



Consultants in Natural Resources and the Environment

Vegetation Report and Biological Evaluation East Boulder Mine Stage 6 Tailings Storage Facility Expansion Project

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April 13, 2020, Revised August 20, 2020

Introduction

Conservation of plant species at risk, as identified by the U.S. Forest Service (Forest Service) and the U.S. Fish and Wildlife Service (USFWS), is integral to the maintenance of ecosystem resilience, and serves to provide wildlife habitat, prevent loss of biological diversity, and provide opportunities for research and public enjoyment. This vegetation report and biological evaluation (BE) analyzes direct, indirect, and cumulative effects on federally listed and proposed plant species and Regional Forester sensitive plant species for the proposed East Boulder Mine Stage 6 Tailings Storage Facility Expansion Project (Project). This assessment was prepared in accordance with Forest Service policy (Forest Service Manual (FSM) 2670.32 and 2672.4).

The East Boulder Mine is located within the Yellowstone Ranger District of the Custer Gallatin National Forest (CGNF). The mine is situated along the East Boulder River approximately 23 miles south of Big Timber, Montana (MT; Figure 1). The surrounding national forest is currently managed pursuant to the 1987 Gallatin Forest Plan as amended in 2015 (Forest Service 2015). The forested landscape is mountainous, set at an elevation of 6,265 feet above sea level. The Absaroka-Beartooth Wilderness Area is located several miles south of the mine. The Project area is managed by CGNF for timber management (Management Area 8) as described in the Gallatin Forest Plan (Forest Service 2015). NFS Road 205 (East Boulder Road) is the only road that provides access to the mine. The East Boulder River lies adjacent to the mine on the north and east sides and flows to the west.

Issue Statements

This section includes issues pertaining to sensitive plant species that have been identified for detailed analysis. “An issue is a statement of cause and effect linking environmental effects to actions” (Forest Service Handbook 1909.15).

Issue Statement: The removal of habitat in the permit boundary could adversely affect sensitive plant species or valuable timber stands.

Issue Statement: Ground disturbance and construction could result in an increase and spread of noxious weeds in the National Forest.

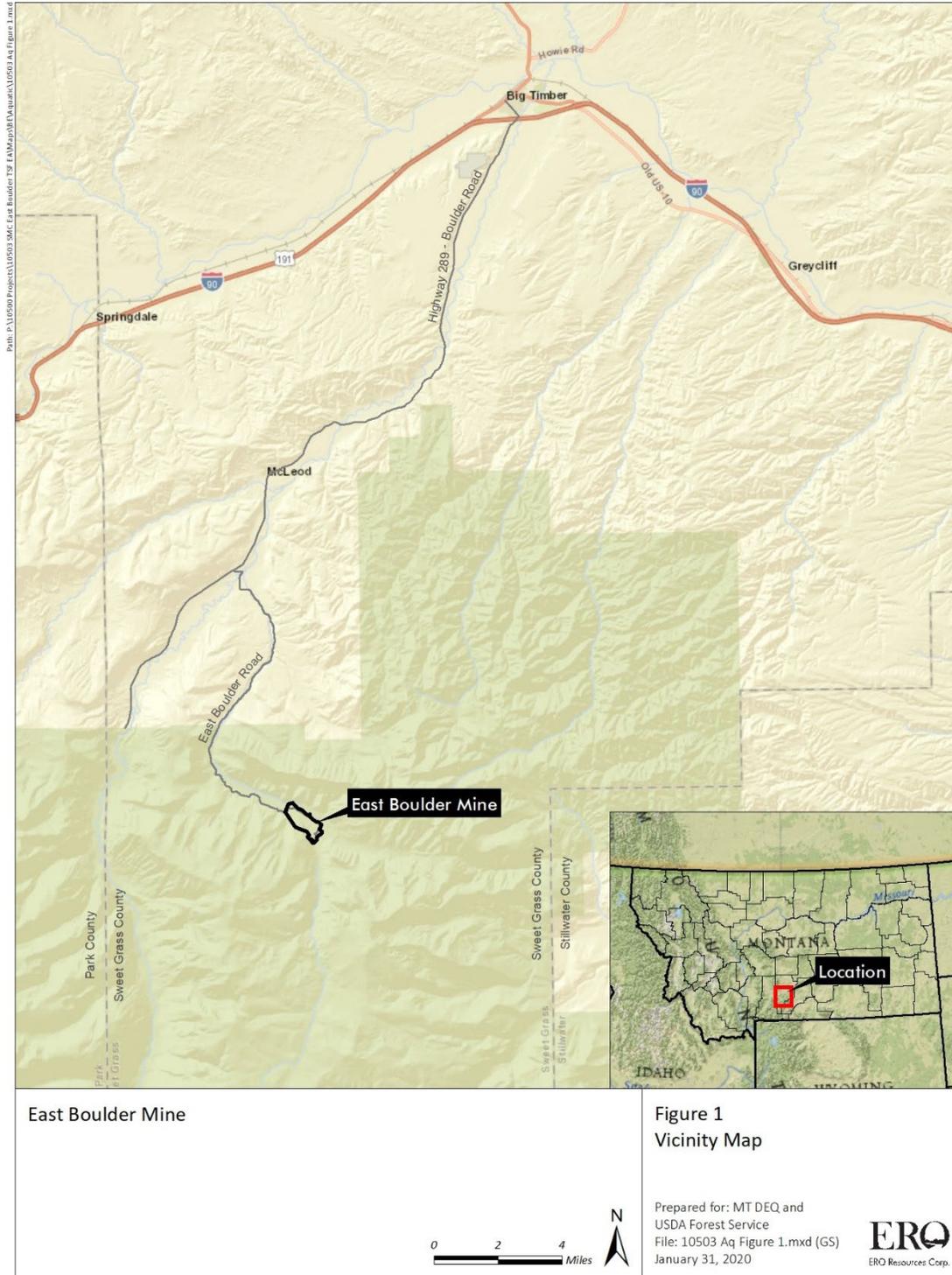


Figure 1. Vicinity Map

Project Description

Stillwater Mining Company (SMC) applied for Amendment 003 (amendment) to Operating Permit Number 00149 issued by the Montana Department of Environmental Quality (DEQ) and a revision to the Plan of Operations approved by the Forest Service. The proposed amendment and plan revision for the East Boulder Mine (Proposed Action or Project) would authorize SMC to expand the Tailings Storage Facility (TSF) to Stage 6, which would raise the TSF an additional 14 feet in elevation. The Project would not result in a change to the 396.99-acre permit area (Project area).

Currently, the East Boulder Mine comprises an underground platinum and palladium mine, access tunnels, plant site facilities, a lined TSF and other ancillary facilities to support the operation. Waste rock from the underground mine is fully used in ongoing construction for the TSF embankments. Reclamation is conducted according to SMC's Consolidated Operations and Reclamation Plan (CORP [SMC 2016]) and, to the extent practicable, is completed concurrent with mining operations to control erosion and the spread of noxious weeds. Concurrent reclamation has occurred since the start of operations in 2002, with a focus on the powerline corridor, soil stockpiles, cut and fill slopes, borrow areas, percolation pond slopes, and TSF embankment slopes. The current reclamation status within the permit boundary is provided in the Operating Permit Annual Reports. Mine operation through 2017 included reclamation on 39.36 acres.

Under the No Action Alternative, DEQ and the CGNF would not approve SMC's application for implementation of the Project. The No Action Alternative effectively represents current conditions and the full construction of TSF embankment Stages 4 and 5, which were permitted and analyzed in the East Boulder Mine Project Final Environmental Impact Statement (FEIS) (Montana Department of State Lands [DSL] et al. 1992). Impacts of the No Action Alternative are not expected to vary beyond those considered in the 1992 FEIS and the 2012 FEIS for SMC's Revised Water Management Plans and Boe Ranch LAD (DEQ and Forest Service 2012).

Under the Proposed Action Alternative, DEQ would approve Amendment 003 and the CGNF would approve the revised Plan of Operations to authorize construction of the Stage 6 TSF expansion. The proposed amendment and the plan of operations revision would expand the existing 243.88-acre disturbance area to 286.85 acres and would authorize SMC to expand the TSF to Stage 6, raising the height of the impoundment 14 feet above the previously approved Stage 5 elevation of 6,344 feet. Mining activities and operation of the TSF would be extended from 2027 to 2033 at current fill rates.

All Project activities would occur within the existing 396.99-acre permit boundary and would disturb 56.74 acres within the proposed 286.85-acre disturbance boundary (Figure 2); in terms of the existing 243.88-acre bonded disturbance area, 41.13 acres within and 15.61 acres outside the existing 243.88-acre bonded disturbance area would be disturbed. The 41.13 acres in the previously permitted area were evaluated in the 1992 FEIS and 2012 FEIS. Project disturbances would result from building and widening an access road; relocating an access road and other infrastructure including a fence around the

TSF; constructing a borrow area, stockpile area, and stormwater diversions; and widening the TSF embankment (Table 1; Figure 2).

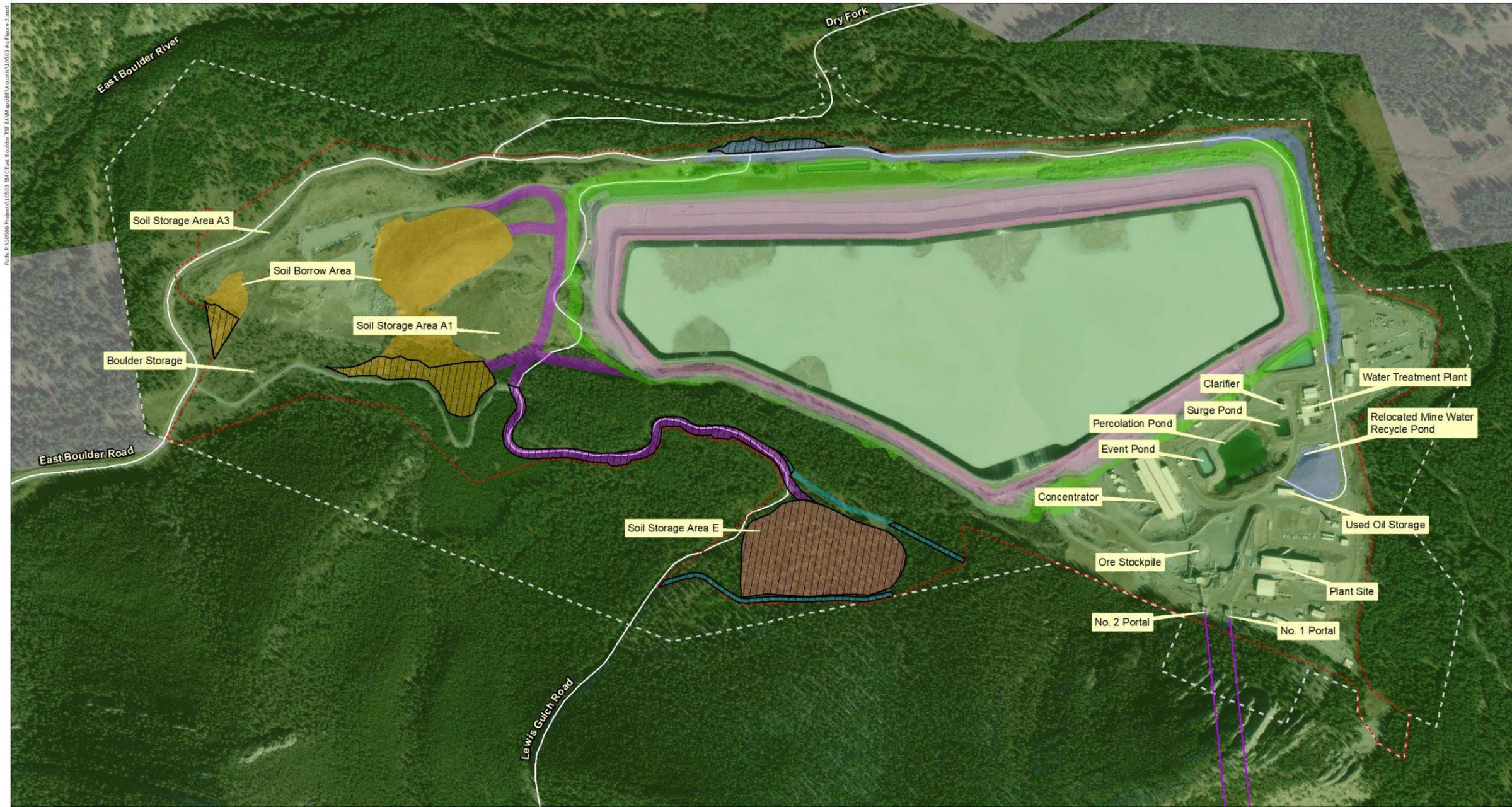
Table 1. Proposed Project Disturbance.

Project Activities	<i>Existing 243.88-acre Bonded and Permitted Disturbance Area</i>		<i>Proposed 286.85-acre Disturbance Area</i>
	Project Disturbance Within Permitted and Bonded Disturbance Area (acres)	Project Disturbance Outside Permitted and Bonded Disturbance Area (acres)	Project Disturbance within Expanded Disturbance Area (acres)
Lewis Gulch Road Improvements	3.26	2.62	5.88
East Boulder Road and Associated Infrastructure Relocations (Guard House, wildlife exclusion fence, etc.)	5.50	0.72	6.22
Storm Water Runoff Diversion	0.33	1.03	1.36
Soil Stockpile Area "E"	0.00	8.05	8.05
Stage 6 Borrow Area	9.25	3.19	12.44
Stage 6 Embankment	22.79	0.00	22.79
Total	41.13	15.61	56.74

Source: Knight Piésold Ltd. 2020, Appendix A, Drawing No. 0010

Note: acreages are approximate due to rounding errors.

Additional information on the Project can be found in the Environmental Assessment (EA) prepared jointly by the Forest Service and DEQ.



East Boulder Mine

- Permit Boundary
- Proposed Limit of Permitted Disturbance Area (286.85 acres)
- Addition to Permitted Disturbance
- Adit

- Stage 6 Disturbance Areas**
 (Acreages within Proposed Limit of Permitted Disturbance Area)
- Stage 6 Embankment (22.79)
 - Access Road and Infrastructure Relocation (6.22)

- Storm Water Runoff Diversion (1.36)
- Proposed Surface Stockpile Area "E" (8.05)
- Access Road (5.88)
- Stage 6 Borrow Area (12.44)

- Stage 4 Embankment
- Stage 5 Embankment
- US Forest Service Land
- Private Land

Image Source: DigitalGlobe©, October 2017 and July 2018



Figure 2
 Proposed Action Activities

Prepared for: MT DEQ and
 USDA Forest Service
 File: 10503 Aq Figure 2.mxd (GS)
 August 20, 2020



Figure 2. Proposed Action Activities

Regulatory Framework

Land and Resources Management Plans

Gallatin Forest Plan

The Gallatin Forest Plan (Forest Service 2015) provides limited forestwide management direction for threatened, endangered, and sensitive plant species. A forestwide goal is to provide sufficient habitat for recovered populations of threatened and endangered species. Forestwide standards for threatened and endangered species specify that a biological assessment will be completed prior to implementation of activities that have potential to affect threatened and endangered species. Reestablishment programs will be evaluated and coordinated with the USFWS; Montana Department of Fish, Wildlife, and Parks; and, where applicable, Yellowstone National Park (Amendment 51). Currently, no designated threatened, endangered, or proposed plants occur within CGNF (USFWS 2019). Sensitive plants have one forestwide standard that states “Habitat for Regionally designated sensitive species on the Gallatin NF will be maintained in a suitable condition to support these species” (Amendment 51).

Gallatin National Forest Noxious and Invasive Weed Treatment Project

A final environmental impact statement (EIS) and record of decision (ROD) for the Gallatin National Forest Noxious and Invasive Weed Treatment Project was completed in 2005 (Forest Service 2005). The selected alternative authorized treatment of 13,260 acres of existing weeds with a combination of herbicides (both aerial and ground), biological control agents, cultural, and mechanical treatments. In addition, the selected alternative allows for adaptive management including: treatment of new weed species, new weed patches, and new control methods (including new herbicides, biological control agents, mechanical and cultural techniques) provided that the environmental impacts are within the scope of those disclosed within Final EIS (Forest Service 2005). The selected alternative provides for the use of the most effective tools for controlling weeds while having minimal impact on the environment. Weed treatment consistent with the selected alternative is occurring annually within the 1.8 million acres of the Gallatin National Forest.

Gallatin National Forest Travel Management Plan

A final EIS and ROD for the Gallatin National Forest Travel Management Plan was completed in 2006 (Forest Service 2006). The Gallatin National Forest Travel Management Plan manages public access and travel within the Gallatin portion of the CGNF. Standards from the Travel Management Plan are applicable to the Project.

Other Laws, Regulations, and Policies

Endangered Species Act

Section 7 of the Endangered Species Act (ESA, PL 93-205, as amended) directs federal agencies to ensure that actions authorized, funded, or carried out on National Forest lands are not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse

modification of habitat or their critical habitat (16 U.S.C. 1536). CGNF is required to consult with USFWS on Forest Service determinations of effects on federally listed/proposed species and critical habitat in accordance with the ESA, its implementation regulations (50 Code of Federal Regulations 402.13), and FSM 2671.4.

National Forest Management Act and Forest Service’s Sensitive Species Policy (FSM 2670.5)

The National Forest Management Act (NFMA) directs the Forest Service to review programs and activities to ensure that species do not become threatened or endangered as a result of Forest Service actions. FSM 2670.5 defines sensitive species as those plant species identified by the Regional Forester for which population viability is a concern, as evidenced by significant current or predicted downward trends in numbers, density, or habitat capability that would reduce a species’ distribution. Regional Foresters are delegated the authority to designate sensitive plant species based on the definition above, with the goal of preventing their formal listing through modification of land management practices that may affect their population viability (FSM 2670.22 and 2670.32). FSM 2670.22 requires the maintenance of viable populations of native and desired nonnative species and to avoid actions that may cause a species to become threatened or endangered. The NFMA directs the Forest Service to “provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives” (16 United States Code (U.S.C.) 1604(g)(3)(B)). Providing ecological conditions to support diversity of native plant and animal species in the planning area satisfies the statutory requirements. The Forest Service’s focus for meeting the requirements of NFMA and its implementing regulations is on assessing habitat to provide for a diversity of species

Environmental Consequences

Analysis Area

The analysis for evaluating direct, indirect, and cumulative effects on vegetation includes the 396.99-acre Project area (Figure 2 and 3). The temporal bounds for this analysis address vegetation effects for the duration of Project implementation and final reclamation (21 years). Effects on vegetation are not expected to persist beyond completion of construction, operations, and final reclamation. A majority of the mine permit area has been previously disturbed and substantially altered and, therefore, only areas within the mine permit area that have not been disturbed were analyzed.

Methods and Data Sources

In 2018/2019, a desktop assessment of land cover, including vegetation, was completed in ArcGIS using aerial imagery to digitize distinct land cover (vegetation, water, and developed areas) polygons within the analysis area. Vegetation polygons were then classified into coarse vegetation types based on plant species and tree density. A cursory field verification of the vegetation types occurred during an April 2019 site visit by ERM; ERM was the third-party consultant hired by DEQ and CGNF prior to ERO Resources, Corp. to analyze impacts of the proposed Project. Separately, in 2015, KC Harvey Environmental, LLC (KC Harvey) completed a baseline environmental assessment (KC Harvey Environmental, LLC 2016), including vegetation surveys, on behalf of SMC for another project at the East

Boulder Mine that is still in development; the KC Harvey survey area overlaps with the analysis area for this project. In its public comments on the Draft EA, SMC suggested that the agencies include the KC Harvey survey in EA analysis. The agencies concurred, and the analysis in this BE was revised using this new baseline data. Terminology used in the in the Revised BE to described vegetation communities varies slightly from what was used in the April 13th, 2020 BE in order to facilitate use of both the 2018/2019 desktop assessment and the 2016 KC Harvey survey data. Similarly, the vegetation mapping from both efforts were combined for this analysis to develop the vegetation type layer. The area of new disturbance under the Proposed Action was then overlain on the vegetation type layer to quantify the acreage of new vegetation clearing under the Proposed Action.

In addition to knowledge of the local vegetation, the vegetation classification was informed by the Montana Spatial Data Infrastructure Land Use/Land Cover spatial data layer. This spatial data layer was developed by the Montana Natural Heritage Program (MNHP) using the Ecological System Classification developed by NatureServe (Comer et al. 2003).

Many species are listed as sensitive for the CGNF (Forest Service 2011a). To determine their potential for occurring within the Project area, this list of sensitive plant species was screened based on a review of existing information relating to species extent and ecological requirements. Listed sensitive species with potential habitat in the Project area were evaluated for inclusion in this analysis. Site-specific information from aerial photographs, topographic position, GIS data, past activities, and existing habitat and survey information were used to evaluate potential habitat presence for sensitive plants within the Project area.

Existing Conditions

Affected Environment

Vegetation types, sensitive species, and noxious weeds for the larger original East Boulder Mine Project area were described in the 2012 FEIS (DEQ and Forest Service 2012). Current conditions specific to the vegetation analysis area are described here.

Vegetation

Three vegetation types were identified in the analysis area, as described below. Land cover types (vegetation, developed areas, and water) are presented in Table 2 and shown on Figure 3.

Table 2. Land cover types in the permit area

Vegetation Types	Mine Permit Area (acres)	Percent of Analysis Area
Reclaimed Grassland	15.71	8.3
Mature Douglas Fir Forest	119.54	63.3
Early Seral Douglas Fir Forest	46.13	24.4
Developed	2.50	1.3
Water (East Boulder River)	0.65	0.34
Total	184.53	100

Reclaimed Grassland

Reclaimed grassland in the analysis area is limited to the area previously disturbed and revegetated with grassland species. Hard fescue (*Festuca brevipila*) and Great Basin wildrye (Figure 3) are the dominant grass species. Lodgepole pine, Douglas fir, and numerous native forbs and shrubs are beginning to colonize this plant community (KC Harvey Environmental, LLC 2016).

Mature Douglas Fir Forest

The mature Douglas fir vegetation type is the most common in the analysis area (Figure 3 and Figure 4) and is found on the slopes south of the TSF, north of the TSF between the main access road and the East Boulder River, and along Lewis Gulch Road. This vegetation type consists of an overstory dominated by lodgepole pine (*Pinus contorta*), with areas of Douglas-fir (*Pseudotsuga menziesii*), subalpine fir (*Abies lasiocarpa*), and Engelmann spruce (*Picea engelmannii*), and an understory of buffaloberry (*Shepherdia canadensis*), Rocky Mountain juniper (*Juniperus communis*), kinnikinnick (*Arctostaphylos uva-ursi*), snowberry (*Symphoricarpos* spp.), ninebark (*Physocarpus malvaceus*), and Oregon grape (*Mahonia aquifolium*).

Much of the lodgepole pine, Douglas-fir, and spruce trees in this vegetation type are merchantable timber (logs, poles, and firewood). Merchantable timber would not be removed by SMC without Forest Service authorization. The Forest Service reserves the right to sell any merchantable timber and may choose to sell directly to SMC or may advertise the volume and award to a third party. Salvaged logs would be separated and decked according to product in a secure location until they are valued and disposed of by recommendation of the Forest Service Authorized Officer.

Early Seral Douglas Fir Forest

The early seral Douglas fir vegetation type consists of scattered low-density conifers among grassland. Most of the areas were logged in recent decades or cleared for adjacent development and are a regenerating earlier seral version of the mature conifer forest described above. The young conifers are lodgepole pine and Douglas-fir with scattered buffaloberry, and a grassland of Idaho fescue (*Festuca idahoensis*), western wheatgrass, Kentucky bluegrass, Timothy, and bluebunch wheatgrass (*Pseudoroegneria spicata*).

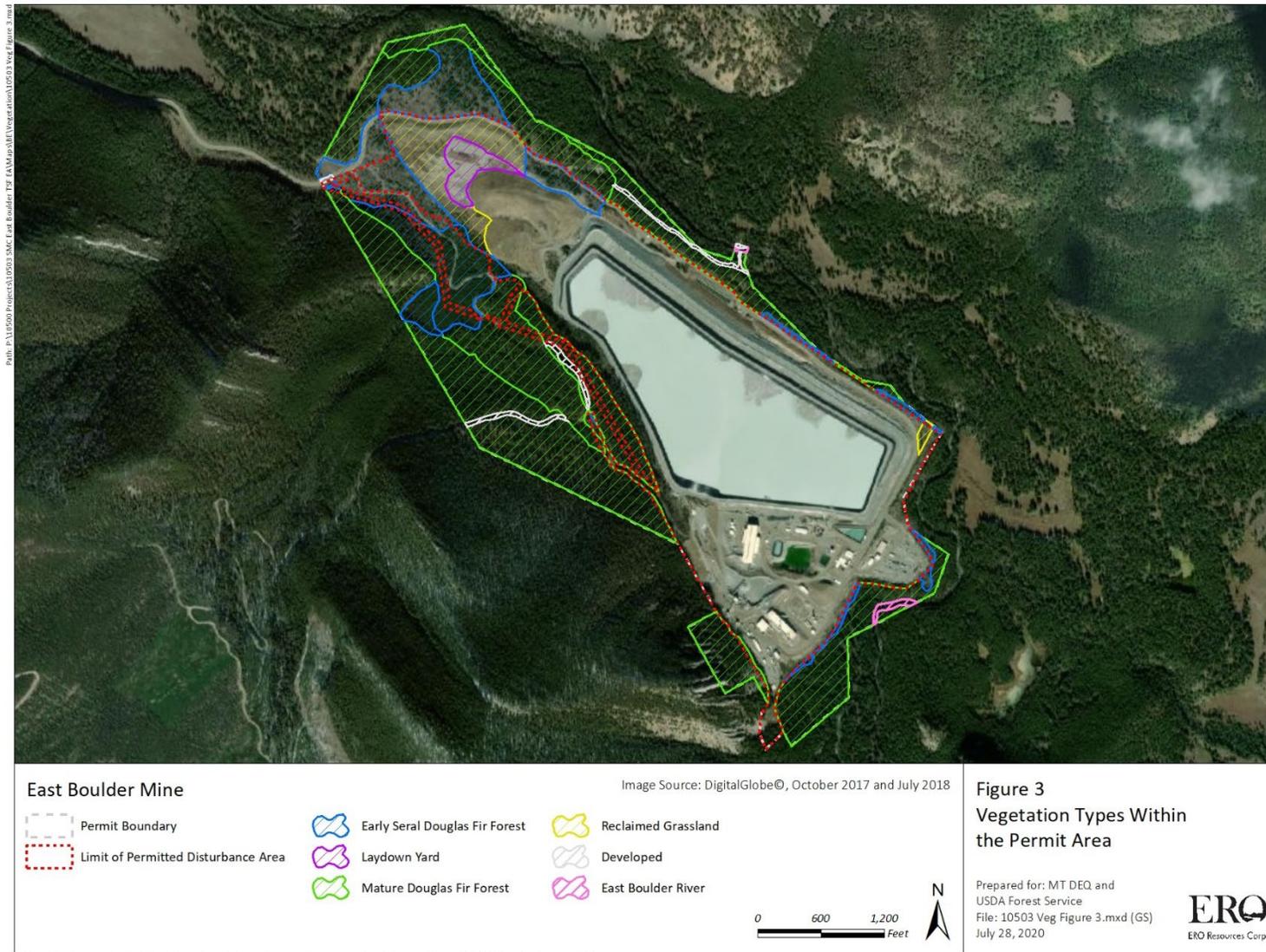


Figure 3. Vegetation Types within the Permit Area



Figure 4. Mature Douglas Fir Forest Vegetation North of the East Boulder Mine TSF

Federally Listed Threatened or Endangered Species

The USFWS has not designated any threatened, endangered, or proposed plant species for CGNF. On July 19, 2011, the USFWS published in the Federal Register its 12-month status review finding on a petition to list whitebark pine under the ESA. After a review of all available scientific and commercial information, the USFWS concluded that listing the species as threatened or endangered is warranted, but precluded by higher priority actions. This finding results in whitebark pine being a USFWS candidate for listing. Because of this finding, the Regional Forester designated whitebark pine as sensitive (Forest Service 2011b).

Regional Forester Sensitive Species

Sensitive species, as determined by the Regional Forester (Forest Service 2011a), are those for which population viability is a concern. This can be indicated by a current or predicted downward trend in population numbers or suitable habitat, which would reduce the species' existing distribution. Currently, the Gallatin side of CGNF recognizes 22 species as sensitive (Table 3).

Table 3. Regional Forester sensitive species that may occur on the CGNF.

Plant Name	Habitat ¹	Documented in Project Area?	Potential Occurrence in Areas of Project Activities
Musk root <i>Adoxa moschatellina</i>	Vernally moist mossy slopes in the mountains at the bottom of undisturbed open rock slides and crevices with cold air drainage; generally shaded, montane to subalpine, 4,400 to 5,400 feet	No	No, habitat not present and outside of elevation range (Project area above 5,400 feet)
Short-styled columbine <i>Aquilegia brevistyla</i>	Open woods and streambanks, limestone sites, northern aspect, 5,000 to 6,000 feet	No	Yes, potential habitat present

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Plant Name	Habitat ¹	Documented in Project Area?	Potential Occurrence in Areas of Project Activities
Large-leaved balsamroot <i>Balsamorhiza macrophylla</i>	Open hills, associated w/ bunch grasses, 7,000 to 8,500 feet	No	No, no habitat and below elevation range
Small yellow lady's slipper <i>Cypripedium parviflorum</i>	Fens, damp mossy woods, seeps, moist forest-meadow ecotones in valley to lower montane, 3,000 to 6,200 feet	No	Yes, species documented within Yellowstone Ranger District and potential habitat present
English sundew <i>Drosera anglica</i>	Peat lands, on floating organic mats--undisturbed sphagnum bogs, 3,000 to 9,000 feet	No	No, no habitat present
Beaked spikerush <i>Eleocharis rostellata</i>	Bogs, 2,700 to 6,100 feet	No	No, no habitat present
Giant helleborine <i>Epipactis gigantea</i>	Streambanks, fens with springs/seeps, often near thermal waters, 2,000 to 5,750 feet	No	No, no habitat present
Slender cottongrass <i>Eriophorum gracile</i>	Peat land, fen, bog species, 3,000 to 7,600 feet	No	No, no habitat present
Hiker's gentian <i>Gentianopsis simplex</i>	Fens, meadows, mountain bogs, seeps; usually in areas of crystalline parent material, montane and subalpine zones, 4,400 to 8,400 feet	No	No, no habitat present
Northern rattlesnake plantain <i>Goodyera repens</i>	Open mossy forests, mountains, limestone, shale or moist limestone slopes of old growth Douglas-fir, montane zone or cool north aspects characterized by spruce/twinflower or subalpine-fir/twinflower habitat types, 5,700 to 6,800 feet	No	Yes, potential habitat present
Discoid goldenweed <i>Haplopappus macronema</i> var. <i>macronema</i>	Rocky open or sparsely wooded slopes, talus, above timberline, 7,640 feet +	No	No, above elevation range
Hall's rush <i>Juncus hallii</i>	Moist to dry meadows and slopes; from valley to montane, 6,900 to 8,400 feet	No	No, no habitat present
Dwarf purple monkeyflower <i>Mimulus nanus</i>	Dry gravelly or sandy slope with sparse grass or sagebrush; may prefer bare areas with minimal competition, 6,565 feet	No	No, no habitat present
Austin's knotweed <i>Polygonum douglasii</i> spp. <i>austiniae</i>	Open, gravelly, shale soils with eroding slopes and banks in montane, 5,800 to 9,400 feet	No	No, no habitat present
Barratt's willow <i>Salix barrattiana</i>	Boggy meadows, moist open hillsides in mountains, lakeshores, stream banks, rock slides, and recent alluvial deposits; forms extensive thickets near or above timberline; cold, moist soils range from very calcareous to very acidic, 6,800 to 10,500 feet	No	No, no habitat present
Shoshonea <i>Shoshonea pulvinata</i>	Open, exposed, windswept limestone outcrops, ridgetops and canyon rims, in thin rocky soils, 6,800 to 9,000 feet	No	No, no habitat present
Alpine meadowrue <i>Thalictrum alpinum</i>	On hummocks with low shrubs in moist, alkaline meadows in montane, subalpine, 6,500 to 7,000 feet	No	No, no habitat present
California false hellebore <i>Veratrum californicum</i>	Wet meadows and streambanks in montane to alpine; associated with spruce, Douglas-fir, 5,000 to 8,500 feet	No	No, no habitat present

Plant Name	Habitat ¹	Documented in Project Area?	Potential Occurrence in Areas of Project Activities
Whitebark pine <i>Pinus albicaulis</i>	Moderate shade tolerance. Most often growing with other conifers on weakly developed (immature) soils. Cold, windy, snowy, and generally moist climatic zone. In moist mountains, it is most abundant on warm, dry exposures. In semiarid ranges, it is found on cool exposures and moist sites. In all but the driest regions, whitebark pine is most abundant on warm aspects and ridgetops having direct exposure to sun and wind, 7,000 to 9,300 feet.	No	No, no habitat present and outside of elevation range
Upward-lobed moonwort <i>Botrychium ascendens</i>	Low canopy cover settings. Stream floodplain habitats dominated by deciduous shrubs with lush cover by forbs, graminoids, and mosses in northwest MT. Mesic meadows, alpine vegetated talus in south central MT; areas of light to moderate disturbance, 5,000 to 9,000 feet.	No	No, no habitat present
Western moonwort <i>Botrychium hesperium</i>	Low canopy cover settings. Mesic meadows associated with spruce and lodgepole pine forests in the montane and subalpine zones, 5,000 to 9,000 feet.	No	No, no habitat present
Peculiar moonwort <i>Botrychium paradoxum</i>	Low canopy cover settings. Dry to moist, often gravelly and lightly disturbed soil of bunchgrass, meadows, and mid-succession gravel bars in the valley and montane zones. Alpine vegetated talus in south central MT; areas of light to moderate disturbance, 5,000 to 9,000 feet.	No	No, no habitat present

¹ Montana Natural Heritage Program. 2019.

² Options in determination of effects: (1) No impact; (2) May impact individuals, but is not likely to cause a trend toward federal listing or loss of viability; (3) Will Impact - Likely to result in a trend toward federal listing or loss of viability; and (4) Beneficial impact. There would be "no impact" on sensitive species determined to be absent from the Project area or lacking habitat within the Project area.

Potential habitat for three Regional Forester sensitive species occurs within the analysis area:

- Short-styled columbine (*Aquilegia brevistyla*), a species in mesic forest habitats with a state rank of S2S3¹
- Small yellow lady's slipper (*Cyripedium calceolus* var. *parviflorum*), a species found in fens and mesic forest habitat with a state rank of S3S4
- Northern rattlesnake plantain (*Goodyera repens*), a species found in mesic forest habitat with a state rank of S3

Of these, only small yellow lady's slipper has been documented on the Yellowstone Ranger District of the CGNF (MNHP 2019). The 1992 FEIS (DSL et al.) reports that field surveys of sensitive plants in 1989

¹ Montana State rank codes (MNHP 2019):

S2: At risk because of very limited and/or potentially declining population numbers, range and/or habitat, making it vulnerable to global extinction or extirpation in the state.

S3: Potentially at risk because of limited and/or declining numbers, range and/or habitat, even though it may be abundant in some areas.

S4: Apparently secure, though it may be quite rare in parts of its range, and/or suspected to be declining.

documented one species of potential concern - Rydberg's springbeauty (*Claytonia multiscapa*; also known as western springbeauty [*Claytonia lanceolata* var. *flava*]). This species was removed from the species of concern list in 1993 (MNHP 2019).

In 2009, CGNF conducted sensitive plant surveys within the proposed East Boulder Fuels Reduction Project treatment areas (Forest Service 2011c). Given that the proposed treatment areas are adjacent to the mine permit area, the results are discussed here. The EA (Forest Service 2011c) reports that "...there is some potential habitat for 5 [special status] species within the proposed treatment areas: Small-flowered columbine, small yellow lady's slipper, Northern rattlesnake plantain, Hall's Rush (*Juncus hallii*; removed from the SOC list in 2012 [MNHP 2019]), California false hellebore (*Veratrum californicum*)."

These species were targeted in the 2009 surveys but were not documented in the proposed treatment areas.

A sensitive plant survey was also conducted in 2015 (KC Harvey Environmental, LLC 2016) for another project at the East Boulder Mine that is in development. The survey area, which overlaps with this Project's analysis area. The survey included evaluating the Lewis Gulch expansion site for the short-styled columbine, moonworts (*Botrychium* spp.), small-winged sedge (*Carex stenoptila*), hiker's gentian (*Gentianopsis simplex*), northern rattlesnake plantain (*Goodyera repens*), Hall's rush (*Juncus hallii*), whitebark pine (*Pinus albicaulis*), Douglas's knotweed (*Polygonum douglasii*), alpine meadow rue (*Thalictrum alpinum*), and California false-hellebore (*Veratrum californicum*). None of the species were identified during the field surveys (KC Harvey Environmental, LLC 2016).

Noxious Weeds

The Montana Department of Agriculture maintains the list of noxious weeds for the state, with the most recent list published in 2017 (MT DOA 2017). Weeds are classified into five categories (priority type) based on known presence in MT and management criteria.

In 2015, SMC developed the East Boulder Mine Integrated Weed Management Plan ("weed management plan"; Appendix E8 of the CORP (SMC 2016) to guide weed management on SMC-controlled lands with the goal of identifying and controlling the spread of noxious weeds. Weed surveys were completed on SMC lands in the 1980s, yet there is no up-to-date weed map for the East Boulder Mine permit area. As such, one of the short-term (one- to three-year) objectives of the weed management plan is to conduct a comprehensive weed survey and develop a weed infestation map. In the meantime, the weed management plan presents the current status of weeds in the area. It describes Canada thistle (*Cirsium arvense*) as the primary noxious weed in the SMC-controlled areas. Canada thistle is classified as a Priority 2B weed (MT DOA 2017), defined as a weed that is abundant and widespread in MT, with eradication or containment required where it is less abundant. Other introduced weed species targeted for control are houndstongue (*Cynoglossum officinale*), leafy spurge (*Euphorbia esula*), and spotted knapweed (*Centaurea stoebe*) (SMC 2016), all of which are also classified as Priority 2B species. Other weeds previously identified in the Project area include oxeye daisy (*Leucanthemum vulgare*), nodding plumeless thistle (*Carduus nutans*), yellow salsify (*Tragopogon dubius*), and bull thistle (*Cirsium vulgare*).

Effects of the No Action Alternative

Under the No Action Alternative, Amendment 003 and the revised Plan of Operations would not be approved. No additional surface disturbance, noise, human activity, or additional expansion of the TSF would occur beyond what is currently authorized under Operating Permit 00149 and the currently approved Plan of Operations. Mining activities would end in 2027. Currently permitted surface disturbance would be reclaimed in accordance with the reclamation plan detailed in the CORP (SMC 2016). Therefore, there would be no additional adverse impacts on vegetation.

Care and maintenance of the TSF's vegetative cover may be necessary beyond mine closure and joint reclamation bond release to prevent post-reclamation damage. As the federal land manager, the Forest Service would determine the scope, frequency, and cost of any long-term oversight beyond the obligations of the joint bond held by DEQ and the Forest Service for reclamation covered in the No Action for the TSF Stage 6 (plan of operations) and current reclamation bond for the existing operation.

Because the No Action Alternative would not result in any impacts, no cumulative impacts would occur.

Effects of the Proposed Action

Construction would occur concurrently with mining activities, occurring over approximately seven years, beginning in 2020. Expansion of the TSF would allow the mine to remain active for approximately seven years beyond the current plan of operations, from the end of 2027 through 2033 at current production rates (Knight Piésold Ltd. 2020). Reclamation of all disturbed areas are anticipated to be completed within approximately eight years. Therefore, the surface disturbance and human activities associated with the Proposed Action would span approximately 21 years before reclamation would be completed.

Implementation of the Proposed Action would result in a total of 56.74 acres of disturbance within the proposed 286.85-acre disturbance area; in terms of the currently permitted disturbance area, 41.13 acres would be disturbed within and 15.61 acres would be disturbed outside this area (Figure 5). The 41.13 acres within the currently permitted disturbance area are already disturbed and are mostly unvegetated and, thus, provides low-quality habitat for sensitive plant species. The 15.61 acres of new disturbance would occur mostly within mature and early seral Douglas fir forests in areas adjacent to the existing mine. Vegetation would be removed in these areas for access road and infrastructure relocation, and construction of a stormwater runoff diversion, temporary soil stockpile, and borrow area; approximately 1.48 acres of this new disturbance is within already developed/unvegetated areas (Lewis Gulch Road prism), so direct impacts would be limited to approximately 20 acres. Table 4 lists the acreage of each vegetation type affected by the Proposed Action.

Table 4. Direct vegetation impacts under the Proposed Action Alternative

Vegetation Types	Disturbance Outside of Permitted Disturbance Area (Acres)
Reclaimed Grassland	2.75
Mature Douglas Fir Forest	11.58
Early Seral Douglas Fir Forest	4.77
Lewis Gulch Road prism (previously disturbed; no impact)	1.48
Total	20.58

Direct impacts on vegetation resulting from the Proposed Action are not expected to significantly adversely impact vegetation as a whole within the analysis area/mine permit area. With approximately 189 acres of total vegetation within the mine permit boundary (Table 2), the permanent removal of approximately 19 acres represents only 10 percent of the total vegetation. Reclamation would seek to restore vegetation during closure to provide post-mining uses, such as wildlife habitat. Therefore, direct adverse impacts on vegetation would be minimal and short-term.

Care and maintenance of the TSF’s vegetative cover may be necessary beyond mine closure and joint reclamation bond release to prevent post-reclamation damage. As the federal land manager, the Forest Service would determine the scope, frequency, and cost of any long-term oversight beyond the obligations of the joint bond held by DEQ and the Forest Service for reclamation covered in the Proposed Action for the TSF Stage 6 (plan of operations) and current reclamation bond for the existing operation.

Threatened, Endangered, and Sensitive Species

The Proposed Action would not impact any ESA-listed plant species as there is no potential for ESA-listed species to be present in the analysis area. The sensitive plant species survey completed in 2015 (KC Harvey Environmental, LLC 2016) covered all areas within analysis area with potential habitat for those species identified as potentially occurring in the analysis area and did not identify any populations of those sensitive species. Due to the limited amount of habitat in the Project area, and the negative results from the 2015 survey, the potential for impacts on any sensitive species are expected to be low and no mitigation is necessary.

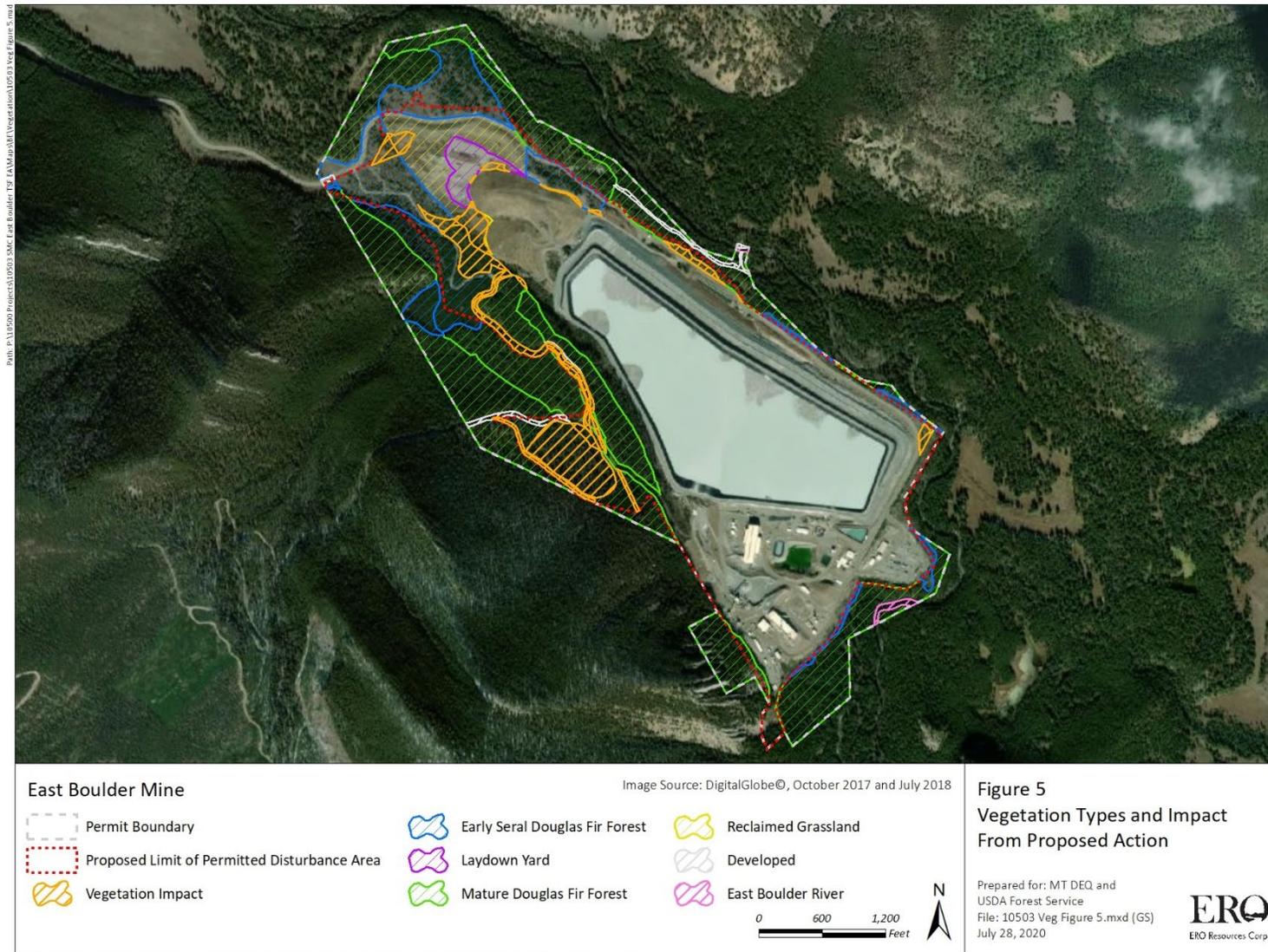


Figure 5. Vegetation Types and Impact from Proposed Action

Noxious Weeds

The Project has the potential to increase the spread of noxious weeds directly through the transport of plant material or seeds, or indirectly through ground disturbance that could increase the susceptibility of the disturbed areas to weed infestation.

The weed management plan (Appendix E8 of the CORP [SMC 2016]) would be implemented on all lands within and adjacent to the mine permit area as part of construction, operation, and closure/reclamation to minimize the spread of noxious weeds. Key aspects of this mitigation program include conducting a weed survey and developing a weed map, semiannual weed spraying, timely revegetation of all disturbed areas to minimize weed infestation, and educating the workforce to identify weed species. Park Electric is responsible for weed management within the power line corridor.

Measurement indicators are the current extent of weed populations within the analysis area, the amount of ground disturbance, and the susceptibility of newly disturbed areas to weed colonization.

Given the weed management plan and the current extent of noxious weeds in the mine permit area boundary, the spread of weeds is not expected to increase under the Proposed Action.

Cumulative Impacts

There is not expected to be any discernible cumulative impact on vegetation, including sensitive species and noxious weeds, resulting from the East Boulder Fuels Reduction Project as it is located primarily outside of the mine permit area boundary. Given the select clearing (20 to 60 percent canopy retention) of trees proposed for the fuels reduction project, any windthrow resulting from fuels reduction tree clearing adjacent to the mine permit area is expected to cause limited, if any, windthrow in the mine permit area. Given its purpose, the fuels reduction project could result in a beneficial impact of reduced wildfire risk within and adjacent to the mine permit area.

There is an out-year proposal being developed for a conceptual future expansion at the East Boulder Mine. Engineering design and facility locations are not finalized at this time. Because we do not have this level of detail, we cannot fully consider the cumulative impacts of future mine expansions in this analysis effort, but will consider the impacts of the Stage 6 proposal on those actions when they are formally submitted.

Determination of Effects

Table 5 provides the effects determination for each analyzed plant species.

Table 5. Determination of Effects

Plant Name	Determination of Effect ¹
Musk root - <i>Adoxa moschatellina</i>	No impact
Short-styled columbine - <i>Aquilegia brevistyla</i>	No impact
Large-leaved balsamroot - <i>Balsamorhiza macrophylla</i>	No impact
Small yellow lady's slipper - <i>Cypripedium parviflorum</i>	No impact
English sundew - <i>Drosera anglica</i>	No impact
Beaked spikerush - <i>Eleocharis rostellata</i>	No impact

Plant Name	Determination of Effect ¹
Giant helleborine - <i>Epipactis gigantea</i>	No impact
Slender cottongrass - <i>Eriophorum gracile</i>	No impact
Hiker's gentian - <i>Gentianopsis simplex</i>	No impact
Northern rattlesnake plantain - <i>Goodyera repens</i>	No impact
Discoïd goldenweed - <i>Haplopappus macronema</i> var. <i>macronema</i>	No impact
Hall's rush - <i>Juncus hallii</i>	No impact
Dwarf purple monkeyflower - <i>Mimulus nanus</i>	No impact
Austin's knotweed - <i>Polygonum douglasii</i> spp. <i>austiniae</i>	No impact
Barratt's willow - <i>Salix barrattiana</i>	No impact
Shoshonea - <i>Shoshonea pulvinata</i>	No impact
Alpine meadowrue - <i>Thalictrum alpinum</i>	No impact
California false hellebore - <i>Veratrum californicum</i>	No impact
Whitebark pine - <i>Pinus albicaulis</i>	No impact
Upward-lobed moonwort - <i>Botrychium ascendens</i>	No impact
Western moonwort — <i>Botrychium hesperium</i>	No impact
Peculiar moonwort - <i>Botrychium paradoxum</i>	No impact

¹ Options in determination of effects: (1) No impact; (2) May impact individuals, but is not likely to cause a trend toward federal listing or loss of viability; (3) Likely to result in a trend toward federal listing or loss of viability; and (4) Beneficial impact. There would be "no impact" on sensitive species determined to be absent from the Project area or lacking habitat within the Project area.

Regulatory Consistency

A survey for sensitive species was previously completed; therefore, the Project is consistent with Gallatin Forest Plan (Forest Service 2015) and NFMA direction. The Project would follow the GNF Noxious and Invasive Weed Treatment EIS and ROD regarding weed treatment protocols within the Project area. The Project is consistent with the Travel Management Plan. As discussed above and below, no designated federally threatened, endangered, or proposed plants occur within CGNF and, therefore, the Project complies with the ESA.

Responsibility for a Revised Biological Evaluation

This Biological Evaluation was prepared based on presently available information. If the Proposed Action is modified in a manner that causes effects not considered, or if new information becomes available that reveals that the Proposed Action may impact endangered, threatened, proposed, or sensitive species in a manner or to an extent not previously considered, a new or revised biological evaluation would be required.

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