

EXECUTIVE SUMMARY

This draft Environmental Impact Statement (DEIS)/draft Resource Management Plan (RMP) amendment discloses the direct, indirect, and cumulative environmental effects that could result from a set of mine plan alternatives (Alternative M1 through Alternative M3) and an independent set of land disposal alternatives (Alternative L1 through Alternative L5). Of the alternatives under consideration at this stage, the agency-preferred alternatives are Alternative M2 (Modified Mining Plan of Operations [MMPO] as submitted to the agencies) and Alternative L2 (land exchange proposal).

PROPOSED (FEDERAL) ACTIONS

Thompson Creek Mining Company (TCMC) has submitted an MMPO to the Bureau of Land Management (BLM) Challis Field Office; US Forest Service, Salmon-Challis National Forest (SCNF); and other cooperating agencies for an expansion (extension of mine life) of the Thompson Creek molybdenum mine. In relation to the MMPO, TCMC is also expected to submit an application to the US Army Corps of Engineers (USACE) for a permit under Section 404 of the Clean Water Act of 1972, as amended, to discharge dredged or fill materials into waters of the US. In addition, TCMC has submitted a proposal to exchange Federal land administered by the BLM for private lands owned by TCMC; this action would require the BLM to amend the Challis RMP as suitable for disposal under the Federal Land Policy and Management Act of 1976 (FLPMA).

For the MMPO alternatives, the BLM will issue a decision regarding the storage of waste rock south of the open pit and long-term water management; the Forest Service will issue a decision regarding the storage of waste rock north of the open pit, expansion of the tailings storage facility (TSF), and re-alignment of a section of power line; and the USACE will issue a decision regarding a 404 permit for waters of the US that would be filled under an MMPO alternative. The BLM will also issue a decision regarding the land disposal alternatives (exchange, sale, no action), and a decision regarding the proposed RMP amendment (that would be required if a land disposal action alternative is to be implemented).

ADMINISTRATIVE REVIEW

The BLM decision for the MMPO alternatives will be subject to administrative review (appeal) pursuant to 43 Code of Federal Regulations (CFR) 3809.800. The BLM proposed Challis RMP amendment (part of the final EIS) will also be subject to administrative review (protest) pursuant to 43 CFR 1610.5-2.

The Forest Service will issue a draft Record of Decision subject to administrative review (objection) pursuant to 36 CFR 218. That is, the Forest Service would select an MMPO alternative under authorities other than the Healthy Forests Restoration Act of 2003. Therefore, the applicable regulations for objection to the draft Record of Decision would be 36 CFR 218 Subparts A and B, and only the parties who have submitted timely, specific written comments about the project during a designated opportunity for public comment may file an objection (36 CFR 218.5(a)). The first designated opportunity was the 30 day public scoping period

(Section 1.9). The second opportunity will be the 90 day public comment period for this DEIS/draft RMP amendment. No further opportunities are anticipated for the project. Individual members of organizations must have submitted their own comments to meet the requirements of eligibility as an individual. Objections received on behalf of an organization are considered as those of the organization. Comments submitted must have evidence of timely submission (36 CFR 218.25(a)(4)) and meet the requirements of 36 CFR 218.25(a)(3).

Under the USACE appeal process dated March 28, 2000, “a District Engineer’s decision on an approved jurisdictional determination, a permit denial or a declined individual permit is subject to an administrative appeal by the affected party in accordance with the procedures and authorities contained in 33 CFR Part 331.” Affected party means “a permit applicant, landowner, or a lease, easement, or option holder (i.e., an individual who has identifiable and substantial legal interest in the property) who has received an approved jurisdictional determination, permit denial, or has declined a proffered individual permit.” Therefore, in the case of the USACE the decision could only be administratively appealed by TCMC.

MMPO ALTERNATIVES

The mine is currently permitted to complete Phase 7 (Alternative M1 – No Action). The MMPO submitted by TCMC would allow the completion of Phase 8 (Alternative M2 – MMPO as Submitted by TCMC). Alternative M3 (No Name Waste Rock Storage Facility [WRSF]) is generally the same as Alternative M2, except the No Name WRSF would be included within the overall configuration of the WRSFs and the Buckskin and Pat Hughes WRSFs would have correspondingly smaller final footprints. The core mine operations (e.g., molybdenum production rate and reclamation measures) are essentially the same in all of the MMPO alternatives.

Alternative M1 - No Action

Alternative M1 is TCMC completing mining operations per the approved mine plan of operations; i.e., through Phase 7. The existing operations (Section 2.1.1.) disturb 2,822.6 acres, mostly owned by TCMC (Table 2.1-2., Figure 2.1-3). Phase 7 ore production (from the base of the pit and entirely within the existing surface disturbance) would be completed by the end of 2016, with much of the reclamation (Section 2.1.1.8.) and post-reclamation monitoring (Table 2.1-3.) being completed 10 to 15 years later; reclamation would start at year 1 after mining and take 5 years, and monitoring and maintenance would occur from year 6 until year 15 (Section 2.1.6. includes information regarding adaptive management that may extend this period). Final surface disturbance would include the addition of waste rock to the WRSFs and tailings to the TSF generated during Phase 7 ore production.

Under Alternative M1 the mine would produce an additional 76 million pounds of molybdenum during Phase 7. Under Alternative M1 the TSF would contain approximately 235 million tons of tailings with a pre-reclamation embankment elevation of 7,646 feet (7,656 feet post-reclamation).

Active water treatment is not described in the approved reclamation plan for Alternative M1, but would have to be incorporated into the current reclamation plan even if TCMC were to withdraw the proposed MMPO. That is, the approved reclamation plan requires any discharged water to

meet all applicable laws and regulations, and active water treatment would be required. Therefore, active water treatment (described in Section 2.1.3.6.) is implicitly required.

Alternative M2 - MMPO as Submitted by TCMC

In December 2008 and January 2009 TCMC submitted an MMPO to the BLM, Forest Service, and other cooperating agencies. A revision to the MMPO was submitted in October 2009 (TCMC 2009). The MMPO describes Phase 8 mining (Alternative M2, the proposed action). The differences between this alternative and Alternative M1 are the following:

- The mine life would be 9 years longer;
- A section of power line would be relocated;
- The open pit would be deepened and widened to mine Phase 8 ore;
- The Buckskin and Pat Hughes WRSFs would be expanded and used to store Phase 8 waste rock;
- The TSF embankment would be raised and the TSF impoundment expanded to store the tailings produced from milling Phase 8 ore;
- The long-term water management plan (part of the reclamation plan) would be modified because of the size and configuration of the Phase 8 facilities and the need for water treatment to ensure water quality standards are met (Lorax 2012a); and
- Two additional groundwater cutoff walls would be installed in the Pat Hughes drainage.

Under Alternative M2 there would be additional surface disturbance on 94.2 acres of TCMC land and 352.5 acres of Federal lands as compared to Alternative M1 (Figure 2.1-4., Table 2.1-4., Table 2.1-5). Of this disturbance, 3.36 acres of wetlands and 9,900 linear feet of stream channel designated as waters of the US would be subject to a 404 permit from the USACE.

Transportation, Access, and Power

Under Alternative M2 4,900 feet of an existing 24.9 kV power line on National Forest System land (“Phase 8 power line,” Figure 2.1-4.) would be relocated on National Forest System land in the area northeast of the open pit. The relocation would be necessary because of expansion of the open pit. The relocated utility corridor would include 21.9 acres of surface disturbance.

Mining operations

Under Alternative M2 molybdenum production would continue to 2025 (instead of 2016 under Alternative M1), with most reclamation completed 10 to 15 years later (Section 2.1.6. includes information regarding adaptive management that may extend this period). The mine would produce an additional 131 million pounds of molybdenum as compared to Alternative M1.

Waste rock storage facilities

Under Alternative M2 263.5 million tons of waste rock would be removed and stored in the Buckskin (upper Buckskin) (107.7 million tons) and Pat Hughes (lower Pat Hughes) (155.8 million tons) WRSFs (Figure 2.1-4). The expansion of the WRSFs would occur on both private and Federal land (Table 2.1-4). The Pat Hughes sediment control pond (sedimentation pond) would be relocated to the base of the final toe of the Pat Hughes WRSF.

Mill and tailings operations

Milling the Phase 8 East and Phase 8 West ore would require additional tailings storage capacity, which would be accomplished by raising and partially re-aligning the TSF embankment crest compared to that at the end of Phase 7 (Figure 2.1-4). This would increase the capacity of the TSF by 100 to 125 million tons, which would provide adequate space for the tailings produced during Phase 8. The TSF is permitted to store approximately 240 million tons of tailings through the end of Phase 7 (Alternative M1), and approximately 335 million tons at the end of Phase 8 (Alternative M2). The TSF embankment would be raised to 7,742 feet before reclamation (from 7,646 feet at the end of Phase 7) to provide sufficient storage in the upgradient impoundment.

Environmental controls and monitoring

TCMC would utilize the same environmental controls and monitoring under Alternative M2 as would be used under Alternative M1 (Section 2.1.1).

Reclamation

Reclamation would generally be the same for Alternative M2 (Phase 8) as it would be for Alternative M1 (Phase 7) (Section 2.1.1.8.), except as summarized in this section. Note that the active water treatment described in this section is not described in the approved reclamation plan for Alternative M1, but would have to be incorporated into the current reclamation plan even if TCMC were to withdraw the proposed MMPO. That is, the approved reclamation plan requires any discharged water to meet all applicable laws and regulations, and active water treatment would be required. Therefore, active water treatment is implicitly required.

At the end of Phase 8, the Buckskin WRSF would consist of an upper and middle bench between 8,200 to 7,600 feet and a lower bench at 7,600 to 6,650 feet elevation. The Pat Hughes WRSF would have four benches at 7,850 to 7,350 feet; 7,350 to 7,000 feet; 7,000 to 6,750 feet; and 6,750 to 6,250 feet elevation. The reclamation of the TSF under Alternative M2 would be the same as that under Alternative M1, except the footprint of the facility would be slightly larger, the final reclaimed height of the embankment would be 7,752 feet instead of 7,656 feet, and the spillway would be constructed through native rock at an elevation of 7,722 feet.

TCMC would either construct a long-term water treatment facility or modify the existing process water treatment plant. TCMC would also, on a long-term basis, collect water from the WRSFs and TSF and route this water to the open pit and eventually to the water treatment facility. These inputs would inundate the pit to an elevation of 7,030 feet to minimize oxidation of the pit walls. The water level in the pit would be maintained at this elevation to avoid the potential of water leaving the southeast end of the pit via an exploration adit (sealed), and to maintain a cone of depression, i.e., keep groundwater flowing into the pit to minimize the potential for mine-

affected waters to affect off-site groundwater. The cutoff walls, which would be installed during operations, would remain in place throughout reclamation.

The sedimentation ponds below the WRSFs and the seepage return dam and pump-back sump/station below the TSF would be maintained as permanent features to collect drainage from these facilities, which would be pumped through pipelines to the open pit, and eventually to the water treatment plant. The treated water would then be discharged via pipelines to either Outfall 002 at the confluence of Pat Hughes Creek and Thompson Creek, or Outfall 005 near the confluence of Thompson Creek and the Salmon River (Figure 2.1-1). The difference under Alternative M2 in the post-reclamation monitoring as compared to that under Alternative M1 is that some monitoring could continue for longer durations (Table 2.1-6).

Alternative M3 - No Name Waste Rock Storage Facility

This alternative is similar to Alternative M2, except that the No Name WRSF would contain approximately 115 million tons of waste rock on 232.9 acres of currently undisturbed BLM land. The WRSF would include a downgradient sedimentation pond. The location is economically favorable for waste rock storage due to the proximity of the No Name drainage to the open pit and a level to downgradient loaded haul. Accordingly, under Alternative M3, less waste rock would be placed in the Buckskin and possibly the Pat Hughes WRSFs, and these WRSFs would have smaller overall footprints than under Alternative M2 (Figure 2.1-5., Table 2.1-7). Under Alternative M3, compared to Alternative M2, there would be an additional 0.02 acres of disturbance in wetlands and an additional 5,563 linear feet of designated waters of the US subject to a 404 permit from the USACE.

LAND DISPOSAL ALTERNATIVES

Alternative L1 - No Action

The BLM would not approve the land exchange proposal or any of the other land disposal alternatives, and would not amend the Challis RMP to identify the selected land as suitable for disposal under the FLPMA (Section 1.4). There would therefore be no change to the current land status: the Broken Wing Ranch (813 acres) and Garden Creek property (80 acres) would remain privately owned, and the selected land (~ 5,100 acres) would remain as BLM land (Figure 1.2-1., Figure 1.3-1). Since none of the MMPO alternatives are affected by any of the land disposal alternatives, under Alternative L1 the mine would continue operations on a combination of private, BLM, and National Forest System land as described in MMPO Alternative M1, M2, or M3 depending upon the agency decisions for the MMPO alternatives (Section 2.1).

Alternative L2 - Land Exchange Proposal

The BLM would amend the Challis RMP to identify the selected land as suitable for disposal under the FLPMA, and would approve the land exchange proposal. TCMC would thus acquire a tract of BLM (selected) land, including both surface and mineral estates on up to approximately 5,000 acres at the mine site. The US would acquire two tracts of privately owned (offered) land, including both surface and mineral estates on up to approximately 900 acres that would be administered by the BLM. The selected land comprises all Federal land in Sections 1 to 4, 9

to 12, T. 11 N., R. 16 E. and Sections 5 to 8, T. 11 N., R. 17 E., B.M. in Custer County, Idaho (Figure 1.2-1., Figure 2.2-1). However, as an example of the minor adjustments that might occur, the BLM may exclude Federal land outside the disturbance footprint of existing mining disturbance or the MMPO disturbance footprint along the east boundary of the selected land.

The offered lands consist of two tracts owned by TCMC: the Broken Wing Ranch, 6 miles northeast of Clayton in Custer County, Idaho; and the Garden Creek property, 16 miles south of Pocatello in Bannock County, Idaho and (Figure 2.2-2).

Selected land

The selected land (~ 5,100 acres) is either undeveloped, forested land or is already used for mining. All of the land is covered by mining claims owned by TCMC. Mining currently disturbs 451 acres of the selected land including a widely distributed network of sedimentation ponds, access roads, and power line and pipeline corridors (Figure 2.2-1., Table 2.1-2). The additional disturbance of the selected land under the MMPO alternatives would be 198.3 acres under Alternative M2, and 416.1 acres under Alternative M3. There would not be any additional disturbance of the selected land under Alternative M1.

TCMC has stated that it has no current intention to use any of the selected land for mining, including mineral exploration, apart from the activities identified in the MMPO alternatives above. That is, TCMC would not mine differently under any of the MMPO alternatives if the selected land were owned by TCMC, or if the selected land continued to be Federal land. In addition, internal and public scoping and a mineral potential report (Gardner 2008) have not identified any mining activities that would reasonably be expected to occur on the selected land, apart from those identified in the MMPO alternatives. TCMC does not have post-reclamation development plans for the selected land should TCMC acquire it. In addition, water treatment reclamation activities on some of the land could occur many decades after mining ceases in 2025.

Broken Wing Ranch

The Broken Wing Ranch consists of 813 acres of irrigated agricultural fields, rangeland, ranch structures, and a historic homestead in Custer County. The ranch includes 4.4 miles of Salmon River frontage as well as various streams including Lyon Creek. In addition to the Resource Advisory Committee (RAC)-recommended management of the ranch (Alternative L2), a sub-alternative for ranch management has been developed (Alternative L2-B).

Alternative L2

Under this alternative, the ranch would be managed according to the recommendations of the BLM Idaho Falls District RAC (BLM 2009b), which categorizes the ranch into nine management parcels with specific management recommendations for each parcel. However, because the nine management parcels do not all correspond to surveyed areas of land, the management parcels are assigned to seven surveyed subparcels (BWR-1 through BWR-7) (Figure 2.2-3., Table 2.2-1).

The BLM policy is to avoid obtaining structures not necessary for the BLM mission. Therefore, as part of the land exchange, TCMC would donate to Custer County the Lyon Creek Bridge and the Lyon Creek and Sink Creek ranch houses/outbuildings. However, the historical structures on the ranch would be acquired by the BLM. The structures would include 2.5 acres (county minimum parcel size) of land around each house, and appropriate easements for access. For liability reasons, Custer County would not allow public use of the bridge. However, the BLM would have administrative access to use the bridge (as well as administrative access under the FLPMA to all BLM land, despite any public restrictions).

The BLM would make the ranch available for grazing (~ 800 acres of irrigated fields and rangeland), and would authorize grazing for 27 animal unit months in the Lyon Creek “Graham Field” meadow. For the rest of the irrigated fields on the ranch, the potentially available forage would be 3,040 AUMs (Table 2.2-1., Table 2.2-2).

The non-motorized access in the Lyon Creek drainage would begin at or near the Lyon Creek ford by the Lyon Creek ranch house. Firearm discharge safety zones would be established around the two ranch houses, but hunting and shooting would otherwise (generally) be allowed in the same manner as is allowed on other Federal lands. However, the public would not be allowed in the cultivated fields during the growing season (e.g., mid-April through mid-October) to avoid damage to crops. The dilapidated trailer on the east side of the Salmon River would be demolished and removed, and the driveway and former trailer site would be used for parking and river access.

Alternative L2-B

Alternative L2-B would be the same management as under Alternative L2, except: 1) there would be no grazing at the ranch (on the fenced fields), 2) the cultivated fields would be actively converted to native vegetation, and 3) motorized access would be allowed in the Lyon Creek drainage to near the western edge of BWR-1 (where there are existing areas to park and turn around longer vehicles). The irrigated portions of the ranch (~ 400 acres) would actively be converted to native vegetation, except for the Lyon Creek meadow. The conversion would require approximately 3 years, and would consist of having a full-time ranch manager plow and/or use herbicide to kill the current vegetation in the cultivated fields and roads, seed the fields with a native seed mixture, operate the existing irrigation systems, and manage an aggressive invasive and non-native plant (“weed”) eradication program. After 3 years the manager would also remove all of the ranch equipment except the fences. There would be a high probability – but not certainty – of successful conversion, i.e., self-sustaining native vegetation, no excessive soil erosion/loss, and no major weed infestations.

Garden Creek property

The Garden Creek property consists of 80 acres of undeveloped, forested land south of Pocatello in Bannock County (Figure 2.2-2). Under Alternative L2 the Garden Creek property would be managed under the BLM Pocatello RMP with no site-specific management provisions for the property.

Alternative L3 - Land Sale

The BLM would amend the Challis RMP to identify the selected land as suitable for disposal by sale under Section 203 of the FLPMA. The US would not obtain any of the offered lands. The selected land would be sold by a direct (non-competitive) sale to TCMC, a modified competitive sale (TCMC would be identified as the bidder authorized to meet the high bid), or a competitive sale (the highest bidder would receive title to the property). In the first case the sale would be at the appraised fair market value pursuant to Section 203 of the FLPMA and all other applicable laws, regulations (e.g. 43 CFR 2710).

Alternative L4 - Reduced Area Land Exchange, Fee Simple

The BLM would amend the Challis RMP to identify approximately 3,600 acres of the selected land (rather than ~ 5,100 acres) as suitable for disposal, and the BLM would approve a land exchange in which TCMC would acquire approximately 3,600 acres of the selected land (Figure 2.2-4). The US would correspondingly acquire an equivalent fair market value (~ 30 % less by area) of the offered lands. To balance the reduced value of the selected land, the US would not acquire the Garden Creek property and/or lower priority portions of the Broken Wing Ranch.

Alternative L5 - Reduced Area Land Exchange, Easement

The BLM would amend the Challis RMP to identify all of the selected land (~ 5,100 acres) as suitable for disposal under the FLPMA. The BLM would approve the land exchange proposal, but with approximately 1,500 acres of the selected land protected by a conservation easement held by the BLM (Figure 2.2-5). This alternative, a variation of Alternative L4, would result in a more compact land jurisdiction pattern in the vicinity of the mine, and would protect a block of the selected land on which mining activities are not foreseen and would not occur under the MMPO alternatives.

TCMC would therefore acquire the selected land, and the US would acquire most of the offered lands. However, unlike Alternative L2, approximately 1,500 acres of the selected land would be protected by a conservation easement requiring the land to remain essentially in its current condition, e.g., no residential development or mining. The lesser fair market value of the offered lands due to the easement would require eliminating either the Garden Creek parcel and/or certain subparcels of the Broken Wing Ranch from the land exchange, but to a lesser extent than under Alternative L4. That is, compared to Alternative L2, the US would acquire approximately 30 percent less (by fair market value) of the offered lands under Alternative L4 and approximately 10 percent less under Alternative L5. The offered lands that the US would acquire would be administered by the BLM as described in Alternative L2 or Alternative L2-B (Section 2.2.2).

Land Disposal Action Alternative Provisions

The seven following provisions would occur at or before title transfer under all of the land disposal action alternatives, unless under Alternative L3 the selected land was sold to a party other than TCMC. In such case, only the seventh provision would occur.

1. *South Butte Road Access*

TCMC would grant public access along two sections of the South Butte Road, which passes through private property owned by TCMC (Figure 2.2-6). Such a grant would ensure future public access to approximately 7,000 acres of Federal and State lands that are now essentially inaccessible to the public, apart from the South Butte Road, due to rugged topography and the lack of public access via other roads.

2. *Twin Apex Property Access*

The BLM would grant the owners of the Twin Apex property access to their property via the Bruno Creek Road, and TCMC would modify its exclusive right-of-way (granted by the BLM) for Bruno Creek Road to allow such access (Figure 2.2-6).

3. *Thompson Creek Road Access*

The existing public access along the upper Thompson Creek Road would be retained by the US (Figure 2.2-7).

4. *Management for Big Game Including Provisions for Public Access*

TCMC would allow non-motorized access to the selected land through the Idaho Department of Fish and Game Access Yes Program with the exception of the land that drains into Bruno Creek, Buckskin Creek, Pat Hughes Creek, and Cherry Creek (Figure 2.2-8).

5. *Squaw¹ Creek Grazing Allotment, Saturday Mountain Pasture*

TCMC would grant administrative access to the BLM and its permittees to use roads on property owned by TCMC to reach the Saturday Mountain Pasture (Figure 2.2-6). The grant would provide access to these parties of approximately 2,500 acres of Federal and State lands (excluding the selected land) that are now essentially inaccessible to these parties due to rugged topography and the lack of legal access on existing roads.

6. *Challis East Subdivision Trail Access*

TCMC would grant public access (motorized or non-motorized) via a trail within a 20 foot wide easement along one side of the perimeter of property owned by TCMC in the Challis East Subdivision provided that trail access is also acceptable to the subdivision property owners and/or the local government. The trail would provide a connection to the Lombard Trail around Blue Mountain, and could ultimately be part of a new trail system envisioned to the Salmon River (Figure 2.2-6).

7. *Thompson Creek and S. Creek Conservation Easement*

TCMC² would grant the BLM a conservation easement for the following areas: 1) the area of the selected land within 1/8 mile of the centerline of Thompson Creek, and 2) the

¹ *Squaw Creek* is an official place name in Custer County, and appears in numerous published documents including US Geological Survey topographic maps. The name was established by the US Board of Geographic Names to maintain uniform geographic name usage throughout the Federal Government. However, the word *Squaw* is offensive to some people including the Shoshone-Bannock Tribes. Therefore, *Squaw Creek* is hereafter referred to in the main text as *S. Creek*.

² or another owner if the selected land was sold to a party other than TCMC under Alternative L3

area of the selected land within $\frac{1}{8}$ mile of the centerline of the portions of S. Creek within the selected land (Figure 2.2-1).

ENVIRONMENTAL EFFECTS

The environmental effects of the MMPO and land disposal alternatives were evaluated and compared in detail in Chapter 4 of the DEIS/draft RMP amendment. A listing of the primary environmental effects of the MMPO and land disposal action alternatives is provided in Tables ES-1 and ES-2, respectively. Effects related to the offered lands would not occur under Alternative L3 because the offered lands would not change jurisdictions.

Table ES-1. Effects comparison, MMPO alternatives.

Indicator	Alternative M1	Alternative M2	Alternative M3
GEOLOGIC RESOURCES AND GEOTECHNICAL ISSUES			
Molybdenum production	Increase in world molybdenum production of 73 million pounds (short-term, moderate effect)	Increase in world molybdenum production of 204 million pounds (short-term, moderate effect)	Same as Alternative M2
Molybdenum reserves	Decrease in world molybdenum reserves by 73 million pounds (short-term, minor effect)	Decrease in world molybdenum reserves by 204 million pounds (short-term, minor effect)	Same as Alternative M2
Paleontological sites	No change to existing conditions	No change to existing conditions	No change to existing conditions
SOIL RESOURCES			
Soil productivity	No change to existing conditions	336.0 acres of permanent effects (negligible to moderate) and 112.1 acres of temporary effects (negligible to moderate)	477.6 acres of permanent effects (negligible to moderate) and 112.1 acres of temporary effects (negligible to moderate)
VEGETATION, FOREST RESOURCES, AND INVASIVE AND NON-NATIVE PLANTS			
Area of special status ¹ plant habitat disturbed	No change to existing conditions	448.1 acres of suitable sensitive plant habitat disturbed (no records of occurrence); may affect individual plants but would not cause a trend towards listing	589.7 acres of suitable sensitive plant habitat disturbed (no records of occurrence); may affect individual plants but would not cause a trend towards listing
Area of forest habitat disturbed	No change to existing conditions	364.1 acres forest habitat (2,357 mbf) ² harvested (long-term, moderate effect)	459.7 acres forest habitat (2,988 mbf) harvested (long-term, moderate effect)

Indicator	Alternative M1	Alternative M2	Alternative M3
Change in carbon sequestration	No change to existing conditions	No change to existing conditions	No change to existing conditions
RANGE RESOURCES			
Change in AUMs ³	No change to existing conditions	4 % decrease (long-term, minor effect)	6 % decrease (long-term, minor effect)
WATER RESOURCES			
Water quality - turbidity, concentrations of suspended sediment, and constituents of concern	<p>During mining/after cutoff wall installation: decreased concentrations of most constituents in Thompson Creek; increased concentrations of some constituents over time would still meet WQSs⁴ with the exception of copper for the upper estimate (long-term, moderate effect); negligible effect to Thompson Creek, Bruno Creek, and S. Creek from sediment delivery</p> <p>After mining: increased concentrations of constituents in S. Creek, but would be within WQSs except for cadmium for the upper estimates; discharge from Outfall 005 to the Salmon River would need to meet all NPDES⁵ permit limits</p>	<p>During mining/after cutoff wall installation: decreased concentrations of most constituents in Thompson Creek; increased concentrations of some constituents over time would meet WQSs with the exception of copper for the upper estimate (long-term, moderate effect); negligible effect to Thompson Creek, Bruno Creek, and S. Creek from sediment delivery</p> <p>After mining: increased concentrations of constituents in S. Creek; would be within WQSs except for cadmium for the upper estimates; discharge from Outfall 005 to the Salmon River would need to meet all NPDES permit limits</p>	Same as Alternative M2

Indicator	Alternative M1	Alternative M2	Alternative M3
Water quantity - discharge	<p>During mining/after cutoff wall installation: negligible or minor reduction in flow in Thompson Creek</p> <p>After mining: negligible effects to flow in Bruno Creek and S. Creek; negligible to minor effects to flow in Salmon River (depending on flow) due to cessation of removal of water for mine processes</p>	<p>During mining: negligible to minor reduction in flow in Thompson Creek and S. Creek from cutoff walls</p> <p>After mining: negligible effects to flow in Bruno Creek and S. Creek; negligible to minor effects to flow in Salmon River (depending on flow) due to cessation of removal of water for mine processes</p>	Same as Alternative M2
WILDLIFE RESOURCES			
Area of disturbance to high value wildlife habitat	No change to existing conditions	Decrease of 364 acres of suitable or marginally suitable habitat with long-term, negligible to minor effect on sensitive wildlife species; long-term, minor effect on wide-ranging species; short-term, minor effect to winter range; negligible effect on migration	Decrease of 598 acres of suitable or marginally suitable habitat with long-term, negligible to minor effect on sensitive wildlife species; long-term, minor effect on wide-ranging species; short-term, minor effect to winter range; negligible effect on migration
Water quantity/quality effects on wildlife	Negligible effects from changes to water quantity; negligible effect to birds from ingestion of pit water	Negligible effects from changes to water quality; negligible effects to birds from ingestion of pit water	Same as Alternative M2
Noise disturbance	No change to existing conditions	Negligible (temporary) effect during construction of WRSFs	Same as Alternative M2
Wildlife mortality from traffic (road kill)	No change to existing conditions	No effect on existing road mortality, but 9 additional years of effect of mine traffic on road mortality	Same as Alternative M2

Indicator	Alternative M1	Alternative M2	Alternative M3
FISH AND AQUATIC RESOURCES			
Aquatic habitat	Negligible effect to existing conditions	Negligible effect to aquatic habitat in Salmon River; long-term, moderate effect to aquatic habitat in Thompson Creek and S. Creek	Same as Alternative M2
Fish populations	Negligible effect to existing conditions	Negligible effect to fish populations in Salmon River; long-term, moderate effect to aquatic habitat in Thompson Creek; long-term, minor to moderate effects to fish populations in S. Creek	Same as Alternative M2
Bioaccumulation	Negligible effect to existing conditions	Negligible chance of bioaccumulation of selenium in Thompson Creek	Same as Alternative M2
Macroinvertebrate organisms	Negligible (selenium bioaccumulation) to minor (reduced overall taxa richness) effects on macroinvertebrate organisms	Minor effects to Thompson Creek and S. Creek macroinvertebrate organisms for the best estimates; moderate effects for the upper estimates	Same as Alternative M2
WETLANDS, FLOODPLAINS, AND RIPARIAN AREAS			
Area of wetlands	No change to existing conditions	Fill or burial of 3.36 acres of jurisdictional wetlands (0.43 acre filled by Phase 8, 2.93 acre filled by reclamation); mitigation would result in no net effect	Fill or burial of 3.40 acres of jurisdictional wetlands (0.47 acre filled by Phase 8, 2.93 acre filled by reclamation); mitigation would result in no net effect

Indicator	Alternative M1	Alternative M2	Alternative M3
Length of stream channel	No change to existing conditions	9,900 feet (10 % of the stream channel) of WUS ⁶ filled (5,502 feet filled by Phase 8, 4,397 feet filled by reclamation); mitigation would result in no net effect	15,505 feet (50 % of the stream channel) of WUS filled (11,108 feet filled by Phase 8, 4,397 feet filled by reclamation); mitigation would result in no net effect
AIR QUALITY, NOISE, AND CLIMATE CHANGE			
Quantities of air pollutants	No change to existing conditions	No effect to existing quantity of air pollutants, but the existing quantity of air pollutants related to the mine would persist for an additional 9 years	Same as Alternative M2
Noise levels	No change to existing conditions	No effect to existing noise levels but the current noise levels related to the mine would persist for another 9 years	Same as Alternative M2
Climate change	No change to existing conditions	No effect to climate change and no effect of climate change to the project	No effect to climate change and no effect of climate change to the project
VISUAL (AESTHETIC) RESOURCES			
Visual Quality Objectives and VRM ⁷ classification	No change to existing conditions	The visual disturbance would meet the current visual classifications at all KOPs ⁸ except KOP 6; the Pat Hughes WRSF would not meet the VRM Class II objective (long-term, moderate to major effect)	The visual disturbance would meet the current visual classifications at all KOPs except KOP 6 and KOP 2; neither the Pat Hughes nor No Name WRSF would meet the VRM Class II objective (long-term, moderate to major effect)

Indicator	Alternative M1	Alternative M2	Alternative M3
LAND USE AND RECREATION			
Recreational access	No change to existing conditions	Negligible effect to recreational access	Negligible effect to recreational access
ROS ⁹ classification	No change to existing conditions	No change to ROS classification	No change to ROS classification
Special Designations	No change to existing conditions	Negligible effect to Challis ERMA ¹⁰	Negligible effect to Challis ERMA
SOCIOECONOMIC FACTORS			
Local economy	No change to existing conditions	No change to the current local economy, except the economic effects of the mine on the local economy would extend an additional 9 years	Same as Alternative M2
Molybdenum supply and prices	No change to existing conditions	No effect to current molybdenum supply or prices, except the effects of the mine on supply and prices would extend an additional 9 years	Same as Alternative M2
Financial risk to agencies and taxpayers	Financial risk would be mitigated by financial guarantees	Financial risk would be mitigated by financial guarantees	Financial risk would be mitigated by financial guarantees
TRIBAL TREATY RIGHTS AND INTERESTS			
Area of unoccupied Federal land	No change to existing conditions	< 1 % decrease (minor, permanent, adverse)	Same as Alternative M2
Cultural resource sites	No change to existing conditions	Prehistoric site component (10CR758; not eligible for the NRHP ¹¹) would be inundated by the expansion of the TSF (long-term, minor, adverse effect)	Same as Alternative M2

Indicator	Alternative M1	Alternative M2	Alternative M3
Effects to natural resources utilized by tribes	Summarized in the sections for the other resources	Summarized in the sections for the other resources	Summarized in the sections for the other resources
CULTURAL RESOURCES			
Cultural resource sites	No change to existing conditions	Prehistoric site component (10CR758; not eligible for the NRHP) would be inundated by the expansion of the TSF (long-term, minor, adverse effect)	No change to existing conditions
TRANSPORTATION, ACCESS, AND PUBLIC SAFETY			
Molybdenum spills due to vehicle accidents	No change to existing conditions	No effect to current threat of spills, but the current potential for spills would extend additional 9 years	Same as Alternative M2
HAZARDOUS MATERIALS AND SOLID WASTE			
Threat of releases of hazardous materials and petroleum products	No change to existing conditions	No effect to threat of releases, but the current potential for releases would extend additional 9 years	Same as Alternative M2

¹ Threatened, Endangered, Proposed, Candidate, and Sensitive (special status)

² mbf = 1,000 board feet

³ animal unit months (AUMs)

⁴ water quality standards (WQSs)

⁵ National Pollutant Discharge Elimination System (NPDES)

⁶ waters of the US (WUS)

⁷ visual resource management (VRM)

⁸ key observation point (KOP)

⁹ recreational opportunity spectrum (ROS)

¹⁰ extensive recreation management area (ERMA)

¹¹ National Register of Historic Places (NRHP)

Table ES-2. Effects comparison, land disposal alternatives.

Indicator	Alternative L1	Alternative L2	Alternative L3	Alternative L4	Alternative L5
GEOLOGIC RESOURCES AND GEOTECHNICAL ISSUES					
Saleable, locatable or leasable mineral availability	No change to existing conditions	Negligible effect to mineral availability	Same as Alternative L2	Same as Alternative L2	Same as Alternative L2
SOIL RESOURCES					
Acres or % of area of soil compaction, change to productivity, erosion potential	No change to existing conditions	No effects to the selected land. Small areas of soil at ranch could become compacted from parking areas, campgrounds. Under L2-B ~ 52 % of the soil at the ranch would be altered by the conversion to native vegetation.	No effects to the selected or offered lands	No effects to the selected land. Effects to the offered lands would be the same as Alternative L2, except land removed from the transaction would not be subject to potential limited soil compaction from development.	No effects to the selected land; effects to the offered lands would be the same as Alternative L4
VEGETATION, FOREST RESOURCES, AND INVASIVE AND NON-NATIVE PLANTS					
Area of special status plant habitat	No change to existing conditions	365 acres of occupied or potentially occupied special status plant habitat on ranch would come under BLM administration	No change to existing conditions	Same as Alternative L2, except the area would change to achieve equal value	Same as Alternative L2, except the area would change to achieve equal value

Indicator	Alternative L1	Alternative L2	Alternative L3	Alternative L4	Alternative L5
RANGE RESOURCES					
Area of suitable grazing lands	No change to existing conditions	Decrease of 80 % of suitable grazing lands (major, long term) on selected land	Same as Alternative L2	Decrease of 71 % of suitable grazing lands (major, long term) on selected land	Same as Alternative L2
Change in AUMs	No change to existing conditions	Decrease of 80 % of AUMs (major, long term) on selected land	Same as Alternative L2	Decrease of 69 % of AUMs (major, long term) on selected land	Same as Alternative L2
WATER RESOURCES					
Water quality (no indicators)	No change to existing conditions	No effect to selected land or Garden Creek property Negligible effect to Salmon River due to sediment delivery from BLM-recommended management such as campground or boat launch; riparian improvements would cause negligible reduction in sediment delivery to Salmon River	No change to existing conditions	Effects would be the same as Alternative L2, except the effects related to subparcels (~ 30 % less by fair market value compared to Alternative L2) that would not be acquired by the US which would not occur	Effects would be the same as Alternative L2, except the effects related to subparcels (~ 10 % less by fair market value compared to Alternative L2) that would not be acquired by the US which would not occur

Indicator	Alternative L1	Alternative L2	Alternative L3	Alternative L4	Alternative L5
Water quantity (change in flow)	No change to existing conditions	No effect to selected land or Garden Creek property No change to flow or volume associated with water rights on Broken Wing Ranch	No change to existing conditions	Same as Alternative L2	Same as Alternative L2
WILDLIFE RESOURCES					
Area of special status wildlife habitat	No change to existing conditions	No change to existing conditions	No change to existing conditions	No change to existing conditions	No change to existing conditions
Hunting pressure	No change to existing conditions	Increased hunting pressure (long-term, minor effect)	No change to existing conditions	Increased hunting pressure (long-term, minor effect)	Increased hunting pressure (long-term, minor effect)
FISH AND AQUATIC RESOURCES					
Amount of suitable habitat	No change to existing conditions	No effect to Garden Creek property; net increase in both suitable habitat and designated critical habitat under BLM jurisdiction	Decrease of 5.3 miles of occupied designated critical habitat under BLM jurisdiction; however, no new disturbance would occur adjacent to streams	Same as Alternative L2	Same as Alternative L2

Indicator	Alternative L1	Alternative L2	Alternative L3	Alternative L4	Alternative L5
Habitat quality	No change to existing conditions	No effect to selected land or Garden Creek property; long-term, moderate beneficial effect to aquatic habitat in Lyon Creek and Salmon River	No change to existing conditions	Same as Alternative L2	Same as Alternative L2
WETLANDS, FLOODPLAINS, AND RIPARIAN AREAS					
Area of wetlands	No change to existing conditions	49.69 acres of wetlands would leave Federal jurisdiction; 37.68 acres of wetlands would enter Federal jurisdiction; improvements to riparian areas along Salmon River on the ranch	49.69 acres of wetlands would leave Federal jurisdiction	21.72 acres would leave Federal jurisdiction; unknown area would enter Federal jurisdiction, but would probably be less than 37.68 acres	Same as Alternative L4, except slightly more wetlands would probably enter Federal jurisdiction
AIR QUALITY, NOISE, AND CLIMATE CHANGE					
Change in noise at ranch and in Lyon Creek	No change to existing conditions	Minor increase in noise due to agricultural activities	No change to existing conditions	Same as Alternative L2	Same as Alternative L2
VISUAL (AESTHETIC) RESOURCES					
Changes in scenery	No change to existing conditions	Subtle visual changes to ranch due to BLM administration	No change to existing conditions	Same as Alternative L2	Same as Alternative L2

Indicator	Alternative L1	Alternative L2	Alternative L3	Alternative L4	Alternative L5
LAND USE AND RECREATION					
Area of Federal land	No change to existing conditions	Net decrease of 4,300 acres of Federal land in the BLM Challis Field Office District (negligible effect); net increase of 80 acres in Pocatello Field Office District (negligible effect)	Net decrease of 5,100 acres of Federal land in Challis Field Office District (negligible effect)	Decrease of 3,600 acres of Federal land in the BLM Challis Field Office District (selected land); increase of 880 acres less ~ 30 % by fair market value in the BLM Challis and Pocatello Field Office Districts	Decrease of 5,100 acres of Federal land in the BLM Challis Field Office District (selected land); increase of 880 acres less ~ 10 % by fair market value in the BLM Challis and Pocatello Field Office Districts
Recreational use	No change to existing conditions	Negligible effects due to reduced access to some portions of selected land; public recreation opportunities increased on ranch and Garden Creek property	Same as Alternative L2	Negligible effects due to reduced access to some portions of selected land; public recreation opportunities increased on ranch but less than Alternative L2	Negligible effects due to reduced access to some portions of selected land; public recreation opportunities increased on ranch, less than Alternative L2 but more than Alternative L4
SOCIOECONOMIC FACTORS					
Tax revenue	No change to existing conditions	Negligible effects to tax revenue	Same as Alternative L2	Same as Alternative L2	Same as Alternative L2
BLM revenue	No change to existing conditions	Negligible effects to BLM revenue	Same as Alternative L2	Same as Alternative L2	Same as Alternative L2

Indicator	Alternative L1	Alternative L2	Alternative L3	Alternative L4	Alternative L5
TRIBAL TREATY RIGHTS AND INTERESTS					
Area of unoccupied Federal land	No change to existing conditions	< 1 % decrease in unoccupied Federal land (minor, permanent, adverse)	Same as Alternative L2	Same as Alternative L2	Same as Alternative L2
CULTURAL RESOURCES					
Cultural resource sites	No change to existing conditions	5 NRHP-eligible and 2 potentially eligible sites would come under BLM management (on ranch)	No change to existing conditions	The effect to cultural resource sites would be similar to Alternative L2, but the number of sites would depend on which subparcels were acquired by the US	The effect to cultural resource sites would be similar, but the number of sites would depend on which subparcels were acquired by the US
TRANSPORTATION, ACCESS, AND PUBLIC SAFETY					
Access to grazing allotments	No change to existing conditions	Access to grazing would increase	No change to existing conditions	Same as Alternative L2	Same as Alternative L2
HAZARDOUS MATERIALS AND HAZARDOUS AND SOLID WASTE					
Chance for releases or dumping on ranch	No change to existing conditions	Minor increase in potential for dumping (because public land)	No change to existing conditions	Same as Alternative L2	Same as Alternative L2

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