the Cover Alternative indicate that theore can be recovered from the Maybe Canyon Lease while maintaining compliance with regulatory requirements."

Response:

The Proposed Action was specifically developed by Itafos to minimize the release of contaminants. It was developed to minimize surface disturbance, minimize the external storage of overburden, to maximize backfill, to separate reclamation vegetation from backfill, to reduce infiltration, and to avoid the disturbance of historic facilities being addressed by CERCLA. Each and all of these practices are identified in the EIS and are included in the analysis.

The extensive data collection to characterize the source term, which was used in the conservative analysis groundwater model, the results of which are documented in the Groundwater Flow and Transport Modeling Report (Tetra Tech, Inc., 2021c), was the basis for the impacts predicted in the EIS. Please see the groundwater modeling report.

Comment 124 **Groundwater Cumulative/Environmental Protection Agency**

Include an analysis of the impacts the proposed mining activities will or may have on the North and South Maybe Mines. A protectiveness evaluation should be conducted to demonstrate how the proposed mining activity will be conducted to avoid any impact to the CERCLA sites. If the CERCLA sites will be impacted by the mine, explain in detail what those potential impacts would be.

Response:

This information was included in Section 3.4.3.

Comment 125 **Mitigation/Environmental Protection Agency**

Explain measures that will be taken to avoid creating new pathways for contamination to spread or impact human health or the environment, to avoid impacts to the ongoing investigation and cleanup at the mine sites where CERCLA or state-lead response actions are being conducted to address contamination. The DEIS should describe how this approach differs from and improves the mining practices that caused the existing contamination.

Response:

See responses to Comment 20 and Comment 31.

Comment 126 **Financial Assurance/Environmental Protection Agency**

Provide sufficient detail related to financial assurance to demonstrate that the financial assurance would be adequate to ensure successful reclamation, closure, monitoring, and long-term water treatment if necessary. This is important because phosphate mining in southeast Idaho has created multiple hazardous waste sites requiring years of investigation and cleanup. EPA is aware that BLM and USFS developed a policy for establishing reclamation cost estimates for phosphate mines in Idaho.[17] EPA recommends the FEIS for H1NDR include reclamation cost estimates and a specific breakdown of the costs in such that the public can understand whether the estimate is adequate for all reclamation activities.

- Clarify whether an air permit to construct the project will be needed. Given the magnitude of emissions listed in the table and the type of project, EPA assumes the project will require a Major or Minor New Source Review air permit-to-construct from IDEQ.
- Include information on recommended measures to protect air quality, should an air permit to construct be required.

Response:

Section 2.2.11 provides sufficient information on the bonding calculations and methods. The final bond amount will be determined as a condition of the BLM Record of Decision and will be based on the selected alternative and any additional mitigation requirements. The bond amount will be publicly available but will not be subject to NEPA.

Excluding General Permits and Permit by Rule, IDEQ has three types of air permits: Tier I, Tier II, and Permit to Construct. Section 3.16 has been revised to indicate that an air Permit to Construct will be required, as identified in **Table 1**. That permit would lay out any requirement for monitoring, testing, and record keeping.

An additional measure has been added to Section 2.2.9.1 to describe the monitoring, testing, record keeping, and reporting that would be required.

Comment 127 **Air/Environmental Protection Agency**

With emissions of this magnitude air quality and visibility impacts, and pollutant deposition could be of concern, particularly because of selenium content in particles and the already impaired nature of the adjacent areas. The statement that impacts to air quality would be "negligible and short- term" is not supported by the information provided.

Response:

The EIS is tiered to the Rasmussen Valley Mine FEIS, which characterizes air conditions. An air quality section has been added to the FEIS (Section 3.16) using the information included in Table 63 in the DEIS, with supplemental information added.

Comment 128 **Air/Environmental Protection Agency**

- Include a thorough project air pollutant emissions inventory with a special focus on fugitive dust emissions.
- Conduct air pollutant dispersion and deposition modeling

Response:

An estimate of air pollutant emissions was included in Table 63 in the DEIS, now FEIS Section 3.16.

Comment 129 **Air/Environmental Protection Agency**

- using EPA's preferred regulatory model AERMOD to disclose expected local air quality impacts from the project. Maximum rate of selenium deposition on local waters is of particular concern. In our Nov. 2, 2015, letter to BLM, EPA identified selenium deposition as an impact of concern that was insufficiently addressed in the Rasmussen Valley Mine FEIS. It is also pertinent to assess whether additional modeling and assessment may be needed to gauge project impacts to the nearby Class I areas, which have special visibility and acid deposition protections.

- Include a robust fugitive dust control plan as an appendix to demonstrate the procedures and protocol for suppressant application, episode monitoring, and responding to fugitive dust emission episodes.
- Discuss the effectiveness of the dust control measures.

Response:

The need for air dispersion and deposition modeling will be determined by the IDEQ when they receive an application for an air permit. The FEIS Section 3.16 has been revised to include additional information from the emissions from the Rasmussen Valley Mine, its similarity to H1NDR, and the impact emissions have had on the air quality in the region. There are no nearby Class 1 airsheds. Selenium deposition was considered in the aquatic species, wildlife, and soil sections of the DEIS.

An EPM has been added to the FEIS Section 2.2.9.1 noting the requirement of a dust control plan as required by the air permit.

Comment 130 **Air/Environmental Protection Agency**

…there was no assessment of regional background concentrations of criteria air pollutants, no identification of any nearby non-attainment regions, and no identification of possible hazardous/toxic air pollutants of significant concern.

Response:

See response to Comment 127.

Comment 131 **Environmental Justice/Environmental Protection Agency**

As the proposed project has the potential for impacts to communities with EJ concerns, EPA recommends that the FEIS:

- Include a detailed analysis of potential impacts to communities with EJ concerns in the project's region of influence, including Pocatello, Soda Springs, and the Fort Hall Reservation.
- Use block groups (the smallest geographical unit for which the U.S. Census Bureau publishes detailed demographic data) for EJ impacts analysis rather than larger tracts, such as counties or cities, which may dilute the presence of low-income populations and/or vulnerable populations and their concerns.
- Provide information on the potential effects from this project when added to effects of other foreseeable projects in the decision area.
- Consider impacts of climate change on communities in this project's region of influence.
- Ensure meaningful participation of communities with environmental and inequity concerns and in decisions being made about the proposed action. The CEQ states that, "Throughout the process of public participation, agencies should elicit the views of the affected populations on measures to mitigate a disproportionately high and adverse human health or environmental

effect on a low-income population, minority population, or Indian tribe and should carefully consider community views in developing and implementing mitigation strategies.” In addition, CEQ states that, “Mitigation measures identified in an EIS or developed as part of a FONSI should reflect the needs and preferences of affected low-income populations, minority populations, or Indian tribes to the extent practicable.”

***Response**:*

The EJSCREEN was conducted at the block group level for the direct project area. A typo in Table 63 (now Section 3.14.3.4) has been corrected to show the block group as 160299602001. See also the response to Comment 42. Climate change impacts are discussed. Because of the nature of climate change and the scale at which impacts are assessed, one can assume that impacts stated would occur to all communities and there is no way to analyze climate change on individual communities. Since the action alternatives are not expected to appreciably affect the climate, it is not possible to connect any climate changes from the project to specific communities.

BLM and USFS continue to consult with the Shoshone-Bannock Tribes with an interest in the area.

Comment 132 **Environmental Justice/Environmental Protection Agency**

…this project’s region of influence includes communities in Pocatello, Soda Springs, and Fort Hall, all of which contain block groups that already experience environmental pollution burdens that merit closer attention and analysis, including air pollution, proximity to traffic and contaminated sites, and other burdens. Hence, a comprehensive analysis of these burdens and related effects is particularly important for the proposed action due to the existence of other past, current, and foreseeable projects in the analysis area, including mining projects that result in multiple and cumulative exposures to environmental hazards for low-income and minority populations, and Indian tribes.

Response:

In the 3-county analysis area there is a single census block with a minority population. See response to Comment 42. This population is not experiencing greater environmental impacts than other populations. The county-level assessment is consistent with Executive Order 12898. The phosphate mine site cannot be selected from a variety of locations like other large infrastructure-based projects. The phosphate mine can only be located where the phosphate ore is located. The assessment in the EIS documents that there are no minority populations in the study area that would be disproportionately affected.

Socio-economic impacts would be the same on all populations. There are no predicted surface water impacts that would leave the site and affect any of the local or regional population, and the extent of the predicted groundwater impacts are shown in the FEIS and they would not affect any of the local or regional population. There is a program of compensatory mitigation specifically designed to minimize the long-term residual impacts to the habitat following reclamation.

Comment 133 **Environmental Justice/Environmental Protection Agency**

…consider the definition of “disadvantaged community” referenced in Executive Order (EO) 14008 and further described in the Interim Implementation Guidance for the Justice for the Justice40 initiative when assessing a community.

Response:

It is not clear what definition is referred to since there are no definitions in EO 14008 (Executive Office of the President, 2021). If the definition is “-historically marginalized and overburdened-” in Section 219 of the EO, this definition does not characterize the project area. There is an “interim definition” in “Interim Implementation Guidance for the Justice40 Initiative” (OMB, 2021). H1NDR does not meet the definition of a covered program by the Justice40 initiative. Based on the interim definition in the Justice40 Initiative, there is no “disadvantaged community” affected by the project. Tribal treaty rights are not one of the criteria for “disadvantaged community”.

Comment 134 **Environmental Justice/Environmental Protection Agency**

EPA also encourages the agencies to consult the Fourth National Climate Assessment report, which indicates that, “climate change creates new risks and exacerbates existing vulnerabilities in communities across the United States, presenting growing challenges to human health and safety, quality of life, and the rate of economic growth.” Those who are already vulnerable, as mentioned above, due to a range of social, economic, historical, and political factors likely will have a lower capacity to prepare for, cope with, and recover from climate change impacts.

Response:

Climate change impacts are discussed. Because of the nature of climate change and the scale at which impacts are assessed, one can assume that impacts stated would occur to all communities and there is no way to analyze climate change impacts on individual communities. Since the action alternatives are not expected to appreciably affect the climate, it is not possible to connect any climate changes from the project to specific communities.

Comment 135 **NEPA/Environmental Protection Agency**

As an analysis of these effects was not included in the DEIS, EPA recommends that the FEIS assess indirect effects from this project and describe measures to take to avoid, minimize, and mitigate indirect effects.

Response:

Direct, indirect, and cumulative impacts were considered in the DEIS. EPMs are listed in Section 2.2.9.

The Proposed Action was specifically developed by Itafos to minimize the release of contaminants. It was developed to minimize surface disturbance, minimize the external storage of overburden, to maximize backfill, to separate reclamation vegetation from backfill, to reduce infiltration, and to avoid the disturbance of historic facilities being addressed by CERCLA. Each and all of these practices are identified in the EIS and are included in the analysis.

Comment 136 **Editorial-Ground and Surface Water/ Environmental Protection Agency**

EPA offers several recommendations to describe the impacts more accurately.

- For groundwater, indicate that impacts will exceed standards and provide the geographic extent and duration for each alternative.

- EPA disagrees that surface water quality impacts for the proposed action are “minor” since these impacts will contribute selenium to already impaired streams.

Show impacts of the No Action Alternative in Section 2.9.1.

Response:

See **Figure 21** through **Figure 32** and accompanying text in Sections 3.4.3.3 and 3.4.3.5. **Table 12**) was not revised. Please see the introductory text to the table.

Definitions of impacts are qualified in Section 3.1. As discussed in Section 3.5.3.1, effects to downstream reaches would be undetectable and negligible. However, an increased loading source to impaired reaches is disclosed.

Comment 137 — Monitoring/Environmental Protection Agency

As the proposed action has the potential to impact a variety of resources for an extended period – up to 15 years and possibly beyond, EPA recommends that the FEIS:

- Include an environmental inspection and mitigation-monitoring program to ensure compliance with all mitigation measures and assess their effectiveness.
- Describe the monitoring program and how it will be used as an effective feedback mechanism so needed program adjustments are made to meet environmental objectives throughout the life of the mine.
- Explain how existing environmental monitoring results from the other mines apply to this project and discuss implications for H1NDR.

Response:

See response to Comment 170.

Comment 138 — Editorial/Environmental Protection Agency

Other general comments:

- Section 1.7, 1st paragraph: Plans need to be updated every 12 years, clarify if the new plan will incorporate the areas not under the MA.
- Section 2.2.2, 2nd paragraph: Recommend including dimensions of the buffer zone.
- Figure 3: Include buffer zone in map.
- Section 2.2.4.2, 2nd paragraph: Clarify why at least 12 inches. State which calculations were used to obtain this estimate.
- Section 2.2.5, 2nd and 3rd bullet point: With climate change events and policies becoming more stringent, recommend 100-year storm event at minimum. In addition, the 2012 planning rules require climate change analysis to be incorporated in projects.
- Section 2.4.2: The no action alternative should provide a baseline for the effects comparison and be included in the alternative comparison table.
- Section 2.4.2, 2nd paragraph: If this is meant to be an all-exhaustive list, recommend including SWPPP.

Response:

- Plan revisions are based on a need to change the plan. Usually, the Responsible Official begins a plan revision because it is time to do so; that is, National Forest Management Act requires plan revision "at least every 15 years." (16 USC 1604 (f)(5); Forest Service Handbook 1909.12 – Chapter 21.2). The 2003 RFP is the current management direction that is being used for this analysis and decision. The 2003 RFP is not scheduled for revision, therefore, there is no way to clarify anything in regard to a new plan's direction.
- The buffer zone terminology has been changed to operational zone; there is no set distance.
- The operational zone is included on **Figure 3** and is in the disturbance calculations.
- The soil section (see Section 3.10.3 explains the calculations for growth media depth.
- The design meets requirements; climate change is included in the analysis.
- Section 2.2.5 does include 100-year events for the water management system. The 2012 Planning Rule (36 CFR 219) governs development of Land and Resource Management Plans, not project-specific analysis. This is not an all-inclusive list.
- See the text above **Table 12** for the No Action Alternative impacts.
- Section 2.4.2 is the No Action Alternative and therefore the SWPPP does not apply. This paragraph indicates that if the No Action Alternative were selected, the current CERCLA remedial activities would continue at the mine site.

Comment 139 **Access/Simplot – Alan Prouty**

While the DEIS describes the temporary closure of FS 134 as "significant" and provides two access alternatives in the form of a new road or trail resulting in significant additional disturbance, the DEIS ignores the fact that public access is still assured to the area via other existing routes. The DEIS implies that the public will be deprived of access to public land in the Dry Valley area as a result of closure of 4.6 miles of FS 134. This is not correct as there are numerous access options to Dry Valley Road and closure of FS 134 will not be significant. Initially it may cause inconvenience to recreationists that have previously relied on this portion of FS 134 to Dry Valley, but it is not depriving access to public land. The 18 or more acres of new disturbance for the new access road cannot be justified against what is at most a temporary inconvenience. In fact, the DEIS on page 168 states there are approximately 81 miles of National Forest Service designated roads open to full size vehicles in the analysis area. This is more than ample to assure there is no "significant" impact to public access to public land due to the temporary closure of 4.6 miles of FS 134.

Response:

The access that would be maintained (on the Blackfoot River Road to Diamond Creek Road) was noted and analyzed in EIS Section 3.12.3.1.

Comment 140 **Access/Inventoried Roadless Areas/ Simplot – Alan Prouty**

Further, the proposed alternatives of a trail or road for FS 134 described in the DEIS would permanently move this public access route adjacent to an Inventoried Roadless Area (IRA). Realigning a forest system road adjacent to an Inventoried Roadless Area seems counterproductive to the rationale of establishing a roadless area. Building a new road or trail in the location depicted in the DEIS will undoubtedly lead to increased unauthorized motorized access into the Inventoried Roadless Area.

Response:

This comment will be considered in the USFS Record of Decision. There is no prohibition against adjacent roads or trails to roadless areas, most of the area boundaries are roads. The Alternative Access 2 would not place the new alignment in an Inventoried Roadless Area. The new alignment would remain outside of the roadless boundary.

Comment 141 **Access – Health and Safety/Simplot – Alan Prouty**

Finally, reasonable risk management does not support placing a road adjacent to or on top of an existing slurry pipeline that is currently authorized to Simplot on forest system land by Special Use Authorization (SUA) SSC 51. The phosphate slurry being pumped within this pipeline is non-hazardous but is subject to high pressure. Placing the public road adjacent to or potentially over the top of this existing SUA for the pipeline is exposing unacceptable risk to damage, either intentionally or unintentionally to the pipeline and the vent pipes that extend above ground surface.

Response:

A new access road alternative has been incorporated in the FEIS to address this comment (Alternative Access 2, see Section 2.5.2). Section I. General Terms G. Non-Exclusive Use of special use authorization SSC51 addresses other users on the right-of-way. It states, "The Forest Service reserves the right to allow others to use the permit area in any way that is not inconsistent with the holder's rights and privileges under this permit, after consultation with all parties involved."

Comment 142 **Access/Simplot – Alan Prouty**

It is Simplot's position that the Forest Service is missing a golden opportunity to temporarily close this portion of FS 134 to allow for the rehabilitation of existing impacts to aquatic habitat along Stewart Creek and the future relocation of this forest system road to a better location to assure long-term sustainability and environmental protection, at the expense of Itafos after mining is completed. This is a win-win for public land management. Currently impacted habitat will be addressed, and properly locating this forest system road in the future to assure environmental protection and long-term sustainability can be achieved without the expense to the public land management agency. This will occur without "losing" public access to any public land. The approximately 18 additional acres of new disturbance adjacent to an Inventoried Roadless Area for the new access road alternative contemplated in the DEIS is simply unnecessary and not sound resource management.

Response:

A new access road alternative has been incorporated in the FEIS to address this comment (Alternative Access 2, see Section 2.5.2).

Comment 143 **Access-Feasibility/Simplot – Alan Prouty**

Simplot also has reservations about the alignment of the trail or road alternatives for FS 134 depicted in the DEIS. Simplot is very familiar with the topography and route in this area because the existing, permitted slurry line is adjacent to the proposed alternative trail or road alignment or may be directly under the proposed alignment. As such, Simplot disagrees that the route depicted within the DEIS accurately represents the amount of disturbance that may be caused by the cut and fill that would be needed for a full-sized access road. Specifically, the portion of the proposed alternative alignment in 8S 45E Section 19 would not be feasible as currently depicted.

Response:

A new access road alternative has been incorporated in the FEIS to address this comment (Alternative Access 2, see Section 2.5.2).

Comment 144 **Mitigation Methodology/Simplot – Alan Prouty**

HEA was developed for Natural Resource Damage Assessments (NRDA), not for use in evaluating potential effects in an EIS. The purpose of HEA is to scale potential ecological service losses to potential restoration gains from a restoration project to compensate for those losses. As such, HEA requires an extensive set of economic assumptions about the types of habitats, relative values of habitats and the flows of services over time. HEA also requires the selection of a metric to measure the relevant ecological services, which may involve substantial judgments rather than scientific measurements. Itafos proposes to simply, "consider the most recent compensatory mitigation calculation used for a southeast Idaho phosphate mine project, which could be scaled to fit H1NDR." While that may meet Itafos' goal to avoid delay to the NEPA process, it is not the appropriate or responsible approach to mitigation.

BLM's handbook recognizes the limitations of HEA: "The HEA and REA methods can be useful tools because calculating the value of the injured resources or lost services themselves in some cases may be problematic. As an example, in the case of ecological service losses, the services themselves are not valued, but instead, the cost of their replacement becomes the measure of damages. Note that these methods involve economic analyses that should be performed by economists. Although simple in concept, the reliability of HEA and REA is completely dependent on the Coordinator's decision-making on the selection of model inputs." The HEA methodology has significant shortcomings when used to try to quantify effects. HEA uses an economic approach to approximate natural resource service losses due to the releases of hazardous substances. This is different than trying to determine potential effects from a proposed mining project. Next, substantial and transparent analysis of the HEA input variables and assumptions is essential to understanding the calculated results. Analysis of the HEA methodology has shown that assumptions and model inputs greatly influence the calculated results. Without understanding this high level of variability and uncertainty, the model outputs can be misleading. Finally, the development of a HEA is very expensive and time consuming; often the money required for the studies and analyses would be better spent in actual habitat improvement projects based on existing known environmental conditions. These significant shortcomings in the HEA methodology also greatly reduce its use in assessing potential mitigation needs. Evaluating mitigation requirements can be, and has been performed for many years, without the use of HEA. In fact, it has been done numerous times for Simplot projects. In Itafos' July 2021 memo it states, "recent phosphate mine projects in southeast Idaho phosphate patch were permitted (2019, 2020) with zero off-site compensatory mitigation requirements..." This statement is correct in regard to there not being compensation mitigation requirements; however, it is not correct to assume that resulted in no mitigation.

Response:

Itafos has committed to provide additional mitigation to address residual impacts that remain following reclamation. The inclusion of additional mitigation is consistent with current BLM policy, IM 2021-046, and supports a sustainable phosphate industry by reducing cumulative and tribal impacts. Itafos has proposed to use the HEA process to determine how much mitigation is appropriate. The method described in Appendix A of the FEIS will use the HEA process, including the habitat value to wildlife (RICHCOVWET) and recovery curve factors developed for the Rasmussen Valley Mine, and apply those factors to the acres of disturbance, by vegetation type, by habitat at H1NDR. The services that each habitat provide to wildlife do not change between these two proximal locations. The biologic processes that control revegetation success and recovery factors at Rasmussen Valley Mine are anticipated to also control revegetation successes recovery factors at H1NDR. The two projects are within several miles of one another. Both are subject to similar weather and climate, both contain similar types of habitat, and support similar fauna. The HEA process has been reviewed by federal and state agencies and the public and was thoroughly vetted during the NEPA process for the Rasmussen Valley Mine. The habitat values and recovery factors have been reviewed by agency specialists, contractors, and members of the public and other non-governmental organizations. Use of an HEA to gage appropriate mitigation is vetted and has been shown to be successful.

Comment 145 **Mitigation Requirements/Simplot – Alan Prouty**

The inference in the July 2021 Itafos memo that mitigation must be further required in order for meaningful mitigation to be applied to a project is patently false. Further, utilizing a HEA approach as opposed implementing the necessary hierarchy of mitigation misses important steps that may result in a project having lesser impacts as opposed to just paying a fee without analyzing impacts that may be avoided.

Response:

Appendix A in the EIS, specifically the Introduction, clearly describes the hierarchy of mitigation intended by NEPA. In short, they could be described as avoid, minimize, rectify, manage, and compensate. The mitigation that Itafos has committed to addresses residual impacts of the project after fully considering the "hierarchy of mitigation". The committed mitigation is intended to address the remaining impacts after impacts have been minimized and reclamation has been completed.

From the planning stages, Itafos developed the MRP for H1NDR which minimized the footprint of disturbance as much as economically possible. The MRP maximizes use of existing facilities, such as roads and pits, to limit creation of new surface disturbance. Further, the EIS considered alternatives that reduce potential surface disturbance. Combined, these efforts embody the concept of avoidance of impacts.

The MRP also contains general and specific actions intended to limit impacts. The MRP was specifically designed not to interfere with the CERCLA remedial actions at the historic facilities. The proposed MRP contains cover systems intended to reduce the magnitude of the impacts on water quality. The EIS Section 2.2.9 also provided a list of standard BMPs utilized to limit impacts on surface resources such as air, water, soil, and cultural resources. Further, the EIS fully analyzes the Alternative Cover to reduce impacts to surface and groundwater; the Alternative Stream Routing to reduce impacts to riparian habitat; and the Alternative Access 1 and Alternative

Access 2 to reduce access impacts to the public and Shoshone-Bannock Tribes from closure of NFS Road 134.

Section 2.2.10 describes the reclamation, including salvaging topsoil at the time of disturbance, backfilling pits, replacement of topsoil and revegetating with a seed mix intended to promote habit creation, and natural succession. The Proposed Action would be 98% reclaimed and the 2% that remains unreclaimed would consist mainly of highwall scarps. These efforts would rectify the impacts to surface resources as much as possible.

Monitoring is proposed and will be required if an action alternative is selected in the Records of Decision. The results of the monitoring program would be used as feedback to BLM and Itafos to manage the mine operations in a way that reduces the impacts during the life of the operation. As issues such as unintended impacts are identified, they would be addressed.

Lastly, NEPA allows for compensation or replacement of impacted resources when warranted. In this case Itafos has committed such compensation to address the residual impacts after avoidance, reduction, repairing, and site maintenance. The proposed mitigation addresses long-term cumulative impacts associated with phosphate recovery in the Western Phosphate Field and promotes sustainable development. Compensatory mitigation efforts such as this one have been successfully implemented in the very recent past, and the projects have provided valuable habitat on public lands.

Comment 146 **Purpose and Need/WildEarth Guardians**

The DEIS's Purpose and Need are too narrowly defined.

This Purpose and Need statement highlights mineral development but does not recognize BLM's obligations to conserve natural resources in accordance with the Endangered Species Act, FLPMA, and the Mineral Leasing Act of 1920. (The latter requires BLM to only issue or modify mineral leases that conserve natural resources. 43 C.F.R. § 3510.15 (g).) Emphasizing mineral development but not natural resource conservation is contrary to NEPA and Federal Land Policy and Management Act.

Nor does the Purpose and Need statement include the fundamental reason that Itafos Conda LLC seeks to mine phosphate ore, which is to provide ore to its nearby Soda Springs, Idaho processing plant for processing into elemental phosphorus, which Itafos Conda uses to manufacture fertilizer.

Response:

The concept of managing resources consistent with the laws listed in the comment – and many others – is captured in the phrase "*...in accordance with federal laws and regulations governing federal leases*." However, the EIS Purpose and Need section is not intended to describe BLM's overall purpose and need for managing public lands. It is specifically intended to address the joint federal undertaking and the decisions that need to be made on this project, which in this case is to respond to a mineral development proposal from a proponent who already holds mineral leases. The other sections of the DEIS then provide information about additional natural resources in the project area, assess the impacts to those resources due to the mineral development project, and evaluate the project's compliance with applicable agency management plans. In addition, the MRP, along with the EPMs and BMPs that are part of H1NDR, describe the measures that would be implemented to conserve natural resources while allowing development of valid mineral leases.

Comment 147 **Alternatives Considered/WildEarth Guardians**

The range of alternatives in the DEIS are insufficient to satisfy NEPA requirements. …the DEIS must analyze an alternative in which BLM decides not to modify the lease and Itafos Conda does not mine an additional 559 BLM mineral acres. Mining fewer acres would have fewer environmental impacts.

Response:

The DEIS does consider an alternative with no lease modifications. See Section 2.7.2.1. The agencies believe that an adequate and appropriate array of alternatives was considered. NEPA and agency policy on how to develop, select, and screen alternatives was followed. The No Action Alternative maximizes protection of wildlife and other resources. This alternative was fully analyzed. The EIS considers numerous other alternatives that would also have less impact on resources but were dropped from full analysis for the reasons stated in Section 2.6. The MRP, including EPMs and BMPs would be implemented.

Comment 148 **Alternatives Considered/WildEarth Guardians**

The DEIS does not state which of the alternatives is the environmentally superior alternative or which is BLM's preferred alternative, thus making it more difficult for the public to assess the DEIS's alternatives analysis.

Response:

The BLM's and USFS's preferred alternative is stated in Section 2.8. The Records of Decision will state the environmentally preferred alternative, as required. The DEIS included a comparison of effects table for the public to review.

Comment 149 **Records of Decision/WildEarth Guardians**

BLM must therefore assess whether natural resources will be conserved if it modifies the lease as part of the proposed action.

Response:

Conservation of natural resources is considered. BLM looks at environmental impacts of mining to a variety of surface resources before making a recommendation to the state office, who will then decide on the leasing. If the impacts to surface resources from placing additional lands under lease and recovering the leased mineral are within acceptable limits, then it is typical to recommend a lease modification. BLM looks to state and federal law, other applicable statutes, and local land use plans to determine what is acceptable.

Comment 150 **Purpose and Need/WildEarth Guardians**

The DEIS should explain why BLM proposes to increase the size of the existing phosphate lease (lease modification) by 559 acres rather than issue a new lease (fringe acreage lease).

Response:

Regardless of which administrative leasing process is used for areas outside of the current lease boundaries, the EIS contains sufficient information to assess the impacts because the impacts would be the same.

The EIS explains in Section 2.2.1 and shows on **Figure 2** that portions of the phosphate resource proposed for recovery are currently unleased and adjacent to two existing federal leases. Federal regulations at 43 CFR 3510 govern the procedures for leasing these lands. Where said lands are located adjacent to an existing federal lease, the mother lease can be modified to encompass new lands. When said lands are located adjacent to non-federal lands (i.e., state or private where no federal lease exists) then a new lease, called a Fringe Acreage Lease, may be issued to encompass said lands. The act of leasing has no direct impact on the environment. It is an administrative action. The end result is that once the said lands are under lease, the phosphate will be extracted by the proposed MRP or another action alternative. Impact analysis is based on the MRP and alternatives and not on the type of existing lease or type of proposed lease.

No matter the process, the projected impacts to the environment would be exactly the same because they stem from the same MRP, are governed by the same laws, and would be subject to the same conditions of approval in the BLM Record of Decision. Lease terms are programmatic in nature and do not address the specifics of a mine plan. Lease terms address administrative matters such as leased rights, lands encumbered, royalty rates, federal access, damages to property, equal opportunity, lease transfers, lease relinquishment, heirs and successors, and liability. Once leased, the lands are subject to exactly the same laws, statutes, and land use plans (i.e., applicable requirements). Laws and other requirements do not vary, no matter if a lease is modified or a Fringe Acreage Lease is issued. Land use plans and amendments to land use plans would be applied to either circumstance in exactly the same manner. Mining would take place according to the selected alternative regardless of circumstance. The EIS and the Record of Decision are specific to this MRP and alternatives. The Conditions of Approval and other protective requirements contained in the Record of Decision would be applied to the newly lease lands in the same manner, no matter if they were a lease modification or a Fringe Acreage Lease.

Comment 151 **Stipulation/WildEarth Guardians**

The DEIS should describe and explain the current lease stipulations in comparison to stipulations that would be attached to a new lease. Lease modification allows the additional acreage to be leased under the existing lease stipulations while fringe acreage leases are treated as new leases with new lease stipulations. …because the current lease stipulations are not described and explained, it is impossible for the public to evaluate whether they are protective enough to conserve natural resources

Response:

See response to Comment 150.

Comment 152 **Alternatives/WildEarth Guardians**

DEIS additionally does not include an alternative that maximizes wildlife protection and natural resources conservation. This is a concern in large part because the project's proposed reliance on compensatory mitigation means that there is little analysis of the efficacy of such mitigation in the DEIS.

Response:

An alternative for resource protection was reviewed in Section 2.7.4.4and was dismissed for the reasons explained.

Comment 153 **Indirect or Cumulative/WildEarth Guardians**

The proposed H1/NDR Mine would provide phosphate ore to be processed at the Itafos Conda Plant, a Soda Springs phosphorus manufacturing facility. We are concerned that processing of ore from the H1/NDR mine at Itafos Conda's Soda Springs phosphorus processing plant will contribute to impairments to groundwater and surface waters downstream of the processing plant. The environmental impacts of continued phosphate processing at the Itafos Conda's phosphate processing plant should be analyzed as indirect and cumulative impacts as part of the DEIS for the proposed H1/NDR mine, as but for operation of the H1/NDR Mine, the plant would be expected to cease operations much sooner than currently forecast.

Response:

The impacts of continued operations at the Itafos Conda Plant were considered in the Rasmussen Valley Mine FEIS (BLM, USFS, USACE, IDEQ, 2016), which was incorporated by reference as stated in Section 3.1. In several locations in the FEIS, additional information on the cumulative impacts of continued operation of the Conda Plant have been added. Impacts from the operations of the Conda Plant have been added in Section 3.2.2.

Comment 154 **NEPA-Cumulative /WildEarth Guardians**

The DEIS's cumulative impacts analysis does not adequately address one of the most significant environmental issues of the area, nearby phosphate mines that are active Superfund sites. A search on the EPA website found 12 Superfund sites that may be active in the vicinity of the proposed H1/NDR Mine. …In order for the BLM to adequately assess cumulative effects, the EIS must name each of these 10 phosphate mine sites within the cumulative affects area and discuss why they have been named as Superfund sites, their current remediation status, their most recent EPA Five-Year Reviews, whether they are improving, and whether they are getting worse. The EIS must also discuss the current impacts to habitat, wildlife, water quality, and human communities of 10 phosphate mine sites concentrated within a relatively small cumulative affects area, and how the H1/NDR Mine will add to them. We note that the DEIS predicts the Mine will create plumes of selenium, sulfates and manganese, among other impacts.

Pursuant to Secretarial Order 3399, recent case law and BLM's NEPA Handbook, the DEIS needed to analyze the cumulative impacts of the H1/NDR Mine. …the failure to include a robust cumulative effects analysis in the DEIS resulted in a different application of NEPA compared to how NEPA would have been applied to the proposed action before the 2020 CEQ NEPA Rule went into effect, which is contrary to the Secretarial Order.

The DEIS should have analyzed the H1/NDR Mine proposal for cumulative impacts including air quality, climate change, geology and mineral resources, hazardous and solid wastes, lands and realty, migratory birds, Native American religious and cultural concerns, noxious weeds (invasive and non-native species), rangeland management/livestock grazing, recreation, soils, special-status species (including sage-grouse, Columbian sharp-tailed grouse, and northern goshawk), surface and groundwater resources, vegetation, visual resources, and wildlife.

Response:

The sites are named and described in Section 3.2. Where impacts from H1NDR would contribute cumulative effects to resources analyzed, those additional cumulative effects were included in Chapter 3. The additive nature of effects was disclosed in Chapter 3 of the DEIS. However, information on cumulative effects have been added to resource discussions in the FEIS to supplement and more clearly elucidate what was already described.

Comment 155 **Grazing/Dry Valley Cattle Association**

The Dry Valley Cattle Association has some concerns regarding the Tipple Site, located on our Dry Valley Unit 11 and 12 grazing areas. In reading the proposal it shows we will be losing 166 acres of prime grazing land on the two allotments of our grazing association. This land has been grazed and protected by our association for the last 80 to 100 years. The large part of our association has passed down their permits for three to four generations of ranchers. Through the power of grazing cattle on public land we are able to do our part in reducing wild fires in our area. With the inflation of land values due to the recreational value in our area, it has become impossible to purchase land for the purpose grazing of cattle. The cattle association have two troughs which are in the enclosed purposed area. They will need to be relocated and a third trough will need to be installed due to a pond will no longer be available to us for watering cattle.

Response:

The 2003 RFP requires that loss of available surface water sources for uses such as wildlife or grazing, as a consequence of mining operations, will be replaced or mitigated by the mine operator. See EPM and BMP Section 2.2.9.17, which has been revised to include specific replacements. This requirement will be carried forward into the Records of Decision.

Comment 156 **Water Quality/Idaho Conservation League and Greater Yellowstone Coalition**

In addition to selecting the Alternative Cover, BLM/USFS should evaluate the need for a refined material segregation plan for pit backfill. It is very important to use only non-seleniferous material in backfill areas that could be exposed to oxidation from water transfer along the geomembrane and concentrated flow paths. Well-established protocols for sorting seleniferous/non-seleniferous material and regular monitoring that material is being properly sorted are vital components to managing Contaminants of Potential Concern.

Response:

In addition to analyzing the Proposed Action and its proposed cover systems, the EIS also analyzed the Alternative Cover. The Alternative Cover does not involve material segregation based on selenium content; however, as mentioned in Section 2.4.3, the Alternative Cover does include re-distributing overburden compared to the Proposed Action. The re-distribution would allow for a final reclaimed surface that is amenable to each of the cover designs to be deployed. The analysis of the Alternative Cover shows it to be in compliance with statutory requirements, so no additional segregation was necessary. Also see response to Comment 111 which is related.

Comment 157 **Bonding/Idaho Conservation League and Greater Yellowstone Coalition**

Bonding calculations should factor in potentially decreased long-term water treatment costs of the Alternative Cover compared with other alternatives. Bonding calculations should be part of the DEIS, FEIS, and Record of Decision.

Response:

An actual cost bond will be required, calculated, and posted prior to mining. The water quality analysis in the EIS indicates that water treatment would not be necessary and, therefore, would not be included in the bond calculation. If future monitoring results demonstrate the need, and water treatment is required, then the bond would be updated accordingly. Although financial assurance is an important aspect of BLM's inspection and enforcement program, it is not an environmental impact and the amount of the bond is not part of the analysis in the EIS. As described in Section 2.2.11, posting of an adequate bond will be a requirement in the Records of Decision and the bond amount will be based on the selected alternative, conditions of approval in the Records of Decision, and any other applicable requirements.

Comment 158 **Wildlife/Idaho Conservation League and Greater Yellowstone Coalition**

The moose, elk, mule deer, white-tailed deer, and pronghorn that utilize the project area for high-quality habitat, migrating, moving, foraging, and security/cover will be greatly impacted by the permanent loss of 822 of mature forest habitat. Although the DEIS indicates that the Dry Ridge area is not a major migration corridor, it remains a migration corridor utilized by big game individuals nonetheless, and should therefore be afforded special considerations and protections due to its high value for the species, particularly in light of the management directions established by Executive Order 3362. Moreover, the 1.48 acres of Prescription 2.7.2(d) areas (Elk and Deer Winter Range) disturbed should also be afforded similarly significant considerations and protections due to the management prescription attached to this area and the high value for elk and deer during the winter months, also in accordance with Executive Order 3362. Although the DEIS states that the loss would affect a relatively small proportion of the winter habitat, we urge BLM/USFS to elevate protections for these high value acres.

Response:

The EIS Section 3.9.3 discloses that the loss of habitat would have a moderate adverse effect on big game habitat. Secretarial Order 3362 is about identifying and conserving migration corridors where appropriate and where identified, but does not restrict multiple use. Additionally, the surface resources (habitat) on the lease are managed by the USFS under its 2003 RFP. Neither BLM nor USFS has identified this area as appropriate for conservation. Both land use plans recognize the existing Known Phosphate Leasing Area and the existing phosphate leases. The Proposed Action and Alternatives are consistent with the standards for development in both land use plans. Following mine reclamation, which would occur progressively, vegetation would be restored with a seed mix that matches the big game winter forage requirements (which is described in the 2003 RFP page 4-42 as a mixture of grasses, forbs, and shrubs).

Comment 159 **Wildlife/Idaho Conservation League and Greater Yellowstone Coalition**

Individual moose, elk, mule deer, white-tailed deer, and pronghorn will be additionally impacted by the disturbances associated with mining operations, including but not limited to noise, light, dust, and human presence in previously unoccupied areas. Furthermore, the data analyzed in the DEIS indicates that some of these big game individuals may be accessing seleniferous forage at reclaimed mine sites in and around the project area. Concentrations are approaching threshold levels and therefore require careful attention and continued monitoring.

Response:

The EIS Section 3.9.3 discloses the effects of noise and other mining disturbance to big game. The vegetation would be monitored following reclamation to ensure selenium levels are consistent with this analysis and are not above the BLM performance standard.

Comment 160 **Wildlife/Idaho Conservation League and Greater Yellowstone Coalition**

Other species that utilize the project area, including the threatened Canada lynx and sensitive species like the Northern goshawk, bald eagle, flammulated owl, boreal owl, great gray owl, Greater sage-grouse, Columbian sharp-tailed grouse, three-toed woodpecker, gray wolf, trumpeter swan, and North American wolverine, will also be significantly impacted by the loss of habitat, disturbances from mining operations, and the presence of seleniferous forage. Although the DEIS suggests that these impacts will be moderate overall, we underscore the need to address these impacts through comprehensive implementation of Best Management Practices (BMPs), avoidance, mitigation, and monitoring.

Response:

Effects on threatened and sensitive species are disclosed in Section 3.9.3 of the EIS. EPMs and BMPs are described in Section 2.2.9. Please also see response to Comment 145 on avoidance and mitigation of potential impacts.

Comment 161 **Wildlife/ Idaho Conservation League and Greater Yellowstone Coalition**

Although the Project's disturbance footprint is not in priority, general or important habitat management areas for Greater sage-grouse, and despite the fact the DEIS states that there is no suitable sage-grouse habitat present, we request that BLM/USFS pay careful attention to any species impacts to sage-grouse given increasing habitat loss and population declines. If BLM/USFS is committed to reversing long-term downward trends in sage-grouse populations and habitats, then we recommend that BLM/USFS continue to carefully monitor the leks described in the DEIS: pending lek 3C040 located in the analysis area 1.2 miles to the west of the Project on private land, and occupied lek 3C028 located 7.6 miles to the west.

Response:

Idaho Department of Fish and Game is responsible for managing wildlife populations in Idaho and monitors greater sage-grouse leks annually. They classified lek 3C040 as inactive following 2021 lek surveys as no grouse had been observed at the lek since 2018. Lek 3C028 would not be affected by H1NDR as it is not within line-of-sight and is too far to be affected by noise. As the project area does not include greater sage-grouse habitat and there are no anticipated impacts on greater sage-grouse leks from H1NDR, the project-specific monitoring program will not address greater sage-grouse. The state will continue to monitor greater sage-grouse.

Comment 162 **Wildlife/Idaho Conservation League and Greater Yellowstone Coalition**

To mitigate additional impacts to wildlife from mining operations, we suggest that BLM/USFS address the permanent wildlife habitat removal by restoring the lost mature forest habitat to the greatest extent possible in and adjacent to the project area, where feasible, and establishing new grasslands and grass shrub mixes in accordance with the Proposed Action and in addition, offsite, where practicable. In addition, we respectfully request that BLM/USFS preserve the 11-acre stand of Douglas fir that satisfies the region's definition of old growth. Although small in acreage, the loss of this old growth unit may further complicate vegetation management activities in other old growth sections elsewhere on the Caribou-Targhee National Forest where USFS may be interested in conducting forest restoration activities.

Response:

The old-growth stand that would be affected is 11 acres (this information has been added to Section 3.8.2). Of that total, 2.4 acres would be affected by mining and that 2.4 acres cannot be avoided; however, 9 acres will remain. As stated in Section 2.2.9.18, 90% of the watershed is mature and late serial stage, and the 2003 RFP standards for maintaining old-growth characteristics would be met. Compensatory mitigation will be required to offset the habitat loss (see Appendix A).

Comment 163 **Fish/Idaho Conservation League and Greater Yellowstone Coalition**

The Yellowstone cutthroat trout, brook trout, longnose dace, mottled and other sculpin species, sculpin, mountain sucker, Paiute sculpin, redside shiner, speckled dace, Utah sucker, boreal toad, northern leopard frog, boreal chorus frog, tiger salamanders, and myriad macroinvertebrate species that utilize the project area for habitat and migration purposes will be greatly impacted by the loss of 49.6 acres of Aquatic Influence Zone (AIZ) slated to be modified and/or relocated by the disturbances associated with mining operations. If BLM/USFS select the Proposed Action, then the data analyzed in the DEIS suggests that selenium concentrations would exceed Idaho's water column criteria for aquatic life in water from seeps that discharge to the headwaters of Stewart Creek, East Mill Creek, and Maybe Creek, peaking long after the end of the mine's life and reclamation activities conclude. The data analyzed in the DEIS baseline surface water quality study also found that selenium concentrations in ponds utilized by amphibians already exceeds water column criteria for lentic waters.

Response:

Effects on AIZs and aquatic species are discussed in the Section 3.7.3. The Proposed Action is not the Preferred Alternative.

Comment 164 **Aquatic Resources/Idaho Conservation League and Greater Yellowstone Coalition**

Selenium concentrations exceeding Idaho's water column criteria for aquatic life, and those criteria for lentic waters, require careful attention and continued monitoring during mining operations, reclamation, and even after reclamation activities conclude. Although the DEIS suggests that these impacts will be negligible over the long term, we underscore the need to address these impacts through comprehensive implementation of BMPs, mitigation, and monitoring.

Response:

Potential increased loading to the Blackfoot River segments that are listed as impaired for selenium are disclosed in Section 3.5.2. Monitoring, mitigation, and application of BMPs will comply with implementation plans for TMDLs as they are developed in the region. The proposed monitoring in Appendix D includes monitoring of water quality upstream of the Blackfoot River.

Comment 165 **Surface Water-Monitoring/Idaho Conservation League and Greater Yellowstone Coalition**

To mitigate addition impacts to aquatic species from mining operations, we suggest that BLM/USFS address the loss of 49.6 acres of AIZ by restoring the lost acreage to the greatest extent possible in and adjacent to the project area, where feasible, and establishing new aquatic habitat in accordance with the Proposed Action and in addition, offsite, where practicable. In addition, we respectfully request that BLM/USFS address selenium concentrations in ponds and streams that already exceed IDAPA criteria, and plans to address future selenium concentration exceedances.

Response:

An EPM has been added requiring that if the Stewart Canyon road is reestablished following mining, the road would be placed outside the AIZ where it needs to be reconstructed. Two other road routing alternatives were developed that would reduce the impacts on AIZs. Effects on fish and aquatic species habitat is disclosed in Section 3.7.3 and addresses offsite compensatory mitigation to address residual impacts.

Comment 166 **Reclamation-Mitigation/Idaho Conservation League and Greater Yellowstone Coalition**

Many restoration activities take longer than three (3) years, particularly in drought years, and we recommend planning a five (5) year reclamation window to make sure vegetation becomes established. We also recommend that reclaimed areas be permanently closed to livestock grazing to speed revegetation efforts, protect revegetation efforts, provide forage for wildlife, and generally support reclamation activities and rehabilitation of the landscape in and around the project area.

Response:

Activities to implement reclamation are anticipated to be completed within 2 years of initiation (EIS Section 2.2.10). Reclamation bonds will not be released until reclamation conditions are met per Section 2.2.11. This includes allowing grazing.

Comment 167 **Alternative-Mitigation/Idaho Conservation League and Greater Yellowstone Coalition**

The DEIS indicates that the 1,180 acre disturbance footprint will be 98 percent reclaimed, leaving approximately 24 acres permanently disturbed by mining operations. To uphold the highest standards of forest function and health and mitigate impacts from mining operations, we suggest that BLM/USFS address the permanent disturbance of 24 acres plus some additional amount by restoring forest function and health the greatest extent possible in and adjacent to the project area, where feasible, and establishing new, healthy forest habitat offsite, where practicable.

Response:

Compensatory mitigation is included to address residual effects. See response to Comment 144.

Comment 168 **Vegetation/Idaho Conservation League and Greater Yellowstone Coalition**

Monitoring will be essential to the success of project reclamation. The Mine Reclamation Plan (MRP) must include a robust vegetation monitoring plan to ensure that selenium concentrationsare below BLM performance standards. This vegetation monitoring plan should also include provisions for monitoring noxious weeds to limit and control the introduction and spread of noxious weeds.

Response:

As stated in Section 2.2.9.17, vegetation monitoring would ensure selenium concentrations and noxious weeds prior to bond release. The draft environmental monitoring plan in Appendix D includes noxious weed control monitoring.

Comment 169 **Water Quality/Idaho Conservation League and Greater Yellowstone Coalition**

The MRP should additionally include a detailed groundwater and surface water monitoring plan to be implemented during the life of the mine and for several years after the end of mine's life. This groundwater and surface water monitoring plan needs to include provisions to measure and prevent selenium contamination and other water quality impairments.

Response:

As described in sections 2.2.9 and 2.2.9.7, monitoring will be required as part of the IDEQ Point of Compliance specified in **Table 1**. A proposed monitoring plan is provided in Appendix D. This plan includes surface and groundwater monitoring.

Comment 170 **Wildlife/Idaho Conservation League and Greater Yellowstone Coalition**

Finally, we encourage the inclusion of a comprehensive wildlife monitoring plan in the MRP to assess the loss of terrestrial habitat services resulting from mining activities. This wildlife monitoring plan will need to include assessments of individuals, populations, communities, and ecosystems, and objectives for wildlife and habitat health, a schedule for monitoring and reporting, and parameters to measure whether the impacts are within the range of the environmental analysis. This plan should additionally develop and implement a comprehensive aquatic species monitoring plan to assess the loss of aquatic habitat services resulting from mining activities. Aquatic species monitoring and evaluation should include assessments of individuals, populations, communities, and ecosystems, and objectives for aquatic species and habitat health, a schedule for monitoring and reporting, and parameters to measure whether the impacts are within the range of the environmental analysis.

Response:

An agency-approved environmental monitoring plan will be a required condition of approval (see Section 6.3.7 of MRP) and will include monitoring of selenium levels in water and vegetation. Monitoring wildlife is not required because it is not anticipated that wildlife will be exposed to selenium. No monitoring of fish tissue is anticipated because of the lack of fish in the impacted streams; monitoring of water quality will be used as a surrogate. The EIS discloses the adverse effects that would occur on wildlife in Section 3.9.3 and effects to aquatic species in Section 3.7.3. The amount of habitat lost/altered is quantified (summarized in **Table 11**). A Habitat Equivalency Analysis (Appendix A) was completed to estimate residual loss of habitat services post-reclamation and to determine mitigation requirements to offset the loss.

Comment 171 **Alternatives/Yellowstone to Uintas Connection, et al.***

There must be an alternative that specifically addresses climate change, phosphate mining, logging and "vegetation management" and livestock grazing impacts on forest stands, understory conditions and aspen recruitment, and the impact that climate change and livestock grazing have on overall forest resiliency.

There must be an alternative that addresses the Regionally Significant Wildlife Corridor, ESA, special status species such as Grizzly bear, goshawk, Canada lynx or wolverine, or for that matter the native plant community and the impact that this project will have on these species. It should include mapping and identification of all roads, trails, open or closed, user created or not and a plan to close the illegal roads and trails, while also reducing the OMRD to within limits recognized in the Caribou National Forest Revised Forest Plan (CNF RFP).

…provide a map and analysis of the Corridor addressing habitat fragmentation and the presence of core, corridor, Lynx Analysis Units (including the LAUs proposed, but omitted from the RFP for the 2003 RFP and an analysis of their condition then and current conditions), Roadless Areas, Wilderness Areas, NRAs, areas closed to livestock grazing, security areas, and Goshawk home ranges.

Then provide an alternative that proposes road closures to attain a scientifically defensible density per square mile, grazing allotment closures, fence removals, and setting noise limits on vehicles. Winter use should be closed or severely limited in the CEA and Corridor so that lynx, wolverine, and other far-ranging species (elk, deer) have an opportunity to migrate and have security cover during all seasons. The Forest Service can use its Prohibition Authority (36 CFR 261) to regulate noise and other activities detrimental to wildlife such as hunting, trapping, or harassing wildlife.

Response:

An alternative for resource protection was reviewed in Section 2.7.4.4 and dismissed for the reasons explained.

Comment 172 **Wildlife – Lynx/ Yellowstone to Uintas Connection, et al.***

The FEIS for the 2003 Caribou National Forest Revised Forest Plan (CNF RFP) provides a section on corridors in Volume IV. In that section (pages D-4 to D-8), a process for assessing connectivity is suggested. This includes:

- Assess historic patterns in vegetation and relative connectivity.
- Assess current patterns in vegetation and relative connectivity, including the impacts of human disturbance or physical barriers.
- Compare historic and current patterns of relative connectivity to determine if animal movement opportunities have been significantly interrupted.
- Consider ecologically based measures to restore historic animal movement, referring to Table 1 provided therein.

The NEPA analysis for the Husky 1 North Dry Ridge mine must take a hard look at the mapped area for lynx linkage and conduct the analysis suggested.

Response:

The EIS describes the current conditions of the analysis area and discloses H1NDR's potential effects on the general linkage habitat and lynx movements in Section 3.9.3.1. No key movement pathways would be interrupted by H1NDR. Reference to a USFS process paper on identifying linkages and corridors on the CNF has been added to the FEIS.

Comment 173 **Wildlife/Yellowstone to Uintas Connection, et al.***

The DEIS must include the results of a formal consultation with the US Fish and Wildlife Service (USFWS) regarding the impact of the project on lynx, wolverine, grizzly bear. Please include a formal consultation in the FEIS.

Response:

H1NDR's official species list from USFWS includes monarch butterfly (candidate) and Canada lynx. On October 8, 2020, the USFWS withdrew the 2013 proposed rule to list the North American wolverine as threatened under the Endangered Species Act. The North American wolverine is a USFS Region 4 Sensitive Species and effects are addressed in the Biological Evaluation/Wildlife Resources Report and EIS. Following informal consultation with USFWS, grizzly bear has been added to the FEIS and Biological Assessment. Informal consultation between USFS and USFWS has been ongoing since February 2021, and the Biological Assessment analyzing impacts to the monarch butterfly, Canada lynx, and grizzly bear has been submitted to the USFWS.

Comment 174 **Wildlife – Lynx/ Yellowstone to Uintas Connection, et al.***

The current state of this linkage area must be analyzed and reflect all human disturbances to habitat integrity and quality. This would include mines, roads, ATVs/OHVs and snowmobile activity, rail lines, pipelines, timber harvests, forest and vegetation treatments, livestock grazing and their effects on habitat continuityor fragmentation, understory plant communities and their condition as compared to potential.

Response:

The H1NDR EIS analysis is a site-specific NEPA analysis, focused on the area where effects from H1NDR would occur and current disturbances are described for this area (see Section 3.9.1). Analysis of wildlife corridors and Canada lynx habitat linkages on the Caribou National Forest was accomplished during the Forest Plan revision and is described in the Wildlife Resources Report. No corridors or important Canada lynx linkages (movement pathways) were identified in the analysis area. Important Canada lynx linkages are those that connect mountain ranges that are occupied habitat, and Dry Ridge does not meet that definition. A brief description of the process and outcome and reference to the USFWS process paper on identifying corridors has been added to the FEIS.

Comment 175 **Wildlife – Lynx/Yellowstone to Uintas Connection, et al.***

Northern Rockies Lynx Management Direction Record of Decision and its standards and guidelines - Where is the analysis for these timber- related factors in the Husky 1 North Dry Ridge DEIS for its analysis and cumulative effects, or wildlife analysis areas?

Response:

The Northern Rockies Lynx Management Direction does not apply to H1NDR, as the Caribou National Forest is outside the planning area per Attachment 1 in the Northern Rockies Lynx Management Direction Record of Decision and Figure 1-1 and p. 12 of the related 2007 FEIS.

Comment 176 **Wildlife – Wolverine/Yellowstone to Uintas Connection, et al.***

The CTNF must provide a more detailed mapping, capability and suitability analysis for wolverine habitat integrating the above information on the Corridor and current conditions (security cover, snow cover, elevation, mines, roads, timber projects and other fragmenting or habitat degrading activities and the current rate of occurrence) for wolverine.

A “hard look” must be conducted of habitat fragmentation, corridor functionality, vegetation treatments, road density, ATV/OHV and snowmobile activity, trapping and other human activity and livestock grazing and the associated impact on wolverine. That look must also include all ESA and Forest Plan requirements and intent and embody the best available science applicable to wolverine.

Response:

See responses to Comment 172 and Comment 173. In addition, in 2018 the USFS completed a GIS analysis for the Caribou National Forest to map potential North American wolverine natal den sites per Objective #1 on p. 3-24 of the 2003 RFP, as discussed in the Wildlife Resources Report. No North American wolverine denning habitat was mapped in the H1NDR analysis area. The process paper and GIS database have been included in the project record. A brief description of the North American wolverine habitat analysis was added to the FEIS.

Comment 177 **Wildlife – Grizzly Bear/Yellowstone to Uintas Connection, et al.***

A “hard look” must be conducted of habitat fragmentation, corridor functionality, vegetation treatments, road density, ATV/OHV and snowmobile activity, trapping and other human activity and livestock grazing and the associated impact on grizzly bear. That look must also include all ESA and Forest Plan requirements and intent and embody the best available science applicable to grizzly bear.

Response:

See responses to Comment 172 and Comment 173.

Comment 178 **Reclamation/Vegetation and Wildlife/Yellowstone to Uintas Connection, et al.***

Why does non-native grasses sewn to provide forage for domestic cattle grazing qualify as restoration?

State of Idaho statute: 47-1510. VEGETATION PLANTING. (a) Except as otherwise provided in this act, an operator shall plant on affected lands, vegetation species that can be expected to result in vegetation comparable to the vegetation that was growing on the area occupied by the affected lands prior to the exploration and mining operations.

Note that the proposed reclamation does not meet the intent of 47-1510 as the species to be planted are not comparable to the removal of a native forest and its associated species.

Response:

The MRP proposed a seed mix that is 96% native species and includes grasses and native forb and shrub species that provide value to wildlife. Section 2.2.10 in the FEIS has been revised. The seed mix used at the time of reclamation will be approved by the agencies to ensure that the reclamation vegetation provides a long-term stable surface, habitat for post-mining land uses, does not promote the uptake of selenium, and would not compromise the cover systems that are important for the protection of water quality. The seed mix is compliant with the applicable BLM and USFS land use plan requirements.

Comment 179 **Wildlife – Sage Grouse/Yellowstone to Uintas Connection, et al.***

Sage grouse: The DEIS for Husky 1 North Dry Ridge does not analyze connectivity between these SE Idaho, Wyoming and Bear Lake Plateau populations or their status.

Response:

Connectivity for sagebrush habitat or greater sage-grouse populations was not discussed because H1NDR is forested and does not provide suitable habitat for greater sage-grouse.

Comment 180 **Climate Change – Cumulative/Yellowstone to Uintas Connection, et al.***

The Husky 1 North Dry Ridge DEIS (p189) characterizes annual Greenhouse Gas (GHG) emissions as 17,668 metric tons CO2 from stationary sources. This does not include emissions from processing plants. What is not included is the amount of carbon storage lost as the project area is logged and all vegetation destroyed. Nor are the decreases in soil carbon or additional releases to the atmosphere of carbon in soil accounted for.

Response:

Section 3.15.3.1 of the DEIS (now Section 3.16.3.1 in the FEIS) has been corrected to indicate the 17,668 metric tons is both stationary and mobile sources. Carbon storage change was also addressed in Section 3.15.3.1 of the DEIS (now Section 3.16.3.1 of the FEIS).

The continued operation of the processing plants is included in the list of past, present, and reasonably foreseeable actions in **Table 13** (Table 12 in the DEIS) and is considered in the impact analysis. See also response to Comment 153. Emissions from the processing plants will not change.

Comment 181 **Wildlife/Yellowstone to Uintas Connection, et al.***

Management Indicator, Sensitive and Special Status Species - Population trends and viability assessments for these species and their habitats must be analyzed in concert with the various activities the Forest Service has implemented over the history of the mining in the CEA.

Response:

See response to Comment 162. Effects on Management Indicator Species and sensitive species were disclosed in Section 3.9.3. EPMs and BMPs were described in Section 2.2.9.

Comment 182 **Wildlife/Yellowstone to Uintas Connection, et al.***

The Forest Plan is 18 years old and the analysis incorporated into that RFP even older. Many projects have occurred in the 41,255-acre (DEIS p139) goshawk habitat in the intervening years in addition to older projects. In addition, roads continue to expand, both permanent, temporary and illegal, which engender additional human activity in areas that were previously interior forest habitat. All of this must be characterized in the NEPA analysis for the

Response:

Current conditions of wildlife habitat in the analysis area are described in Section 3.9.2 of the DEIS and FEIS.

Comment 183 **Wildlife/Yellowstone to Uintas Connection, et al.***

The Forest Service Manual 2323.33c - Predator Control states, "Predacious mammals and birds play a critical role in maintaining the integrity of natural ecosystems. Consider the benefits of a predator species in the ecosystem before approving control actions." The NEPA for the Husky 1 North Dry Ridge analysis must address the role of predators and the killing of these important animals by livestock permittees, trappers, DWR and Wildlife Services, disclosing the losses on an annual basis since the 2003 CNF RFP was implemented. It should also address the economics of this, and the risk to non-target animals, domestic pets and the ecosystem.

Response:

H1NDR is not a predator removal project; therefore, this analysis is out of scope for the H1NDR EIS.

Comment 184 **Air Quality/Yellowstone to Uintas Connection, et al.***

The Husky 1 North Dry Ridge DEIS (page 22) states that Itafos has committed to implementing environmental protection measures (EPMs) and Best Management Practices (BMPs) to ensure responsible mining operations and reduce adverse environmental impacts. Without analysis the effectiveness of the current EPMs and BMPs cannot be determined. Without analyzing the accuracy and validity of the assumptions used in previous NEPA processes one has no way to judge the accuracy and effectiveness of the EPMs or BMPs.

Response:

The EMPs described in Section 2.2.9.1 are similar to the measures employed at similar mines in the same airshed. Information has been added to the air quality section (3.16) that describes the previous activities and demonstrates the effects operating mines have had on air quality over the last decade, which demonstrates the effectiveness of the similar measures and the IDEQ's permitting and monitoring program to protect and improve air quality.

Comment 185 **Air Quality/Yellowstone to Uintas Connection, et al.***

Idaho DEQ also has the AQI calculator which can be used to determine the AQI for a particular pollutant and concentration. This information needs to be incorporated into the analysis.

Response:

The air quality is now analyzed in detail in Section 3.16, and information on the air quality index trend has been included. The AQI calculator is EPA's, not IDEQ's. Because background levels of any particular pollutant do not approach thresholds, they are not discussed individually. As corrected in the FEIS, the project is subject to future air quality permitting, which will address air quality concerns.

Comment 186 **Geology/Yellowstone to Uintas Connection, et al.***

There is no discussion of the effect of fault disturbance by mining activity and haul road construction in the Husky 1 North Dry Ridge DEIS.

This DEIS does not include any discussion regarding mining related to seismic activity. A temporal analysis by location and total occurrence should be done and compared to the progression of mining through the region.

Response:

Fault disturbance and mining-related seismic activity was not analyzed in detail. Additional information has been added to **Table 66** where geologic hazards are discussed.

Comment 187 **Surface Water/Yellowstone to Uintas Connection, et al.***

The failure to account for the value of any stream rerouting or lost springs occurring in the project area in any NEPA analysis for the Husky 1 North Dry Ridge mine project is a failure to take a hard look.

Response:

Impacts from stream rerouting and impacts on seeps and springs are disclosed in Section 3.5.3.1. Impacts on fish and amphibian habitat are disclosed in Section 3.7.3.1.

Comment 188 **Surface Water/Yellowstone to Uintas Connection, et al.***

Surface water impacts by sediment and metals could be mitigated in part by restoring stream flows, retiring grazing permits through buyouts, removing diversions for livestock watering, and removing livestock to restore stream banks and riparian areas. An analysis of the location of these diversions, the net effect on spring and stream flows, riparian and wetland areas must be done for a hard look.

Response:

An alternative for resource protection was discussed in Section 2.7.2.2 of the DEIS, now Section 2.7.4.4 of the FEIS and dismissed for the reasons explained. The anticipated impacts to surface water quality are discussed in detail in Section 3.5 and are predicted to be within regulatory limits.

Comment 189 **Cumulative/Yellowstone to Uintas Connection, et al.***

Because the impacts of mining are concurrent with motorized recreation use of the CEA, an analysis of this activity and its impacts thru road density, noise, effects on people and wildlife are additive to the mining activity and a hard look at this activity is needed in conjunction with this project and any others proposed.

The DEIS provides no data on vehicle use in the CEA. The DEIS (p169) states that there are no traffic count data for any of the NFS or Caribou County roads near the proposed mine.

Road densities and effects on wildlife must be analyzed in any NEPA analysis for the Husky 1 North Dry Ridge mine project and for other projects being considered by the CTNF.

Response:

The effect of the Alternative Access 1 and Alternative Access 2 is analyzed in Section 3.9.3.5 of the EIS. The analysis addresses impacts on wildlife based on noise, human activity, habitat loss, and other factors. It is acknowledged in the EIS that there are current recreational uses that affect wildlife. These affects are considered existing. The analysis also provides a summation of effects including past, current, direct impacts from this project, and future impacts.

Comment 190 **Alternatives/Yellowstone to Uintas Connection, et al.***

An alternative must be provided that proposes road closures to attain a scientifically defensible density per square mile, grazing allotment closures, fence removals, and setting noise limits on vehicles. Winter use should be closed or severely limited in the Study Area, the CEA, and the Corridor so that lynx, wolverine and other far-ranging species (elk, deer) have an opportunity to migrate and have security cover during all seasons.

Response:

Rationale for not considering this alternative in detail was included in Section 2.7.2.2 of the DEIS, now Section 2.7.4.4 of the FEIS.

Comment 191 **Compliance With Forest Plan/Yellowstone to Uintas Connection, et al.***

Attachment 1 – Pocatello ARMP Goals, Objectives, Actions; Attachment 2 – Forest Plan Guidance

Provisions of the 2003 CNF RFP that should be incorporated into the DEIS analysis and mitigation plans are referenced below by RFP page number, as indicated in comment. See comment letter for text copied from RFP

Response:

A thorough review of the 2003 RFP and the ARMP was conducted (see Sections 1.7 and 1.8) and no inconsistencies were identified, with the exception of the forest plan amendments noted in Section 1.8. Many of the measures indicated in the comment letter as inconsistent with the Forest Plan or inadequate analysis are out of scope for a project-level analysis and pertain to Forest Plan level analysis and decisions. The rest were addressed in the EIS or the record for conformance.

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Appendix D
Draft Environmental Monitoring Plan

ARCADIS

ITAFOS

Itafos Conda LLC

DRAFT Environmental Monitoring Plan

Husky 1 North Dry Ridge Mine

Caribou County, Idaho

March 30, 2022

DRAFT Environmental Monitoring Plan

Husky 1 North Dry Ridge Mine
Caribou County, Idaho

March 30, 2022

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Appendix

Acronyms and Abbreviations

amsl	above mean sea level
Arcadis	Arcadis U.S., Inc.
bgs	below ground surface
BLM	Bureau of Land Management
BMP	best management practice
COPC	constituent of potential concern
CTNF	Caribou-Targhee National Forest
DVM Pit D Lease	Dry Valley Mine Pit D Federal Phosphate Lease IDI-0678
EIS	Environmental Impact Statement
EMP	Environmental Monitoring Plan
GWBSR	Groundwater Baseline Study Report
H1 Mine	Husky 1 Mine
H1 Lease	Husky 1 Federal Phosphate Lease IDI-05549
H1NDR	Husky 1 North Dry Ridge
HUC	hydrologic unit code
ID	identification
IDAPA	Idaho Administrative Procedures Act
IDEQ	Idaho Department of Environmental Quality
Itafos	Itafos Conda LLC
MCM Lease	Maybe Canyon Mine Federal Phosphate Lease IDI-04
Meade Peak Member	Meade Peak Phosphatic Shale Member
mg/kg	milligram per kilogram
MRP	Mine and Reclamation Plan
NDR Mine	North Dry Ridge Mine
NDR Lease	North Dry Ridge Federal Phosphate Lease IDI-8289
POC	point of compliance
POC Application	Application for Setting Points of Compliance
Project	Husky 1 North Dry Ridge Mine open-pit phosphate mine project

QAPP	Quality Assurance Project Plan
SUP	special use permit
SWBSR	Surface Water Baseline Study Report
USFS	U.S. Forest Service
USGS	U.S. Geological Survey

1 Introduction

Itafos Conda LLC (Itafos) proposes to develop an open-pit phosphate mine in Caribou County, Idaho. The Husky 1 North Dry Ridge Mine (H1NDR) is located approximately 16 miles (26 road miles) northeast of Soda Springs, Idaho (Figure 1-1). The H1NDR open-pit phosphate mine project (project) is within the Caribou-Targhee National Forest (CTNF) as well as on private lands.

The project will occur within four federal phosphate lease boundaries: the North Dry Ridge Federal Phosphate Lease IDI-8289 (NDR Lease), the Husky 1 Federal Phosphate Lease IDI-05549 (H1 Lease), the Maybe Canyon Mine Federal Phosphate Lease IDI-04 (MCM Lease), and the Dry Valley Mine Pit D Federal Phosphate Lease IDI-0678 (DVM Pit D Lease). Additional permanent project components are proposed outside of existing federal phosphate leases but within the known phosphate lease area. Permanent project activities within the CTNF outside of existing federal phosphate leases will require lease modifications. These areas are referred to as off-lease areas. Temporary project activities within the CTNF outside of existing federal phosphate leases will require special use permits (SUPs). These areas are referred to as off-lease SUP areas (Figure 1-1).

The project will result in the development of two primary mining areas in which mining and reclamation activities will occur. The North Dry Ridge Mine (NDR Mine) will consist of one open pit that will occupy a portion of the NDR Lease. The Husky 1 Mine (H1 Mine) will consist of a series of adjacent pits and will occupy portions of the H1 Lease, the off-lease area, and the MCM Lease. Ore will be transported via haul roads from the H1NDR pits to the proposed ore stockpile and train loading facility (tipple) location within the DVM Pit D Lease boundary. From the tipple, ore will be loaded onto railcars and transported to the Itafos processing facility north of Soda Springs. The project will result in the development of one temporary overburden storage area (on the H1 Lease and a temporary off-lease SUP area) and one permanent overburden storage area (on the MCM Lease and off-lease area). The shop, offices, equipment storage, and some haul roads will be located on private land.

This Environmental Monitoring Plan (EMP) has been prepared to document the environmental monitoring activities that will be performed during active mining operations and after reclamation has been completed. These monitoring activities are intended to document the compliance with applicable regulations and standards. Through monitoring, Itafos and the regulatory agency can determine the effectiveness of best management practices (BMPs) that have been implemented for the project as part of mining operations and reclamation.

Stormwater and air quality monitoring are not included in this EMP. A separate Stormwater Pollution Prevention Plan and air permit will be prepared for those monitoring activities.

1.1 EMP Objective and Approach

The objective of this EMP is to describe the monitoring programs and process for implementation during active mining operations and after reclamation. Specific resources to be monitored are identified and described, as well as the monitoring methods and locations for each resource. Certain resources have an existing monitoring dataset as part of the baseline data collection effort (e.g., groundwater and surface water). This EMP may be updated and finalized, as needed, following the issuance of a Record of Decision.

1.2 Site Description

A complete project description is provided in the H1NDR Mine and Reclamation Plan (MRP; Itafos 2020). The project will occur within four federal phosphate lease boundaries (Figure 1-2): NDR Lease, the H1 Lease, the MCM Lease, and the DVM Pit D Lease. Mineral and surface rights of the four project leases are administered by the U.S. Department of the Interior, Bureau of Land Management (BLM) and the U.S. Forest Service (USFS), respectively. Itafos is the current lease holder for the H1 and NDR Leases through asset acquisition from Agrium/Nu-West. Nu-West currently retains ownership of the MCM Lease and part of the DVM Pit D Lease. A summary of the pertinent information for this EMP is provided in the sections below.

1.2.1 Location

The project is in Caribou County, Idaho, approximately 16 miles (27 road miles) northeast of Soda Springs. The NDR Mine is located about 2 miles south of Rasmussen Valley Mine on the north end of the northwest-southeast trending Dry Ridge. The H1 Mine is located about 6 miles southeast of NDR at the southern end of Dry Ridge and extending southeast along the western flank of Dry Ridge.

The project is accessed from Soda Springs, Idaho by taking State Highway 34 north for approximately 11 miles, then turning right (east) onto Blackfoot River Road and proceeding for approximately 10 miles, then veering right at Slug Creek Road for 0.04 mile, and then proceeding southeast along Dry Valley Road for approximately 6 miles to its junction with Stewart Canyon Road/Caribou National Forest Road 134 (Figure 1-1).

1.2.2 Site Area Background

The project is located within an area considered part of the Southeast Idaho Phosphate Mining Resource Area. This area generally consists of a series of northwest-southeast-trending ridges and valleys, along which mineable phosphate ore is hosted. The project lies along the Dry Ridge, a ridge line trending generally northwest-to-southeast. The H1 Lease is located along the central portion of Dry Ridge, and the NDR Lease is located along the northern portion of Dry Ridge. The leases all occur along the northeastern dipping limb of the Dry Valley anticline, and the various geologic units occur as outcrops along Dry Ridge. The phosphate-bearing units outcrop between 7,550 and 7,680 feet above mean sea level (amsl; based on the North American Vertical Datum of 1988) on the H1 Lease, and between 6,775 and 7,460 feet amsl on the NDR Lease. Though no historical mining has occurred on the H1 or NDR Leases, exploratory drilling has been completed across both leases.

1.2.3 Geology and Hydrogeology

This section describes the structural geology and hydrogeology within the project area and surrounding area. Maps and additional details are provided in the Groundwater Baseline Study Report (GWBSR; Arcadis U.S., Inc. [Arcadis] 2020a), Groundwater Flow and Transport Modeling Report (Tetra Tech 2021), and Application for Setting Points of Compliance (POC Application; Arcadis 2022 [Appendix A to this EMP]).

1.2.3.1 Stratigraphy

Rocks exposed at the surface at the H1NDR range in age from Mississippian to recent and include Quaternary-age alluvium, colluvium, and sedimentary bedrock of Mississippian- to Triassic-age formations. A brief description of the stratigraphic units, as referenced in the GWBSR (Arcadis 2020a), is provided below from youngest to oldest:

- *Alluvium/Colluvium – Quaternary*. This unit is composed of unconsolidated sand, silt, and gravel in drainages and along hillsides and averages 0 to 60 feet in thickness.
- *Basalt – Quaternary*. This unit is composed of dark gray olivine basalt and averages 0 to 150 feet in thickness.
- *Thaynes Formation – Triassic*. The Thaynes Formation was deposited during the Triassic Period and overlies the Dinwoody Formation. This formation is divided into four members and consists of gray fossiliferous limestone, calcareous siltstone, and black and gray shale with a total thickness of 2,650 to 3,000 feet.
- *Dinwoody Formation – Triassic*. The Dinwoody Formation outcrops on the eastern slope of Dry Ridge and is approximately 1,700 to 2,200 feet thick. This unit consists of thin-bedded tan siltstone, shale, and interbedded limestone. Surficial wreathing of the Dinwoody Formation forms dense, clayey soils.
- *Phosphoria Formation – Permian*. This unit forms the central-eastern portion of Dry Ridge. The Phosphoria Formation is divided into three members, described from youngest to oldest below:
  - *Cherty Shale Member*. The unit thickness ranges from 100 to 200 feet along Dry Ridge and is composed of thinly bedded dark brown to black cherty mudstone, siliceous shale, and argillaceous chert.
  - *Rex Chert Member*. The Rex Chert Member is composed of thick-bedded black to bluish-white or occasionally reddish-brown chert with small amounts of interbedded mudstone and lenticular limestone. The unit ranges from 50 to 150 feet thick along Dry Ridge. The Rex Chert Member is highly siliceous and resistant to weathering (Hein et al. 2002), often forming overhanging ledges above the less resistant Meade Peak Phosphatic Shale Member (Meade Peak Member).
  - *Meade Peak Phosphatic Shale Member (Meade Peak Member)*. The Meade Peak Member is approximately 110 to 200 feet thick and consists of dark carbonaceous, phosphatic, and argillaceous rocks including shale, mudstone, and limestone. The upper contact of the Phosphoria Formation is marked by nodular phosphorite. The lower contact with the underlying Grandeur Tongue Member of the Park City Formation is marked by a phosphorite seam (4 to 6 inches thick) containing abundant fossil fish scale and bones. The mineable phosphate rock occurs in two separate ore zones within the Meade Peak Member, identified as the lower ore and upper ore, which are separated by approximately 80 to 110 feet of sub-economic phosphoric shale. The lower and upper ore units vary in thickness throughout the leases but average approximately 40 and 15 feet, respectively.
- *Grandeur Tongue Member of the Park City Formation – Pennsylvanian*. This unit directly underlies the Phosphoria Formation and outcrops on the central-western portion of Dry Ridge. The Grandeur Tongue Member of the Park City Formation is typically mapped with the Wells Formation. It is composed primarily of gray to tan, thick to massively bedded, finely to coarsely crystalline dolomite and dolomitic limestone. This unit ranges from 75 to 110 feet thick along Dry Ridge.
- *Wells Formation – Pennsylvanian*. The upper member of the Wells Formation averages 1,350 to 1,450 feet thick and consists of buff-colored sandy limestone, gray to reddish-brown sandstone, dolomitic limestone, and interbedded gray limestone and dolomite. The lower member of the Wells Formation averages 850 to 950 feet thick and consists of thin- and medium-bedded, gray, silty limestone with cherty nodules, flattened oolites,

and some interbedded sandstone. The Wells Formation outcrops along the western side of Dry Ridge. The Upper Wells Formation member is typically a light gray to yellowish-orange sandstone with interbedded limestone and chert bands in the upper 50 feet.

- *Monroe Canyon Limestone Formation – Mississippian*. The Monroe Canyon Limestone Formation (also mapped as the Brazer Limestone by Cressman and Gulbrandsen [1955]) is the oldest unit in the Dry Valley Quadrangle, deposited during the upper Mississippian Period. Only the upper 800 feet of the Monroe Canyon Limestone Formation are exposed in the area, which is characterized by thickly bedded, light gray limestone containing corals and brachiopods, and interbedded limestone and sandstone. This unit is partly exposed in Dry Valley and forms the axis of the Dry Valley anticline.

1.2.3.2 Structural Geology

The description of the structural geology provided in this section is summarized from Cressman and Gulbrandsen (1955) and subsequent studies by Ralston et al (1983) and Itafos (2020). The regional geologic structure is characterized by thrust faulting and folding into a series of northwest-to-southeast-trending folds (i.e., anticlines and synclines). Bedrock strata in the project area form the eastern limb of the Dry Valley anticline and generally dip northeastward. The Meade Peak Member is overturned at the NDR Lease and in the southern portion of the H1 Lease. Subsidiary folding and faulting are also found in the southern portion of the H1 Lease.

Two sets of faults were previously mapped in the project area: a set of thrust faults with strike parallel to northwest-trending folds with relatively large displacements (up to 500 feet) and an orthogonal set of minor faults with normal displacements less than 25 feet. The Henry Thrust Fault parallels Dry Ridge on the east side, and the Dry Valley Thrust Fault parallels Dry Ridge on the west side. The Dry Valley Thrust Fault and Henry Thrust Fault are subsidiary to the Meade Thrust Fault and are contained within the Meade Thrust plate. The north end of Dry Ridge is terminated by the Blackfoot Fault, which is a left lateral tear fault with approximately 1 mile of left-lateral displacement and substantial normal vertical displacement with the north side downthrown.

The structural feature that dominates the H1NDR area is the northwest-trending North Dry Valley anticline. The NDR and H1 Mines are located on the northeast limb of the anticline and, as such, the strata of NDR and H1 dips very steeply to near vertical to the northeast. Faulting in the northern portion of the NDR Lease has forced the Meade Peak Member of the Phosphoria Formation to uplift to the overlying Dinwoody Formation, resulting in the absence of the Meade Peak Member north of the Blackfoot Fault within the NDR property. Additional folding and faulting are found in the southern portion of the H1 Mine area (notably, the Stewart anticline), which trend northeast-southeast. The axis of the Stewart anticline is within the southern portion of the H1 Lease and results in a large outcrop area of the Meade Peak Member.

The project area is located on the upper Meade Thrust plate, one of several thrust plates developed as part of the Rocky Mountain overthrust belt, a zone of eastward compression associated with significant folding and faulting. These processes resulted in a series of northwest-to-southeast-trending anticlines and synclines that form northwest-to-southeast-trending ridges and valleys where exposed and shallow expressions of the Meade Peak Member of the Phosphoria Formation have been the target of phosphate mining in the region. The project area occurs along the northeast dipping limb of the Dry Valley anticline where the Phosphoria Formation outcrops along Dry Ridge. The Meade Peak Member outcrops between 7,550 and 8,260 feet amsl at the H1 Mine area and between 6,775 and 7,460 feet amsl level at the NDR Mine area.

The phosphate mineralization is sedimentary in nature, occurring in a conformable sequence of alternating phosphatic and weakly- to non-phosphatic shale, mudstone, carbonate, and chert beds within the Meade Peak Member. The phosphate mineralization encountered in the Meade Peak Member is stratigraphic in nature, and the deposit type is considered a typical example of a marine sedimentary phosphate deposit. The phosphate mineralization occurred during the primary depositional processes, and there are no known secondary phases of phosphate mineralization or enrichment identified in the deposits.

The beds of the Meade Peak Member were deposited within a marine sedimentary basin within the Phosphoria Sea that marked the western margin of the North American craton approximately 250 million years ago. Depositional processes during the period in which the Meade Peak Member was being deposited resulted in alternating beds of phosphatic shale and mudstone with layers of non-phosphatic shale, carbonate, and chert beds. The phosphate mineralization within the Meade Peak Member consists of apatite pellets, oolites, and sand grains, some of which are further cemented together into clusters of pellets and grains in an apatite cement; the apatite within the Meade Peak Member is entirely in the form of carbonate fluorapatite (Altschuler et al. 1958). Individual beds of the Meade Peak Member are laterally continuous over significant distances, with some beds commonly found distributed over tens of thousands of square miles within the Western Phosphate Field (Sheldon 1989); however, the thickness and geometry of the beds has been locally impacted on a deposit scale by both primary depositional variability and post-depositional structural modification due to both regional and deposit-scale faulting and folding.

Additional details regarding the structural geology of the project area, including geologic maps and geologic cross sections are provided in the MRP (Itafos 2020), the GWBSR (Arcadis 2020a), and the POC Application (Appendix A).

1.2.3.3 Groundwater Presence and Flow

The interaction of the regional geologic structure, differing hydraulic properties of the geologic units, and the recharge and discharge patterns has led to the identification of multiple groundwater flow systems within the project area. Regional groundwater studies (Ralston and Williams 1979a, 1979b; Ralston et al. 1981; Ralston et al. 1983; Mayo Muller, and Ralston 1985) identify three tiers of groundwater flow systems associated with the Meade Thrust plate of southeastern Idaho (Tetra Tech 2021 [Figure 2-9]). Tier 1 includes local- and intermediate-scale flow systems in the bedrock above the low-permeability Meade Peak Member and in the alluvium and colluvium near the land surface. Tier 2 includes the regional-scale flow systems in the bedrock below the Meade Peak Member but within the Meade thrust plate. Tier 3 includes very deep flow systems below the Meade thrust plate.

Groundwater flow in the local- and intermediate-scale systems is controlled by topography, stratigraphy, and geologic structure, whereas groundwater flow in the regional-scale system is controlled primarily by geologic structure and only secondarily by stratigraphy. Local- and intermediate-scale aquifers are recharged locally and discharge locally. Regional-scale aquifers are recharged where exposed at the surface and where they subcrop beneath saturated alluvium. They typically discharge at springs along the extensional fault that bounds the west side of the Aspen Range and along the eastern edge of the Meade Thrust plate (Tetra Tech 2021 [Figure 2-9]), although local discharge points within the thrust sheet also exist. Very little is known about the very deep flow systems below the Meade Thrust plate because very few wells have penetrated below the Meade Thrust, which more than 1 mile below land surface in the project area.

The groundwater flow and transport model (Tetra Tech 2021) includes local- and intermediate-scale systems and regional-scale aquifers. The model terminates at approximately 4,000 feet below mean sea level, the approximate location of the Meade thrust fault, which is postulated to be a barrier to groundwater flow. The local- and intermediate-scale systems and regional-scale groundwater flow systems are described in further detail in the Groundwater Flow and Transport Modeling Report (Tetra Tech 2021) and POC Application (Appendix A), and are summarized below.

1.2.3.3.1 Local- and Intermediate-Scale Groundwater Flow Systems

Local groundwater flow systems occur where alluvium is present along the surface water drainages (Appendix A [Figure 5-3]). Local- and intermediate-scale groundwater flow systems also exist in the Thaynes and Dinwoody Formations and in the Rex Chert Member of the Phosphoria Formation.

Groundwater flow paths in the local- and intermediate-scale aquifers are relatively short. Flow generally is from higher-elevation areas toward lower-elevation areas; consequently, the potentiometric surface typically is a subdued replica of topography (Tetra Tech 2021 [Figures 2-10, 2-11, and 2-12]). The topography is dramatic and highly variable in the project area (Figure 1-2); therefore, the potentiometric surface is expected to vary in a similar manner.

Recharge to the local- and intermediate-scale flow systems is from infiltration of precipitation and snowmelt on the outcrops and from seepage of surface water along losing reaches of streams crossing the outcrops. Losing reaches are present on all the monitored streams that drain the project area, as discussed in the Surface Water Baseline Study Report (SWBSR; Arcadis 2020b).

Groundwater flow in the intermediate bedrock units is structurally controlled and flows primarily along bedding planes. In the vicinity of the project, intermediate bedrock units outcrop east of the planned mine pits, and bedding planes generally dip towards the east (Appendix A), resulting in intermediate groundwater flow directions downdip towards the east or along strike (north or south). Locally, in the vicinity of the NDR pit, bedding planes are vertical or overturned (Appendix A [Figure 4-6]). Discharge from the local- and intermediate-scale groundwater flow systems in the Thaynes and Dinwoody Formations and the Rex Chert Member of the Phosphoria Formation typically occurs to the alluvial and colluvial aquifers along the steep canyon drainages (Appendix A [Figures 4-3 and 4-4]), to the underlying regional flow system (particularly in areas where the rocks are heavily fractured), and through evapotranspiration. Discharge from the alluvial aquifers occurs to gaining reaches of streams, to evapotranspiration (particularly in wetland areas), and, notably in Dry Valley, as downward seepage to underlying bedrock of the regional flow system (primarily Wells Formation).

1.2.3.3.2 Regional Groundwater Flow System

The geologic units comprising the regional groundwater flow system include the Grandeur Tongue Member of the Park City Formation (typically mapped with the Wells Formation), the Wells Formation, and the Monroe Canyon Formation. These units are present continuously throughout the project area and surrounding area and are compartmentalized by geologic structure (Appendix A [Figure 5-1]). About 3,000 feet of older Paleozoic-age sedimentary strata underlie the Monroe Canyon Formation in the Meade thrust sheet. These lower Paleozoic rocks may contain aquifers that are part of the regional groundwater flow system.

Recharge to the regional-scale groundwater flow system within and near the project area is derived from infiltration of precipitation and runoff on outcrops along Dry Ridge, Dry Valley, and the east side of upper Diamond

Valley. Losing reaches of Dry Valley Creek, Maybe Creek, and Diamond Creek provide recharge to the underlying alluvial aquifers, which in turn recharge the regional aquifer system beneath the alluvium. Groundwater in the regional system also enters the project area as deep underflow from the east, where the aquifers are present in the subsurface.

Based on potentiometric data from monitoring wells within and near the project area, the regional groundwater hydraulic gradient is generally toward the west-southwest (Appendix A [Figure 5-2]; Tetra Tech 2021 [Figure 2-13]). Although the Wells Formation and Monroe Canyon Formation dip steeply eastward just east of the axis of the Dry Valley anticline, the groundwater monitoring well data (i.e., between monitoring wells MW-501-BW and MW-301-BW [Appendix A (Figure 5-2)]) do not indicate an eastward hydraulic gradient in the regional aquifer in this area. Rather, groundwater in the regional flow system likely flows westward, as indicated by the hydraulic gradient. Exceptions to the westward regional flow may occur along higher elevation Wells Formation and Monroe Canyon Formation outcrops along Dry Ridge and along the axis of the Snowdrift anticline on the east side of upper Diamond Creek valley.

A compartmentalized/localized flow system is present in the Wells Formation along Dry Ridge. This is indicated by potentiometric surface elevations at Wells Formation monitoring well MW-201-BW in the NDR area and at VWP H12-11-1 in the H1 Mine area (Appendix A [Figure 5-3]) that are hundreds of feet higher than would be expected in the regional groundwater flow system. The strong downward hydraulic gradient indicated by the relatively high water level elevations in these wells is likely due to a combination of hydraulic properties, recharge, and compartmentalization. Testing in monitoring well MW-201-BW in the Wells Formation and packer testing in the borehole for monitoring well MW-701-BG in the Grandeur Tongue Member of the Park City Formation at the North Maybe Mine open pit indicated low hydraulic conductivity values (AECOM 2014). The existence of transient pit lakes in the North Maybe Mine and South Maybe Canyon Mine open pits (Global Environmental Technologies 2007; Arcadis 2019a) supports the packer test results, showing low hydraulic conductivities in the uppermost unit of the regional aquifer (the Grandeur Tongue of the Park City Formation).

Further evidence for a strong downward gradient is provided by drilling and monitoring data from well HU-MW-3BW in the northern part of the H1 Lease area (Arcadis 2020a). Groundwater at monitoring well HU-MW-3BW was encountered at about 500 feet below the top of the Wells Formation, at a depth of 1,003 feet below ground surface (bgs), entering the borehole from a fracture.[1] The well was drilled to 1,175 feet bgs, and the water level initially stabilized between about 1,058 and 1,075 feet bgs (Arcadis 2020a). After the well was completed, the water level declined gradually until the water level was below the well casing (Arcadis 2020a).

As described in Arcadis (2020a), three vibrating wire piezometers were installed in the HU-MW-3BW borehole and set in the Cherty Shale Member and Meade Peak Member of the Phosphoria Formation and the Grandeur Tongue of the Park City Formation at depths of 170, 425, and 680 feet bgs, respectively. The water level elevation data from the Wells Formation and the vibrating wire piezometers indicated a downward gradient of approximately 1 foot per foot. Permeability dominated by fractures oriented perpendicular to bedding and of relatively small lateral extent relative to the bedding (and thus poorly interconnected) combined with steeply dipping to overturned bedding could result in groundwater within a poorly interconnected fracture system appearing to be perched.

[1] The well completion report for monitoring well HU-MW-3BW is provided in Appendix B to the GWBSR (Arcadis 2020a).

West of the H1NDR mine areas and the axis of the Dry Valley anticline, the groundwater in the regional aquifer passes beneath Dry Valley and Schmid Ridge and continues moving west-southwest toward regional discharge points at the extensional fault, bounding the west side of the Aspen Range approximately 15 miles from the project area (Arcadis 2015; Ralston et al. 1983). East of the divide, the regional groundwater flow is generally east and southeast; west of the divide, the regional flow is west and southwest. The divide would be produced by recharge to the regional aquifer east of the project area. Such recharge could occur where the regional aquifer is exposed along the axis of the anticline in the Diamond Creek drainage east and southeast of the H1 Lease area and where it subcrops beneath the alluvial aquifer in Diamond Valley.

Potentiometric data suggest a change or discontinuity across the Blackfoot Fault north of the NDR Lease area, which is consistent with the regional flow system interpretation by Mayo, Muller, and Ralston (1985) for the Meade thrust allochthon. North of the fault, in the vicinity of the Rasmussen Valley Mine, groundwater flow in the regional aquifer is generally toward the north and northwest. In contrast, south of the fault, in the H1NDR area, regional flow is toward the west-southwest, and potentiometric data suggest that flow in the regional flow system at the north end of the NDR area is to the north-northwest (Tetra Tech 2021 [Figure 2-13]). The apparent change in flow direction across the Blackfoot Fault occurs where the lower Thaynes and Dinwoody Formations (both of which exhibit lower permeability) are brought adjacent to the Wells and Monroe Canyon Formations. The presence of fault gouge and/or breccia along the faults in the H1NDR area is not well documented, but may be suggested by groundwater flow patterns, particularly in cases where lower-permeability units are brought into contact with higher-permeability units.

2 Monitoring Programs

This EMP describes proposed monitoring programs that will be conducted during mining operations and during the post-mining period. The purpose of the monitoring programs is to:

- Monitor surface water quality
- Monitor groundwater quality
- Monitor reclamation success and selenium concentrations in reclamation vegetation
- Monitor and control the presence of noxious weeds
- Provide a plan for identifying and segregating of mined overburden.

Quality assurance for the monitoring programs will be described in project-specific Quality Assurance Project Plans (QAPPs) that will be prepared before beginning operations. In addition, a work plan for noxious weed monitoring and control and a work plan and QAPP for vegetation monitoring will be completed before beginning reclamation at H1NDR.

2.1 Surface Water Monitoring

This section describes the studies that were conducted to assess baseline surface water conditions and describes the surface water monitoring objectives and plan for the project.

2.1.1 Surface Water Baseline Conditions

The project is located within the Blackfoot River sub-basin upstream of the Blackfoot Reservoir. The Blackfoot River sub-basin is classified by the U.S. Geological Survey (USGS) as an 8th order hydrologic unit code (HUC-8) sub-basin (17040207); it was classified as an HUC-4 sub-basin at the time the SWBSR was published (Arcadis 2020b). This sub-basin occupies 1,270 square miles and drains into the Snake River basin. The Blackfoot River sub-basin includes historical phosphate mines in varying stages of closure, reclamation, and/or remediation, as well as several active phosphate mines. The project is located within two watersheds (HUC-10; previously categorized as a HUC-5 at the time the SWBSR was published) within the sub-basin. These watershed sub-basins are further broken into sub-watersheds (HUC-12; previously categorized as a HUC-6 at the time the SWBSR was published) and drainages. Arcadis has adopted the naming convention of these drainages from adjacent mine sites and the USGS, which are presented along with the associated Idaho Department of Environmental Quality (IDEQ) assessment unit names and identification numbers in Table 2-1, below.

Table 2-1. H1NDR Area Watersheds

<table>
<tr><th>IDEQ Watershed (HUC-10)</th><th>IDEQ Subwatershed (HUC-12)</th><th>IDEQ Assessment Unit Name (Assessment Unit ID)</th><th>Drainage</th></tr>
<tr><td rowspan="2">Lanes Creek-Diamond Creek (1704020701)</td><td rowspan="2">Headwaters Diamond Creek (170402070103)</td><td>Diamond Creek – unnamed tributaries (ID17040207SK016_02)</td><td>South Stewart Canyon</td></tr>
<tr><td>Stewart Canyon (ID17040207SK016_02f)</td><td>Stewart Canyon</td></tr>
<tr><td rowspan="10">Upper Blackfoot River (1704020702)</td><td>Goodheart Creek-Middle Slug Creek (170402070203)</td><td>Goodheart Creek (ID17040207SK012_02b)</td><td>Goodheart Creek</td></tr>
<tr><td rowspan="6">Angus Creek-Blackfoot River (170402070205)</td><td>East Mill Creek (ID17040207SK015_02a)</td><td rowspan="2">East Mill Creek</td></tr>
<tr><td>Lower Mill Canyon (ID17040207SK015_02b)</td></tr>
<tr><td>Blackfoot River – headwaters to Slug Creek (ID17040207SK010_04)</td><td rowspan="3">Blackfoot River</td></tr>
<tr><td>Lower Angus Creek – Rasmussen Creek to Blackfoot River (ID17040207SK023_04)</td></tr>
<tr><td rowspan="2">Mill Canyon Creek and other Blackfoot River 2nd order tributaries (ID17040207SK010_02)</td></tr>
<tr><td>Unnamed Drainage 13</td></tr>
<tr><td rowspan="3">Dry Valley Creek (170402070206)</td><td>Dry Valley Creek – unnamed tributaries (ID17040207SK013_02)</td><td rowspan="2">Dry Valley Creek</td></tr>
<tr><td>Dry Valley Creek (ID17040207SK013_02a)</td></tr>
<tr><td>Maybe Creek – source to mouth (ID17040207SK014_02)</td><td>Maybe Creek</td></tr>
</table>

Notes:
The information in this table was obtained from the USGS National Geospatial Technical Operations Center: Watershed Boundary Dataset (USGS 2020) and the IDEQ 2018/2020 305(b) Integrated Report (IDEQ 2020).
ID = identification

To assess baseline surface water conditions prior to project operations data were collected during baseline studies between May 2011 and October 2019. These studies and the study results are presented in the the Final SWBSR (Arcadis 2020b [data collected between 2014 and 2019]). During the study of the baseline conditions within the H1NDR area, 252 surface water locations were accessed for some or all of the following:

- Surface water quality and flow rate measurement

- Seep/spring surveys
- Stream gain-loss surveys along the Blackfoot River from its headwaters to the confluence with Dry Valley Creek.

Water quality standards for surface water are established in Idaho Administrative Procedures Act (IDAPA) 58.01.02 (Idaho Department of Administration 2021). According to IDAPA 58.01.02, streams and lakes are classified and managed by beneficial use. Designated beneficial uses for a water body may include warm- or cold-water aquatic life; salmonid spawning; seasonal cold water or modified aquatic life; primary- or secondary-contact recreation; domestic, agricultural, or industrial water supply; wildlife habitat; and aesthetics. If more than one beneficial use is recognized for a water body, the most stringent water quality standard is applicable. Standards for cold-water aquatic life, primary- or secondary-contact recreation, agricultural water supply, industrial water supply, wildlife habitat, and aesthetics are applicable to all undesignated non-private surface water bodies in the state of Idaho. Water quality standards are not applicable to mine water management and impoundment facilities, such as sedimentation ponds and pit impoundments.

The Blackfoot River has designated beneficial uses including recreation, cold-water aquatic life habitat, salmonid spawning habitat, wildlife habitat, and aesthetics. Beneficial uses also include water rights (i.e., domestic, agricultural, or industrial water supply) designated at specific locations.

2.1.2 Surface Water Monitoring Objective

Surface water monitoring will be conducted throughout the project to identify any changes from baseline surface water conditions potentially caused by project operations.

The objective of surface water monitoring during operations is to monitor for changes in surface water conditions, such as changing levels of constituents of potential concern (COPCs), associated with project activities at the H1NDR.

2.1.3 Surface Water Monitoring Plan

During H1NDR mining operations, surface water monitoring will be conducted twice annually at 16 locations, in spring (high-flow conditions, typically in May or June) and fall (low-flow conditions, typically in September or October). The timing of the monitoring events will depend on observed site and access conditions. Surface water monitoring will be conducted concurrently with groundwater monitoring.

Proposed surface water monitoring locations are shown on Figures 2-1, 2-2, and 2-3 and listed in Table 2-2, below. Surface water monitoring locations were established along Maybe Creek, Dry Valley Creek, Stewart Creek, South Stewart Creek, and Unnamed Drainage 13. Surface water monitoring locations were not established where surface water monitoring is being conducted for other projects in the area along Dry Valley Creek, Maybe Creek, and East Mill Creek to avoid duplicative monitoring. Data collected and published for these other projects may be incorporated into the H1NDR dataset by reference. Data collected by other projects along these drainages may be incorporated after the data become publicly available in annual reports.

Environmental Monitoring Plan

Table 2 2. Surface Water Sampling Locations

Sample Location	Drainage	Waterbody Type	Latitude[a]	Longitude[b]	Surface Elevation (feet amsl)
HNSS-11	Maybe Creek	Pond Outflow	42.706633	-111.256141	8399
HNSS-8	Maybe Creek	Seep/Spring	42.718099	-111.265423	7970
SW-SP36	Maybe Creek	Seep/Spring	42.721442	-111.271525	7829
SW-SP42	Maybe Creek	Seep/Spring	42.722752	-111.273300	7760
HNSS-30	Maybe Creek	Seep/Spring	42.729210	-111.280925	7344
SW-SP48	Dry Valley Creek	Pond Outflow	42.725332	-111.305895	6572
HNSS-22	South Stewart Creek	Seep/Spring	42.682758	-111.228730	7530
HNSS-24	South Stewart Creek	Seep/Spring	42.683677	-111.228501	7488
SW-SSC1	South Stewart Creek	Stream	42.689869	-111.201516	6939
SW-SP40	Stewart Creek	Seep/Spring	42.698726	-111.243524	8255
HNSS-15	Stewart Creek	Seep/Spring	42.697411	-111.245539	8023
HNSS-18	Stewart Creek	Seep/Spring	42.695264	-111.243340	7830
SW-SC2	Stewart Creek	Stream	42.692402	-111.225369	7303
SW-SC1	Stewart Creek	Stream	42.694623	-111.200253	6933
SW-INT13	Unnamed Drainage 13	Stream	42.811106	-111.326250	6525
HNSS-21	Unnamed Drainage 13	Seep/Spring	42.803321	-111.326693	6775

Notes:
[a] North American Horizontal Datum 1983, measured in decimal degrees.
[b] North American Vertical Datum 1988, measured in decimal degrees.
amsl = above mean sea level

Surface water monitoring will include the following activities:

- Measurement of field parameters: pH, temperature, specific conductance, oxidation-reduction potential, dissolved oxygen, and turbidity
- Manual measurement of stream flow
- Collection and laboratory analysis of water quality samples.

Table 2-3 includes the potential target laboratory analytes that will be analyzed for in surface water samples. Field parameter measurements and analytical samples will be collected, preserved, and analyzed in accordance with the QAPP.

An updated monitoring work plan, including locations, methodologies, analytical testing, and a QAPP, will be developed after the Record of Decision has been issued.

2.2 Groundwater Monitoring

This section describes the studies that were conducted to assess baseline groundwater conditions and describes the groundwater monitoring objectives and plan for the project.

2.2.1 Groundwater Baseline Conditions

To assess baseline groundwater conditions prior to project operations data were collected during baseline studies between October 2012 and October 2019. Results of the groundwater baseline studies are presented in the GWBSR (Arcadis 2020a). The baseline studies included the following activities:

- Installation of 17 monitoring wells and 56 datalogging vibrating wire piezometers[2] at 30 boreholes within the study area between 2011 and 2013.
- Single-well aquifer tests performed at eight monitoring wells in July and September 2014 to assess the transmissivity and storativity of the saturated hydrostratigraphic units at the H1NDR.
- Semiannual analytical sampling and/or groundwater level monitoring at 22 monitoring wells between July 2012 and October 2019. Data presented in the GWBSR (Arcadis 2020a) include monitoring wells from multiple projects in the area including the Champ Mine, Dry Valley Mine, North Maybe Mine, and South Maybe Canyon Mine projects

Groundwater at H1NDR occurs in three general flow systems as described in Section 1.2.3.3 (regional, intermediate, and local groundwater flow systems). The regional groundwater flow system comprises the Grandeur Tongue Member of the Park City Formation, the Wells Formation, and the Monroe Canyon Formation. Local- and intermediate-scale groundwater flow systems exist in the Thaynes and Dinwoody Formations and in the Rex Chert Member of the Phosphoria Formation. Local groundwater flow systems occur where alluvium is present along the surface water drainages.

Primary and secondary groundwater quality standards for Idaho are established in IDAPA 58.01.11 (Idaho Department of Administration 2020). All aquifers within the H1NDR area are classified as General Resource or are currently unclassified.

2.2.2 Groundwater Monitoring Objective

Compliance with Idaho's Groundwater Quality Standards for H1NDR will be established through a project-specific point-of-compliance (POC) determination from the IDEQ under IDAPA 58.01.11.401 (Idaho Department of Administration 2020). The objective of groundwater monitoring during operations is to monitor for changes in groundwater conditions, including changing COPC concentrations, potentially resulting from project activities at H1NDR, and collect data that may be used to assess compliance with the Idaho Groundwater Quality Rule (IDAPA 58.01.11).

[2] Twenty vibrating wire piezometers provided useable water level data and exhibited saturated or seasonally saturated conditions after water levels equilibrated following borehole completion (Table 1 in Arcadis 2019b).

2.2.3 Groundwater Monitoring Plan

The POC Application submitted to the IDEQ on January 18, 2022 (Arcadis 2022) presents the proposed groundwater monitoring network, and is provided as Appendix A to this EMP.

Well construction details for the groundwater monitoring network are provided in Table 2-4, along with a proposed well installation schedule. Additional details regarding the proposed POC monitoring well network are provided in the POC Application (Appendix A). The proposed monitoring well network is subject to change depending on the POC determination. If the monitoring well network is modified in the future, the new well locations and well construction details will be updated in a revised EMP as appropriate.

Groundwater monitoring will be conducted twice annually, in spring (high-flow conditions, typically in May or June) and fall (low-flow conditions, typically in September or October), concurrent with surface water monitoring activities. The actual timing of the monitoring events will depend on observed site and access conditions.

Groundwater monitoring will include the following activities:

- Measurement of field parameters: pH, temperature, specific conductance, oxidation-reduction potential, dissolved oxygen, and turbidity
- Measurement of groundwater depth
- Collection of groundwater quality samples for laboratory analysis.

Table 2-5 includes the potential target laboratory analytes that will be analyzed for in groundwater samples. Field parameter measurements and analytical samples will be collected, preserved, and analyzed in accordance with the QAPP.

This groundwater monitoring work plan, including locations, methodologies, analytical testing, and a QAPP, will be updated when the POC determination is finalized by the IDEQ.

2.3 Reclamation Monitoring

This section describes the proposed reclamation monitoring for the project.

2.3.1 Soils

The soils to be used for reclamation and cover construction will be obtained on lease or from adjacent borrow areas. The performance standard for soils is the concentration of selenium in vegetation grown in the soil, which will be monitored; therefore, soil monitoring for selenium will not be required.

2.3.2 Vegetation

The objective of the vegetation monitoring plan is to monitor re-vegetation to determine compliance with the Caribou National Forest Revised Forest Plan (Revised Forest Plan; USFS 2003) standards.

2.3.2.1 Annual Monitoring

The Revised Forest Plan Prescription 8.2.2(g) Standard (USFS 2003) states that "vegetation monitoring to determine reclamation success on reclaimed sites shall be conducted annually and reported to the USFS by the operator until reclamation is accepted and the reclamation bond is released." Itafos' annual vegetation monitoring will include visually inspecting for dead spots, weeds, or damaged areas of vegetation and reseeding if necessary. Yearly photos at established locations will be taken to document the vegetative cover. Photos and documentation of the monitoring will be included in the Annual Operations Report.

2.3.2.2 Vegetation Surveys

Vegetation surveys will consist of visual estimates and sampling. Itafos will conduct detailed cover vegetation surveys no sooner than 2 and 4 years after seeding and no later than 2 and 4 years after completion of final mine reclamation to determine reclamation success. Vegetative cover estimates will be conducted along survey transects with one transect per 1,000 feet.

Visual estimates of reclamation vegetation success, including cover percentage and richness in accordance with Revised Forest Plan (USFS 2003) requirements, will be conducted using the Daubenmire system (or similar system) at randomly selected locations on reclaimed areas along each transect, spaced approximately 200 feet apart. The same locations will be used for subsequent survey events.

Vegetation sampling will be conducted 2 and 4 years after completion of final mine reclamation at the same locations as established for the visual estimate transects. Sampling will be conducted at the same time each year, at the end of the growing season. The frequency of vegetation sampling will be re-evaluated, as needed, in coordination with the BLM.

Samples of reclamation vegetation will be analyzed for the constituents listed in Table 2-6, below, with the laboratory analysis methods to be determined prior to sample collection. The recorded level for selenium in reclamation vegetation will also be used as the performance standard for selenium in reclamation soils.

Table 2-6. Mine Reclamation Vegetation Suitability Standards

Constituent	Screening Level (mg/kg, dry weight)
Selenium	5.0
Cadmium	4.2
Chromium	30.6
Nickel	35.5
Vanadium	55.9
Zinc	615.0

Note:
mg/kg = milligram per kilogram.

2.4 Noxious Weed Control

Noxious weed monitoring will be a continuous process during mining operations and periodically during post-closure activities. Post-closure noxious weed monitoring and spraying within the disturbance area, will occur annually, at a minimum, until the leases are relinquished by the BLM. Weed species and locations will be documented as part of the weed control program. A Pesticide Use Proposal will be developed and submitted for approval by the USFS and BLM. Application and reporting of pesticides will be in accordance with the proposal. Annual reporting of noxious weed management will be submitted in the Annual Operations Report.

2.5 Overburden Segregation

This section describes the baseline overburden conditions at the H1NDR and describes the objective of segregating mined overburden and the plan for overburden segregation.

2.5.1 Overburden Baseline Conditions

The overburden that contains Meade Peak Member (center waste shale, hanging wall mud, and footwall muds) and certain strata within the Rex Chert Member and Cherty Shale Member (dark-colored chert) have the potential for releasing COPCs, including selenium. This overburden is called "Meade Peak material" or "Meade Peak overburden." Overburden not containing this material, and designated as "non-Meade Peak material" or "non-Meade Peak overburden," typically does not contain leachable COPCs at levels that would prevent it from being used for constructing roads and other ancillary foundations. The non-Meade Peak material typically includes the alluvial/colluvial deposits, hard sparry lighter-colored layers of the Rex Chert Member of the Phosphoria Formation, the Dinwoody Formation, the Grandeur Tongue Member of the Park City Formation, and the Wells Formation.

2.5.2 Overburden Segregation Objective

The objective of the overburden segregation program is to identify and segregate mined overburden so that only non-Meade Peak material is used to construct roads and other ancillary features. In addition, Meade Peak and non-Meade Peak material will be identified in the field so that proper segregation occurs in an accurate and timely manner.

2.5.3 Overburden Segregation Plan

Non-Meade Peak material to be used for constructing roads and other ancillary structures will be visually identified in situ by trained operators, marked with wood stakes and/or colored flagging, and segregated during mining as necessary. Overburden materials will be handled according to the MRP (Itafos 2020).

3 Data Validation and Reporting

Data quality objectives, data validation, and other quality assurance/quality control procedures will be defined in the QAPPs of the final EMP, and field procedures will follow medium-specific Field Sampling Plans, which will be developed before sampling begins. The field procedures and laboratory results will be reviewed and evaluated by the Project Manager and Quality Assurance Officer to confirm that the data obtained from the field activities are valid and meet the data quality objectives defined in the QAPPs.

4 References

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Tables

Table 2-3
Potential Surface Water Analyte List
Environmental Monitoring Plan
Husky 1 North Dry Ridge Mine
Caribou County, Idaho

ARCADIS

Analyte	Analytical Method	Fraction	Unit	Criteria for Protection of Aquatic Life		Criteria for Protection of Human Health Based on Consumption of:		Selected Screening Level
				CMC (Acute)	CCC (Chronic)	Water and Fish	Fish Only	
General Parameters								
Flow	Field Measurement	--	cfs	--	--	--	--	--
pH	Field Measurement	N	S.U.	--	--	--	--	6.5 to 9.0[a]
Specific Conductivity	SM 2510B	N	mS/cm	--	--	--	--	--
Dissolved Oxygen	Field Measurement	N	mg/L	--	--	--	--	>6[a]
Oxidation Reduction Potential	Field Measurement	N	mV	--	--	--	--	--
Alkalinity	SM 2320B	N	mg/L	--	--	--	--	--
Total Hardness	USEPA SW6020B	D	mg/L	--	--	--	--	--
Total Suspended Solids	SM 2540D	N	mg/L	--	--	--	--	--
Total Dissolved Solids	SM 2540D	D	mg/L	--	--	--	--	--
Total Dissolved Solids Balance	SM 1030E	N	none	--	--	--	--	--
A/C Balance (+/- 5)	SM 1030E	N	%	--	--	--	--	--
Total Organic Carbon	SM 5310C	N	mg/L	--	--	--	--	--
Temperature	Field Measurement	N	°C	--	--	--	--	<22[a]
Turbidity	USEPA E180.1	N	NTU	--	--	--	--	[b]
Major Ions								
Chloride	USEPA E300.0	N	mg/L	--	--	--	--	--
Sodium	USEPA SW6020B	D	mg/L	--	--	--	--	--
Sulfate	USEPA E300.0	N	mg/L	--	--	--	--	--
Metals								
Antimony	USEPA SW6020B	D	mg/L	--	--	0.0052	0.190	0.0052
Arsenic	USEPA SW6020B	D	mg/L	0.340	0.150	0.010	0.010	0.010
Cadmium	USEPA SW6020B	D	mg/L	[c]	[c]	--	--	[d]
Copper	USEPA SW6020B	D	mg/L	0.0123[e]	0.0076[e]	1.30	--	0.0076[e]
Nickel	USEPA SW6020B	D	mg/L	[c]	[c]	0.058	0.10	[d]
Selenium	USEPA SW6020B	D	mg/L	--	0.0015 or 0.0031[f]	0.029	0.250	0.0015 or 0.0031[f]
Selenium	USEPA SW6020B	T	mg/L	--	0.0015 or 0.0031[f]	--	--	0.0015 or 0.0031[f]
Thallium	USEPA SW6020B	D	mg/L	--	--	0.000017	0.000023	0.000017
Zinc	USEPA SW6020B	D	mg/L	[c]	[c]	0.870	1.50	[d]

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Table 2-3
Potential Surface Water Analyte List
Environmental Monitoring Plan
Husky 1 North Dry Ridge Mine
Caribou County, Idaho

Notes:

[a] pH, dissolved oxygen, temperature, and turbidity screening levels are based on the IDAPA 58.01.02 Cold Water Surface Water Quality Criteria for Aquatic Life Use Designations (Idaho Department of Administration 2021).

[b] IDAPA 58.01.02 Water Quality Standards specify screening turbidity at <25 NTU above background for 10 consecutive days and <50 NTU above background at any time.

[c] IDAPA 58.01.02 Water Quality Standards screening levels (i.e., the aquatic CCC) for these metals are a function of total hardness (mg/L as calcium carbonate) and the pollutant's water effect ratio as defined in IDAPA 58.01.02 Subsection 210.03.c.iii., and multiplied by an appropriate dissolved conversion factor as defined in IDAPA 58.01.02 Subsection 210.02 (Idaho Department of Administration 2021).

[d] CCC value selected.

[e] Aquatic life criteria for copper are derived using the Biotic Ligand Model in accordance with IDAPA 58.01.02 Subsection 210.02.c.v (Idaho Department of Administration 2021).

[f] Selenium water column screening levels are dependent on whether the location is lentic or lotic. Lentic (ponded) locations are screened against the 0.0015 mg/L criterion. Lotic (flowing) locations are screened against the 0.0031 mg/L criterion.

Acronyms and Abbreviations:

-- = not available
< = less than
> = greater than
°C = degree Celsius
A/C = anion/cation
cfs = cubic feet per second
CMC = criteria maximum concentration
CCC = criteria continuous concentration
D = dissolved
IDAPA = Idaho Administrative Procedures Act
mg/L = milligram per liter
mS/cm = milliSeimen per centimeter
mV = millivolt
N = primary sample
NTU = nephelometric turbidity unit
SM = standard method
S.U. = standard unit
T = total
USEPA = United States Environmental Protection Agency

Reference:

Idaho Department of Administration. 2021. Idaho Administrative Procedures Act (IDAPA) 58.01.02 Surface Water Quality Standards. July 1. Available online at: https://adminrules.idaho.gov/rules/current/58/580102.pdf.

Table 2-4
Proposed H1NDR Groundwater Monitoring Well Network
Environmental Monitoring Plan
Husky 1 North Dry Ridge Mine
Caribou County, Idaho

ARCADIS

Well ID	Screened Formation	Northing (feet)[a]	Easting (feet)[a]	Latitude	Longitude	Ground Surface Elevation (feet amsl)[b]	Total Well Depth (feet bgs)[c]	Screened Interval (feet bgs)	Installation Schedule
Proposed Point of Compliance Well									
NDR-MW-22BW	*Wells Formation*	*416517*	*877734*	*42.805958*	*-111.340986*	*6850*	*500*	*475 - 495*	*Anticipated installation in the first year of construction at the NDR Mine, expected to be Production Year 10*
Proposed Indicator Monitoring Wells									
NDR-MW-21A	*Alluvium / Colluvium*	*414587*	*881846*	*42.801275*	*-111.325739*	*6900*	*20*	*10 - 20*	*Anticipated installation in the first year of construction at the NDR Mine, expected to be Production Year 10*
NDR-MW-19A	Alluvium / Colluvium	412188	882634	42.794672	-111.322892	6911	25	10 - 20	Existing Well Installed 2013
SM-MW-20A	*Alluvium / Colluvium*	*394915*	*890134*	*42.747072*	*-111.295617*	*6864*	*20*	*10 - 20*	*Anticipated installation in the first year of construction of the H1 Mine, expected to be Production Year 1*
HU-MW-10A	*Alluvium / Colluvium*	*374468*	*907585*	*42.690464*	*-111.231499*	*7440*	*15*	*5 - 15*	*Anticipated installation in the first year of construction of the H1-L Pit, expected to be Production Year 7*
SM-MW-11BD	Dinwoody Formation	388938	893642	42.730576	-111.282789	7254	193	171 - 191	Existing Well Installed 2013

Notes:

Underlined italics indicates future monitoring well to be installed. Location coordinates, elevation, depths, and screened intervals are estimated based on site knowledge. Actual monitoring well locations will be sited based on field reconnaissance and access considerations. Actual monitoring well construction details will be determined based on field conditions observed during drilling.

[a] Horizontal datum = North American Datum of 1983, Idaho State Plane System East.

[b] Vertical datum = NAVD88: ellipsoid height adjusted to NAVD88 by applied geoid model GEOID99. Approximate ground surface elevations were estimated using Google Earth for new wells.

[c] Total depth values were estimated using available geologic maps and nearby borehole information.

Acronyms and Abbreviations:

amsl = above mean sea level
bgs = below ground surface
NAVD88 = North American Vertical Datum of 1988

3/18/2022

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Table 2-5
Potential Groundwater Analyte List
Environmental Monitoring Plan
Husky 1 North Dry Ridge Mine
Caribou County, Idaho

Analyte	Analytical Method	Fraction	Unit	Numeric Water Quality Standards – Groundwater – Idaho GWQS (mg/L)		Primary/Secondary Standard
General Parameters						
Groundwater Level	Field Measurement	--	ft	--	--	--
pH	Field Measurement	N	S.U.	6.5 to 8.5	b	Secondary
Specific Conductivity	SM 2510B	N	mS/cm	--	--	--
Dissolved Oxygen	Field Measurement	N	mg/L	--	--	--
Oxidation Reduction Potential	Field Measurement	N	mV	--	--	--
Alkalinity	SM 2320B	N	mg/L	--	--	--
Total Hardness	USEPA SW6020B	D	mg/L	--	--	--
Total Suspended Solids	SM 2540D	N	mg/L	--	--	--
Total dissolved solids	SM 2540D	N	mg/L	500	b	Secondary
A/C Balance (+/- 5)	SM 1030E	N	%	--	--	--
Total Organic Carbon	SM 5310C	N	mg/L	--	--	--
Temperature	Field Measurement	N	°C	--	--	--
Turbidity	USEPA E180.1	N	NTU	--	--	--
Major Ions						
Chloride	USEPA E300.0	N	mg/L	250	b	Secondary
Sodium	USEPA SW6020B	D	mg/L	--	--	--
Sulfate	USEPA E300.0	N	mg/L	250	b	Secondary
Metals						
Antimony	USEPA SW6020B	T	mg/L	0.006	a	Primary
Arsenic	USEPA SW6020B	T	mg/L	0.05	a	Primary
Cadmium	USEPA SW6020B	T	mg/L	0.005	a	Primary
Copper	USEPA SW6020B	T	mg/L	1.3	a	Primary
Iron	USEPA SW6020B	T	mg/L	0.3	b	Secondary
Manganese	USEPA SW6020B	T	mg/L	0.05	b	Secondary
Selenium	USEPA SW6020B	T	mg/L	0.05	a	Primary
Thallium	USEPA SW6020B	T	mg/L	0.002	a	Primary
Zinc	USEPA SW6020B	T	mg/L	5	b	Secondary

Notes:

[a] Primary numeric GWQS (Groundwater Quality Rule IDAPA §58.01.11 [Idaho Department of Administration 2021]).

[b] Secondary numeric GWQS (Groundwater Quality Rule IDAPA §58.01.11 [Idaho Department of Administration 2021]).

Acronyms and Abbreviations:

-- = not available
°C = degree Celsius
A/C = anion/cation
D = dissolved
ft = feet
GWQS = groundwater quality standard
IDAPA = Idaho Administrative Procedures Act
mg/L = milligram per liter
mS/cm = milliSeimen per centimeter
mV = millivolt
N = primary sample
NTU = nephelometric turbidity unit
SM = standard method
S.U. = standard unit
T = total
USEPA = United States Environmental Protection Agency

Reference:

Idaho Department of Administration. 2021. Groundwater Quality Rule. IDAPA 58.01.11. Available online at: https://adminrules.idaho.gov/rules/current/58/580111.pdf.

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Figures

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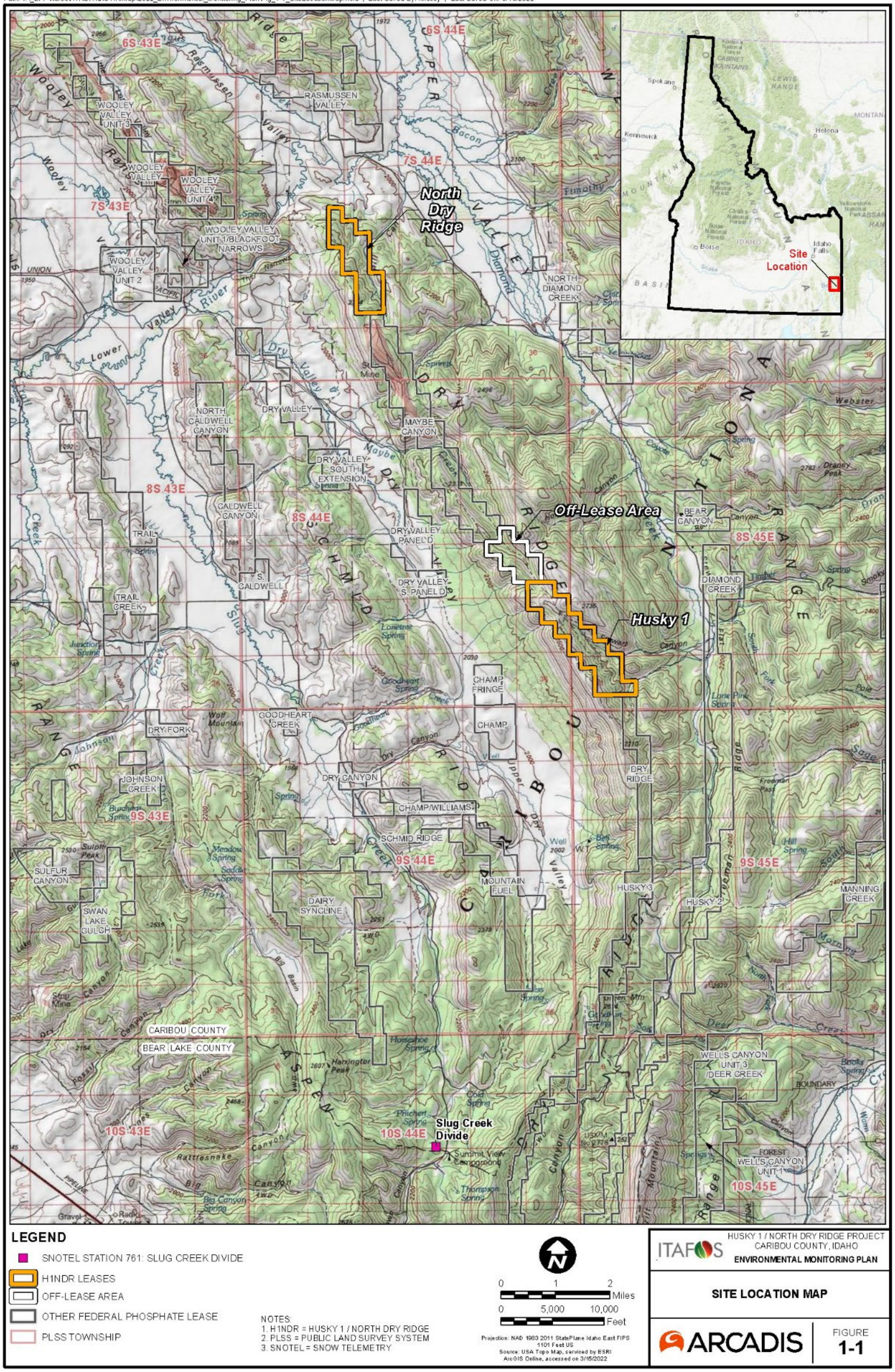

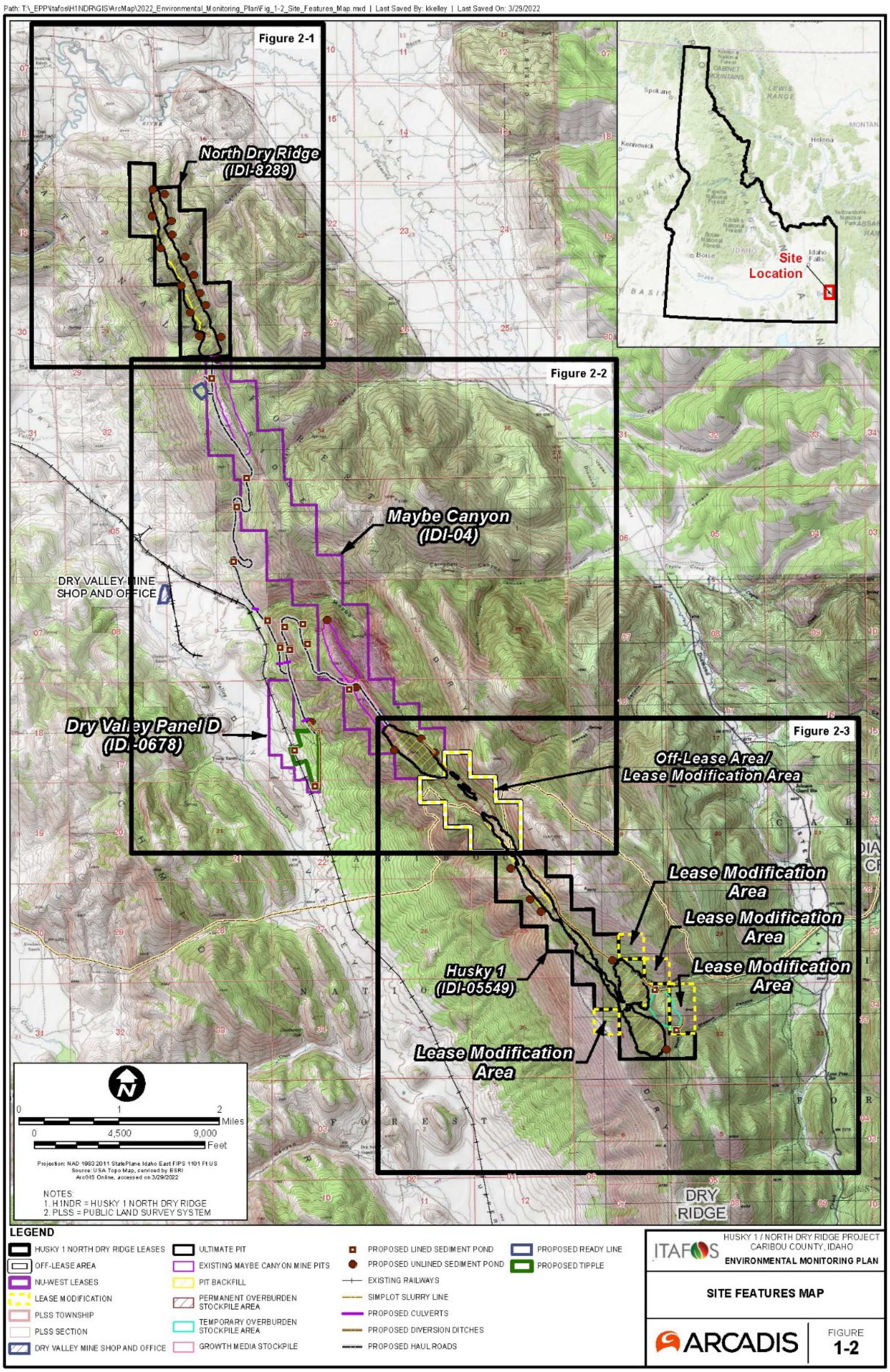

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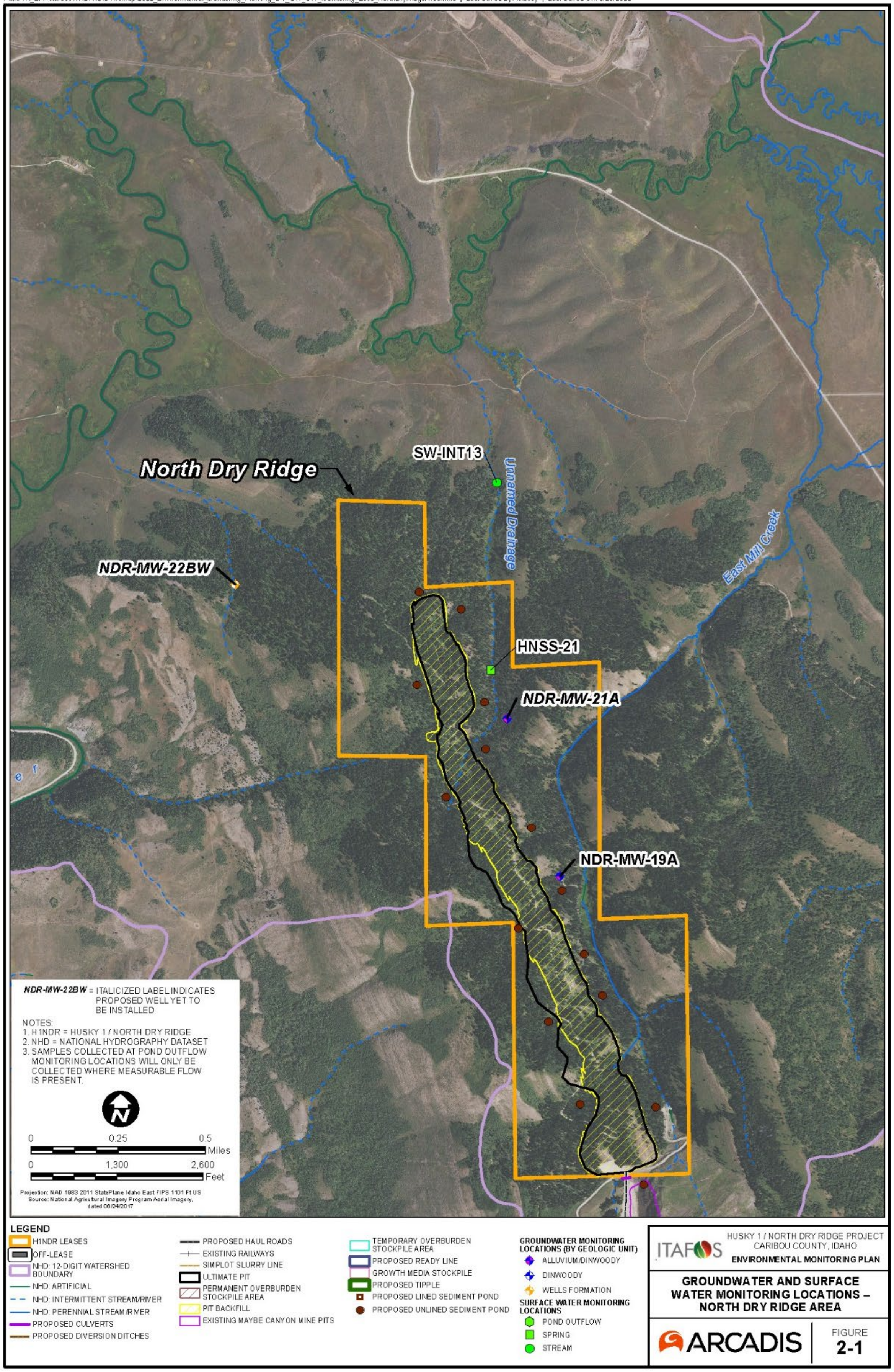
Figure 2-1
Figure 2-2
Figure 2-3
North Dry Ridge (IDI-8289)
Maybe Canyon (IDI-04)
DRY VALLEY MINE SHOP AND OFFICE
Dry Valley Panel D (IDI-0678)
Off-Lease Area/ Lease Modification Area
Lease Modification Area
Lease Modification Area
Lease Modification Area
Husky 1 (IDI-05549)
Lease Modification Area
Site Location
DRY RIDGE
0 1 2 Miles
0 4,500 9,000 Feet
Projection: NAD 1983 2011 StatePlane Idaho East FIPS 1101 Ft US
Source: USA Topo Map, serviced by ESRI ArcGIS Online, accessed on 3/29/2022
NOTES:
1. H1NDR = HUSKY 1 NORTH DRY RIDGE
2. PLSS = PUBLIC LAND SURVEY SYSTEM
LEGEND
HUSKY 1 NORTH DRY RIDGE LEASES
OFF-LEASE AREA
NU-WEST LEASES
LEASE MODIFICATION
PLSS TOWNSHIP
PLSS SECTION
DRY VALLEY MINE SHOP AND OFFICE
ULTIMATE PIT
EXISTING MAYBE CANYON MINE PITS
PIT BACKFILL
PERMANENT OVERBURDEN STOCKPILE AREA
TEMPORARY OVERBURDEN STOCKPILE AREA
GROWTH MEDIA STOCKPILE
PROPOSED LINED SEDIMENT POND
PROPOSED UNLINED SEDIMENT POND
EXISTING RAILWAYS
SIMPLOT SLURRY LINE
PROPOSED CULVERTS
PROPOSED DIVERSION DITCHES
PROPOSED HAUL ROADS
PROPOSED READY LINE
PROPOSED TIPPLE
ITAFOS
HUSKY 1 / NORTH DRY RIDGE PROJECT
CARIBOU COUNTY, IDAHO
ENVIRONMENTAL MONITORING PLAN
SITE FEATURES MAP
ARCADIS
FIGURE 1-2

Path: T:_EPP\Itafos\H1NDR\GIS\ArcMap\2022_Environmental_Monitoring_Plan\Fig_2-1_GW_SW_Monitoring_Locs_NorthDryRidgeArea.mxd | Last Saved By: kkelley | Last Saved On: 3/29/2022



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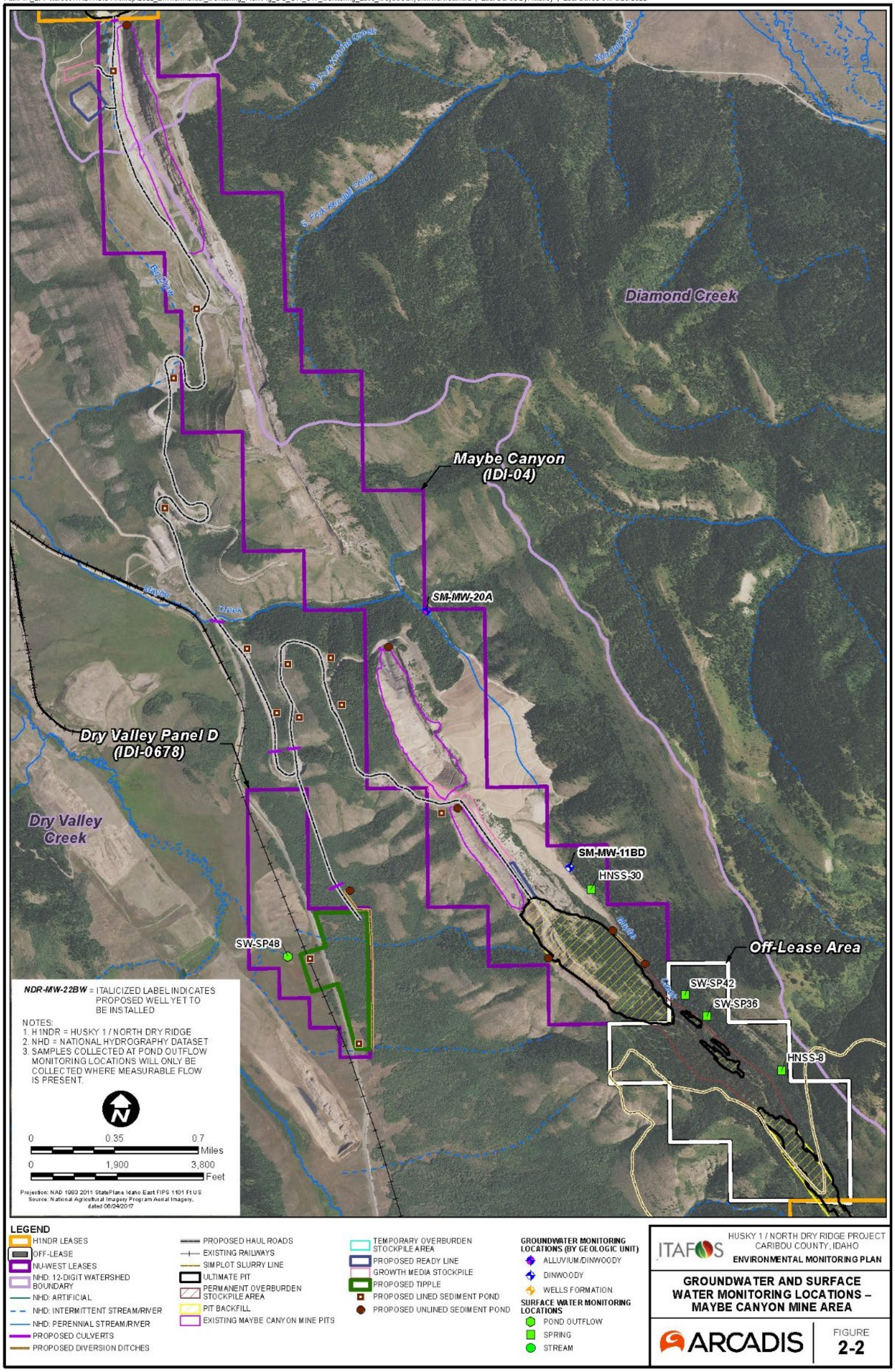

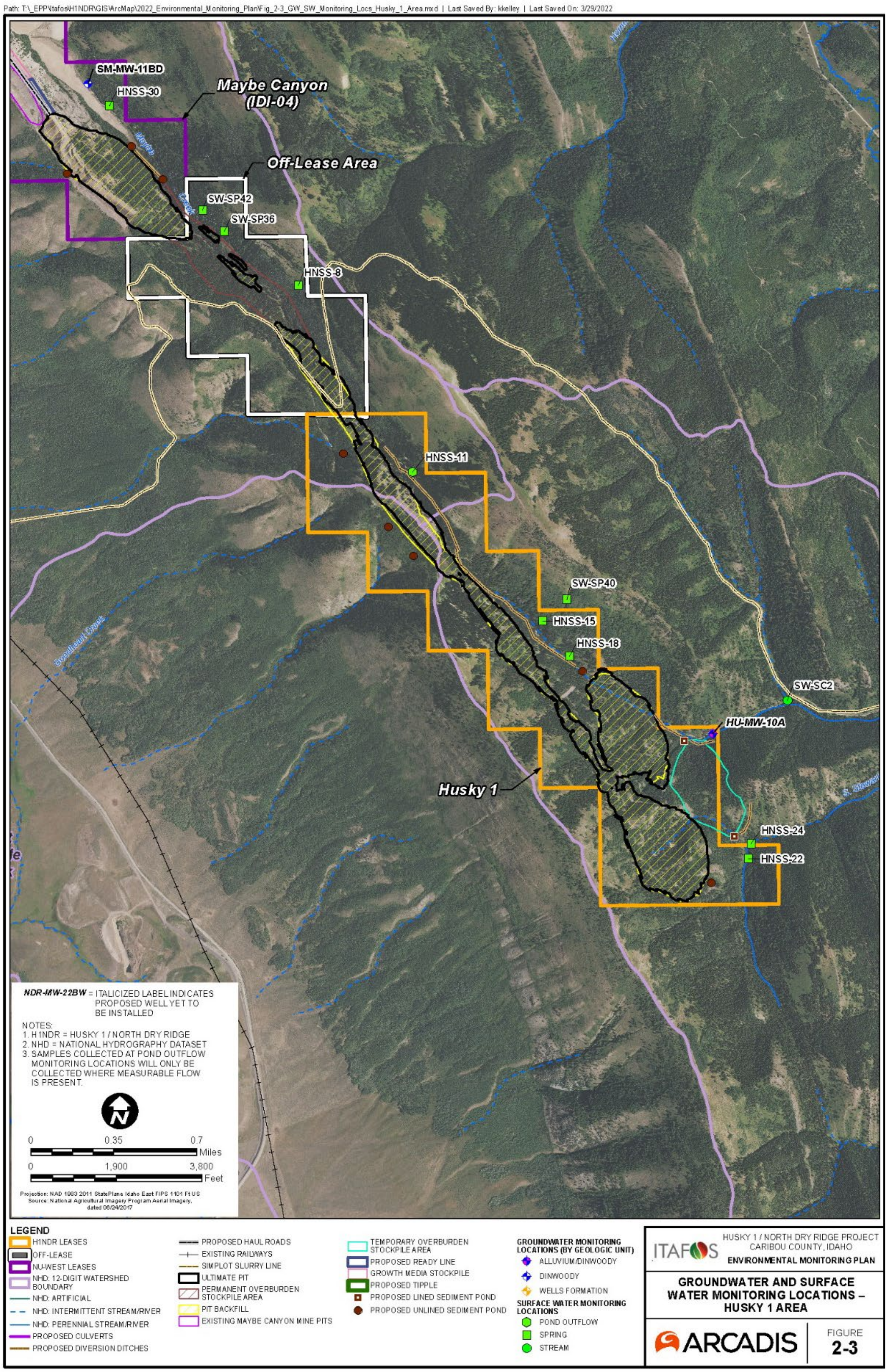
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SM-MW-11BD
HNSS-30
Maybe Canyon (IDI-04)
Off-Lease Area
SW-SP42
SW-SP36
HNSS-8
HNSS-11
SW-SP40
HNSS-15
HNSS-18
SW-SC2
HU-MW-10A
Husky 1
HNSS-24
HNSS-22
NDR-MW-22BW = ITALICIZED LABEL INDICATES PROPOSED WELL YET TO BE INSTALLED
NOTES:
1. H1NDR = HUSKY 1 / NORTH DRY RIDGE
2. NHD = NATIONAL HYDROGRAPHY DATASET
3. SAMPLES COLLECTED AT POND OUTFLOW MONITORING LOCATIONS WILL ONLY BE COLLECTED WHERE MEASURABLE FLOW IS PRESENT.
0 0.35 0.7 Miles
0 1,900 3,800 Feet
Projection: NAD 1983 2011 StatePlane Idaho East FIPS 1101 Ft US
Source: National Agricultural Imagery Program Aerial Imagery, dated 06/24/2017
LEGEND
H1NDR LEASES
OFF-LEASE
NU-WEST LEASES
NHD: 12-DIGIT WATERSHED BOUNDARY
NHD: ARTIFICIAL
NHD: INTERMITTENT STREAM/RIVER
NHD: PERENNIAL STREAM/RIVER
PROPOSED CULVERTS
PROPOSED DIVERSION DITCHES
PROPOSED HAUL ROADS
EXISTING RAILWAYS
SIMPLOT SLURRY LINE
ULTIMATE PIT
PERMANENT OVERBURDEN STOCKPILE AREA
PIT BACKFILL
EXISTING MAYBE CANYON MINE PITS
TEMPORARY OVERBURDEN STOCKPILE AREA
PROPOSED READY LINE
GROWTH MEDIA STOCKPILE
PROPOSED TIPPLE
PROPOSED LINED SEDIMENT POND
PROPOSED UNLINED SEDIMENT POND
GROUNDWATER MONITORING LOCATIONS (BY GEOLOGIC UNIT)
ALLUVIUM/DINWOODY
DINWOODY
WELLS FORMATION
SURFACE WATER MONITORING LOCATIONS
POND OUTFLOW
SPRING
STREAM
ITAFOS
HUSKY 1 / NORTH DRY RIDGE PROJECT
CARIBOU COUNTY, IDAHO
ENVIRONMENTAL MONITORING PLAN
GROUNDWATER AND SURFACE WATER MONITORING LOCATIONS – HUSKY 1 AREA
ARCADIS
FIGURE 2-3

Appendix A

The application for setting points of compliance will be revised and submitted to IDEQ.

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