## ATTACHMENT C: 404(b)(1) Alternatives Analysis

## DRAFT

## Clean Water Act Section 404(b)(1) Evaluation for the Stibnite Gold Project

Prepared for Perpetua Resources Idaho, Inc. 405 S 8<sup>th</sup> St. Boise, Idaho 83702 April 2023



# **Table of Contents**

List	List of Figuresv					
List	List of Tablesv					
List	t of App	endices		v		
List	t of Abb	oreviatio	ns	vi		
1.	Introd	uction		1-1		
	1.1 Perpetua Resources' Proposed Project					
		1.1.1	Project Area	1-3		
		1.1.2	Project Background	1-16		
	1.2	Project	Purpose and Need	1-16		
	1.3	Basic P	roject Purpose	1-17		
	1.4	Water [	Dependency	1-17		
	1.5	Overall	Project Purpose	1-17		
2.	Propos	sed Actio	on and Alternatives	2-1		
	2.1	Alterna	tives Development	2-1		
		2.1.1	Alternatives Development Summary	2-2		
	2.2	Alterna	tives Descriptions	2-5		
		2.2.1	ModPRO2 (SDEIS 2021 MMP, Proposed Action)	2-5		
		2.2.2	Johnson Creek Route Alternative	2-8		
		2.2.3	No Action	2-9		
		2.2.4	PRO (DEIS Alternative 1)	2-9		
		2.2.5	ModPRO (DEIS Alternative 2)	2-9		
		2.2.6	EFSFSR TSF (DEIS Alternative 3)	2-9		
	2.3	Alterna	tives Practicability Analysis			
		2.3.1	Practicability Analysis Methods			
	2.4	Factors	Used to Analyze Alternatives			
		2.4.1	Tier 1 Environmental Factors for Primary Impacts to WOTUS			
		2.4.2	Tier 2 Environmental Factors for Indirect Impacts to WOTUS			
		2.4.3	Tier 3 Environmental Factors for Sensitive or Protected Species			
	2.5	Summa	ary of Alternatives Analysis			
З.	Enviro	nmenta	Setting/Existing Conditions	3-1		
3.1 Geological Resources			ical Resources	3-1		
	3.2 Air Quality			3-1		
	3.3	Climate	Change	3-2		
	3.4	Soils ar	nd Reclamation Cover Materials	3-2		
	3.5 Noise					



	3.6	Hazardous Materials		3-3	
	3.7	Surface Water and Groundwater Quantity			
	3.8	Surface	Water and Groundwater Quality	3-5	
		3.8.1	Geology and Mineralization	3-5	
		3.8.2	Geochemical Influence of Historical Mining Wastes	3-6	
		3.8.3	Surface Water	3-7	
		3.8.4	Groundwater	3-8	
	3.9	Vegetat	ion	3-8	
	3.10	Wetland	ds and Riparian Resources	3-9	
	3.11	Fish Re	sources and Fish Habitat	3-10	
	3.12	Wildlife Species	and Wildlife Habitat (Including Threatened, Endangered, Candidate, and Se	nsitive 3-11	
	3.13	Timber	Resources	3-12	
	3.14	Land Us	se and Land Management	3-12	
	3.15	Access	and Transportation	3-13	
	3.16	Heritage	e Resources	3-13	
	3.17	Public H	lealth and Safety	3-14	
	3.18	Recreat	ion	3-15	
	3.19	Scenic Resources			
	3.20	Social a	nd Economic Conditions	3-17	
	3.21	Environ	mental Justice	3-18	
	3.22	Special	Designations	3-19	
	3.23	Tribal R	ights and Interests	3-21	
4.	Avoida	ance, Mir	nimization, and Compensatory Mitigation	4-1	
	4.1	Measur	es Considered to Avoid Aquatic Impacts	4-1	
		4.1.1	Total Avoidance of Impacts to Waters of the United States	4-1	
		4.1.2	Minimization of Impacts to Waters of the United States	4-1	
		4.1.3	Proposed Action	4-1	
		4.1.4	Aquatic Impact Minimization Measures	4-2	
	4.2	Comper	nsatory Mitigation	4-3	
		4.2.1	Applicant's Proposed Compensatory Mitigation Plan	4-3	
		4.2.2	Mitigation Requirement	4-5	
		4.2.3	Available Mitigation	4-5	
		4.2.4	Conclusions	4-5	
5.	Prohib	itions an	d Significant Degradation	5-1	
	5.1	5.1 Subpart C – Potential Effects on Physical and Chemical Characteristics of Aquatic			
		Ecosyst	ems	5-1	
		5.1.1	Substrate (40 CFR 230.20)	5-1	
		5.1.2	Suspended Particulates and Turbidity (40 CFR 230.21)	5-3	



	5.1.3 Water (40 CFR 230.22)		Water (40 CFR 230.22)	5-5
		5.1.4	Water Current Patterns and Circulation (40 CFR 230.23)	5-8
		5.1.5	Normal Water Fluctuations (40 CFR 230.24)	5-10
		5.1.6	Salinity Gradients (40 CFR 230.25)	5-12
	5.2	Subpart	t D – Potential Effects on Biological Characteristics of Aquatic Ecosystems	5-12
		5.2.1	Threatened and Endangered Species (40 CFR 230.30)	5-12
		5.2.2	Fish, Crustaceans, Mollusks, and other Aquatic Organisms in the Food Web	(40
		523	Other Wildlife (10 CER 230 32)	5-17
	53	Subpar	t E – Potential Effects on Special Aquatic Sites	5-19
	5.5	5 3 1	Sanctuaries and Refuges (40 CER 230 40)	5-19
		532	Wetlands ( $40 \text{ CFR}$ 230 $41$ )	5_10
		533	Mud Flats (40 CFR 230.42)	5-21
		534	Vegetated Shallows (40 CFR 230.43)	5-21
		535	Coral Reefs (40 CFR 230 44)	5-21
		536	Riffle and Pool Complexes (40 CFR 230 45)	5-21
	5.4	Subpart	t F: Potential Effects on Human Use Characteristics	
	011	5.4.1	Municipal and Private Water Supplies (40 CFR 230.50)	
		5.4.2	Recreational and Commercial Fisheries (40 CFR 230.51)	
		5.4.3	Water-Related Recreation (40 CFR 230.52)	
		5.4.4	Aesthetics (40 CFR 230.53)	5-29
		5.4.5	Parks, National and Historical Monuments, National Seashores, Wilderness	F 00
			Areas, Research Sites, and Similar Preserves (40 CFR 230.54)	5-33
	5.5	Subpart	t G: Evaluation and Testing	5-35
		5.5.1	General Evaluation of Dredged or Fill Material (40 CFR 230.60)	5-35
~	<b>.</b> .	5.5.2	Chemical, Biological, and Physical Evaluation and Testing (40 CFR 230.61).	5-36
6.	Subpa	irt H – Ac	ctions to Minimize Adverse Effects	6-1
	6.1	Actions	Concerning the Location of the Discharge (40 CFR Section 230.70)	6-1
	6.2	Actions	Concerning the Material to be Discharged (40 CFR Section 230.71)	6-1
	6.3	Actions	Controlling the Material after Discharge (40 CFR Section 230.72)	6-2
	6.4	Actions	Affecting the Method of Dispersion (40 CFR Section 230.73)	6-2
	6.5	Actions	Related to Technology (40 CFR Section 230.74)	6-3
	6.6	Actions	Affecting Plant and Animal Populations (40 CFR Section 230.75)	6-3
6.7 Actions Affecting Human Use (40 CFR Section 230.76)		Affecting Human Use (40 CFR Section 230.76)	6-5	
	6.8	Other A	ctions (40 CFR Section 230.77)	6-5
		6.8.1	Water Quality	6-5
		6.8.2	Water Temperature	6-6
-	6.9	Discuss		6-6
1.	Deterr	nination	of Cumulative Effects on the Aquatic Ecosystem	/-1



	7.1	Surface Water and Groundwater Quantity7-1
	7.2	Surface Water and Groundwater Quality7-1
	7.3	Wetlands and Riparian Resources7-2
	7.4	Fish Resources and Fish Habitat7-3
8.	Deter	mination of Secondary Effects on the Aquatic Ecosystem
	8.1	Surface Water and Groundwater Quality8-1
	8.2	Wetlands and Riparian Resources8-1
	8.3	Fish Resources and Fish Habitat8-2
9.	Findir	ngs9-1
	9.1	Status of Other Authorizations and Legal Requirements9-1
	9.2	Evaluation of Compliance with 404(b)(1) Guidelines (restrictions on discharge, 40 CFR
		230.10)
	9.3	Findings of Compliance or Non-compliance with the Restrictions on Discharge (40 CFR
10		Summary of Conclusions 10.1
10.		
11.		Evaluation Responsibility 11-1
12.		References 12-1

## List of Figures

Figure 1-1.	Project Location Map	1-5
Figure 1-2.	Project Site (End of Year 12)	1-6
Figure 1-3.	Project Area	1-7
Figure 1-4.	Project Area Watersheds	. 1-15

## List of Tables

Table 2-1.	Description of Alternative Naming Conventions for the Stibnite Gold Project	2-2
Table 2-2.	Summary of LEDPA Analysis	-14

## List of Appendices

Appendix A Alternatives Comparison Spreadsheet



## List of Abbreviations

°C	degrees Celsius	FCRNRW	Frank Church River of No Return	
°F	degrees Fahrenheit	EMD	Fisherias and Aquatia Bassurasa	
AADT	average annual daily traffic	FIVIP	Mitigation Plan	
ABA	Acid Base Accounting	FOMP	Fishway Operations and Management	
amsl	above mean sea level		Plan	
ASAOC	Administrative Settlement Agreement	Forest Plan	Land and Resource Management Plan	
	Agonov for Toxic Substances and	FR	Forest Road	
AISDR	Disease Registry	FS	Feasibility Study	
BA	biological assessment	FSH	Forest Service Handbook	
BMP	Best Management Practice	GHG	greenhouse gas	
BNF	Boise National Forest	GIS	geographic information system	
CCD	Census County Division	Guidelines	CWA Section 404(b)(1) Guidelines for	
CEA	cumulative effects analysis area		Dredged or Fill Material	
CEQ	Council on Environmental Quality	HAP	Hazardous Air Pollutant	
CERCLIS	Comprehensive Environmental	HCT	Humidity Cell Test	
	Response, Compensation, and Liability	HUC	hydrologic unit code	
CFR	Code of Federal Regulations	IDEQ	Idaho Department of Environmental Quality	
cfs	cubic feet per second	IDFG	Idaho Department of Fish and Game	
CL	Cultural Landscape	IP	intrinsic potential	
CMP	Compensatory Stream and Wetland Mitigation Plan	IRA	Inventoried Roadless Area	
CR	County Road	L <sub>EQ</sub>	equivalent sound level	
CWA	Clean Water Act	LAU	Lynx Analysis Unit	
DA	Department of the Army	LEDPA	least environmentally damaging practicable alternative	
dBA	A-weighted decibels	Ма	million vears ago	
dbh	diameter at breast height	LWD	large woody debris	
DEIS	Draft Environmental Impact Statement	MA	Management Area	
DPS	Distinct Population Segment	mg/L	milligram per liter	
District	Stibnite-Yellow Pine Mining District	Midas Gold	Midas Gold Idaho. Inc.	
DRSF	development rock storage facility	MMP	Modified Mine Plan	
EDF	Environmental Design Feature	ModPRO	Modified Proposed Action	
EFSFSR	East Fork of the South Fork of the Salmon River	ModPR02	Refined Proposed Action	
EIS	environmental impact statement	MPG	major population group	
EMMP	Environmental Monitoring	MWAM	Montana Wetland Assessment Method	
	Management Plan	MWMP	Meteoric Water Mobility Procedure	
EPA	Environmental Protection Agency	NAAQS	National Ambient Air Quality Standards	
ESA	Endangered Species Act	NAG	Net Acid Generation	





NEPA	National Environmental Policy Act	TES	Threatened and Endangered
NF	National Forest	TSF	Tailings Storage Facility
NFS	National Forest System	USACE	U.S. Army Corp of Engineers
NIDGS	Northern Idaho Ground Squirrel	USFS	U.S. Forest Service
NMFS	National Marine Fisheries Service	USGS	U.S. Geological Survey
NOAA	National Oceanic and Atmospheric Administration	WCI	Watershed Condition Indicator
NRHP	National Register of Historic Places	WOTUS	
NSR	noise sensitive receptor	WED	Wild and Soonia Divor
NTU	nephelometric turbidity unit	WSR	
ОМ	occupancy model		
ORV	Outstandingly Remarkable Value		
OW	open water		
PEM	palustrine emergent marsh		
Perpetua	Perpetua Resources Idaho, Inc.		
Resources			
PFO	palustrine forested		
PNF	Payette National Forest		
PRO	Plan of Restoration and Operations		
PSS	palustrine shrub-scrub		
Project	Stibnite Gold Project		
RAMP	Restoration and Access Management Plan		
RCA	Riparian Conservation Area		
RCM	Reclamation Cover Material		
RCP	Reclamation and Closure Plan		
RFFA	reasonable foreseeable future action		
RioASE	Rio Applied Science and Engineering		
RNA	Research Natural Area		
SDEIS	Supplemental Draft Environmental Impact Statement		
SFA	Stream Functional Assessment		
SFSR	South Fork Salmon River		
SGCN	Species of Greatest Conservation Need		
SGLF	Stibnite Gold Logistics Facility		
SGMP	Stibnite Gold Mitigation Plan		
SGP	Stibnite Gold Project		
SODA	spent ore disposal area		
SWPPP	Stormwater Pollution Prevention Plan		
ТСР	Traditional Cultural Property		
TDS	total dissolved solids		



# Section 1 Introduction

Perpetua Resources Idaho, Inc. (formerly Midas Gold Idaho, Inc. [Midas Gold], hereafter Perpetua Resources) has applied to the Regulatory Division of the U.S. Army Corps of Engineers (USACE) Walla Walla District for a Department of the Army (DA) permit pursuant to Section 404 Clean Water Act (CWA) permit (DA permit) for the proposed Stibnite Gold Project (SGP or Project). Section 404 of the Clean Water Act requires authorization from the Secretary of the Army, acting through the USACE, for the discharge of dredged or fill material into all waters of the United States, including wetlands. As part of the USACE's evaluation, the USACE must evaluate the compliance of the proposed SGP with the CWA Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material (Guidelines).

The CWA Section 404(b)(1) Guidelines (40 CFR 230) are regulations established by the Environmental Protection Agency (EPA) that constitute the substantive criteria used in evaluating activities regulated under Section 404 of the Clean Water Act.

This document was developed on behalf of Perpetua Resources and does the following:

- Presents the criteria used to determine the practicable alternative with the least impact on the aquatic ecosystem as described in 40 CFR 230.10 (a) aka. Least environmentally damaging practicable alternative (LEDPA).
- Provides the USACE with a summary of alternatives evaluated to support the USACE's determination of the LEDPA.
- Provides the USACE with a summary of pertinent information for applicable sections of the CWA Section 404(b)(1) guidelines to aid in their review of the Section 404 CWA application and evaluation of compliance with CWA Section 404(b)(1).

This document provides a summary of the alternatives evaluated in compliance with the Guidelines. This document was produced for use by the USACE and is submitted with Perpetua Resources' complete DA permit application package. Each section of this document includes a narrative with sufficient detail to minimize the need for time consuming reference to other documents.

The U.S. Forest Service (USFS) is the lead federal agency and prepared the Draft Environmental Impact Statement (DEIS; USFS 2020) the Supplemental Draft Environmental Impact Statement (SDEIS; USGS 2022a) pursuant to the National Environmental Policy Act (NEPA) (40 CFR Parts 1500 – 1508) for the refinement of the Project' Proposed Action – ModPRO2 (ModPRO2) (Perpetua Resources 2021). The USACE is a cooperating agency in the preparation of the SDEIS and will use the SDEIS in part to support its decision on the DA permit as described in the guidelines (40 CFR 230.10 4; 40 CFR. 1506.3). The permit application is subject to review and modification as part of the 404 permitting processes for the Project.

The NEPA alternatives analysis and impact assessment in the DEIS and SDEIS provides information supporting the evaluation of compliance with the Guidelines. The Guidelines provide that USACE Districts should not complete separate alternatives analyses for NEPA and the 404(b)(1) Guidelines, where possible and appropriate. The USACE may, where necessary, supplement their evaluation of compliance with the Guidelines with additional information. This document includes additional



information not considered in the DEIS or SDEIS but supports the evaluation of compliance the Guidelines.

The proposed Project would result in a discharge of dredge and fill materials into waters of the United States (WOTUS). Pursuant to Section 404 of the CWA, the EPA established the regulatory program, administered by the USACE, to regulate the discharge of dredge and fill materials into WOTUS, including wetlands, through issuance of permits. This document is based on the information from the DA permit application submitted by Perpetua Resources, and the DEIS and SDEIS completed for the Project by the USFS and to which USACE is a cooperating agency.

This document is intended to supplement the DEIS and SDEIS with additional information necessary to complete the requirements of the Guidelines. The USACE and the USFS have concurred that the range of alternatives included in the DEIS and SDEIS are sufficient to meet both agencies' requirements under their authorities. The DEIS and SDEIS establish the range of reasonable alternatives to the proposed Project, which USACE as a cooperating agency helped review (i.e., Plan of Restoration and Operations [PRO], ModPRO, ModPRO2) or develop (i.e., USFS TSF alternative).

The DEIS and SDEIS analyzes the potential direct, indirect, and cumulative impacts associated with the Project for each of the action alternatives. This serves as the starting point for the USACE's evaluation of the impact of alternatives and alternative components on WOTUS and special aquatic sites. Information from the DEIS and SDEIS has been referenced in this document or incorporated where applicable. This document was developed by Perpetua Resources following the SDEIS developed and publicly released by the USFS. Efforts were made to ensure consistency in descriptions; however, this document is not intended to replace or supersede the content of the DEIS or the SDEIS.

**Section 1** in this document presents Perpetua Resources' proposed Project, the Project purpose and need, the USACE Basic Project Purpose, overall project purpose, and a determination of water dependency.

### 1.1 Perpetua Resources' Proposed Project

Perpetua Resources plans to redevelop portions of the Stibnite-Yellow Pine Mining District (District), as outlined in the ModPRO2. Prior to the development of the ModPRO2, a preliminary PRO (Midas Gold 2016a) was submitted to the USFS and the Idaho Department of Lands in September 2016 and deemed complete by the USFS in December 2016. Concurrently with preparation of the Project DEIS (USFS 2020), federal and state permits, and agency and stakeholder consultations required for approval of the PRO (Midas Gold 2016a), Perpetua Resources advanced the Project's engineering design to the feasibility study level. While the USFS was in the process of evaluating alternatives in the DEIS, Perpetua Resources continued to refine and clarify the PRO. This included completing more detailed feasibility analyses and re-evaluating components of the project to further avoid and minimize environmental impacts, particularly impacts on WOTUS. The combination of incremental improvements to the PRO was submitted to the USFS in May 2019 as the Modified Proposed Action (Modified PRO or ModPRO) (Brown and Caldwell 2019a) and represented Perpetua Resources' refined proposal in the DEIS as Alternative 2.

Concurrently with the preparation of the DEIS, Perpetua Resources continued to study alternatives that would further reduce the overall project footprint, reduce WOTUS impacts, improve surface water and groundwater quality, reduce temperature impacts to surface water, reduce air emissions, improve fisheries and wildlife habitat, and improve upon reclamation and restoration design. These



considerations guided the preparation of the PRO and the ModPRO and were influential in preparation of Perpetua Resources' Feasibility Study (FS) (M3 2021).

In continuation of these efforts and the development of the SDEIS, Perpetua Resources developed the ModPRO2 which is the Proposed Project. The Proposed Project was also developed from information derived from agency and public scoping, the alternatives development process, baseline data collection and analysis, and predictive modeling (hydrologic, geochemical, stream temperature) and informed by Perpetua Resources' interactions with the public; federal, state, and local governments; Native American tribes; and other project stakeholders. The Proposed Project also takes into account a number of comments made during the public comment period on the DEIS (USFS 2020).

#### 1.1.1 Project Area

The Project site is located near Stibnite, Idaho, approximately 100 miles northeast of Boise, Idaho, 38 miles east of McCall, Idaho, and approximately 10 miles east of Yellow Pine, Idaho. **Figure 1-1** illustrates the Project location.

Located in the Salmon River Mountains, a high-relief mountainous physiographic province in central Idaho, the terrain within the Project site consists of narrow valleys surrounded by steep mountains. Elevations along valley floors range from 6,000 to 6,600 feet above mean sea level (amsl). The surrounding mountains reach elevations over 8,500 feet amsl. The main drainage basin in the Project site is the East Fork of the South Fork of the Salmon River (EFSFSR). The EFSFSR is joined by Johnson Creek 16 miles downstream near Yellow Pine and flows into the South Fork of the Salmon River approximately 14.5 miles downstream of the Johnson Creek confluence.

The following terms are used throughout this document for Project features and areas:

- Project site includes the mine area and associated on-site infrastructure and facilities (Figure 1-2).
- **Project Area** includes all Project features, including both the Project site and off-site infrastructure (**Figure 1-3**).
- Off-site infrastructure includes all infrastructure and facilities outside of the Project site.1

The Project Area is encompassed by two subbasins (hydrologic unit code [HUC] 8) and seven watersheds (HUC 10) (**Figure 1-4**). Tributaries of the EFSFSR include, among others, Sugar Creek, Meadow Creek, Johnson Creek, Riordan Creek, Burntlog Creek, Trout Creek, Hennessy Creek, Midnight Creek, Fiddle Creek, Garnet Creek, and Rabbit Creek, with West End Creek a tributary of Sugar Creek. The Project Area also includes Cabin Creek and Warm Lake Creek, which are tributary streams to the South Fork of the Salmon River (**Figure 1-4**). Diverse wetlands are located throughout Project Area drainages and slopes that drain to the valleys downslope and include wetlands classified as palustrine emergent marsh (PEM), palustrine shrub-scrub (PSS), palustrine forested (PFO), and open water (OW) (Cowardin, et al. 1979). The primary uses or activities in the Project Area have been mineral exploration, mining, logging, and dispersed recreation.

<sup>&</sup>lt;sup>1</sup> The SDEIS employed different terminology and spatial delineation of Project features and areas, which are also referenced in this document: the *SDEIS Operations Area Boundary* is the boundary within which Perpetua Resources would control public access, as shown on SDEIS Figures 2.4-1 and 2.4-2 (similar to the "Project Area"). *SDEIS Offsite Facilities* include only the Burntlog Maintenance Facility, Landmark Maintenance Facility, and Stibnite Gold Logistics Facility, as shown on SDEIS Figure ES-1. Under the Proposed Action, the Burntlog Maintenance Facility and Stibnite Gold Logistics Facility would be constructed. Under the Johnson Creek Route Alternative, the Landmark Maintenance Facility and Stibnite Gold Logistics Facility would be constructed.



During non-winter conditions (unmaintained roads clear of snow), the Project site/area can be accessed from the city of Cascade by traveling northeast on Warm Lake Road (National Forest [(NF)] road NF-22) for about 37 miles to Landmark, then north on Johnson Creek Road (NF-413) for 28 miles to Yellow Pine, and 14 miles east on Stibnite Road (NF-412) (**Figure 1-1**). The site can also be accessed from McCall during non-winter conditions by traveling east on Lick Creek Road (NF-48) for 33 miles to East Fork Road, then 16 miles to Yellow Pine, and 14 miles on Stibnite Road (NF-412). During winter, the site can be accessed with highway vehicles only from Cascade by traveling 24 miles northeast on Warm Lake Road (NF- 22) to the intersection with South Fork Road (NF-674), then north on South Fork Road for 32 miles to East Fork Road, 16 miles east on East Fork Road to Yellow Pine, and 14 miles on Stibnite Road (NF-412).





Figure 1-1. Project Location Map





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Figure 1-2. Project Site (End of Year 12)











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Figure 1-4. Project Area Watersheds



#### 1.1.2 Project Background

Located in Valley County in central Idaho, the District is characterized by historical mining activities and unpatented (federal land) and patented (private land) mining claims with known deposits of gold, silver, tungsten, and antimony. The District is in the Boise National Forest (BNF) but is administered by the Krassel Ranger District of the Payette National Forest (PNF).

Mining began in the District in the late 1800s and continued on and off through 1997. Two main phases of mining activity have occurred at the Project site and include antimony, gold, and tungsten mining in the 1920s to the 1950s, and a second phase that began in 1974 and ended in 1997. Historical mining activities at the Project site have created numerous legacy impacts including underground mine workings, multiple open pits, development rock dumps, tailings deposits, heap leach pads, spent heap leach ore piles, a mill and smelter site, three town sites, camp sites, a ruptured water dam (with its associated erosion and downstream sedimentation), and partially reclaimed or un-reclaimed haul roads.

Beginning in 2009, Perpetua Resources began to acquire mining claims throughout the District from prior owners or by staking claims on its own behalf. With federal and state approval, Perpetua Resources initiated mineral exploration activities in 2009 as part of the Project to better define the mineral deposit potential for the area. This work included using the existing road network and construction of several temporary roads to access drill sites, build drill pads, drill on both National Forest System (NFS) and private lands, and access disturbed areas for reclamation when exploration work ends. Proposed Project facilities include an ore processing facility, three open pits (Hangar Flats, West End, and Yellow Pine), a temporary tunnel diversion of the EFSFSR, development rock storage facilities (DRSFs), a lined tailings storage facility (TSF), haul roads, access roads, power lines, employee housing, and ancillary facilities and infrastructure. Additional details on proposed onsite and offsite Project activities, facilities, and infrastructure are provided in Chapter 2 of the SDEIS.

Further details about the Project area and onsite and offsite activities, facilities, and infrastructure associated with the Project are provided in the sections below, in the ModPRO2 (Perpetua Resources 2021), and in the SDEIS (USFS 2022a).

## **1.2** Project Purpose and Need

Section 1.6 of the SDEIS includes a discussion of the Purpose and Need of the Project. The following sections of this document (1.3, 1.4, and 1.5) were incorporated from Chapter 1 of the SDEIS.

In the ModPRO2, Perpetua Resources stated that the Project purpose and need is:

"to economically develop and operate a modern gold, antimony, and silver mine to obtain financial return and benefits from its property rights and investment and supply extracted minerals for various uses. The plan would be executed while undertaking cleanup, reclamation, and restoration of legacy mining impacts before, during, and after the proposed mining activities."

As provided in the SDEIS, the USFS has stated that the purpose and need for federal action regarding the Project is:

"to consider approval of Perpetua's proposed use of the surface of NFS lands in connection with operations authorized by the United States mining law as first described in the Plan submitted September 2016, then refined in 2019 (Brown and Caldwell 2019a), and further modified in [the ModPR02]."



## 1.3 Basic Project Purpose

As stated in Section 1.6.2 of the SDEIS, the USACE is required by the CWA to independently consider and express the [Project's] underlying purpose and need from Perpetua Resources and the public's perspectives (33 CFR 325). Accordingly, the USACE has determined that the basic Project purpose is:

"...to extract gold, silver, and antimony from ore." (USFS 2022a).

The USACE uses the basic project purpose to determine if a project is "water dependent."

### **1.4 Water Dependency**

The basic purpose – to extract gold, silver, and antimony from ore – does not require access or proximity, or siting within, a special aquatic site to fulfill the basic purpose. Accordingly, as stated in the SDEIS, the USACE has found that the Project is not water dependent. Based on this determination, for the purposes of this analysis, Perpetua Resources assumes that available practicable alternatives that do not involve a special aquatic site (e.g., wetlands) will have less adverse impact.

## 1.5 Overall Project Purpose

Under its regulations, the USACE uses the overall project purpose for evaluating practicable alternatives under the Guidelines and in its determination of which alternative is the LEDPA that would meet the overall project purpose. As stated in Section 1.6.2 of the SDEIS, the USACE has determined that the overall project purpose for the SGP is:

"...to mine gold, silver, and antimony from ore deposits associated with the SGP." (USFS 2022a).



## Section 2 Proposed Action and Alternatives

## 2.1 Alternatives Development

Chapter 2 of the SDEIS includes a thorough discussion of alternatives development. As described in SDEIS Chapter 2, as part of the NEPA process, the USFS conducted an extensive alternatives development, screening, and evaluation process with the participation of the USACE. Alternatives were developed based on the NEPA purpose and need for the action by the USFS with input from the USACE as a cooperating agency. Action alternatives were developed to respond to a key issue or issues identified through the scoping process (see Section 1.10 of the SDEIS). Development of the alternatives was guided by requirements for alternatives under regulations and rules implementing the NEPA (40 CFR Parts 1500 – 1508) and Section 404 of the CWA (33 CFR Part 230).

Alternatives were developed to address scoping comments, anticipated impacts to the human environment and natural resources, and internal USFS and cooperating agency discussions. Additionally, Perpetua Resources identified design features and other potential improvements for consideration intended reduce environmental effects. The process for development and consideration of alternatives followed 40 CFR 1502 and Council on Environmental Quality (CEQ) guidance (CEQ 1983, 1986).

The following criteria were used by the USFS in the SDEIS review process to develop and evaluate the range of reasonable alternatives for the SGP as identified in Chapter 2 of the SDEIS:

- Does the alternative meet the purpose and need to which the agencies are responding? (as described in Chapter 1: 36 CFR 220.5; Forest Service Handbook [FSH] 1909.15).
- Does the alternative comply with federal, state, and local laws and regulations?
- Would implementation of the alternative potentially reduce environmental effects to a resource? (36 CFR 220.5; FSH 1909.15)
- Is the alternative technically feasible from an available technological perspective? (CEQ 40 Most Asked Questions – Answer 2A [CEQ 1986]; FSH 1909.15.14.4)
- Is the alternative economically feasible? (CEQ 40 Most Asked Questions Answer 2A [CEQ 1986])

As identified in Chapter 2 of the SDEIS, to develop a reasonable range of alternatives in compliance with NEPA, the USFS separated the Project into components that could be identified as discrete activities, operations, or facilities (e.g., mine pits, access roads, ore process, etc.). Information from the Project development methodology presented in Appendix G of the PRO (Midas Gold 2016a) was also considered. For each component, conceptual alternatives were formulated that could potentially avoid or reduce resource impacts identified during scoping and internal USFS and cooperating agency discussions and addressing the avoidance and minimization of impacts to WOTUS. Each component alternative was evaluated for inclusion in an action alternative. Component alternatives include but were not limited to alternate tailings and development rock storage facility locations, ore processing methods, water management methods, transportation and transmission line corridors, and offsite facility locations.



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An action alternative is defined in Chapter 2 of the SDEIS as a complete package of operations, activities, and facilities that comprise a functioning mine project. Conceptual alternatives that met the criteria above, were carried forward for further consideration and described in the SDEIS.

The component alternatives were combined into two action alternatives, including the Proposed Action (ModPRO2and the Johnson Creek Route Alternative 2 which address specific key issues or resource impacts identified in the SDEIS, such as Inventoried Roadless Areas (IRAs), WOTUS and other aquatic and wildlife resources, and air quality.

Each action alternative carried forward for analysis in the SDEIS fulfills the purpose and need for the Project. Each component was developed to a similar level of detail that allows for a comparative analysis of the potential adverse and beneficial environmental impacts. Brief summaries of the proposed action and alternatives described in the SDEIS and those developed and analyzed leading up to the SDEIS publication are provided in **Section 2.1.1**. The three SDEIS alternatives are summarized in greater detail in **Sections 2.3 to 2.5**.

#### 2.1.1 Alternatives Development Summary

Several proposed actions and alternatives have been developed and analyzed throughout the Project planning stage and NEPA review process. Three distinct iterations of the proposed action have been put forth by the Project proponent for public and agency review: the PRO, ModPRO, and ModPRO2. The Project proponent also considered and screened Project component alternatives during its own feasibility and tradeoff studies and in the NEPA review process. In addition to the proposed action iterations, three separate action alternatives have been carried forward for detailed study by the USFS and cooperating agencies during the NEPA review process: two in the DEIS and one in the SDEIS. A summary of alternative naming conventions across multiple plans and documents is provided in **Table 2-1**.

Table 2-1. Description of Alternative Naming Conventions for the Stibnite Gold Project					
	Alternative Name by Document				
	Draft Environmental Impact	Supplemental Draft Environmental	404(b)(1) Alternatives Analysis -		
Alternative	Statement – 2020	Impact Statement 2022	2023		
ModPR02		2021 MMP, Proposed Action	ModPRO2		
Johnson Creek Route		Johnson Creek Route	Johnson Creek Route		
No Action	Alternative 5	No Action	No Action		
PRO	Alternative 1		PRO		
ModPRO	Alternative 2		ModPRO		
EFSFSR TSF	Alternative 3		EFSFSR TSF		

Note: EFSFSR TSF = East Fork South Fork Salmon River Tailings Storage Facility, MMP = Modified Mine Plan

Proposed actions and alternatives as described in the PRO, ModPRO, DEIS, ModPRO2, and/or SDEIS are summarized in chronological order below.

- PRO (Midas Gold 2016a)
  - Proposed action: redevelopment of the existing inactive mine site, entailing resumption of open pit mining; ore processing, recovery of gold, silver and antimony, placement of neutralized tailings in a composite lined TSF, development rock placement in fully engineered and designed facilities, and construction and operation of appurtenant facilities and infrastructure.



- Project component alternatives: As detailed in Appendix G of the PRO, the Project proponent considered and screened alternative project components to the proposed action, including alternative: mining methods, tailings placement, ore processing flowsheet and facilities, mine support facilities, development rock placement, EFSFSR management, fish passage, East Fork Meadow Creek (also known colloquially and referenced in other Project-related documents as Blowout Creek) water and sediment management, site access, site power, and employee and contractor housing and transportation.
- ModPRO (Brown and Caldwell 2019a)
  - Proposed action: modification of the PRO based on exploration, alternatives analyses, and pre-feasibility studies evaluating the size, location, and design of project components including pits, TSF, DRSFs, access and haul roads, and transmission lines. Minimizing potential impacts to natural and human resources was a central element of the modification efforts.
  - Project component alternatives: project components described in the ModPRO that were modified or changed from the PRO include: revising or eliminating DRSF layouts, generating lime onsite, changing TSF diversion and liner design, adding or changing surface water management and diversion design, relocating the offsite maintenance facility, realigning mine access roads, allowing public access through the site during operations, and realigning portions of transmission line.
- DEIS (USFS 2020)
  - Proposed action: As described in the DEIS, in practical effect, the proposed action is the ModPRO, and is designated in the DEIS as Alternative 2.
  - Alternatives carried forward for further study:
    - DEIS Alternative 1 (PRO): Alternative 1 is based on the PRO along with clarifications and supplemental information. Alternative 1 serves as the benchmark for impact analysis because the other action alternatives described in the DEIS were developed based on refinement of the PRO to reduce impacts, resulting in the ModPRO.
    - DEIS Alternative 2 (ModPRO): Alternative 2 is the ModPRO and in practical effect is the proposed action described in the DEIS. Alternative 2 represents a modified version of Alternative 1 primarily developed by the project proponent to provide additional avoidance and mitigation measures to address significant impact issues identified through the DEIS scoping process.
    - DEIS Alternative 3 (EFSFSR TSF): Alternative 3 was developed to address issues related to WOTUS and federally protected fish species by relocating the TSF and one of the DRSFs to a location in the upper EFSFSR valley.
    - DEIS Alternative 4: Alternative 4 was developed by the USFS and the cooperating agencies to incorporate several independent component options and evaluate potential reductions in effects concerning many of the significant issues identified during DEIS scoping. The primary focus of Alternative 4 is consideration of using an existing route for mine access instead of a route that under Alternative 1 requires new road construction in IRAs.
    - DEIS Alternative 5: Alternative 5 is the No Action Alternative, which provides an environmental baseline for comparison of the action alternatives. Under the No Action Alternative, the mining, ore processing, and related activities under the action alternatives considered in the DEIS would not take place. However, existing and



approved activities (i.e., approved exploration activities and associated reclamation obligations) would continue and the project proponent would not be precluded from subsequently submitting another plan of operations pursuant to the General Mining Law of 1872.

- ModPRO2 (Perpetua Resources 2021)
  - Proposed action: further refinements of the PRO and ModPRO developed to reduce potential environmental Impacts, including those to WOTUS. The ModPRO2 presents a smaller footprint. Mining methods, ore processing, exploration activities, water management, and supporting features including structures, access, haul roads, and infrastructure are similar to the PRO and/or ModPRO or are modified to reduce WOTUS and other environmental impacts.
  - Project component alternatives: project components described in the ModPRO2 that were modified or changed from the PRO and/or ModPRO include reductions in: overall mined material production, size (volume) of the Hangar Flats pit by allowing for complete backfill, overall disturbance area from open pits, and overall area of on-site disturbance by eliminating the Fiddle DRSF and reduction in WOTUS impacts.
- SDEIS (USFS 2022a)
  - Proposed action: As described in the SDEIS, the proposed action is based on the ModPRO2, and is designated in the SDEIS as the 2021 Modified Mine Plan (MMP).
  - Alternatives carried forward for further study:
    - 2021 MMP: The 2021 MMP is based on the ModPRO2. Site access under the 2021 MMP would utilize Warm Lake Road, Johnson Creek Road, and Stibnite Road (together comprising the Johnson Creek Route [Johnson Creek Route Alternative]) during construction of the Burntlog Route, then utilize the Burntlog Route for the last year of construction of the mine site through operations and reclamation. The 2021 MMP is referenced in this document as the ModPRO2.
    - Johnson Creek Route Alternative: The Johnson Creek Route Alternative was developed by the USFS and cooperating agencies to evaluate potential impact to IRAs, sensitive plant species, and wetlands from access related causes. The mining portion of this alternative would be the same as under the ModPRO2 (MMP 2021). Therefore, the primary focus of the Johnson Creek Route Alternative is consideration of using an existing route, that would require improvements for mine access during operations and reclamation, instead of a route that under the ModPRO2 requires new road construction in and through IRAs.
    - No Action Alternative: Under the No Action Alternative, the Project would not be approved and no mining, ore processing, or related activities would occur, including removal of legacy materials (i.e., spent ore disposal area and Hecla heap leach) incorporated as part of the Project. Previously approved activities (i.e., approved exploration activities and associated reclamation obligations) would continue.

As described in SDEIS Section 2.6, alternatives not considered in detail and eliminated from further study may include, but are not limited to, alternatives that 1) fail to meet the purpose and need; 2) are technologically infeasible; and/or 3) would result in unreasonable environmental harm. The alternatives considered but eliminated from further study were categorized into five alternative components: mining method, processing method, facility locations, transportation and access roads, and water management. Each component included one or more alternative subcomponents. The



rationale for the elimination from further study for each subcomponent is described in SDEIS Section 2.6. Some alternatives were eliminated before the feasibility analysis because the rationale for elimination was clear and did not require additional review of information for a feasibility determination. However, Perpetua Resources has retained the PRO (DEIS Alternative 1), the ModPRO (DEIS Alternative 2), and the USFS EFSF TSF alternative (DEIS Alternative 3) in the LEDPA determination analysis. The PRO, ModPRO, and the USFS EFSFSR TSF alternatives are included in the practicability analysis as shown in **Appendix A** but were not carried forward in this document beyond **Section 2**.

## **2.2 Alternatives Descriptions**

#### 2.2.1 ModPRO2 (SDEIS 2021 MMP, Proposed Action)

The ModPRO2 Alternative is defined in the SDEIS as the 2021 MMP and the Proposed Action (USFS 2022a). Mining operations would occur on patented mining claims owned or controlled by Perpetua Resources and on unpatented mining claims and other areas of federal public lands comprised of NFS lands that are administered by the PNF. Supporting infrastructure corridors (access and transmission line) are located on the BNF, Bureau of Reclamation, and non-federal lands.

Development of the mineral resource would include construction of access and haul roads; construction of supporting infrastructure; open pit mining; ore processing; placement of tailings in a TSF; and placement of development rock. New access to the Project would be provided by the proposed Burntlog Route, which would be a combination of widening the existing Burnt Log Road (Forest Road [FR] 447) and Meadow Creek Lookout Road (FR 51290) and constructing new connecting road segments of approximately 15 miles (Figure 1-1). Development of the Burntlog Route would entail 340.9 acres of new cut and fill activity (including borrow sources) along existing and newly constructed roadways. Construction of the Burntlog Route would occur from both ends of the route at the same time seasonally (May to November), but construction could occur outside of this time period if conditions allow.

To provide electric power for the Project, an existing powerline would be upgraded and a new transmission line from a new Johnson Creek substation to the mine would be constructed. Additional off-site support facilities to be constructed along access corridors include the SGLF and the Burntlog Maintenance Facility. The SGLF would have an approximately 25-acre footprint and would be located along Warm Lake Road on private land approximately 7 miles northeast of the city of Cascade. The SGLF would house administrative offices, the assay laboratory, and a warehouse. The Burntlog Maintenance Facility would have an approximately 3.5-acre footprint and would be located on NFS land within a previously disturbed borrow source site 4.4 miles east of the junction of Johnson Creek Road and Warm Lake Road. The maintenance facility would be the headquarters for road maintenance and snow removal. The proposed facilities and access roads are shown on **Figure 1-1** and **Figure 1-2**. Perpetua Resources would control public access within the Project Area, as shown in **Figures 1-1** and **1-2**.

The actions proposed under the ModPRO2 would take place over a period of approximately 20 to 25 years, not including the long-term, post-closure environmental monitoring or potential long-term water treatment. The phases of the operation include: (1) Construction (approximately 3 years); (2) Mining and Ore Processing Operations (approximately 15 years); (3) Surface and Underground Exploration (approximately 17 years, beginning during construction and continuing during operations); and (4) Closure and Reclamation (approximately 5 years). The environmental monitoring phase would continue for as long as needed to demonstrate that the site has been fully reclaimed.



Implementing the ModPRO2 would require construction of surface facilities, haul roads, and water management features. Supporting infrastructure would include transmission lines, substations, communication sites, and access roads. Additionally, removal of legacy mining features would be initiated during the construction phase. Perpetua Resources would install 15 to 20 temporary trailers on private lands adjacent to the existing exploration camp (located in the proposed ore processing area) to accommodate construction crews; these temporary trailers would be used during site preparation and early construction until the worker housing facility is constructed.

Prior to site preparation and construction of surface facilities, vegetation would be removed from operating areas. Trees, deadwood, shrubs, and slash would be removed, and any remaining vegetation would be grubbed using a bulldozer. The resulting material would be chipped and stockpiled for use as mulch or blended to create a growth media additive. After vegetation removal, growth media would be salvaged and stockpiled. Stockpiles would be stabilized and seeded.

Mining operations would occur in the area of two historical open pit mined areas (Yellow Pine and West End) and one new open pit (Hangar Flats) that includes former underground mining and mineral processing facilities. In general, ore mined from the three open pits would be hauled directly to the primary crusher area; however, during extended periods when the ore tonnage or ore type from the pits exceed the availability of the ore processing plant, the ore would be stockpiled and processed at a future time. Development rock (also commonly referred to as waste rock) would be hauled to the TSF embankment or placed in one of four destinations: the TSF Buttress, the mined-out Yellow Pine open pit, the mined-out Hangar Flats open pit, or the Midnight area within the mined-out West End open pit (**Figure 1-2**).

Closure and reclamation at the site would include interim, concurrent, and final closure and reclamation as described in the Project Reclamation and Closure Plan (RCP) (Tetra Tech 2021c). Interim reclamation is intended to provide shorter-term stabilization to prevent erosion of disturbed areas and stockpiles that would be more fully and permanently reclaimed later. Concurrent reclamation is designed to provide permanent, low-maintenance achievement of final reclamation goals on completed portions of the site prior to the overall completion of Project mining activities. Approximately 46 percent of the reclamation would be completed concurrent to mining and ore processing; remaining reclamation activities would be completed during closure. Final closure and reclamation would involve removing all structures and facilities; reclamation of those areas that have not been concurrently reclaimed such as the TSF and some backfill surfaces; recontouring and improving drainages; creation of wetlands; reconstructing stream channels; decommissioning the EFSFSR diversion tunnel; growth media placement; planting and revegetation on disturbance areas; and reopening Stibnite Road (FR 50-412) through the Operations Area. The Burntlog Route would be needed until the TSF is fully reclaimed, after which the portions of the road constructed for the SGP would be decommissioned and reclaimed, except for the removal of soil nail walls. The existing portions of the road would be returned to prior use. Surface water flow diversion of portions of Garnet Creek, Meadow Creek, Midnight Creek, and Hennessey Creek would be reclaimed and incorporated into constructed wetlands or restored stream channels across the reclaimed TSF or Yellow Pine Pit backfill. The purpose of closure and reclamation activities would be to achieve postmining land uses of wildlife and fisheries habitat and dispersed recreation.

Air emissions, groundwater, surface water, aquatic, and other environmental parameters would be monitored during mine construction, operation, closure, and post-closure as described and specified in the Project Environmental Monitoring and Management Plan (EMMP) (Brown and Caldwell 2021a). Federal and state monitoring requirements and reclamation success criteria will not be fully known until permit authorizations have been issued. Reclamation monitoring would begin during



concurrent reclamation at Project facilities. Reclamation success monitoring would begin during the first growing season after concurrent or final reclamation is completed and would continue until success criteria are satisfied. Qualitative and quantitative reclamation standards and success criteria would be determined by the USFS and Idaho Department of Lands.

The Project RCP (Tetra Tech 2021c) presents Perpetua Resources' proposed reclamation monitoring requirements and performance standards, which entails erosion and sediment control monitoring, slope stability monitoring, reclamation maintenance procedures, and annual reporting. Erosion and sediment control monitoring would be conducted during the spring and fall, and the monitoring results would be used to determine the cause of any failures and to locate problem areas before erosion becomes widespread. Slope stability monitoring would also be conducted concurrently during the spring and fall to detect slope movement, cut slope and rock face failures, and other indications of slope instability. Monitoring personnel would also track the location and dimension of surface cracks and fill slope bulges. This information would be used to determine the cause of surface cracks and to develop appropriate corrective action plans, if necessary. If reclamation success is not achieved, Perpetua Resources would implement maintenance actions, including sediment removal, surface water diversion, erosion control and stabilization, noxious weed control, and seeding treatment. Perpetua Resources would submit annual monitoring reports to the USFS and other applicable agencies. The annual report would cover the previous calendar year and would describe the location and type of reclamation activities completed, present the reclamation monitoring results, and identify corrective actions implemented during that year.

As outlined in **Section 2.1.1**, Perpetua Resources incorporated Project design features and operational characteristics into the ModPRO2 which are intended to inherently reduce and/or eliminate potential environmental impacts. Such measures are referred to as Environmental Design Features (EDFs). Potential Project impacts remaining after applying the ModPRO2 EDFs were addressed by Perpetua Resources through further avoidance, minimization, and/or compensatory mitigation described in resource mitigation plans. The mitigation plans reflect Perpetua Resources'-proposed environmental protection measures that form the proponent-proposed EDFs analyzed in the SDEIS. The mitigation plans include the Stibnite Gold EMMP (Brown and Caldwell 2021a), Fisheries and Aquatic Resources Mitigation Plan (FMP) (Brown and Caldwell, McMillen Jacobs, and BioAnalysts 2021a), Fishway Operations and Management Plan (FOMP) (Brown and Caldwell, McMillen Jacobs, and BioAnalysts 2021b), and CMP (Tetra Tech 2023).

The stibnite Gold EMMP consists of a program framework and appendices containing Project component monitoring and management plans that would be used to guide monitoring, document permit compliance, implement impact reduction procedures, and address adaptive management thresholds and responses where impacts and mitigation effectiveness carry substantial uncertainty. The FMP describes Perpetua Resources' proposed measures to minimize adverse impacts on fisheries and aquatic resources, with particular attention to species listed as threatened under the Endangered Species Act (ESA): Columbia River bull trout, Snake River spring/summer Chinook salmon, and Snake River Basin steelhead. The FMP plan also addresses other resident fish species including cutthroat trout, considered a sensitive species by the USFS and Idaho Department of Fish and Game (IDFG). The FMP includes water quality protection; fish protection, salvage, and relocation during diversions and dewatering activities; a process of protection and salvage for draining of the Yellow Pine pit; measures to avoid impacts during blasting; monitoring streamflow; restoring passage in stream channels with fish passage impediments; and monitoring of fish and aquatic biota. Perpetua Resources has proposed a fishway for safe upstream and downstream passage of anadromous and migratory fish in the EFSFSR during construction and mine operations, to be part of the tunnel that diverts the EFSFSR around the Yellow Pine pit. The FOMP outlines the fishway



operation and monitoring activities designed for effective fish passage and includes an adaptive alternative approach, if necessary, for fish trap and haul operations using the same facilities. The CMP (Tetra Tech 2023) provides detailed descriptions of restoration, establishment, enhancement, and/or preservation of aquatic resources to compensate for unavoidable impacts to WOTUS resulting from activities that would potentially be authorized by a DA permit. The CMP demonstrates the feasibility of achieving the amount and types of mitigation to offset the impacts in a manner consistent with the USACE 2008 Mitigation Rule and includes the 12 required elements of compensatory mitigation plans (33 CFR 332.4I/40 CFR 230.94(c)).

#### 2.2.2 Johnson Creek Route Alternative

The Johnson Creek Route Alternative was developed to avoid or reduce certain impacts to IRAs, sensitive plant species, and wetlands that would occur under the ModPRO2. In The Johnson Creek Route Alternative, the Burntlog Route would not be constructed; instead, the Johnson Creek Route would be used during initial Project construction and during the operations and closure/reclamation phases of the Project. Additionally, in The Johnson Creek Route Alternative, the Burntlog Maintenance Facility would not be constructed; instead, the Landmark Maintenance Facility would be constructed. Under The Johnson Creek Route Alternative, all the mining, ore processing, and development rock storage activities would be the same as described for the ModPRO2 (Section 2.3). Previously approved exploration activities and associated reclamation obligations would continue. USFS requirements and EDFs described in Section 2.3 would also apply to The Johnson Creek Route Alternative, i.e., the Johnson Creek Route and Landmark Maintenance Facility, are shown on Figure 1-1.

Development of the Johnson Creek Route would entail 216.6 acres of new cut and fill (including borrow sources) along existing roadways that follow segments of Johnson Creek and EFSFSR to make those roadways usable for mine access during the Project lifespan. Improvements to the Johnson Creek Route would include road widening and straightening, constructing retaining walls, drainage and bridge improvements, and installing one hundred eighty-two 18-inch culverts and two 60-inch culverts. The improvements to the Johnson Creek Route would remain after mining operations end. The Landmark Maintenance Facility would be located on NFS land near the intersection of Warm Lake and Johnson Creek roads. The Landmark Maintenance Facility would be functionally identical to the Burntlog Maintenance Facility, i.e., the Landmark Maintenance Facility would have the same 3.5-acre footprint, include the same components, and would serve the same purpose as headquarters for road maintenance and snow removal.

The Johnson Creek Rou2-8ouldould require approximately 4 years to construct, while the Burntlog Route under the ModPRO2 would require approximately 2 years to construct. The level and pace of Johnson Creek Route construction would be limited by space constraints and the need to maintain some level of access through the construction zone to allow for passage of equipment, materials, and laborers to the mine site. Johnson Creek Road would require periodic temporary road closures during construction. To complete upgrades to the Stibnite Road, daily road closures would be required from 10 a.m. to 4 p.m. during a 3-year period to conduct the cut and fill activities required to straighten curves and install retaining walls. The Project lifespan would be 2 years longer under The Johnson Creek Route Alternative than under the ModPRO2, as Project construction under The Johnson Creek Route Alternative could not be completed until the Johnson Creek Route is sufficiently upgraded. The time period for Project operations and closure and reclamation phases would be unchanged, but the start of mining operations under The Johnson Creek Route Alternative would be delayed by 2 years compared to the ModPRO2.



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#### 2.2.3 No Action

Under the No Action Alternative, Alternatives 1 and 2 would not be approved and no mining, ore processing, or related activities would occur, including removal of legacy materials (i.e., spent ore disposal area [SODA] and Hecla heap leach) incorporated as part of the Project. Previously approved activities (i.e., approved exploration activities and associated reclamation obligations) would continue.

#### 2.2.4 PRO (DEIS Alternative 1)

The PRO (Midas Gold 2016a) is described in the DEIS (USFS 2020) as an alternative "based upon Midas Gold's plan of operations, with clarifications and supplemental information. Although this DEIS alternative is no longer Midas Gold's preferred proposal, it continues to serve as an important baseline project description for impact analysis because the other action alternatives were developed based upon the proposed plan of operations." Under the PRO, the proposed action involved the redevelopment of the existing inactive mine site, entailing resumption of open pit mining; ore processing, recovery of gold, silver and antimony, placement of neutralized tailings in a composite lined TSF, development rock placement in fully engineered and designed facilities, and construction and operation of appurtenant facilities and infrastructure. As detailed in Appendix G of the PRO, the Project proponent considered and screened alternative project components to the proposed action, including alternative mining methods, tailings placement, ore processing flowsheet and facilities, mine support facilities, development rock placement, EFSFSR management, fish passage, East Fork Meadow Creek water and sediment management, site access, site power, and employee and contractor housing and transportation.

#### 2.2.5 ModPRO (DEIS Alternative 2)

The ModPRO (Brown and Caldwell 2019a) is described in the DEIS (USFS 2020) as an alternative that "represents a modified version of DEIS Alternative 1 primarily developed by Midas Gold to provide additional avoidance and mitigation measures to address significant impact issues. Although Alternative 2 is, in practical effect, the proposed project for which Midas Gold was seeking approval, Midas Gold has not submitted a revised plan of operations premised upon this alternative. Accordingly, the description of Alternative 2 remains derivative of Alternative 1 as detailed in the plan of operations (Midas Gold 2016a)." Under the ModPRO, the proposed action involved modification of the pRO based on exploration, alternatives analyses, and pre-feasibility studies evaluating the size, location, and design of project components including pits, TSF, DRSFs, access and haul roads, and transmission lines. Minimizing potential impacts to natural and human resources was a central element of the modification efforts. Project components described in the ModPRO that were modified or changed from the PRO included: revising or eliminating DRSF layouts, generating lime onsite, changing TSF diversion and liner design, adding or changing surface water management and diversion design, relocating the offsite maintenance facility, realigning mine access roads, allowing public access through the site during operations, and realigning portions of transmission line.

#### 2.2.6 EFSFSR TSF (DEIS Alternative 3)

During review of the PRO and planned placement of mine facilities, the USFS expressed a need to analyze an alternative location for the PRO TSF. In a Draft Alternatives Component Development Report prepared by the USFS and their third-party EIS consultant (AECOM) (AECOM 2017), an alternative location for the PRO TSF was proposed at a location in the upper reaches of the EFSFSR, hereafter referred to as the EFSFSR TSF and DEIS Alternative 3. This alternative location required an additional disturbance that runs from the EFSFSR TSF along the EFSFSR to its confluence with



Meadow Creek. This disturbance would accommodate a haul road and pipelines that would transport materials to the EFSFSR TSF, and process water from the TSF. Additionally, construction of the EFSFSR TSF would require Midas Gold to relocate the proposed Stibnite Lodge under the PRO in an area adjacent to the haul road. The PRO TSF allowed for the use of the Stibnite Lodge location that directly abuts the existing road along the upper EFSFSR and would not require additional disturbance.

## 2.3 Alternatives Practicability Analysis

As a cooperating agency, the USACE worked with the USFS to establish the reasonable alternatives described in the DEIS and SDEIS. The USACE then evaluated the practicability of the reasonable alternatives to determine whether a practicable alternative to the proposed action exists that "would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences" (40 CFR 230.10[a]) also known as the LEDPA. The USACE determines the practicability of alternatives and alternative components using the definition of practicable stated in the Guidelines – practicable means available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

#### 2.3.1 Practicability Analysis Methods

The USACE and the USFS obtained information from Perpetua Resources to evaluate the logistical and technological constraints associated with the alternatives as part of the NEPA review process. This information supports the practicability analysis required as part of compliance with the Guidelines.

Perpetua Resources has completed extensive analysis on technology and logistics related to the practicability of the alternative components. Completed third party reviews have been incorporated into the USACE decision-making process and were presented in the DEIS and SDEIS for public consideration.

## 2.4 Factors Used to Analyze Alternatives

To support the evaluation of the alternatives considered in the DEIS and SDEIS for determining the LEDPA, Perpetua Resources, in consultation with the USACE, analyzed the following environmental factors from the available information in the DEIS and SDEIS. These criteria are appropriate factors for their direct or indirect representation of ecosystem function and value, and commensurate level of supporting detail available for all alternatives. These factors also support the evaluation of Potential Impacts and Potential Effects as described in Subpart C through Subpart F of the Guidelines. Evaluating alternatives using the environmental factors described below allows for a quantitative evaluation of each alternative against another. In instances where the quantitative determination of an alternative is similar to another, qualitative consideration of potential risks associated with Alternatives 1 and 2 (those advanced for consideration) are described in **Section 5**.

The description of the environmental factors considered in **Table 2-1** and how each factor was used to rate/rank the site is included here.

#### 2.4.1 Tier 1 Environmental Factors for Primary Impacts to WOTUS

**Stream Impacts (feet) and Stream Functional Loss (Functional Units):** The Stream Functional Assessment (SFA) Methodology Report and Stream Functional Assessment Ledger (Rio ASE 2023)



was developed as an adaptation of the USFS's Watershed Condition Indicator (WCI) Matrix (Appendix B in USFS 2003a) that reflects important stream functions and values related to fish species of interest in the PNF, specifically Chinook salmon (*Oncorhynchus tshawytscha*), steelhead (*O. mykiss*), bull trout (*Salvelinus confluentus*), and westslope cutthroat trout (*O. clarki lewisi*). The SFA is used in the Stibnite Gold Mitigation Plan (SGMP) (Brown and Caldwell 2019b) to assess stream aquatic habitat quality and quantity over the life of the proposed Project using structural and functional values combined to yield functional units of measure, for debits associated with stream impacts and credits associated with proposed stream mitigation. The SFA Report includes multiple appendices that fully describe the basis for the SFA, the methodology, and the resulting Stream Functional Assessment Ledger (SFA Ledger).

The results of the stream functional assessment were integrated into a Microsoft Excel spreadsheet ledger that enables the transparent accounting and tracking of impacts (debits) and compensatory mitigation (credits) over time. The SFA Ledger divides all affected jurisdictional streams into unique reaches, aggregates all SFA element scores into a reach functional index (quality), and multiplies each reach functional index by the length and size (based on stream order) of the reach to calculate the functional value of each reach in terms of functional units (quality and quantity). The result is a common unit of measurement (a functional unit) applied to each reach, enabling comparison between reaches over time. This process has also been repeated for different time periods including existing (baseline), interim (impacted during mining operations), and restored (post-mining) for the life of the Project and beyond allowing a year-by-year evaluation of impacts versus mitigation.

**Wetlands Impacts (Acres) and Wetland Functional Loss (Functional Units):**– In consultation with USACE, Perpetua Resources has assessed wetland function using the Montana Wetland Assessment Method MWAM (Berglund and McEldowney 2008) to generate the Wetland Functional Assessment Ledger. The MWAM is a functional assessment approach for quantifying wetland impacts and mitigation that is regionally appropriate for Idaho. USACE agreed that MWAM is an acceptable method to evaluate the effects of the Project and proposed mitigation for unavoidable impacts to wetlands from the Project (HDR 2016).

The MWAM produces a unitless numeric value for each wetland assessment area analyzed. This numeric value is multiplied by the acreage of the assessment area to produce a functional unit. Through this process, acres of wetlands within the assessment that are disturbed can be converted to functional units of wetlands that are lost and would need to be replaced via the compensatory mitigation process. Likewise, the same MWAM is used to create a unitless numeric value for wetlands that are enhanced, restored, or created to satisfy compensatory mitigation. The functional units generated via this process can be used to compensate for those that are impacted by Project disturbance. To track the impacted functional units and those that are part of the compensatory mitigation process, Perpetua Resources developed a comprehensive spreadsheet ledger that accounts for each wetland delineated across the Project site and offsite areas and the functional units associated with each of those wetlands. This spreadsheet also accounts for the functional units that are predicted to be associated with the restored wetlands across the mitigation area.

The detailed conceptual design plans for the stream, wetland, riparian, and upland wildlife habitat restoration are provided in the SGMP, and the SGMP component plans are based on design reports (HDR 2016; Rio ASE 2023) and Appendix D of the Conceptual Stream and Wetland Mitigation Plan (Tetra Tech 2021a) and supported the development of the Draft Compensatory Stream and Wetland Mitigation Plan (CMP) (Tetra Tech 2023), and, in the case of wildlife habitat restoration, in the Wildlife Habitat Mitigation Plan (WHMP) (Tetra Tech 2021b). These reports provide the basis for detailed designs that would be implemented during the proposed SGP and for calculating the



estimated loss of habitat functional values (debits) and, in the case of compensatory mitigation, gains in habitat functional values (credits).

Other Waters Impacts (Acres) Other Waters Functional Loss (Functional Units): Standing or open waters that are not classified as wetlands or streams such as ponds and lakes are considered other waters. Other waters are a subset of the delineated wetlands and have been evaluated accordingly.

#### 2.4.2 Tier 2 Environmental Factors for Indirect Impacts to WOTUS

Water Quality (Riparian Conservation Area [RCA] and CWA Section 303(d) listed 4a & 5 streams): This comparison estimated the length of road (in feet and miles) and the amount of direct disturbance (in acres) within RCAs that occur adjacent to CWA Section 303(d) listed impaired streams. IDEQ's listing and publicly available data of impaired streams was used to identify which streams within RCAs that were also adjacent to CWA Section 303(d) listed impaired streams.

#### 2.4.3 Tier 3 Environmental Factors for Sensitive or Protected Species

#### Federally Listed Threatened and Endangered (TES) Species:

- Bull Trout: An Occupancy Model (OM), developed by Isaac et. al. (2017), was adapted by Ecosystem Sciences (2019a) and applied to estimate for each stream reach the likelihood that bull trout or westslope cutthroat trout would occupy each reach of the study area based on summer stream temperature, flow, and reach slope. The analysis included the change in occupancy probability based on changes to summer stream temperature, flow, and slope for each stream reach which can then be used to characterize changes in reach specific and total suitable habitat.
- Steelhead and Chinook Salmon: An Intrinsic Potential (IP) habitat model, originally developed by Burnett et al. (2007) and refined by fisheries researchers, was adapted and applied by Ecosystem Sciences (2019b). Estimates of IP were derived from reach-scale stream attributes (gradient, stream size, and valley constraint) that influence availability of the fine-scale habitat features (e.g., pools, spawning gravel, and large wood) preferred by salmonids, and provides a measure of the suitability for spawning. Estimates of the amount of stream habitat with low, medium, and high scoring represents the relative potential for separate steelhead and Chinook salmon spawning and initial rearing as a function of stream reach physical characteristics (Cooney and Holzer 2006). Additional details on the IP modeling effort can be found in the Fisheries and Aquatic Habitat Specialist Report (USFS 2022b).
- Wolverine (*Gulo gulo*) (Proposed as Threatened): The analysis addressed the acres of potential wolverine habitat impacted, with wolverine habitat modeled based on the persistent spring snow model updated for the PNF and BNF (2009-2015) for the Wolverine Winter Recreation Research Project: Investigating the Interactions Between Wolverines and Winter Recreation study (Heinemeyer et al. 2017). In the SDEIS wildlife analysis area, wolverines are most likely to use habitats with persistent spring snow cover for denning and winter range and are expected to move through areas without snow at different times of the year (USFS 2022a).
- **Canada Lynx** (*Lynx canadensis*) (Threatened): The analysis addressed the acres of Lynx Analysis Units (LAUs) potentially affected. LAUs were delineated across the PNF and BNF using fifth-level hydrologic unit boundaries whenever possible; when fifth-level hydrologic units were not appropriate, sixth-level hydrologic units were used. The SGP and associated transmission line and access roads lie within 12 LAUs within the two Forests.
- Northern Idaho Ground Squirrel (*Urocitellus brunneus*) (Threatened): The analysis addressed the acres of Northern Idaho Ground Squirrel (NIDGS) suitable modeled habitat potentially affected.



The USFS NIDGS Habitat Model used five parameters to predict potential northern Idaho ground squirrel habitat: LANDFIRE existing vegetation types; LANDFIRE canopy cover; land type/soils; slope; and aspect. Land type was used as a surrogate for soils information. Cover types were selected to represent vegetative features of northern Idaho ground squirrel sites and included canopy cover of < 30 percent and < 40 percent in selected classes (Crist and Nutt 2008). Surveys were conducted to determine presence of NIDGS in these habitats.

• Whitebark Pine (*Pinus albicaulis*) (Threatened): The analysis addressed the amount of modeled suitable whitebark Pine habitat impacted. A potential habitat model was created for whitebark pine by matching its habitat characteristics information with attributes of available geographic information system (GIS) data including potential vegetation groups, lithology layers, and constrained to elevations above 6,500 feet (AECOM 2019a). The modeled area within the SGP footprint was surveyed in 2019 and whitebark pine locations mapped (Tetra Tech 2020a).

## 2.5 Summary of Alternatives Analysis

Factors used to analyze environmental consequences for the ModPRO2, the Johnson Creek Route Alternative, the PRO, the ModPRO, and the USFS EFSF TSF Alternative are shown in **Appendix A**. The table identifies each of the factors specified in **Sections 2.4.1, 2.4.2**, and **2.4.3** above. Environmental Factors were weighted on a scale of 0 to 10. Tier 1 Environmental Factors, considered the primary factors for determining the LEDPA, have a weighting factor of 10. Tier 2 Environmental Factors, considered secondary factors for determining the LEDPA, have a weighting factor of 5. Tier 3 Environmental Factors, considered tertiary factors for determining the LEDPA, have a weighting factor of 2.5. The weights applied to each tier ensure that direct impacts to WOTUS are the primary driver of the LEDPA determination while allowing for a comprehensive evaluation of other important environmental factors beyond dredge and fill. The environmental factors analysis, weighted across each tier as described above, generates a normalized dimensionless Impact Comparison Score for each alternative. Accordingly, the weighted factors analysis allows for direct comparison of the potential environmental impact of each alternative, assisting in identifying the LEDPA. A summary of the alternatives and the quantified impacts to WOTUS is shown in **Table 2-2**.



Table 2-2. Summary of LEDPA Analysis					
Alternative	Practicability Analysis	Comparison of Environmental Impacts to ModPRO2 (Proposed Action)	Cumulative Impact Score <sup>a</sup>	Conclusion	
ModPRO2 (Proposed Action; 2021 MMP; Burntlog Route Alternative)	Practicable	150.4 acres of wetland and 111,486 linear feet of stream impacts. Primary access would be provided by the proposed Burntlog Route, which would be a combination of widening existing roads and constructing approximately 15 miles of new road segments.	88.32	LEDPA	
Johnson Creek Route Alternative	Practicable	171.3 acres of wetland and 107, 650 linear feet of stream impacts. Primary access would use existing roads requiring substantial improvements, instead of the Burntlog Route that requires new road construction. Increased risk for potential for spill contamination, sedimentation, and turbidity to streams relating to proximity of access roads to streams.	92.56	Not LEDPA	
No Action Alternative	Not practicable. Does not meet the overall Project purpose.	Not applicable. Does not meet the overall Project purpose.	NA	Not LEDPA	
PRO (DEIS Alternative 1)	Practicable	170.0 acres of wetland and 114,532 linear feet of stream impacts.	91.69	Not LEDPA	
ModPRO (DEIS Alternative 2)	Practicable	162.4 acres of wetland and 109,071 linear feet of stream impacts	89.34	Not LEDPA	
USFS EFSFSR TSF(DEIS Alternative 3)	Practicable	173.9 acres of wetland and 130,699 linear feet of stream impacts.	98.95	Not LEDPA	

a Normalized dimensionless Cumulative Impact Score from the Environmental Factors Analysis table in Appendix A.

LEDPA = least environmentally damaging practicable alternative



## Section 3

# Environmental Setting/Existing Conditions

The mine site is within terrain consisting of narrow valleys surrounded by steep mountains. Elevations along valley floors range from 6,000 to 6,600 feet amsl. The surrounding mountains reach elevations over 8,500 feet amsl. The main drainage basin at the Project site is the EFSFSR. Chapter 3 of the SDEIS provides a description of the existing natural and human environment that would potentially be affected by the Project with references to additional detailed information provided in specialist reports available on the USFS-hosted SDEIS website (USFS 2023). A summary of the environmental setting and existing conditions of the Project area as described in the SDEIS and organized by environmental resource or resource use is provided in **Sections 3.1 through 3.23**.

## 3.1 Geological Resources

The Project setting is in the Salmon River Mountains, a high-relief mountainous physiographic province in central Idaho. Bedrock geology in the region can be categorized into three generalized groups based on age, lithology, and stratigraphic relationships (listed from oldest to youngest): Pre-Cretaceous to Ordovician (greater than 440 million years ago [Ma]), metasedimentary rocks within the Idaho Batholith; Cretaceous (145 to 66 Ma) igneous rocks of the Idaho Batholith; and Tertiary (65 to 1.6 Ma) intrusive and volcanic rocks. Exposed unconsolidated bedrock in the area is characterized as intrusive, metasedimentary, and volcanic. Surficial deposits in the area include alluvial fans and glacial outwash. Major structural geologic features include Mesozoic folds and Cenozoic faults.

The legacy mine site in the Project area has undergone extensive ground disturbing activities associated with past mineral development spanning more than a century (i.e., legacy mining features) and numerous prospect pits, shafts, adits, tunnels and underground mine stopes are present. The 2021 FS prepared for the Project reports an estimated Proven and Probable Mineral Reserve (the economically mineable part of the measured mineral resource) of 115.3 million tons of ore containing 4.8 million ounces of gold, 6.4 million ounces of silver, and 149 million pounds of antimony (M3 2021). The mineral reserve estimate includes reprocessing approximately 3 million tons of historical mill tailings that underlie the spent leach material in the SODA, which, under Alternatives 1 and 2, would be mined and used for construction of the TSF.

## 3.2 Air Quality

Existing conditions that may be affected by the Project include ambient air quality in comparison to the National Ambient Air Quality Standards (NAAQS), visibility as impacted by regional haze and visible plumes emitted from mine activities, and current rates of atmospheric deposition of mercury, nitrogen, and sulfur compounds. Air quality monitoring data collected in the Project area and at a proxy site indicate that the Project area is in attainment of the NAAQS for all pollutants and averaging times (IDEQ 2019a). The SDEIS also indicates that baseline ambient concentrations of Hazardous Air Pollutants (HAPs) in the Project area are low and less than more industrialized or populated areas.



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## 3.3 Climate Change

The greenhouse gas (GHG) compounds of interest are those that would be released due to operation of diesel-fueled and gasoline-fueled engines, and propane combustion for either process needs or heating of buildings. The use or release of any hydrofluorocarbons or perfluorocarbons would not be necessary for the Project. The effects of climate change in the Project area can be seen by review of reported trends in the temperature, precipitation, snowpack, and other indicators of regional climatology. Similarly, statewide climate trends also reflect the measurable effects of regional climate change that will continue to affect the environmental conditions in the Project area. These statewide and regional trends are used as a proxy to discuss current climate trends in the Project area. Most of Idaho has seen an increase in average temperatures of 0.56 to 1.1 degrees Celsius (°C) (1 to 2 degrees Fahrenheit [°F]) over the last century, with the last two decades being the warmest on record (EPA 2016). The intensity of heat waves is projected to increase, while cold wave intensity is projected to decrease (Runkle et al. 2017). Statewide precipitation is highly variable and showed no overall trend in annual average precipitation during the last century. However, the frequency of extreme precipitation events in Idaho has been above average over the past decade. Increased intensity of drought events is expected to occur throughout the <sup>2</sup>1st century (Runkle et al. 2017). Since the 1950s, Idaho's overall snowpack has been decreasing (EPA 2016). Lower snowpack and increased drought are likely to lead to lower base flows, reduced soil moisture, wetland loss, riparian area reduction or loss, and more frequent and possibly severe wildfire. Increasing air temperatures and decreasing summer flows associated with climate change are expected to warm streams by increasing long-wave radiation and warming groundwater inputs (Isaak et al. 2017). A warming climate and earlier snowmelt patterns have led to longer fire seasons, and these trends are expected to continue.

## 3.4 Soils and Reclamation Cover Materials

Soils at the Project site are generally characterized as weakly developed and coarse textured with a high prevalence of coarse fragments, formed in semi-humid, sub-alpine environments. Historical mining activities have resulted in a wide variety of soils modified by human activity throughout the Project area, with approximately 522 acres considered highly disturbed (Tetra Tech 2017). Soils in the Project vicinity rated as "good" for reclamation use generally have loamy soil textures, few coarse fragments, slightly acidic to slightly alkaline pH, and occur on level to gently sloping ground. Soils in the Project vicinity that are unsuitable for reclamation use have either very high coarse fragment content; are extremely acidic or very strongly alkaline; or occur on very steep slopes. Soils with a high proportion of surface stones, and soils disturbed by legacy mining activities also are considered unsuitable for reclamation.

## 3.5 Noise

This section presents a description of the affected noise environment as it relates to humans and human activity. Effects of noise on fish and wildlife are addressed in **Sections 3.11** and **3.12**, respectively. The Project is located in the upper drainage basin for the EFSFSR, which is characterized by narrow valleys surrounded by steep mountains. Off-site facilities, including much of the Burntlog Route and the transmission line corridor are in portions of the BNF exhibiting similar topography and terrain. On the western edge of the Project area, access routes and transmission lines are in wider valley bottoms. Tall, dense trees and terrain obstructing the line-of-sight propagation of noise can reduce or eliminate noise transmission.



The primary human noise sensitive receptors (NSRs) in the Project area would be Project personnel. Outside of the Project area, the primary human NSRs would be residents and recreationists (e.g., persons at campgrounds, lookouts, trails, dispersed recreational uses in wilderness areas, including undeveloped campsites). Baseline noise conditions were analyzed at 12 sites, with reported average noise levels ranging from 34 to 64 A-weighted decibels (dBA).

## 3.6 Hazardous Materials

Hazardous materials are substances which may pose a risk to human health, wildlife, or the environment. Hazardous materials that would be used and/or transported for the Project include diesel fuel, gasoline, lubricants, antifreeze, process reagents, antimony concentrate, mercury containing residuals, lime, explosives, and other substances. The Project area has been extensively disturbed by past mining activities. Historic activities involved the use of hazardous materials including, but not limited to fuels, lubricants, hydraulic oils, and chemical reagents including sodium hypochlorite, sodium hydroxide, copper sulphate, lead acetate, and cyanide (Bradley et al. 1943).

Current exploration-related activity is occurring in three major deposits identified in the Project area and in areas defined in the Golden Meadows Exploration Project Plan of Operations (Midas Gold 2011, 2016b). Perpetua Resources currently stores and uses substances classified as hazardous materials for ongoing exploration activities, including petroleum products (e.g., fuels, lubricants, and motor oils), cleaning agents, batteries, tires, and other routine materials used to support drill rigs, generators, water pumps, vehicles, helicopters, and other operating needs (HDR 2017a). These materials are stored, handled, and reported in accordance with local and federal regulations. Perpetua Resources also maintains a hazardous substances spill prevention and response program and solid waste management plan (HDR 2017a). The largest volume of hazardous materials currently used at the Project site is petroleum hydrocarbons (e.g., diesel, unleaded gasoline, and Jet A fuel). Fuels are transported to the Project site via tanker truck; transporting these fluids presents the greatest existing risk for spills and releases to the environment. Exploration-related fuel transportation to the site by Perpetua Resources has been occurring since 2011. There have been no reported spills or releases associated with fuel transportation. There was a small fuel spill associated with a plane crash in February 2012.

Past mining activities have deposited metals, spent and neutralized ore, waste rock, and mine tailings over portions of the Project site. Contaminants associated with past mining operations include metals and cyanide in area soil, groundwater, surface water, seeps, and sediments. The Stibnite mine was placed on the Federal Facilities Docket in 1991 CERCLIS No. 9122307607. The Stibnite/Yellow Pine mining area was proposed for listing on National Priorities List in 2001, but no further action has been pursued since then. Previous reclamation, remediation, and mitigation activities conducted in the Project area by other operators are described in detail in the Hazardous Materials Baseline Report completed in 2015 and updated in 2017 (HDR 2017a). In January 2021, Perpetua Resources entered into an Administrative Settlement Agreement and Order on Consent (ASAOC) to remediate certain remaining mine waste impacts and study others (USFS 2022a). The first phase of these removal actions is independent of the proposed Project and are planned to be implemented between 2022 and 2024. Following phases would depend on agreement for implementation by Perpetua Resources, the EPA, and the USFS.

## 3.7 Surface Water and Groundwater Quantity

The SDEIS surface water and groundwater quantity analysis area encompasses the land where Project activities could affect stream flows and/or the quantity of groundwater in storage,



groundwater levels, and groundwater transmission, groundwater-dependent ecosystems, and water rights. Such activities would be concentrated at the proposed mine site and include groundwater withdrawal, streambed alteration/diversion, and surface water management. Open pits excavated below the water table require lowering of the water table via removal of groundwater that would otherwise fill the pit. This is typically achieved by pumping from wells installed around the pit or sumps within the pit. Such pumping can affect nearby surface waters that have a hydraulic connection with the affected groundwater system. Groundwater within the SDEIS analysis area moves primarily through unconsolidated alluvium which is generally confined to the center of valley bottoms surrounded by bedrock mountain slopes. Precipitation in the area infiltrates and moves through these unconsolidated deposits. Baseline characterization of groundwater in the Project area, including water levels, gradients, and flow directions is based on measurements collected from 65 groundwater wells and four exploration boreholes converted to vibrating wire piezometers (Brown and Caldwell 2017). Most wells and boreholes exhibit seasonal groundwater level fluctuations typically ranging from approximately 2 to 20 feet. Perpetua Resources owns the groundwater rights at the Project site (Water Right ID 77-7285 and 77-7141).

The primary surface water features in the Project area include the EFSFSR and its tributaries, as well as intermittent drainages, ephemeral drainages, seeps, springs, wetlands, and ponds. The EFSFSR is the principal stream draining the Project basin of 25 square miles upstream of Sugar Creek. The EFSFSR is a perennial stream and at ordinary high water is approximately 2 to 3 feet deep and 25 to 30 feet wide (Brown and Caldwell 2017). Historical mining activities have affected the course of the EFSFSR in the central portion of the Project where it flows through a lake that has formed in the Yellow Pine pit. The lake has a surface area of approximately 4.75 acres. Upstream fish passage above the pit lake is blocked by an artificial whitewater cascade on the EFSFSR where it enters the pit.

Seeps and springs are locations where water emanates from the ground to form surface water resources aside from the perennial streams draining the SDEIS analysis area. Three hundred and forty seven hydrologic seep/spring sites have been identified in the SDEIS analysis area (HydroGeo 2012a). The majority of seeps and springs were found in the glacial cirques that form the headwaters of Meadow Creek, Fiddle Creek, and Hennessy Creek.

WOTUS are defined by 33 CFR 328.3 as all waters that are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters that are subject to the ebb and flow of the tide; all interstate waters including interstate wetlands; all other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters that are or could be used by interstate or foreign travelers for recreational or other purposes, or from which fish or shellfish are or could be taken and sold in interstate or foreign commerce; all impoundments of waters otherwise defined as Waters of the U.S. under the definition; tributaries of waters identified in paragraphs (a)(1)-(4) of this section; the territorial seas; and wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (1)-(6) of this section.

Within the SDEIS analysis area, there are no federal, state, or other private surface water rights aside from two water rights held by Perpetua Resources. However, the Idaho Water Resource Board and the USFS hold minimum flow water rights downstream of the Project on the EFSFSR, South Fork Salmon River (SFSR), and the main stem of the Salmon River. A minimum streamflow is the amount of flow necessary to preserve stream values, including protecting fish and wildlife habitat, aquatic



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life, navigation, transportation, recreation, water quality, or aesthetic beauty. Under current conditions, surface water diversion within the SDEIS analysis area is limited to water usage by Perpetua Resources in accordance with its current surface water rights. As part of Alternatives 1 and 2, additional surface water diversion from the EFSFSR is proposed from a location upstream of the proposed fish tunnel (Brown and Caldwell 2021b). There are currently no permitted wastewater discharges to surface water within the SDEIS analysis area. Alternatives 1 and 2 include a treated industrial wastewater discharge and a treated residential wastewater discharge that would be permitted under the Idaho Pollutant Discharge Elimination System program.

# 3.8 Surface Water and Groundwater Quality

The SDEIS analysis area for surface water quality includes streams and lakes located in the 22 subwatersheds (U.S. Geological Survey [USGS] 12-digit HUCs [EnviroAtlas 2019; Seaber et al. 1987]) that encompass the Project, access roads, transmission lines, and off-site facilities. The SDEIS analysis area for groundwater quality includes the Sugar Creek and Headwaters EFSFSR subwatersheds, which together encompass the Project infrastructure that is most likely to influence groundwater quality. The SDEIS groundwater quality analysis area focuses on the Project areas where subsurface excavations would occur. It does not cover all components, such as off-site facilities or supporting infrastructure corridors, which are limited to surface disturbance activities that would not affect groundwater quality. This affected environment description for water quality is based on water quality data collected by Perpetua Resources, their consultants, and the USGS between 2011 and 2018, though data collection is ongoing.

## 3.8.1 Geology and Mineralization

The geochemistry of the existing mine site is influenced by both the bedrock geology (including naturally occurring mineralization) and a legacy of historical mining activity that has altered the natural environment (Baldwin and Etheridge 2019). Static Acid Base Accounting (ABA) is an industry recognized method of assessing the potential for acid generation of sulfide-bearing rocks based on the acidification potential of the sulfide minerals and the neutralization potential of carbonates, aluminosilicates, and clays within the rock. Acid Base Accounting analyses indicate that while detectable sulfides are present in all the Project development rock and ore lithologies (aside from the alluvium), most lithologies are not prone to acid-generation as observed in the paste pH results. Ore samples typically had higher acid-generating potentials than development rock samples due to their higher sulfide concentrations.

Static Net Acid Generation (NAG) tests are conducted to determine the maximum potential for acid generation. The NAG test provides a direct empirical estimate of the overall sample reactivity, including any acid generated by semi-soluble sulfate minerals along with acid generation by sulfide minerals. In this regard, the NAG test differs from the Static ABA test and thus provides another measure of the potential for acid-generation by sulfide and sulfate bearing samples from materials in the Project lithology. NAG testing confirmed that ores from the alaskite, quartz monzonite, granite, quartz monzonite-alaskite, and breccia lithologies had the potential for acid-generation. However, while some individual development rock samples exhibited low potential for acid-generation, the development rock tested was non-acid-generating in aggregate (SRK 2021a).

The Meteoric Water Mobility Procedure (MWMP) test is used to evaluate the leachability of metals from mine material by a laboratory simulation of rainwater leaching in the environment. MWMP tests were run on samples collected from subsurface drill cores and on samples collected from weathered rock exposures on site. Tests on core samples had circumneutral pH with low total dissolved solids



(TDS) with concentrations below 280 milligrams per liter (mg/L). Effluent concentrations of aluminum, antimony, arsenic, and mercury frequently exceeded their respective most stringent water quality criteria while concentrations of other analytes were generally not detected at concentrations above their criteria (SRK 2017). Tests on weathered surface materials also had circumneutral pH except for one sample of alaskite material that had an acidic pH of 3.8. Leached TDS concentrations from the weathered rock were generally higher than those from core samples ranging between 77 mg/L and 630 mg/L for non-acidic leachate and 2,300 mg/L for the acidic alaskite sample. Like the tested cores samples, effluent concentrations of antimony, arsenic, and mercury were generally above criteria.

Synthetic Precipitation Leaching Procedure test results on five samples of synthetic tailings materials representative of the different ores that would be processed during the Project lifetime yielded circum-neutral to alkaline pH values between 7.2 and 9.4. Several constituents in the decant solutions were present at concentrations above their most stringent potentially applicable criteria including antimony, arsenic, mercury, sulfate, and TDS (SRK 2021b). Residual cyanide in the tailings was also leached in two of the five tests.

Leachate from Humidity Cell Tests (HCTs) was circum-neutral to moderately alkaline, with pH values ranging from 6.5 to 9.1. The effluent pH also was stable for each of the test cells, indicating that acid generation did not occur, or that the available neutralizing potential was sufficient to offset any acid generation. SRK (2017, 2021b) also found that the consumption of neutralizing potential was slow in each of the HCT cells. This indicates that significant buffering capacity is still available and/or that acid generation is limited or occurs at a slow rate despite relatively high sulfide concentrations in the tested samples. These results are consistent with observations from the site; historic waste rock and tailings have been left at the surface for decades (a duration more than 50 years longer than the proposed SGP mine life), with little evidence of acid rock drainage (SRK 2017). Despite the finding of low acid generation potential, aluminum, antimony, arsenic, manganese, and mercury still proved to be leachable from the HCTs under neutral to alkaline pH conditions, and these constituents were frequently leached at concentrations above the strictest potentially applicable surface water quality standard. Additionally, sulfate, selenium, TDS, copper, cadmium, and zinc were occasionally elevated above the respective water quality criteria. Concentrations of beryllium, bismuth, boron, cadmium, chromium, cobalt, lead, lithium, molybdenum, nickel, selenium, silver, tin, titanium, and vanadium were at or below the strictest potentially applicable water quality criteria, indicating a low potential for leaching of these constituents (SRK 2020).

## 3.8.2 Geochemical Influence of Historical Mining Wastes

Mining and mineral processing, primarily of gold, antimony, and tungsten, have occurred in the Project vicinity intermittently since the early 1900s. The types of waste generated by past mining activity include spent ore (i.e., material that has been leached or otherwise processed to recover metals), tailings, and waste. These historical mining wastes have created geochemical and legacy impacts that are part of the affected environment.

Locally, concentrations of antimony, arsenic, mercury, and cyanide in surface water are potentially attributable to the geochemistry of historical mining wastes present at the site (URS 2000). Mercury concentrations are not elevated by the mine tailings and waste rock, despite periodically exceeding the strictest potentially applicable surface water quality standard. Elevated concentrations of dissolved arsenic and dissolved antimony were associated with groundwater wells screened completely or partially in the Bradley tailings material, suggesting that the historical Bradley tailings currently present throughout the Meadow Creek valley have an adverse influence on groundwater quality within the mine site. A more recent study (Brown and Caldwell 2017) also found elevated



arsenic and antimony concentrations in groundwater near the Bradley tailings and former leach pads, with concentrations higher in the alluvial aquifer than in bedrock. The water quality of nearby seeps associated with the Bradley tailings, SODA, and Keyway Dam also was elevated in metals, an indication that historical mining features are impacting the alluvial and bedrock aquifers. Similarly, in the EFSFSR drainage, arsenic and antimony concentrations in seeps and springs are elevated below the Yellow Pine pit and Northwest Bradley waste rock dump, suggesting that these historical mine facilities are responsible for elevated concentrations of arsenic and antimony in discharging groundwater (URS 2000).

## 3.8.3 Surface Water

This summary of baseline surface water chemistry is organized around water quality indicators including pH, temperature, major cations and anions, TDS, metals, methylmercury, sediment content, and organic carbon. Baseline water quality at the mine site is influenced by both natural mineralization and historical mining activity (Baldwin and Etheridge 2019). With the exception of chloride and sodium, the West End Creek samples had the highest major ion constituent concentrations, with baseline sulfate and TDS concentrations averaging 57 and 209 mg/L, respectively. The West End Creek sample point, identified in the SDEIS as YP-T-6, is located downstream of both the upper and lower historical West End waste rock dumps; it is therefore possible that the water chemistry at this location has been influenced by the waste material, especially where the creek flows directly through historical development rock piles. Field-measured pH values for the surface water assessment nodes were generally in the range of 7 to 8 standard units. The highest average pH (8.4) was observed at West End Creek sample location YP-T-6. Elevated baseline pH measurements at this location are likely another indicator of the geochemical influence exerted by legacy waste rock material, natural mineralization, and the predominance of carbonate bedrock in the West End Creek drainage. Overall, the neutral to alkaline pH values observed in streams near the mine site show that the geochemistry of the natural mineralized deposits and the legacy mine materials is not conducive to acidic drainage. Water chemistry samples collected at Yellow Pine pit lake exhibited circumneutral pH values ranging from 7.2 to 8.2 with low TDS concentrations between 47 and 78 mg/L. Analyses of total and dissolved metals indicated that concentrations of most metals were below reported analytical detection limits with the exceptions of antimony, arsenic, iron, magnesium, and manganese.

Wildfires in the past have burned much of the forested area at the Project and vicinity, resulting in increased erosion from the burned areas. In addition, the failure of a water dam on East Fork Meadow Creek in 1965 caused extensive erosion both upstream and downstream of the former dam, with deposition of eroded sediment in Meadow Creek and transport of this sediment into the EFSFSR continuing to occur. Dissolved organic carbon concentrations are expected to be low in the Project drainage area as the area contains poorly developed mineral soils and sparse vegetation.

The CWA requires states to prepare a report listing the current condition of all state waters and identifying streams that are impaired because they do not meet their designated beneficial uses. Based on data from the Idaho Department of Environmental Quality (IDEQ) 2016 Integrated Report (IDEQ 2018), all inventoried waterbodies at the existing mine site are classified as Category 5 impaired waters, defined as waters that do not meet applicable water quality standards for one or more beneficial uses due to one or more pollutants, except for West End Creek (which is a Category 2 stream that fully supports its designated uses). The causes for Category 5 listing are associated with arsenic, with the EFSFSR also being listed for antimony (downstream of Meadow Creek), and Sugar Creek also being listed for mercury.



## 3.8.4 Groundwater

This summary of baseline groundwater chemistry is based on groundwater monitoring well data collected between 2012 and 2018 and is organized around groundwater quality indicators including pH, major cations and anions, TDS, and metals. Water quality at the mine site is influenced by both natural mineralization and historical mining activity.

Overall, the major ion chemistry of alluvial groundwater at the Project site is similar to surface water, illustrating the interconnectedness between the groundwater and surface water systems. Several alluvial and bedrock well pairs exhibit similar characteristics. Average TDS concentrations in the groundwater wells are variable but tend to be less than the 500 mg/L ldaho secondary groundwater standard. Field-measured pH values for the groundwater wells are generally in the range of 6.1 to 8.9 standard units. Overall, the circumneutral to alkaline pH values observed in groundwater near the Project site show that the geochemistry of natural mineralized deposits and legacy mine materials is not conducive to acidic rock drainage. Constituents exceeding ldaho primary and secondary groundwater, and aluminum, antimony, arsenic, and iron in the bedrock groundwater. Although certain waterways in the Stibnite Mining District have drinking water supply as a designated use, and ldaho groundwater quality standards apply throughout the Stibnite Mining District, there are no current, contemplated, or likely future public water supply intakes or wells in the zones at the Project where metals levels exceed applicable standards.

# 3.9 Vegetation

Existing vegetation mapping typically describes the current dominant vegetative cover or species occupying a site and is frequently updated to reflect vegetation changes due to disturbance such as fire, insects, and disease. In general, existing vegetation types mapped in the SDEIS vegetation analysis area are coniferous forests typical of high mountain regions in Idaho and the inland northwestern U.S. The most common mapped vegetation types are: lodgepole pine (*Pinus contorta*) forests, subalpine fir (*Abies lasiocarpa*) forests, Douglas-fir (*Pseudotsuga menziesii*) forests, ponderosa pine (*Pinus ponderosa*) forests, and Engelmann's spruce (*Picea engelmannii*) forests. Other vegetation types include grand fir (*Abies grandis*) forests, aspen (*Populus tremuloides*) forests, and whitebark pine forests. Fires routinely occur in the SDEIS vegetation analysis area and surrounding forests, and as such, much of the analysis area and vicinity is now mapped as burned herblands (grasses and forbs), burned sparse vegetation, and burned forest shrublands reflective of earlier seral stages.

Whitebark pine is designated as threatened under the ESA (USFWS 2022) and is known to occur in the SDEIS vegetation analysis area; approximately 2,069 acres of occupied whitebark pine habitat have been identified within the analysis area (Tetra Tech 2020a). No other federally threatened, endangered, or candidate plant species have been documented in proximity to the SDEIS vegetation analysis area. Two federally listed threatened species, Ute ladies'-tresses orchid (*Spiranthes diluvialis*) and slickspot peppergrass (*Lepidium papilliferum*), are suspected to occur in the BNF; however, neither have been documented in proximity to the analysis area. Two plant species designated as sensitive by the USFS are known to occur within or immediately adjacent to the SDEIS vegetation analysis area: least moonwort (*Botrychium simplex*) and Sacajawea's bitterroot (*Lewisia sacajaweana*). Four forest watch species are known to occur within or immediately adjacent to the SDEIS vegetation analysis area: bent-flowered milkvetch (*Astragalus vexilliflexus* var. *vexilliflexus*), Blandow's helodium (*Helodium blandowii*), sweetgrass (*Hierochloe odorata*), and Rannoch-rush (*Scheuchzeria palustris*). Eight non-native plant species classified as noxious weeds have been



documented in the vegetation analysis area. Among the eight species, spotted knapweed (*Centaurea* stoebe ssp. *Micranthos*) and rush skeletonweed (*Chondrilla juncea*) are the most extensively distributed and generally occur along roads (USFS 2019a)

# 3.10 Wetlands and Riparian Resources

This section presents an overview of hydrologic conditions, an inventory of existing wetlands, streams, open waters, and riparian areas, and wetland functions and values in the SDEIS wetlands and riparian resources analysis area. The analysis area encompasses the following HUC 10 watersheds: Big Creek North Fork Payette River, Gold Fork River, Indian Creek, Johnson Creek, Lake Fork-North Fork Payette River, Upper EFSFSR, and Upper SFSR.

Wetlands located on slopes and tributary drainages within and near the existing mine site are associated with hillside seeps and springs (HydroGeo 2012b). In most cases, these seep and spring features are hydrologically connected to a larger wetland/stream complex in the valley floor and/or a stream downslope via surface flow (HDR 2017b). Snowmelt runoff and groundwater inputs also contribute to the hydrologic support of wetlands at the mine site. As a result of almost a century of mining and exploration in the mine site area, numerous wetlands and streams have been altered, particularly those adjacent to former mine pits, tailing storage areas, and roads (USFS 1994). Previous mine operators excavated and/or filled wetlands to construct mining facilities and infrastructure. Most of these activities occurred before enactment of the CWA in 1972 and associated mitigation requirements. Approximately 847 acres of the SDEIS Mine Site focus area have been modified by past human activity and are considered highly disturbed. This area represents approximately 49 percent of the proposed disturbance for the Project site. The history of excavation and mine tailings storage in the Project area has introduced areas of soil contamination, which are often in, or adjacent to, wetlands and riparian areas (Midas Gold 2016a). In disturbed areas, water quality and soil stabilizing properties of intact wetlands and riparian areas are especially important for maintaining and improving watershed conditions.

Wetlands in the SDEIS wetlands and riparian resources analysis area were identified and delineated using the methods described in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys and Coast Region* (Environmental Laboratory 2010). A total of 2,567.3 acres of wetlands were identified in the SDEIS analysis area. The wetlands were categorized into one of four wetland classifications: Palustrine Emergent, Palustrine Forested, Palustrine Scrubshrub, or Open Water.

Wetland functions and values were assessed to evaluate the condition of existing wetland resources so that the potential impacts of the Project can be understood and disclosed. Wetland functions are self-sustaining properties of a wetland ecosystem that exist in the absence of societal values and relate to ecological significance without regard to subjective human values. Wetland values are those elements of a wetland that are valued by humans (Berglund and McEldowney 2008). Assessed wetlands at the Project site generally exhibit moderate to high levels of disturbance from historic mining activity, erosion, and fire. Other assessed wetlands were noted as having potential to provide habitat for a variety of wildlife, including USFS sensitive species. Wetlands on slopes, generally resulting from groundwater seepage, function to deliver water, sediment, and nutrients to valley bottom wetlands below. Wetlands located along valley bottom drainages, both on and off the Project site, have the potential to provide water quality, flood storage, and fish habitat functions. These streamside wetlands filter flowing water during high flow events when water is most likely to contain fine sediments that can be harmful to fish. Given the history of mining activity and historical tailings



deposition at the Project site, these water quality functions are an important aspect of stream health, both at, and downstream, of the Project site.

Riparian corridors are areas with distinctive soil and vegetation between a stream or other body of water and an adjacent upland, where elements of both aquatic and terrestrial ecosystems mutually influence each other (USFS 2003b; Knutson and Naef 1997). A total of 130,044 acres of RCAs are mapped in the SDEIS wetlands and riparian resources analysis area. RCAs are associated with all perennial and intermittent streams mapped within the analysis area.

# 3.11 Fish Resources and Fish Habitat

This section provides a description of the SDEIS fish resources and fish habitat analysis area under existing (baseline) physical, chemical, and environmental conditions. While all fish species are of management interest, four special status salmonids are of particular resource management interest because of their status as federally listed fish or fish of management concern to the USFS or State of Idaho. Of the four fish species, three are federally listed as threatened species under the ESA: summer Chinook salmon, Snake River Basin steelhead, and Columbia River bull trout. The USFS Intermountain Regional Forester has identified the westslope cutthroat trout as a USFS sensitive species. The SDEIS fish resources and habitat analysis area encompasses all areas in which fish resources and fish habitat may be affected directly or indirectly by the Project and includes the SFSR subbasin (HUC 17060208) and the North Fork Payette River subbasin (HUC 17050123). Anadromous fish passage in the EFSFSR upstream from the Yellow Pine Pit lake was blocked in 1938 when activities for mining diverted the EFSFSR in surface ditches and later into a bypass tunnel (constructed in 1943). The EFSFSR was routed back through the Yellow Pine Pit after mining ceased, but the remaining 22 percent gradient cascade, just upstream of the Yellow Pine Pit lake, is currently a barrier to upstream fish passage. Perpetua Resources funded aquatic resources baseline studies supporting the fish resources and fish habitat analysis from 2012 to 2020 (AECOM 2020).

Chinook salmon are found throughout the SDEIS fish resources and fish habitat analysis area, including naturally in the SFSR subbasin and the EFSFSR drainage upstream to the Yellow Pine Pit lake within the mine site and upstream of the Yellow Pine Pit when transplanted. Currently, the Chinook salmon stock has been severely depleted from historic levels due to a variety of activities, including hydropower systems, hatcheries, harvest, fish passage, and pathogens, predation, and competition. Chinook salmon remain at risk of becoming endangered within 100 years (National Marine Fisheries Service [NMFS] 2017).

The Snake River Basin steelhead Distinct Population Segment (DPS) is found in the EFSFSR drainage and its tributaries downstream of the Yellow Pine Pit lake. The Interior Columbia Technical Recovery Team (ICTRT) identified five extant major population groups (MPGs) in the Snake River Basin steelhead DPS, which includes the Salmon River Steelhead MPG (ICTRT 2008 as cited in NMFS 2017). The Salmon River Steelhead MPG consists of 12 demographically different steelhead populations all of which are presently considered non-viable (NMFS 2017). The Salmon River Steelhead MPG includes the SFSR population (NMFS 2017), which is within the SDEIS analysis area in three major tributaries: the EFSFSR, Johnson Creek, and the Upper SFSR. The SFSR steelhead population is considered "maintained," with a tentative moderate abundance/productivity risk and low distribution and diversity risk (ICTRT 2008). This population is targeted to achieve a proposed status of "viable," which requires a minimum of low abundance/productivity risk.

Bull trout are currently known to use spawning and rearing habitat in at least 28 streams within the SFSR subbasin. IDFG trend data indicates that the geographic extent of bull trout is increasing (IDFG 2005). Bull trout are not found outside of the SFSR subbasin within the SDEIS fish resources and



fish habitat analysis area (Burns et al. 2005). Bull trout occupy most streams that would be affected by Project construction and operations (MWH 2017). Potential threats to the population within the SFSR subbasin include connectivity impairment, habitat degradation, and competition from invasive brook trout (USFWS 2015).

Cutthroat trout are not found outside of the SFSR subbasin within the SDEIS fish resources and fish habitat analysis area. Individuals are found both upstream and downstream from the Yellow Pine Pit lake. 2018 and 2019 fish sampling resulted in Yellow Pine Pit lake population estimates of 50 individuals and 33 to 101 individuals, respectively (Brown and Caldwell 2019c, 2020).

## 3.12 Wildlife and Wildlife Habitat (Including Threatened, Endangered, Candidate, and Sensitive Species)

This section describes the existing (baseline) conditions relevant to wildlife species and supporting habitats that have the potential to be affected by the Project. The SDEIS wildlife analysis area comprises approximately 400,417 acres. Vegetation communities in the region are generally coniferous forests typical of high mountain regions in Idaho and the inland northwestern U.S. The most common unburned existing vegetation types in the region are lodgepole pine forests, subalpine fir forests, Douglas-fir forests, ponderosa pine forests, and Engelmann spruce forests (USFS 2022c). Because of past disturbance from mining activity and large wildfires, tree canopy closure is low across many portions of the SDEIS wildlife analysis area. Tree size classes in the wildlife analysis area also have been affected by past disturbance, including fire. A small percentage of the wildlife analysis area consists of large tree size classes (greater than 20 inches diameter at breast height [dbh]). Small (5 to 10 inches dbh) and medium (10 to 20 inches dbh) tree size classes are more common throughout the wildlife analysis area. Sapling (0.1 to 5 inches dbh) and non-forested tree size classes are much less prevalent.

Four ESA-listed Threatened, Endangered, Proposed, or Candidate wildlife species are either known to occur or have the potential to occur in the SDEIS wildlife analysis area: Canada lynx, NIDGS. wolverine, and monarch butterfly (Danaus plexippus). Current and historic status of lynx in Idaho and the latest scientific literature predict rare occurrence of lynx in the PNF and BNF. In Idaho, the total population number is unknown, but is expected to be low. At present, occurrence of lynx in the Canada lynx SDEIS analysis area is speculative. The closest known occupied NIDGS site is located south of the town of Cascade (Wagner and Evans-Mack 2017) which is located approximately 40 miles southwest of the Project. The SDEIS indicates that site checks and formal surveys for NIDGS would be conducted, as needed, prior to Project ground-disturbing activities in suitable NIDGS habitat. The Project area is located within two Wolverine Priority Conservation Areas, Tier 1 Game Management Units 25 and 26, as defined by the Management Plan for Conservation of Wolverines in Idaho, 2014-2019 (IDFG 2014). Tier 1 are the highest scoring Game Management Units based on potential wolverine use, cumulative threats, and amount of unprotected habitat. Historically, wolverines have been documented on the PNF and BNF within the wolverine analysis area, and five den sites for four individuals (females) have been confirmed on the PNF and BNF since 2010 (USFS 2022a). The Project vicinity is generally considered part of the monarch butterfly's summer breeding range, though it is suspected that monarch presence on the PNF is more closely associated with migration than breeding; more data collection and habitat assessment is needed. Surveys have not occurred in the SDEIS monarch butterfly analysis area; however, according to the USFWS Monarch Conservation Database, only 1 acre of milkweed, monarch butterfly's breeding host plant, with 21 individual plants has been mapped in Valley County, Idaho, where the Project occurs (USFWS 2020).



Therefore, while monarch butterflies may occur in the SDEIS wildlife analysis area, the probability of occurrence is low.

There are 16 Regional Forester Sensitive Species (sensitive mammals, birds, reptiles, and amphibians) from the Intermountain Region (USFS Region 4) included in this SDEIS analysis. The 16 species were determined to have suitable habitat and documented occurrence or are assumed to occur in the SDEIS wildlife analysis area. In addition to the USFS sensitive species, eight Idaho Species of Greatest Conservation (SGCN) that may occur in the Project vicinity were also considered. The eight species were analyzed in groups depending on the habitats that the species generally occupy, including general habitat, riparian habitat, or alpine habitat. Big game species can be legally hunted and are managed by the IDFG. The wildlife analysis area occurs in IDFG Big Game Management Units 24, 25, 26, and 27. Big game species that are expected to be present and have habitat in the SDEIS wildlife analysis area include Rocky Mountain elk (Cervus canadensis nelsoni) and mule deer (Odocoileus hemionus) (USFS 2003b, 2010). Both species have been recorded in the SDEIS wildlife analysis area (Strobilus Environmental 2017). Migratory birds are protected under the Migratory Bird Treaty Act, and bald eagle (Haliaeetus leucocephalus) and golden eagle (Aquila chrysaetos) also are protected under the Bald and Gold Eagle Protection Act. Migratory bird species known to occur in the SDEIS wildlife analysis area through sightings or sign (e.g., nests, calls) include the bald eagle, golden eagle, Steller's jay (Cyanocitta stelleri), gray jay (Perisoreus canadensis), Clark's nutcracker (Nucifraga columbiana), common raven (Corvus corax), and American dipper (Cinclus mexicanus). Migratory bird species not documented, but assumed to occur due to suitable habitat, include the American robin (Turdus migratorius), hermit thrush (Catharus guttatus), Swainson's thrush (Catharus ustulatus), varied thrush (Ixoreus naevius), and red-tailed hawk (Buteo jamaicensis). The USFWS lists bird species of conservation concern for bird conservation regions across the U.S. (2021). These are species that have reduced populations or a loss of essential habitat. Six of the 17 bird species of conservation concern listed by Region 10 of the USFWS have a reasonable possibility of occurrence in the SDEIS wildlife analysis area.

# 3.13 Timber Resources

Timber resources are the trees used to develop merchantable forest products such as lumber, paper, and firewood, and other "special forest products," derived from sub-merchantable small trees such as floral greenery, Christmas trees, medicinal herbs, fungi, and other natural products (USFS 2017a). Timber resources in the Project area consist of conifer tree species typically harvested to make forest products, including merchantable sawtimber-sized trees and sub-merchantable small trees. The SDEIS timber resources analysis area encompasses the entire area containing saleable timber resources in which disturbance from any action alternative would occur (i.e., the area proposed for direct removal of timber). The SDEIS timber resources analysis area contains a mix of sawtimber and sub-merchantable trees. The most common unburned, existing Coniferous Forest vegetation dominance types in the SDEIS timber resources analysis area, which are used as a proxy for timberland vegetation in the absence of timber-specific mapping, are lodgepole pine forests, subalpine fir forests, Douglas-fir forests, Ponderosa pine forests, and Engelmann spruce forests (USFS 2014a, 2014b, 2016a, 2017b).

# 3.14 Land Use and Land Management

The SDEIS land use and land management analysis area includes the combined footprint of all potential components for the Project including the operating areas, the access routes, transmission line infrastructure, and off-site facilities. The Project primarily consists of NFS lands on the PNF and



the BNF with some private, state, and Bureau of Reclamation lands also included. Land use in the analysis area consists of mining uses, utilities, roads, agriculture, residential, fisheries, timber, tribal, recreational, and special uses. The USFS oversees mineral activities (e.g., exploration and mining) on the surface of unpatented mining claims. The Payette Lakes Supervisory Area office of the Idaho Department of Lands has administrative jurisdiction on mining activities on patented mining claims within the Project Operations Area. The closest community to Project operations area is the village of Yellow Pine, approximately 14 miles to the northwest. Cascade, Donnelly, and Warm Lake are other communities within the SDEIS land use and land management analysis area.

# 3.15 Access and Transportation

This section presents a description of local and regional transportation systems in the SDEIS access and transportation analysis area, including roads, rail, port, and airstrips. The section focuses on the local and regional road transportation system which is dominated by unpaved roads, county roads, and one state highway. There are approximately 130 miles of state roads, approximately 278 miles of Valley County roads, and approximately 1,557 miles of NFS roads in the SDEIS access and transportation analysis area. Many of the forest roads in the Project area were originally built to access mining claims or other remote sites and tend to be very steep, rocky, and winding (USFS 2022a). There are three existing primary routes within the SDEIS access and transportation analysis area to access the Project from Cascade or McCall: Johnson Creek, Lick Creek, and SFSR routes, all of which require the use of Idaho SH 55 and Warm Lake Road. Traffic volume in the analysis area is mainly attributed to recreational activities and residential traffic.

# 3.16 Heritage Resources

For purposes of this document, the term heritage resource is used in place of cultural resource to describe archaeological sites, historic buildings and structures, trails, roads, infrastructure, and other places of traditional, cultural, or religious importance that represent the physical aspects of the activities of past or present cultures. Heritage resources can be human-made or natural features and are, for the most part, unique, finite, and nonrenewable. The SDEIS heritage resources analysis area encompasses the area where physical disturbance may occur and extends out to the next higher ridgeline in some areas and was delineated with the intent to cover the extent of potential Projectrelated visual, auditory, and vibratory impacts to historic properties. General archaeological themes in the analysis area and vicinity include pre-contact archaeology, ranching, settlement, USFS history, traditional practices, and mining. Paleoindian tools have been recovered from archaeological sites in Valley County, including a Clovis projectile point, or spearhead, in Yellow Pine during excavations for a church in 1985. Artifacts also have been found along Johnson Creek and the Middle and South Forks of the Salmon River (Woods 2002). Eligible archaeological historic properties have been recorded along the area's river corridors and in high elevations. Ancestors of the Nez Perce Tribe, Shoshone-Bannock Tribes, and Shoshone-Paiute Tribes were the aboriginal inhabitants of Project's regional landscape. The contact period is generally defined as beginning with the first Euroamerican and Native American contact. For this area, the Lewis and Clark Expedition of 1805 is most often referenced. The first mining work in the Stibnite-Yellow Pine Mining District may have occurred as early as the 1860s. There were two primary periods of heavy production in the Stibnite area: 1) a period encompassing World War I and World War II, which ended in the 1950s and 2) a period that began with exploratory activities in 1974 with intentions to re-open the historic mines, which led to open pit mining and seasonal on-off heap leaching through the 1990s (Midas Gold 2016a).



The SDEIS Operations Area Boundary includes 14,221 acres of which over 12,000 acres has been inventoried for heritage resources, either through intensive pedestrian transects or reconnaissance survey if conditions were too steep or dangerous, or previously disturbed conditions existed; therefore, over 80 percent of the SDEIS Operations Area Boundary has been inventoried. As identified through records searches and as a result of the previous surveys documented with the State Historic Preservation Office through January 2022, a total of 240 heritage resources, including archaeological sites and above-ground resources, have been recorded in the SDEIS heritage resources analysis area. Of the 240 heritage resources, 97 have been determined not eligible for listing on the National Register of Historic Places (NRHP) and would require no further management. The remaining 143 sites would require additional consideration and/or management if impacted by the Project and include 61 resources documented as eligible for listing on the NRHP, three NRHP-listed resources, and 79 resources identified as unevaluated for listing on the NRHP.

Ethnographic studies have been completed for the Project by the Nez Perce Tribe (Battaglia 2018), the Shoshone-Paiute Tribes (Walker 2019), and the Shoshone-Bannock Tribes (Lahren 2020) to assist in identifying Traditional Cultural Properties (TCPs) and Cultural Landscapes (CLs), as defined by the National Park Service. The USFS is in ongoing consultation with Tribes on how to appropriately publicly disclose information presented in tribal ethnographic studies that identified potential TCPs or CLs within the SDEIS heritage resources analysis area. Preliminary results of the Nez Perce Tribe's ethnography study indicate areas and resources that the Nez Perce Tribe is most concerned with and indicate a potential for TCPs and/or CLs to exist in the analysis area. However, specific TCPs or CLs are not currently disclosed. Landscape features noted in the Nez Perce Tribe ethnography (Battaglia 2018) as having specific significance include: viewsheds and soundscapes, water and waterways, minerals, driftwood, culturally modified trees, hot springs, trails, and travel corridors. The Shoshone-Paiute Tribes' ethnography study (Walker 2019) does not go into specific locations of TCPs or CLs. However, landscape features noted in the Shoshone-Paiute Tribes' ethnography as having specific significance include buttes; rock features and rock alignments; springs and hot springs; trails and travel routes; river and stream canyons; rock structures; valleys; and caves and rock shelters. The Shoshone-Paiute Tribes' ethnography also identifies significant flora and fauna species that may be located in the SDEIS heritage resources analysis area. The Shoshone Bannock Tribes ethnography study (Lahren 2020) identifies the SFSR and broader area as a cultural landscape that supports the hunting of salmon, gathering food, collecting berries, harvesting medicinal plants, and hunting big and small game, among other cultural practices. Currently, there are no formally documented TCPs or CLs within the SDEIS analysis area. A Project-specific National Historic Preservation Act Programmatic Agreement is being pursued that would include steps for identifying TCPs and CLs and a management plan for any such resources identified.

# 3.17 Public Health and Safety

Public health and safety is related to the overall health and well-being of populations. This section includes an assessment of the existing environmental conditions, socioeconomic conditions, public services and infrastructure related to public health and safety, and demographics with respect to land use and baseline community health conditions. The National Research Council of the National Academies guidance lists five general categories that should be addressed as part of a public health evaluation to systematically select the issues that need to be addressed for a project: environment, economy, infrastructure, services, and demographics. Five types of health impacts are assessed for each area: chronic disease, infectious disease, injury, nutrition, and well-being/psychosocial effects (National Research Council 2011). Impacts to the environment are typically evaluated based on potential impacts to various environmental media (i.e., air, soil, groundwater, and surface water).



This analysis focuses on whether hazardous pollutants could be emitted by Project activities and enter environmental media at levels that could be a health concern. Most of the SDEIS analysis area is open to the public as most of the area is public land managed by the USFS. Common users of the analysis area include Perpetua Resources and USFS employees, residents of the village of Yellow Pine, tribal members, and recreationists. Many natural and human-made public health and safety hazards are present in the SDEIS analysis area, ranging from avalanches and wildfires to past and present storage and transportation of hazardous materials related to mining operations.

Baseline air quality measurements indicate current concentrations of the criteria air pollutants are well below the NAAQS for six criteria pollutants: particulate matter (including particulate matter less than 10 and 2.5 microns diameter [aka PM<sub>10</sub> and PM<sub>2.5</sub>]), sulfur dioxide, nitrogen dioxide, ozone, lead, and carbon monoxide. There are currently no permitted sources of HAP emissions under Title V of the Clean Air Act in the vicinity of the SDEIS analysis area. Thus, the baseline concentrations of HAPs from human-made sources are likely within regulatory limits (Trinity Consultants 2017). In 2003, the Agency for Toxic Substances and Disease Registry (ATSDR) completed a Public Health Assessment for the Stibnite/Yellow Pine Mining Area (ATSDR 2003). The assessment concluded that reasonable maximum exposure concentrations of arsenic and antimony in surface soil are unlikely to result in adverse public health effects for reclamation workers and recreational users of the site. In groundwater samples from alluvial and bedrock wells, analytes concentrations generally met regulatory criteria except for arsenic and antimony. Arsenic and antimony are considered the key chemicals of public health concern in groundwater in the SDEIS analysis area. Highest groundwater concentrations were noted in wells directly downgradient of the legacy disturbed areas. Because groundwater in the Project area does not represent a drinking water source, the ATSDR Public Health Assessment eliminated groundwater quality from consideration as a public health concern (ATSDR 2003). Any potential future Project use of existing groundwater would likely need to incorporate appropriate filtration or water treatment systems to remove conditions of concern due to meet regulatory criteria. Based on surface water sampling and analyses, antimony, arsenic, and mercury are considered the key chemicals of public health interest in surface water in the SDEIS analysis area and these constituents are naturally elevated in the region (Brown and Caldwell 2017). The ATSDR Public Health Assessment evaluated potential public health risk associated with exposure to contaminants in surface water from the mine site and concluded that contaminants in surface water would be unlikely to result in adverse health effects for recreational users in the existing mine site (ATSDR 2003). The assessment also concluded that for recreational fishers and even for local fishers from American Indian tribes, who have higher fish consumption rates (estimated at 2.5 times other recreational fishers), consumption of fish harvested from surface waters in the existing mine site is unlikely to result in any adverse health effects.

Approximately 10 percent of Valley County residents are below the poverty level, and median household and per capita incomes in Valley County are slightly higher than the statewide averages, but the percentage of people not in the labor force in Valley County is relatively high at 50.5 percent (Social and Economic Conditions Specialist Report, USFS 2022d). The current economic ability to access health care is better than the Idaho statewide average. Valley County ranks sixth best in the state for health outcomes, based on an equal weighting of length and quality of life. Valley County ranks fourth best in the state for overall health factors, based on weighted scores for health behaviors, clinical care, social and economic factors, and the physical environment.

## 3.18 Recreation

This section provides a description of recreation resources, including recreation opportunities, physical facilities, access for recreation, and the setting in which recreation activities occur in the



SDEIS recreation analysis area. This section also describes existing recreation uses/users and recreation-related special use permits. The SDEIS recreation analysis area includes PNF Management Area (MA) 13 (Big Creek/Stibnite) and BNF MA 21 (Lower Johnson Creek), BNF MA 20 (Upper Johnson Creek), BNF MA 19 (Warm Lake), and a portion of BNF MA 17 (North Fork Payette River), and also includes a 5-mile radius from the major Project components, and in some locations, extends outside the MA boundaries into the adjacent Frank Church River of No Return Wilderness (FCRNRW) where recreation could be affected. The analysis area contains approximately 340 miles of developed trails, about 51 percent of which are open to motorized recreation use.

Winter recreation opportunities include backcountry skiing and snowboarding, snowmobiling and cross-country skiing. Summertime recreation opportunities include hunting, fishing, hiking, camping, mountain biking, river recreation, and horseback riding. Warm Lake is a destination for water-related recreation, such as boating and swimming. Backpacking and pack trips are popular in the Big Creek area and from trailheads into the FCRNRW. Recreation facilities on NFS lands in the SDEIS analysis area include 16 campgrounds, two dispersed camping areas, 28 trailheads, two interpretive sites, four lookouts/cabins, one boating site, one swimming site, and two wildlife viewing sites. Developed recreation use is limited to the developed recreation sites (i.e., overnight facilities) located primarily in the Warm Lake, Landmark, and Johnson Creek Road areas. Most recreation in the SDEIS analysis area is dispersed use, such as hunting, fishing, hiking, backpacking, and all-terrain vehicle use, which occurs outside of these developed recreation sites.

The Idaho Outfitters and Guides Licensing Board issues state licenses to commercial outfitters and guides while the USFS authorizes outfitter and guide services and facilities on NFS lands. Activities permitted by the Idaho Outfitters and Guides Licensing Board in the SDEIS recreation analysis area and vicinity, which vary by outfitter, include trail rides, pack trips, mountain bike touring, backpacking, photo trips, day hikes, snowmobiling, and fishing, llama packing, skiing/snowshoeing, kayaking, float boating, wagon/sleigh rides, zip line tours, mountaineering, and power boating. Several permitted outfitters also are permitted for hunting.

# 3.19 Scenic Resources

Scenic resources are the visible physical features on the landscape (e.g., land, water, vegetation, and structures). The SDEIS scenic resources analysis area generally extends north of and along the East Fork Road segment and the Stibnite Road segment of the McCall-Stibnite Road (County Road [CR] 50-412), to the east into portions of the FCRNRW, south of and along Warm Lake Road (CR 10-579), and west of Lake Cascade. The SDEIS scenic resources analysis area boundary is not definitive, as the analysis area is meant to include all areas where the Project would potentially be visible to the public. Scenic resources in the analysis area are characterized as a continuous mountain landscape broken occasionally by wide valleys with flat or hilly floors. The FCRNRW is a protected wilderness area renowned for its rugged and wild character and is, at a minimum, regionally significant.

Visual sensitivity pertains to the degree of concern for changes to the characteristic landscape. Sensitive use areas were identified in the SDEIS based on the following criteria: use duration, use volume, Land and Resource Management Plan (Forest Plan) sensitivity level, and scenic or special designation. Identified sensitive use areas include travel routes, waterbodies, campgrounds and lodging, trails and trailheads, other recreational uses, and residences. There are 27 roads, including highways, forest roads, and local roads, in the SDEIS scenic resources analysis area identified as sensitive use areas. These roads provide access for forest visitors to the two national forests, the FCRNRW, the Project area, recreation sites, campgrounds and trailheads, and serve as travel routes



for the Yellow Pine village residents. There are six rivers and creeks and two lakes in the analysis area identified as sensitive use areas. The waterbodies are used by residents and forest visitors for motorized boating, rafting, swimming, wildlife viewing, and fishing. There are 16 campgrounds in the SDEIS analysis area: 11 are NFS campgrounds and the remaining 5 are non-USFS facilities. There also are 3 dispersed campsites in the SDEIS analysis area.

# 3.20 Social and Economic Conditions

This section includes a discussion of the social and economic conditions relevant to the Project, including population and housing, income and labor, social conditions, public services, and government revenues. The SDEIS social and economic conditions analysis area consists of Valley County, Adams County, and associated communities. Valley County, which contains the Project, and the associated communities of Cascade, Donnelly, McCall, and the village of Yellow Pine, have potential to be economically affected by the Project. Adams County and the associated towns of New Meadows, Meadow Valley, Council, and Tamarack also are included in the SDEIS social and economic conditions analysis area because of their proximity to the Project.

Valley and Adams counties are both rural areas located in central Idaho with low population densities of 3.2 people per square mile for both counties (Census 2020). In recent years, both counties have attracted new residents including recreationists and retirees looking for small towns, natural beauty, and wide-open areas and landscapes. The communities closest to the Project include Council, New Meadows, McCall, Donnelly, Cascade, and Yellow Pine. Altogether, approximately half of Valley and Adams counties' total year-round populations reside in these six communities. The largest of these communities are McCall (2019 population: 3,347) and Council (2019 population: 747). The majority of Valley and Adams counties' housing inventory consists of vacation/seasonal second homes for out-of-county residents (Census 2010, 2018). Most residents own their homes, with approximately 26 percent and 33 percent having lived in their current place of residence for 20 years or more in Valley and Adams counties, respectively (Census 2018). The data suggest much of the housing formerly available to permanent residents has been sold to second home buyers, increasing the number of occasional housing units and decreasing the availability of housing to local residents (Highland Economics 2018).

Valley County was greatly affected by the 2008 recession, but in recent years its economy has recovered. Historically, Valley County's economy was dependent on timber extraction, but the county's last major mill closed in 2001, and the resulting loss of 70 jobs has continued to impact the area (IDEQ 2019b). Today, tourism is a primary driver of the Valley County economy. Currently, Valley County's highest paying jobs are in mining followed by information services, government, and education/health service sectors, while the lowest paying jobs include leisure and hospitality and other services (Idaho Department of Labor 2020a). Adams County's economy has recovered more slowly since the 2008 recession but has benefited from an increase in retirees relocating to the area. Unlike Valley County, Adams County remains more dependent on natural resources, including farming, ranching, and the timber industry (Idaho Department of Labor 2020a, 2020b). There are currently no active metal mines operating in Adams County (Idaho Department of Labor 2020b). The information sector provides Adams County's highest paying jobs, while the tourism-industry (i.e., leisure and hospitality sector) has the lowest paying jobs (Idaho Department of Labor 2020b).

The USFS supports local economies within the SDEIS social and economic conditions analysis area through recreation, timber, energy, minerals, and livestock grazing, and counties with national forests receive funds to support schools, road maintenance, and stewardship projects. The USFS also contributes through its construction and maintenance of infrastructure, environmental



Section 3

restoration, and forest health management activities. In 2016, USFS management and stewardship activities for the PNF supported approximately 2,010 local jobs and \$73.2 million in local labor income (USFS 2016b). The agency's activities for the BNF supported approximately 2,580 local jobs and \$113.0 million in local labor income in 2016 (USFS 2016c).

Traditional Native American land use occurs throughout the SDEIS social and economic conditions analysis area. The regional tribes include the Nez Perce Tribe, the Shoshone-Bannock Tribes, and the Shoshone-Paiute Tribes. Significant populations of tribal members also live outside these tribal communities elsewhere within the region that also could be affected by the Project. The Nez Perce Tribe's largest economic sectors are educational and health care services, public administration, natural resources (e.g., agriculture, forestry, fishing, hunting, and mining;) and recreation and service (Census 2018). Important tribal enterprises include its fisheries restoration program, fish hatchery operations, and casino. Other tribal enterprises include a convenience store, recreational vehicle park, and forestry products company (Nez Perce Tribe 2018). The Shoshone-Bannock Fort Hall Reservation's largest economic sectors are recreation and service, education, health care, and public administration (Census 2018). The Shoshone-Bannock Tribes also operate a casino, hotel, wildlife and fisheries restoration programs, and the Famous Potatoes farming businesses. The Shoshone-Paiute Duck Valley Reservation's largest economic sectors are public administration, education, and health care services (Census 2018). The Shoshone-Paiute Tribes manage three trout fisheries, several camping areas, a solid waste transfer station, and a recycling center.

Valley and Adams counties, along with their municipalities, provide police, fire, utilities, schools, and libraries for residents and workers. New residents relocating to the region for work at the Project could result in population growth that would generate greater demand for these public services in the local area. Valley and Adams counties residents and businesses pay federal, state, and local income taxes. Household and business purchases generate sales taxes, and the structures owned by individuals and businesses in the area are subject to city and/or county property taxes. Revenues for funding county services are obtained from a variety of sources, including local sales and use taxes, local property taxes, Idaho general funds, Idaho Lottery funds, and Idaho highway users' funds. Schools in Valley and Adams counties also receive federal funding under the Secure Rural Schools program. Mining and mineral sales in Idaho result in property taxes and mining licensing fees for both the state and counties, and mineral extraction from public lands also can generate lease and royalty payments for the government. In 2012, the State of Idaho and its local governments received mining operations contributions of approximately \$6.0 million in local property taxes and \$7.0 million in state royalties, rents, and license fees (Idaho Mining Association 2013).

# 3.21 Environmental Justice

Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Environmental justice is considered during the NEPA process to determine whether any disproportionately high and adverse human health or environmental effects to low-income, racial minority, and tribal populations may occur as a result of the federal action, in accordance with Executive Order 12898. The SDEIS environmental justice analysis area includes Valley and Adams counties and the Nez Perce, Shoshone-Bannock, and Shoshone-Paiute tribes, whose traditional subsistence range includes the Project area.

The state of Idaho was used to represent the general population and "meaningfully greater" was defined as 5 percentage points or more per USFS guidance to identify minority communities of concern for environmental justice analysis (USFS 2014c). Given the total minority population



statewide of 17.4 percent, a community with a total minority population of 22.4 percent or more would meet the definition of a minority community. In Valley and Adams counties, no community in the SDEIS environmental justice analysis area meets the definition of an environmental justice community. The community of Yellow Pine was also reviewed for environmental justice status due to its smaller population and proximity to the Project, and it was determined that Yellow Pine does not meet the definition of an environmental justice community. The Nez Perce Census County Division (CCD) meets the definition of an environmental justice low-income population. The Fort Hall Reservation of the Shoshone-Bannock Tribes meets the definition of an environmental justice low-income population of the Shoshone-Paiute meets the definition of an environmental justice low-income population and an environmental justice low-income population. The Duck Valley Reservation of the Shoshone-Paiute meets the definition of an environmental justice minority community and an environmental justice low-income population.

Numerous areas throughout the PNF and the BNF have traditional, cultural, and spiritual significance for the Nez Perce Tribe, Shoshone-Bannock Tribes, and Shoshone-Paiute Tribes. Tribal use, preservation, and protection of these sacred areas are important means by which tribal members maintain their cultural and religious links to the past and their ancestors. Areas of cultural significance often include mountain ridges, hot springs, waterfalls, trails, rock art panels, and traditional gathering areas and collection areas. Information received from the tribal ethnographies indicate areas, resources, and off-reservation rights of concern and importance. There are several traditionally collected plant and animal species in the SDEIS environmental justice analysis area. The ethnography studies of these tribes identify specific fish, wildlife, and plants that are of traditional and continued cultural importance. The Nez Perce Tribe, Shoshone-Bannock Tribes, and Shoshone-Paiute Tribes see hunting and gathering of these resources as an important link to their past. The Tribes are taking an increasingly active role in the protection and restoration of various species of plants, animals, and fish due to their concern with maintaining this aspect of their cultures.

# **3.22 Special Designations**

This section describes the existing (baseline) conditions relevant to areas of special designation that have the potential to be affected by the Project. The evaluated special designations include wilderness and recommended wilderness, Wild and Scenic Rivers (WSRs), IRAs, and Research Natural Areas (RNAs). Each of these special designation types has a unique analysis area in the SDEIS.

Portions of the FCRNRW are in the SDEIS wilderness analysis area, The FCRNRW covers over two million acres in central Idaho and is the largest contiguous wilderness in the continental 48 states and the largest in the NFS. As the largest block of primitive and undeveloped land outside Alaska, the FCRNRW is of national importance (USFS 2009). The existing conditions of wilderness within the SDEIS wilderness analysis area are described relative to the five qualities of wilderness identified in the Wilderness Act: untrammeled, natural, undeveloped, opportunities for solitude or primitive and unconfined recreation, and other features of value. Wilderness character in the FCRNRW is affected by its variety of uses; however, wilderness retains a wild, uncontrolled nature that is indicative of its untrammeled character. The tributaries to the East Fork and the Middle Fork of the Salmon River provide natural conditions that range from good to excellent in terms of water quality for domestic use, recreational use, and wildlife in the wilderness. Human development in the FCRNRW and recommended wilderness is mostly associated with visitor use, such as access roads, trailheads, and backcountry airstrips. Additional development includes a very high frequency repeater site at Artillery Dome, USFS guard stations and patrol cabins. In areas away from access roads, trailheads, administrative sites, and other areas of concentrated use, the FCRNRW and the recommended



wilderness areas in the SDEIS wilderness analysis area offer outstanding opportunities for solitude and primitive and unconfined recreation during all seasons. The FCRNRW and recommended wilderness areas also preserve "ecological, geological, or other features of scientific, educational, scenic, or historic value," as identified in section 2(c) of the Wilderness Act.

The SDEIS WSR analysis area includes three streams identified in a 1997 USFS study as eligible for inclusion in the National System as WSRs (USFS 2010): SFSR, Burntlog Creek, and Johnson Creek. A combined suitability study of the PNF and BNF concluded that the SFSR is suitable for WSR designation (USFS 2003b). The SFSR has a preliminary WSR classification of recreational and is recognized for the following Outstandingly Remarkable Values (ORVs): recreation, scenic, geological, cultural, botanical, and fisheries (USFS 2003b). Burntlog Creek is eligible for inclusion in the National System as a WSR from its headwaters to its confluence with Johnson Creek. Burntlog Creek has an ORV for fish (USFS 2010), as it is a PACFISH/INFISH<sup>2</sup> priority watershed that supports spawning and rearing habitat for wild Chinook salmon, steelhead, cutthroat trout, redband trout, and bull trout. An approximately 2.9-mile segment of Johnson Creek is eligible for inclusion in the National System as a WSR due to its ORV for cultural (heritage) resources. The Project would intersect WSR corridors at the proposed access roads and utility corridors.

The SDEIS IRA analysis area contains portions of 13 IRAs located within approximately 5 miles of the Project. The natural integrity and appearance of the 13 IRAs and lands contiguous to roadless areas (roadless expanse) are generally undisturbed from natural conditions and unaffected by human development, which is substantially unnoticeable. However, there are an estimated 32.5 miles of unauthorized roads in the SDEIS IRA analysis area. The natural appearance in the roadless expanse has been influenced by past mining activities, road intrusions, and telephone (i.e., utility) infrastructure corridors. The 13 IRAs, including the adjacent roadless areas, provide recreation opportunities, such as camping, canoeing, cross-country skiing, fishing, hiking, hunting, picnicking, and wildlife viewing. The level of opportunity for solitude or primitive and unconfined recreation varies throughout the roadless expanse based on topographic and vegetative conditions and distance to large population centers.

The system of RNAs was established with the goal of allowing natural processes to occur without the influence of human activity. RNAs preserve natural features and plant communities for research and educational purposes and contribute to a national network of ecological areas dedicated to research, education, and the maintenance of biological diversity. These conditions are ordinarily achieved by allowing natural, physical, and biological processes to prevail without human intervention. RNAs that are representative of common ecosystems in natural conditions serve as baseline or reference areas. The SDEIS RNA analysis area includes the six RNAs located within 5 miles of the Project: Back Creek, Belvidere Creek, Chilcoot Peak, Circle End Creek, Needles, and Phoebe Meadows. Back Creek RNA was established to preserve diverse, high-quality streamside meadows, numerous subalpine fir habitat types, and rare lodgepole/Idaho fescue (Festuca idahoensis) habitat types. Belvedere Creek RNA was established to preserve high elevation subalpine fir habitat types, outstanding aquatic features with associated wetland plant communities, and a unique and scenic geomorphic setting. Chilcoot Peak RNA was established to preserve diverse subalpine forest habitats, including subalpine fir, Douglas-fir, and whitebark pine habitat types. Circle End Creek contains nine forested habitat types and significantly enhances the representation of these elements in Idaho's RNA system. Needles RNA was established to preserve high-elevation subalpine fir habitat types, outstanding aquatic features with associated wetland plant communities, and its unique geomorphic

<sup>&</sup>lt;sup>2</sup> Pacific Anadromous Fish Strategy / Inland Fish Strategy



setting. Phoebe Meadows RNA was established to protect a large variety of subalpine fir and Douglas-fir forest types and diverse mountain meadow systems and associated aquatic features.

# 3.23 Tribal Rights and Interests

This section is noted in the SDEIS to be reserved for legal review and therefore is not addressed in this document.



# Section 4

# Avoidance, Minimization, and Compensatory Mitigation

# 4.1 Measures Considered to Avoid Aquatic Impacts

## 4.1.1 Total Avoidance of Impacts to Waters of the United States

There are no practicable and technically feasible alternatives that would avoid all WOTUS impacts and still meet the purpose and need for the Project.

## 4.1.2 Minimization of Impacts to Waters of the United States

The SGP is encompassed by two subbasins (HUC 8) and seven watersheds (HUC 10). Tributaries of the EFSFSR include but are not limited to Sugar Creek, Meadow Creek, Johnson Creek, Riordan Creek, Burntlog Creek, Trout Creek, Hennessy Creek, Midnight Creek, Fiddle Creek, Garnet Creek, and Rabbit Creek, with West End Creek a tributary of Sugar Creek. The Project Area also includes Cabin Creek and Warm Lake Creek, which are tributary streams to the South Fork of the Salmon River (**Figure 1-4**). Diverse wetlands are located throughout Project Area drainages and slopes that drain to the valleys downslope and include wetlands classified as PEM, PSS, PFO, and OW (Cowardin, et al. 1979). The primary uses or activities in the Project Area have been mineral exploration, mining, logging, and dispersed recreation.

Within the Project Assessment Area, there are 240,940 linear feet of stream in the SFSR drainage and 22,368 linear feet of stream in the North Fork Payette River drainage. Impacts to streams in the SFSR drainage total 102,568 linear feet, avoiding 138,372 linear feet of stream. Impacts in the North Fork Payette River drainage total 9,169 linear feet, avoiding 13,199 linear feet of stream.

Within the Project Assessment Area, there are 656.25 acres of wetlands in the SFSR drainage and 117.82 acres of wetlands in the North Fork Payette River drainage. Direct impacts to wetlands in the SFSR drainage total 143.26 acres, avoiding 512.99 acres of wetlands. Direct impacts in the North Fork Payette River drainage total 7.18 acres, avoiding 110.64 acres. Avoidance and minimization of impacts in the North Fork Payette River drainage were integrated in facility siting and alignment.

## 4.1.3 Proposed Action

After submittal of the PRO, Perpetua Resources continued to refine the Proposed Action and advance the Project's engineering design to the FS level. Specifically, Appendix G of the PRO describes alternatives assessments for the Project mining method, tailings management, ore processing, on-site infrastructure, development rock management, EFSFSR water management, fish passage during operations, East Fork Meadow Creek water and sediment management, project road access, power supply, contractor and employee housing, and employee transportation. To align the Project design features with Perpetua Resources' core values, design principles were incorporated into the alternative assessments; one of the 11 primary design principles identified in Appendix G of the PRO was to minimize or avoid, where practicable, direct disturbance to environmentally sensitive resources such as streams and wetlands, leaving a buffer where possible (Midas Gold 2016a). This



allowed reduction of the overall project footprint, reduction of associated wetland impacts, improvement to surface water and groundwater quality, reduction of temperature impacts to surface water, reduction of air emissions, improvement to fisheries and wildlife habitat, and improvement upon reclamation and restoration design as outlined in Appendix A. As the ModPRO2 (Proposed Action) was developed, Perpetua Resources considered and reviewed many alternatives for SGP components. The design principles were taken into consideration along with other design criteria to identify the SGP components described in the ModPRO2 (Proposed Action) (Perpetua Resources 2021). Due to the extensive Project refinement resulting in additional minimization and avoidance of WOTUS between the PRO, ModPRO, and ModPRO2, the ModPRO2 (Proposed Action) is the LEDPA

As shown in **Appendix A**, the ModPRO2 (Proposed Action) will impact 150.44 acres of wetlands and 111,486 linear feet of streams, a net reduction in impacts to WOTUS of 19.56 acres of wetlands and 3046 linear feet of streams from the PRO, demonstrating additional avoidance and minimization during alternatives refinement.,

## 4.1.4 Aquatic Impact Minimization Measures

Measures to maintain aquatic resource function and minimize impacts to fish and aquatic habitat are addressed in the FMP (Brown and Caldwell, McMillen Jacobs, and BioAnalysts 2021a) and FOMP (Brown and Caldwell, McMillen Jacobs, and BioAnalysts 2021b) and incorporated into the Proposed Action through the ModPRO2 (Perpetua Resources 2021). Minimization and active mitigation efforts to protect fish and aquatic habitat include:

- Using appropriate technologies to screen and exclude fish from diversion channels, control water withdrawals to limit entrainment of fish, provide safe passage around diversions, and use low-flow pipes in diversion canals to minimize temperature increases during low-flow periods.
- Isolating work areas from streams with buffers and implementing measures to minimize instream activities during critical periods for fish.
- Applying protective buffer distances from aquatic habitats during blasting activities and/or modifying blasting techniques to avoid impacts to fish and aquatic biota, including effectiveness testing during early operations.
- Removing existing passage barriers within the mine site to allow for fish movement between streams and areas of the mine site where access is currently blocked or impeded.
- Routing streamflow flow around construction areas or during stream restoration activities to protect water quality.
- Operating and maintaining the EFSFSR fishway during construction and operations and later in the mine life by restoring the EFSFSR stream channel over the backfilled Yellow Pine pit to provide permanent, volitional upstream and downstream fish passage and access to important stream habitats of the upper EFSFSR and portions of Meadow Creek.
- Implementing established protocols for the salvage and relocation of fish from streams to be affected by mining operations to minimize loss of fish and fish production, with specific measures for fish handling and transport.
- Maintaining, to the extent practicable, appropriate streamflows and monitoring streamflow in natural or restored channels where fish are present.
- Constructing Stibnite Lake during mine site reclamation to replace the habitat and water temperature moderating function of the existing Yellow Pine pit lake.
- Applying road construction and maintenance Best Management Practices (BMPs) to control sedimentation and water quality effects from mine access routes.



# 4.2 Compensatory Mitigation

Perpetua Resources' CMP (Tetra Tech 2023) describes the stream and wetland mitigation designed to compensate for unavoidable impacts to jurisdictional WOTUS associated with activities that would be authorized by a DA permit for the Applicant's Proposed Action. Additional measures beyond those outlined above are incorporated into the ModPRO2, the RCP (Tetra Tech 2021c), and the WHMP (Tetra Tech 2021b). A summary of additional active mitigation measures in the context of actions to minimize adverse effects pursuant to the Guidelines is provided in **Section 6** below.

## 4.2.1 Applicant's Proposed Compensatory Mitigation Plan

Perpetua Resources' overarching goal for the CMP, developed based on the Proposed Action (LEDPA), is to meet the following primary compensatory mitigation objectives:

- Provide compensatory mitigation for unavoidable impacts to jurisdictional streams and wetlands due to the SGP as authorized under the CWA.
- Offset the SGP's authorized impacts to satisfy mitigation requirements, ensuring there will be no net loss of function of streams and wetlands resulting from construction, operation, and reclamation of the SGP.
- Repair and rehabilitate habitats adversely affected by mining impacts in the SGP area, with the primary goal of producing a net benefit to wetlands, streams, water quality, and fisheries following mining and closure (Midas Gold 2016a; Midas Gold 2020).
- Implement restoration and mitigation in a manner consistent with the USFS' Forest Plans for the PNF (USFS 2003b) and the BNF (USFS 2010) and associated management prescriptions in those plans.
- Accomplish as much on-site mitigation as possible to enhance and restore resources in areas adjacent to where impacts will occur or restore resources after completion of mining activities.

Perpetua Resources anticipates using permittee-responsible mitigation on-site and offsite for much of the compensatory mitigation required for impacts to streams and wetlands associated with the Project. As further described in Section 4 of the CMP, mitigation for stream and wetland impacts would be within the subbasin where the impacts occur and off-site in the Upper Salmon River subbasin and the Payette River subbasin.

Perpetua Resources will design, construct, and monitor wetland and stream restoration and enhancement, fish passage and access, and water quality improvement projects over the course of mine construction, operation, and closure to meet the objectives outlined above. The ModPRO2, CMP, and RCP have all been developed to minimize the temporal lag between permanent impacts to WOTUS and the resulting compensatory mitigation through quantifiable net gains in function of streams and wetlands.

## 4.2.1.1 Stream Mitigation

Compensatory mitigation for unavoidable impacts to streams will be completed in several ways at the Project site (Rio ASE 2021). Stream reaches that have been completely lost, moved, or eliminated would be re-established during mining operations and/or post-operation and closure. Some streams with impaired functions will be rehabilitated and other streams will have habitat features that are enhanced; however, the majority of the stream restoration will involve temporary relocation during mining and re-establishment near their historical locations. For ease of discussion in this document, collectively the activities of temporary relocation, re-establishment, rehabilitation, and enhancement will hereafter be referred to as "restoration."



#### The goals of proposed compensatory stream mitigation are to:

- Provide the required compensation for unavoidable impacts to streams resulting from the SGP and to offset the SGP's authorized impacts.
- Restore stream functions within the Project Area.
- Provide additional off-site mitigation for streams in the same subbasin in which the impacts occur.

#### Objectives for proposed compensatory stream mitigation include:

- Restore functions to streams and floodplains that have been, or would be, disturbed by past mining activities or proposed mining activities and improve habitat conditions for aquatic species.
- Remove the existing fish passage barrier at Yellow Pine pit, restore permanent and volitional passage in the EFSFSR, and make lower Meadow Creek accessible to fluvial and anadromous fish for the first time since the 1930s.
- Allow for fish passage to restored stream channels, where possible, by incorporating appropriate design features.
- Improve physical channel processes and aquatic habitat within restored stream channels by selectively adding large woody debris (LWD) and rock structures, eliminating fish passage barriers, creating scour pools, enabling improved sediment sorting, and generally increasing hydraulic and habitat diversity.
- Provide spawning and rearing habitat for anadromous and resident fish populations, including three ESA-listed salmonid species: bull trout (*Salvelinus confluentus*), Chinook salmon (*Oncorhynchus tshawytscha*), and steelhead (*O. mykiss*).
- Plant riparian vegetation to improve long-term bank stability and increase woody debris recruitment, overhead cover, shade, and terrestrial wildlife habitat.

### 4.2.1.2 Wetland Mitigation

Compensatory mitigation for unavoidable impacts to wetlands will be accomplished through establishment of new wetlands, re-establishment of historical wetlands, and enhancement of existing wetlands. Wetland establishment will occur at areas that were not historically wetlands. This includes areas where a stream is rerouted or where the shallow groundwater and surface hydrology would support wetland establishment. Wetland re-establishment will occur where low functioning wetlands can be returned to historical conditions, thus re-establishing their function. Wetland enhancement may occur where activities can increase the functions of a wetland beyond existing conditions. This may include increasing the functions for certain wildlife species, or planting vegetation, such as hydrophytic shrubs, that increases a wetland's functional value.

#### The goals of proposed compensatory wetland mitigation are to:

- Compensate for unavoidable impacts to wetlands resulting from the SGP's authorized impacts.
- Restore wetland functions within the Project Area.
- Provide additional off-site mitigation for wetlands in the same subbasin in which the impacts occur.

#### Objectives for wetlands mitigation include:

• Restore functions to wetland areas that are disturbed from legacy and proposed mining activities and restore and establish on-site wetlands after completion of mining.



- To the extent possible, restore PEM, PSS, and PFO wetland habitats in similar ratios to baseline conditions.
- Restore hydrologic conditions that will support wetland vegetation and overall function.
- Restore wetland plant communities comparable to existing wetlands and/or reference site wetlands that would be sustainable over the long term with minimal human intervention.
- Restore and increase wetland functions and values within the Project Area.

## 4.2.2 Mitigation Requirement

The Proposed Action results in the loss of 109,421stream functional units (debits) in the SFSR drainage and 2,049 debits in the North Fork Payette River drainage.

the Proposed Action results in the loss of 706.51 wetland functional units (debits) in the SFSR drainage and 10.81 debits in the North Fork Payette River drainage.

## 4.2.3 Available Mitigation

As quantified in Section 9.1 of the CMP (Tetra Tech 2023), Perpetua Resources will offset debits in the SFSR drainage on-site with 171,277 stream functional units (credits), with a net gain of 61,856 stream functional units (excess credits). Temporal losses in the SFSR drainage will be offset with offsite mitigation at the Lemhi Regional Land Trust's Little Springs Conservation Easement and Restoration Project with an expected 5,800 stream functional units created through stream restoration and protection. Temporal losses in the North Fork Payette River drainage will be offset by the BCCRP, with an expected gain of 14,902 stream functional units.

As quantified in Section 9.2 of the CMP (Tetra Tech 2023), Perpetua Resources will offset debits in the South Fork Salmon River drainage through on-site mitigation with 1,735.4 wetland functional units (credits) with a net gain of 1,018.08 wetland functional units (excess credits). Perpetua Resources will offset debits in the North Fork Payette River drainage at the Salmon Meadows Wetland Bank through the purchase of 1.6 acres of wetland credits equating to 12.58 wetland functional units (credits) with a net gain of 1.77 functional unites (excess credits).

## 4.2.4 Conclusions

Perpetua Resources' proposed CMP offsets 111,470 stream functional unit debits with 237,978 of stream functional unit credits. The CMP offsets 717.33 wetland functional unit debits with 1,747.98 wetland functional unit credits. The net gains in both stream and wetland functional units meet the compensatory mitigation requirements of the SGP. Off-site mitigation on the Lemhi River, wetland credits purchased through the Salmon Meadows Wetland Bank, and additional functional units restored during operation and closure offset temporal losses of WOTUS. This mitigation plan would provide appropriate and adequate compensatory mitigation necessary to offset unavoidable permanent and temporal losses in aquatic function that would result from impacts to waters of the U.S. associated with construction of the proposed Project,



# Section 5

# Prohibitions and Significant Degradation

The following sections include direct reference to 40 CFR Section 230.10 (b) and (c) to be considered as described in the Guidelines. Applicable sections of the SDEIS are referenced as appropriate. As previously described in **Section 2.1.1**, alternatives evaluated during the practicability analysis but not advanced for further consideration (Alternatives 4, 5, and 6) are not included in the analysis of Prohibitions and Significant Degradation.

## 5.1 Subpart C – Potential Effects on Physical and Chemical Characteristics of Aquatic Ecosystems

## 5.1.1 Substrate (40 CFR 230.20)

Potential Effects relevant to this characteristic are described in SDEIS Sections 3.5 and 4.5, Soils and Reclamation Cover Materials.

The substrate of the aquatic ecosystem includes sediments that underlie open WOTUS and hydric soils that constitute the surface of wetlands. Substrate consists of organic and inorganic solid materials and includes waters and other liquids or gasses that occupy the pore space in the sediment or soil.

The substrate on which the proposed fill would be placed is located in the channels of streams, including headwaters, slope and depressional wetland areas, and existing ponding areas including Yellow Pine Pit. The substrate of streams and wetlands in the Project area include areas of alluvium on floodplains and terraces adjacent to streams. Floodplain soils in the Project area are variable, with depth to water being shallow (12 to 24 inches below ground surface) (USFS 2020). The floodplain soils consist of silt to sand textures, generally having a high organic matter content in the upper horizons, until the C horizon is reached, and the soils transition to sand (Tetra Tech 2020b). These soils also have elevated antimony, arsenic, and mercury concentrations (Tetra Tech 2021c). Wetland soils in the Project area are observed in seeps, toe slopes, and depressions, and are characterized by saturation and a heavy composition of organic matter. These soils occur on shallow-to-moderate slope faces and tend to lack fluvial depositional patterns, horizonation, and sandy textures (USFS 2022a). These soils are high in calcium, magnesium, potassium, total organic carbon, calcium carbonate, and organic matter in the upper horizons when compared to the other soils (Tetra Tech 2020b). The wetland soils also have elevated antimony, arsenic, and mercury concentrations (Tetra Tech 2021c).

Soil disturbance under the Johnson Creek Route Alternative would be similar to the ModPRO2 (Proposed Action) for SGP-related components but would differ due to use of the Johnson Creek Route instead of the Burntlog Route for SGP access and the public access route through the SGP because of the differences in road disturbance locations. A portion of these SGP soil disturbance impacts would occur on open water and emergent, forested, and scrub shrub wetland habitat and substrate, as depicted on Figure 6-1 of the CMP (Tetra Tech 2023). Crossings of riparian habitat



under the ModPRO2 (Proposed Action) and Alternative 2 (Johnson Creek Route Alternative) are depicted in Figure 3.13-7 of the SDEIS (USFS 2022a).

#### ModPRO2 (Proposed Action)

Under the ModPRO2 (Proposed Action), the magnitude of impacts to soil resources includes excavation, grading, or filling of 1,457 acres (approximately 120 acres of which are already disturbed to some degree) on the PNF, and up to 902 acres (approximately 66 acres of which are already disturbed to some degree) on the BNF (USFS 2022a). A portion of these impacts would occur on the substrate of aquatic ecosystems. Impacts will be minimized through stormwater and sediment control BMPs and soil management EDFs described in SDEIS Section 2.4.9. In order for the USACE to issue a permit under Section 404 of the CWA and authorize dredge or fill placement in WOTUS, all unavoidable impacts to jurisdictional WOTUS must be mitigated. Stream and wetland mitigation work plans for the Project are described in Section 9 of the CMP (Tetra Tech 2023). Based on the implementation of BMPs and EDFs designed to protect soils and wetlands and compensatory mitigation actions designed to offset unavoidable impacts to WOTUS, Alternative 1 would comply with this factor of the Guidelines.

#### Johnson Creek Route Alternative

Under The Johnson Creek Route Alternative, the magnitude of impacts to soil resources includes excavation, grading, or filling of 1,366 acres (approximately 153 acres of which are already disturbed to some degree) on the PNF, and approximately 321 acres (approximately 133 acres of which are already disturbed to some degree) on the BNF (USFS 2022a). A portion of these impacts would occur on the substrate of aquatic ecosystems. Use of the Johnson Creek Route Alternative would avoid construction-related impacts from sedimentation at 21 different streams compared to the ModPRO2 (Proposed Action). These streams include Burntlog Creek, East Fork Burntlog Creek, the EFSFSR, Johnson Creek, Landmark Creek, Peanut Creek, Rabbit Creek, Riordan Creek, Trapper Creek, and 12 unnamed waterbodies. Impacts will be minimized through stormwater and sediment control BMPs and soil management EDFs described in SDEIS Section 2.4.9. In order for the USACE to issue a permit under Section 404 of the CWA and authorize dredged or fill placement in WOTUS, all unavoidable impacts to jurisdictional WOTUS must be mitigated. Stream and wetland mitigation work plans for the Project are described in Section 9 of the CMP. Based on the implementation of BMPs and EDFs designed to protect soils and wetlands and compensatory mitigation actions designed to offset unavoidable impacts to WOTUS. The Johnson Creek Route Alternative would comply with this factor of the Guidelines, though the Johnson Creek Route Alternative has additional indirect environmental risk compared to the ModPRO2, since primary access routes under the Johnson Creek Route Alternative are in greater proximity to streams and rivers.

#### Alternative 3 (No Action Alternative)

Under Alternative 3 (No Action Alternative), there would be no large-scale mine operations by Perpetua Resources, and soil resources would continue to be affected by currently permitted Perpetua Resources drilling activities under the Golden Meadow Exploration Project, per the Golden Meadows Exploration Project Plan of Operations (Midas Gold 2011) and the Golden Meadows Exploration Project Environmental Assessment (USFS 2015). Consequently, there would be little change in the current status of soil resource conditions in the Project area other than natural erosive and soil formation processes.

Past mining activities have resulted in long-term impacts to soils, and past cleanup/remediation projects have attempted to mitigate some of those mining impacts. Under Alternative 3 (No Action Alternative), existing impacts would remain on developed roads and existing waste piles (historic



development rock and tailings), and at other past mining related locations (Tetra Tech 2021c). It is anticipated that soils in most of these areas would not recover naturally. Continuing approved drilling and reclamation activities under Alternative 3 (No Action Alternative) would entail land disturbance, some of which would impact aquatic substrate.

## 5.1.2 Suspended Particulates and Turbidity (40 CFR 230.21)

Suspended particulates in the aquatic ecosystem consist of fine-grained mineral and organic particles. Suspended particulates may enter water bodies from land runoff, flooding, vegetative and planktonic breakdown, resuspension of bottom sediments, and from activities including dredging and filling.

Under baseline conditions, turbidity is generally low (less than 5 nephelometric turbidity units [NTU]) with occasional spikes of up to 70 NTU during snowmelt or rainfall events (USFS 2022e). An overview of sediment transport at the mine site is provided in Etheridge (2015). This study found that much of the sediment entering the EFSFSR was derived from Sugar Creek, Meadow Creek, and East Fork Meadow Creek. The Meadow Creek reach contributes more sediment than Sugar Creek, but most of the sediment load discharged from the Meadow Creek reach is deposited in the Yellow Pine pit lake (Etheridge 2015). Load modeling by Etheridge (2015) also showed that about 90 percent of coarse-grained sediment derived from upgradient is deposited in the Yellow Pine pit, but over 80 percent of the fine-grained sediment (<0.0625 millimeter in diameter) entering the pit lake passes through and is transported downstream. Thus, the Yellow Pine pit is an effective sediment trap for coarse-grained particles but does not have a long enough residence time to remove the majority of the fine-grained sediment load.

The Project may cause an increase in suspended particles and turbidity levels during the entire life cycle of the mining process, including the post-closure phase. Impacts may occur from land disturbance activities, channel modifications and rerouting, effluent discharge from the contact water treatment, and management of overburden and tailings materials. Project-related impacts on suspended particles and turbidity could result from watershed alterations, additional loading of contaminants, water withdrawals and discharges, stormwater runoff, alteration of groundwater contributions, and clearing and industrial activity. Construction and active mining would disturb, excavate, and move soil and overburden thereby raising the potential for sediment runoff and suspended sediment increases in surface waters. However, pre-construction water management activities would include BMPs to reduce erosion and sediment delivery to streams. Water management features could include sedimentation ponds; run-on water diversion ditches, trenches, and/or berms; runoff water collection ditches; silt fence; water bars; culverts; energy dissipation structures; terraces; and other features specified in construction permits (USFS 2022a).

The greatest potential for Project-related increases in stream sedimentation would come during storm events causing overland flow across exposed soil, excavated areas, and roads. BMPs would be employed for near-stream or instream work such as removal of legacy materials and stream restoration to minimize the potential for coarser sediment generation or mass wasting that would affect sediment transport and deposition. Applicable sediment control BMPs would be used to minimize sediment runoff and erosion along roads and excavated areas. On the mine site and along the Burntlog route, expected permit conditions from IDWR and IDEQ would protect streambank vegetation, require culvert maintenance, and require low impact snow removal techniques (USFS 2022a). Surface water quality also could be impacted during operations, closure, and reclamation by fugitive dust from vehicles and heavy equipment that settles into adjacent water bodies. Sediment and turbidity from temporary Project roads are predicted to be within normal range of properly maintained USFS roads (USFS 2022a).



Potential Project-related sediment impacts on fish would include temporary turbidity increases during runoff events and localized deposition of fine sediment in stream channels. Turbidity increases during runoff events have the potential to temporarily change fish behavior but are unlikely to be severe enough, relative to baseline fluctuations, to cause fish mortality or health impacts. Increases in fine sediment deposition within stream channels have the potential to decrease spawning gravel suitability and decrease benthic invertebrate production within gravel riffles. These impacts would impact spawning/incubation and rearing/feeding life stages, respectively, of Chinook salmon, steelhead, bull trout, and westslope cutthroat trout. With the application of sediment reduction BMPs and surface runoff minimizing design techniques, the impacts of sediment in surface water to fish are predicted to be measurable but not severe, limited to the mine area, and occur during the active mining period. However, the restoration efforts in East Fork Meadow Creek would result in a substantial decrease in sediment input into Meadow Creek and the EFSFSR (USFS 2022a).

Potential increases in suspended particulates and turbidity levels from mining operations under the ModPRO2 and the Johnson Creek Route Alternative will be identical. Differences in anticipated impacts to suspended particulates and turbidity between these alternatives will occur due to the differences in access road construction, maintenance, and usage profiles, as summarized below.

### ModPRO2 (Proposed Action)

Thirty-seven stream crossings will occur under the ModPRO2 (Proposed Action). Nine miles of travel corridors will occur within 0.5 mile of streams and 1.6 miles of travel corridors will occur within 100 feet of streams. The sediment and turbidity effects of the ModPRO2 on Chinook salmon, steelhead, bull trout, and westslope cutthroat trout would be moderate, permanent, and localized (USFS 2022a). Upon closure, the new segment of Burntlog Route would be recontoured and reclaimed, which would reduce long-term direct and indirect impacts of sedimentation. Section 9.1 of the CMP (Tetra Tech 2023) describes stream design measures to ensure appropriate sediment transport conditions and improved water quality in streams that are tributary to the EFSFSR. Based on Project reclamation and mitigation actions and incorporation of BMPs to reduce erosion and sediment delivery to streams, the ModPRO2 would comply with this factor of the Guidelines.

#### Johnson Creek Route Alternative

Forty-three stream crossings will occur under the Johnson Creek Route Alternative (Johnson Creek Route Alternative). Twenty-seven miles of travel corridors will occur within 0.5 mile of streams and 6.5 miles of travel corridors will occur within 100 feet of streams. The Johnson Creek Route would be widened and upgraded under the Johnson Creek Route Alternative. Surface water quality impacts from erosion and sedimentation during access road construction could increase during the construction activities (USFS 2022a).

Use of the Johnson Creek Route for site access ( would avoid construction-related impacts from sedimentation at 21 different streams compared to the ModPRO2. These streams include Burntlog Creek, East Fork Burntlog Creek, the EFSFSR, Johnson Creek, Landmark Creek, Peanut Creek, Rabbit Creek, Riordan Creek, Trapper Creek, and 12 unnamed waterbodies.

Under Alternative 2, improved Johnson Creek and Stibnite roads would not be reclaimed to preexisting conditions, and potential impacts of increased sedimentation and turbidity in these areas would remain after closure. Section 9.1 of the CMP (Tetra Tech 2023) describes stream design measures to ensure appropriate sediment transport conditions and improved water quality in streams that are tributary to the EFSFSR. Based on Project reclamation and mitigation actions and incorporation of BMPs to reduce erosion and sediment delivery to streams, Alternative 2 would



comply with this factor of the Guidelines. However, Alternative 2 exhibits the potential for long term impacts of sediment delivery along improved portions of the Johnson Creek Route, which would not occur under the ModPRO2.

#### Alternative 3 (No Action Alternative)

Under Alternative 3 (No Action Alternative), sediment and turbidity conditions are expected to remain consistent with baseline levels as reported in SDEIS Table 3.9-15, and therefore Alternative 3 is anticipated to have a negligible impact on suspended particulates and turbidity in the aquatic ecosystem.

## 5.1.3 Water (40 CFR 230.22)

Water is the part of the aquatic ecosystem in which organic and inorganic constituents are dissolved and suspended. Water clarity, nutrients and chemical content, physical and biological content, dissolved gas levels, pH, and temperature contribute to its life-sustaining capabilities.

Existing conditions and environmental consequences of the Project on surface water and groundwater quantity are described in SDEIS Sections 3.8 and 4.8, respectively. Existing conditions and environmental consequences of the Project on surface water and groundwater quality are described in SDEIS Sections 3.9 and 4.9, respectively.

Surface water resource investigations for the SGP were initiated in 2012 to characterize existing conditions in the analysis area. USGS data from nine gaging stations in or near the analysis area provide much of the available surface water quantity data. Baseline data collection included flow measurements at 32 perennial stream locations and 23 sites where water originated from a seep, adit seep, or another legacy mining-related feature. Sampling was performed on a monthly to quarterly basis for the stream locations and quarterly for the seeps and adit seeps. The samples collected were analyzed for alkalinity, anions, metals, nutrients, cyanide, hardness, methylmercury, TDS and total suspended solids. Field parameters also were measured for each sample including dissolved oxygen, pH, conductivity, temperature, and turbidity (HDR 2017c). Based on data from the 2016 Integrated Report (IDEQ 2018), all inventoried waterbodies at the mine site are classified as category 5 impaired waters except for West End Creek (which is a Category 2 stream that fully supports its designated uses). The causes for listing are associated with arsenic, with the EFSFSR also being listed for Antimony, and Sugar Creek being listed for mercury. Overall, the dissolved arsenic concentration data exhibit an increasing concentration trend from upstream to downstream across the mine site (USFS 2022a).

Project-related impacts on water quality and chemistry may occur during the entire life of the mining process, including the post-closure phase. Impacts may result from land disturbance activities, groundwater lowering, channel modifications and rerouting, effluent discharge from the contact water treatment plant, management of overburden and tailings materials, and changes in water chemistry due to operations. Project-related impacts on water quality could result from watershed alterations, additional loading of nutrients or contaminants, water withdrawals and discharges, stormwater runoff, alteration of groundwater contributions, interaction with pit lakes and backfilled areas, and clearing and industrial activity. Stream diversions and subsequent stream restoration would modify the location of surface water flows. Flow rates would be affected by contact water capture, groundwater pumping, and surface water diversion.

Water quantity related impacts associated with mining activities under the ModPRO2 (Proposed Action), and the Johnson Creek Route are identical. Water for dust control on access roads would be obtained from permitted freshwater sources. The relative sourcing of dust control water from



permitted diversion locations would vary depending on access route but would remain within the authorized diversions (e.g., off-site maintenance facilities, on-site freshwater sources) (USFS 2022a).

Water quality effects of the ModPRO2 (Proposed Action) and Alternative 2 (Johnson Creek Route Alternative) are comparable with regard to contact water, water treatment, groundwater chemistry, surface water chemistry, stream temperature, and impaired water bodies. The change in site access between the ModPRO2 and Alternative 2 does result in some differences in effects of sedimentation and fuels and hazardous chemicals (USFS 2022a), as summarized below.

#### ModPRO2 (Proposed Action)

The ModPRO2 (Proposed Action) would entail 21 stream crossings which would not be crossed under Alternative 2 (Johnson Creek Route Alternative). These streams include Burntlog Creek, East Fork Burntlog Creek, the EFSFSR, Johnson Creek, Landmark Creek, Peanut Creek, Rabbit Creek, Riordan Creek, Trapper Creek, and 12 unnamed waterbodies (USFS 2022a).

Upon closure, the new segment of Burntlog Route would be recontoured and reclaimed, which would reduce long-term direct and indirect impacts of sedimentation on water quality. Section 9.1 of the CMP (Tetra Tech 2023) describes stream design measures to improve water quality in streams that are tributary to the EFSFSR. SDEIS Section 4.9.3 describes mitigation measures to address potential Project water quality impacts, including Perpetua Resources preparation of a Water Resources Monitoring Plan incorporating the confirmation of predicted surface water and groundwater chemistry plus surface water temperature. Project EDFs include continuation of water treatment until metal concentrations from each source have stabilized at levels that meet water quality standards for discharge (USFS 2022a). Lasting impacts to water resources would be limited through incorporation of mitigation actions and Project EDFs implemented for water quality protection and restoration, and therefore the ModPRO2 would comply with this factor of the Guidelines.

#### Johnson Creek Route Alternative

Forty-three streams would be crossed along the Johnson Creek Route under the Johnson Creek Route Alternative. The 21 stream crossings associated with the Burntlog Route of the ModPRO2 would not be constructed under Alternative 2. However, the Johnson Creek Route, adjacent to Johnson Creek and the EFSFSR, would be widened and upgraded under this alterative.

The potential for surface water quality impacts from accidental fuel or chemical spills along the mine access roads would be comparable between the ModPRO2 and Alternative 2. However, under Alternative 2, all vehicle trips would traverse the Johnson Creek Route access roads. The potential location and extent of accidental spills would therefore differ under Alternative 2 (Johnson Creek Route) compared to the ModPRO2 (Proposed Action). The Johnson Creek Route is located in close proximity to streams (i.e., within 100 feet) for 6.5 miles or 18 percent of its approximately 36-mile length, so the potential for fuel and hazardous chemical spills impacting surface water quality is higher under Alternative 2, as the Burntlog Route is within 100 feet of a stream for 1.69 miles, or 4 percent of its length (USFS 2022a).

Under the Johnson Creek Route Alternative, improved Johnson Creek and Stibnite roads would not be reclaimed to pre-existing conditions, and potential impacts on sedimentation and turbidity in these areas would remain after closure. Section 9.1 of the CMP (Tetra Tech 2023) describes stream design measures to improve water quality in streams that are tributary to the EFSFSR. SDEIS Section 4.9.3 describes mitigation measures to address potential Project water quality impacts, including Perpetua Resources preparation of a Water Resources Monitoring Plan incorporating the confirmation of predicted surface water and groundwater chemistry plus surface water temperature. Project EDFs include continuation of water treatment until metal concentrations from each source



have stabilized at levels that meet water quality standards for discharge (USFS 2022a). Lasting impacts to water resources will be limited through incorporation of mitigation actions and Project EDFs implemented for water quality protection and restoration, and therefore the Johnson Creek Route Alternative would comply with this factor of the Guidelines. However, the risk of potential impacts to water resources due to accidental spills is higher under the Johnson Creek Route Alternative due to greater proximity to streams.

#### **No Action Alternative**

Under the No Action Alternative, there would be no large-scale mine operations by Perpetua Resources, and water resources would continue to be impacted by currently permitted Perpetua Resources drilling activities for exploration. The continuation of approved exploration activities would result in the continued use of the existing man camp, office trailers, truck maintenance shop area, potable water supply system, wastewater treatment facility, helipad and hangar, and airstrip. Local minor withdrawals of surface water and groundwater to sustain the permitted exploration activities would continue. Consequently, there would be little change in the water quantity conditions in the Project area.

The continued use of the existing man camp, office trailers, truck maintenance shop area, potable water supply system, wastewater treatment facility, helipad and hangar, and airstrip (located primarily on patented land), would require the continued use of diesel, gasoline, and jet fuel (approximately 141,000 gallons per calendar year) that will be stored in aboveground tanks.

Perpetua Resources would be required to continue to comply with reclamation and monitoring commitments included in the Golden Meadows Exploration Project Plan of Operations and Environmental Assessment (USFS 2015), which include reclamation of the drill pads and temporary roads by backfilling, re-contouring, and seeding using standard reclamation practices, and monitoring to ensure that sediment and stormwater BMPs are in place and effective so that soil erosion and other potential resource impacts are avoided or minimized. Additionally, Perpetua could, pursuant to development of another plan of operations, continue information collecting activities at the SGP and vicinity such as groundwater and surface water monitoring and reporting beyond which is required as part of the Golden Meadows Exploration Environmental Assessment, care and maintenance of stormwater BMPs at over 140 historical mining impact locations, and monitoring stream flow measurements from stream gages installed within creeks.

Soil sampling and analysis indicate that legacy mining wastes have influenced concentrations of arsenic, antimony, and mercury in soil within the SGP. The elevated soil concentrations and continued presence of the waste material provide a pathway for these constituents to leach into groundwater. These effects are described in SDEIS Section 3.9.4.3. The elevated antimony and arsenic concentrations in groundwater are unlikely to improve in the future under Alternative 3 (USFS 2022a).

Under the No Action Alternative, there would be no new or upgraded access roads as described for the ModPRO2 (Proposed Action) and the Johnson Creek Route Alternative. Current access to the area, via Johnson Creek Road and Stibnite Road, would continue to be used and would be expected to have traffic levels similar to current conditions. There would be no change to the existing condition of surface water quality related to roads.

Under the No Action Alternative, there would be no changes to the existing transmission lines and no new segment of transmission line constructed. No new communication towers would be established. As such, there would be no change to the existing condition of surface water quality related to utilities. Offsite facilities would not be constructed under this alternative. Existing facilities would



likely continue to be used in a similar manner. As such, there would be no change to the existing condition of surface water quality related to off-site facilities.

For the purposes of the 404(b)(1) alternatives analysis, it is anticipated that continuation of approved exploration activities under the No Action Alternative will result in a negligible impact to water resources in the aquatic ecosystem.

## 5.1.4 Water Current Patterns and Circulation (40 CFR 230.23)

Current patterns and water circulation are the physical movements of water in the aquatic ecosystem. Currents and circulation respond to natural forces as modified by basin shape and cover, physical and chemical characteristics of water strata and masses, and energy dissipating factors.

The mine site is in the Headwaters EFSFSR and Sugar Creek sub-watersheds. The primary surface water features at the mine site include the EFSFSR and its tributaries (SDEIS Figure 3.8-2), as well as intermittent drainages, ephemeral drainages, seeps, springs, wetlands, and ponds. These features include 10 named surface water channels: the EFSFSR, Rabbit Creek, Meadow Creek, East Fork Meadow Creek, Garnet Creek, Fiddle Creek, Midnight Creek, Hennessy Creek, West End Creek, and Sugar Creek. Most of these streams occur in the Headwaters EFSFSR subwatershed except for Sugar Creek and West End Creek, which are in the Sugar Creek subwatershed. These 10 surface water channels have a combined length of 23.92 miles in the Project area (SDEIS Table 3.8-2).

The highest average monthly flow typically occurs in May to June while the lowest average monthly flows occur from November to March. Hydrologic conditions are dominated by seasonal patterns of snow accumulation and snowmelt. Throughout the winter, snow accumulates and then melts as temperatures rise in spring and early summer (USFS 2022a). The majority of snowmelt contributes to surface runoff, and to a lesser extent infiltrates into the subsurface, or is taken up by vegetation.

Project-related impacts on surface water hydrology, including freshwater circulation and current patterns, may occur during the entire life cycle of the mining process, including the post-closure phase. Impacts may be caused by land disturbance activities, groundwater lowering, channel modifications and rerouting, effluent discharge from the contact water treatment plant, and management of overburden and tailings materials.

Project-related impacts on freshwater circulation and current patterns could result from watershed alterations, water withdrawals and discharges, stormwater runoff, alteration of groundwater contributions, and clearing and industrial activity.

For stream crossings, Perpetua would replace existing, or install new, culverts or bridges at crossings along the Johnson Creek (CR 10-579), McCall-Stibnite (CR 50-412), and Burnt Log (FR 447) roads. Existing bridges and culverts along Warm Lake Road would remain. If not properly designed, constructed, and maintained, culverts and bridges could constrict natural streamflow leading to an increase in water velocity at the downstream end of the structure. This could lead to stream bank and/or streambed erosion, and/or excessive erosion at the structure. Erosion of the streambed and/or banks could result in downstream sedimentation, a change in the morphology of the stream, and/or a change to the aquatic habitat. If a structure does not allow for adequate flow, water could pool excessively on the upstream side. As such, stream crossings associated with access roads would be designed to minimize potential impacts on surface water hydrology, water quality, and fish passage. The USFS would require stream crossings to be designed to accommodate a 100-year flood recurrence interval, unless site-specific analysis using calculated risk tools, or another method determines a more appropriate recurrence interval.



For access road stream crossings associated with the ModPRO2 and the Johnson Creek Route Alternative, Perpetua Resources would replace existing, or install new, culverts or bridges at crossings along the Johnson Creek (CR 10-579), McCall-Stibnite (CR 50-412), and Burnt Log (FR 447) roads. Existing bridges and culverts along Warm Lake Road would remain. If not properly designed, constructed, and maintained, culverts and bridges could constrict natural streamflow leading to an increase in water velocity at the downstream end of the structure. This could lead to stream bank and/or streambed erosion, and/or excessive erosion at the structure. Erosion of the streambed and/or banks could result in downstream sedimentation, a change in the morphology of the stream, and/or a change to the aquatic habitat. If a structure does not allow for adequate flow, water could pool excessively on the upstream side. As such, stream crossings associated with access roads would be designed to minimize potential impacts on surface water hydrology, water quality, and fish passage. The USFS would require stream crossings to be designed to accommodate a 100year flood recurrence interval, unless site-specific analysis using calculated risk tools, or another method determines a more appropriate recurrence interval. During reclamation and closure, Perpetua Resources would dismantle or demolish structures and facilities not necessary for postclosure water management (e.g., certain culverts and pipelines) (USFS 2022a).

Potential impacts to water current patterns and circulation from mining operations under the ModPRO2 and the Johnson Creek Route Alternative are anticipated to be identical. Differences in potential Project impacts to water current patterns and circulation between these alternatives may occur due to the differences in access road construction and management.

### ModPRO2 (Proposed Action)

Under the ModPRO2 (Proposed Action), culvert installation on the Burntlog Route could change the movement of sediment, woody debris, and other organic material, which may impact water current patterns and circulation. (USFS 2022a).

During reclamation and closure, the approximately 15 miles of Burntlog Route connecting Burnt Log Road (FR 447) to Meadow Creek Lookout Road (FR 51290) and Thunder Mountain Road (FR 50375) would be fully decommissioned. Decommissioning would be achieved by pulling back and recontouring road cuts to slopes that are similar to, but not necessarily matching, pre-project conditions, and that would be consistent with the surrounding terrain as practicable. Surface water diversions, cross drains, culverts, safety berms, mile markers, guardrails, and signs would be removed. Water bars or other erosion and sediment control structures, armored stream crossings, and stormwater crossings would be included where necessary (USFS 2022a).

Under the ModPRO2, water current patterns and circulation in the aquatic ecosystem would be impacted by land disturbance activities, groundwater lowering, channel modifications and rerouting, and effluent discharge from the contact water treatment plant. However, reclamation of new segments of the Burntlog Route and post-closure stream restoration actions described in the CMP (Tetra Tech 2023) are anticipated to minimize long-term degradation and result in localized restoration of stream segments to more natural conditions, and therefore the ModPRO2 would comply with this factor of the Guidelines.

#### Johnson Creek Route Alternative

Under the Johnson Creek Route Alternative, road widening and straightening, along with drainage and bridge improvements would be required for the Johnson Creek Road (CR 10-413) portion of the Johnson Creek Route. The Stibnite Road (FR 50412) portion would be improved by straightening curves, constructing retaining walls, and installing 182 18-inch culverts and two 60-inch culverts (USFS 2022a). Culvert installation could potentially change the movement of sediment, woody



debris, and other organic material, which may impact water current patterns and circulation. Improved Johnson Creek and Stibnite roads would not be reclaimed to pre-existing conditions (USFS 2022a).

Under the Johnson Creek Route Alternative, water current patterns and circulation in the aquatic ecosystem would be impacted by land disturbance activities, groundwater lowering, channel modifications and rerouting, and effluent discharge from the contact water treatment plant. However, post-closure stream restoration actions described in the CMP (Tetra Tech 2023) are anticipated to minimize long-term degradation and result in localized restoration of stream segments to more natural conditions, and therefore the Johnson Creek Route Alternative would comply with this factor of the Guidelines. The Johnson Creek Route Alternative exhibits the potential for long term impacts on water current patterns and circulation along improved portions of the Johnson Creek Route, which would not occur under the ModPRO2.

#### No Action Alternative

Under the No Action Alternative, water current patterns and circulation conditions are expected to remain consistent with baseline conditions.

## 5.1.5 Normal Water Fluctuations (40 CFR 230.24)

Natural water fluctuations in an aquatic ecosystem consist of daily, seasonal, and annual flood fluctuations in water level. Biological and physical components of such a system are either attuned to or characterized by these periodic water fluctuations.

Existing conditions and environmental consequences of the Project on surface water and groundwater quantity are described in SDEIS Sections 3.8 and 4.8, respectively. A peak flow analysis also was completed for the 10 major drainages in the analysis area. Peak flows were calculated for the bottom of each drainage using the USGS StreamStats program. Predicted peak flows for a 1.5-year event ranged from 1.84 cubic feet per second (cfs) for West End Creek to 237 cfs for the EFSFSR, and for a 500-year event they ranged from 13.4 cfs to 931 cfs, respectively (USFS 2022a).

Base stream flow data were collected on a monthly or quarterly basis at 32 non-USGS monitoring stations. The monitoring points were selected at upstream and downstream locations to bracket historical and potential future mining activities (Brown and Caldwell 2017). Table 6-6 in the Water Quantity Specialist Report (USFS 2022f) provides stream flow statistics derived from baseline measurements collected between 2012 and early 2016. The mean flows calculated from this dataset for the EFSFSR ranged from 4.47 cfs at the farthest upstream monitoring location to 31.31 cfs at the most downstream location.

Potential Project impacts to normal water fluctuations includes water level modifications which may alter erosion or sedimentation rates, water temperature, and nutrient and dissolved oxygen balance of the aquatic ecosystem.

Low flow would be reduced at some locations during periods of Project mining operations, up to 14 percent in the EFSFSR at USGS Gaging Station 13311250 and up to 40 percent in Meadow Creek downstream of the Hangar Flats diversion but upstream of the confluence with the EFSFSR. SDEIS Table 2.8-1 states that during Project operations, stream flows in the EFSFSR upstream from Sugar Creek would be reduced up to 24.8 percent, flows in the EFSFSR at Stibnite would be reduced up to 20.4 percent, flows in the EFSFSR upstream from Meadow Creek would be reduced by up to 3.8 percent, and flows in Meadow Creek would be reduced by up to 36.4 percent. Surface flows are generally predicted to recover to pre-mine conditions within approximately three years after Project operations cease, though it is anticipated that post-closure flows in the EFSFSR upstream from



Meadow Creek would be reduced by 2 percent and post-closure flows in Meadow Creek would be reduced by less than 1 percent (USFS 2022a).

Dewatering of open pits would lower groundwater levels in alluvial and bedrock formations during operations and post-closure periods. These lower levels would reduce flows in streams that receive groundwater discharge. There are 93 seep and spring locations within the area of groundwater drawdown that could be affected by lower water levels to the extent that any of these specific seeps or springs are receiving discharge from the aquifer affected by groundwater pumping. In most areas, groundwater levels would recover within 10 years. However, groundwater levels below and directly downgradient from facilities lined as part of mine closure (the TSF, TSF Buttress, Yellow Pine Pit backfill, and Hangar Flats Pit backfill) would be permanently lower due to reduced local recharge (USFS 2022a). These impacts are common to the ModPRO2 (Proposed Action) and Alternative 2 (Johnson Creek Route Alternative).

#### ModPRO2 (Proposed Action)

Under the ModPRO2 (Proposed Action), the Burntlog Route will cross 37 streams (USFS 2022a). The potential for impacts to normal water fluctuations associated with these stream crossings would be minimized by sediment and stormwater control BMPs.

Given the anticipated amount of groundwater withdrawal and stream flow reductions in Meadow Creek and the EFSFSR upstream from Sugar Creek and at Stibnite during mining operations, for the purposes of the 404(b)(1) alternatives analysis, the ModPRO2 is anticipated to have an impact on normal water fluctuations in the aquatic ecosystem. However, these impacts would attenuate over time, as groundwater levels are anticipated to recover within 10 years after mining operations and surface flows are generally predicted to recover to pre-mine conditions within approximately 3 years after Project operations cease.

Based on the implementation of sediment and stormwater control BMPs and EDFs and the anticipated recovery of groundwater levels after mine closure, the ModPRO2 would comply with this factor of the Guidelines.

#### Johnson Creek Route Alternative

Under the Johnson Creek Route Alternative, the Johnson Creek Route will cross 43 streams (USFS 2022a). The potential for impacts to normal water fluctuations associated with these stream crossings would be minimized by sediment and stormwater control BMPs.

Given the anticipated amount of groundwater withdrawal and stream flow reductions in Meadow Creek and the EFSFSR upstream from Sugar Creek and at Stibnite during mining operations, for the purposes of the 404(b)(1) alternatives analysis, The Johnson Creek Route Alternative is anticipated to have an impact on normal water fluctuations in the aquatic ecosystem. However, these impacts would attenuate over time, as groundwater levels are anticipated to recover within 10 years after mining operations and surface flows are generally predicted to recover to pre-mine conditions within approximately 3 years after Project operations cease.

Based on the implementation of sediment and stormwater control BMPs and EDFs and the anticipated recovery of groundwater levels after mine closure, the Johnson Creek Route Alternative would comply with this factor of the Guidelines.

#### **No Action Alternative**

Under the No Action Alternative, there would be no large-scale mine operations by Perpetua Resources, and water resources would continue to be impacted by currently permitted Perpetua drilling activities for exploration. The continuation of approved exploration activities at the SGP by



Perpetua Resources would result in the continued use of the existing man camp, office trailers, truck maintenance shop area, potable water supply system, wastewater treatment facility, helipad and hangar, and airstrip. Local minor withdrawals of surface water and groundwater to sustain the permitted exploration activities would continue. Consequently, there would be little change in the water quantity conditions in the Project area. Normal water fluctuations under the No Action Alternative are therefore expected to remain similar to existing conditions in the Project area.

## 5.1.6 Salinity Gradients (40 CFR 230.25)

Salinity gradients form where saltwater from the ocean meets and mixes with freshwater from land. There are no marine or estuarine environments in the Project area. No potential Project impacts to salinity gradients are anticipated.

# 5.2 Subpart D – Potential Effects on Biological Characteristics of Aquatic Ecosystems

## 5.2.1 Threatened and Endangered Species (40 CFR 230.30)

Endangered species include plants and animals in danger of extinction throughout all or a significant portion of its range. Threatened species are those in danger of becoming an endangered species within the foreseeable future throughout all or a significant portion of its range.

The Project may impact terrestrial wildlife species through habitat disturbance, change in noise levels, construction and use of new roads and transmission lines, and increased traffic levels. These activities may introduce movement barriers or potentially increase the risk of direct injury or mortality (USFS 2022a). Construction and operation of mine infrastructure may impact the quality and quantity of water, and habitat for fish. Project activities may also affect fish behavior and reproductive success and may result in injury or mortality (USFS 2022a). The Project would also remove vegetation. Habitat conversion associated with the SGP would impact seed production, dispersal, and establishment (USFS 2022a).

Species listed as threatened or endangered under the ESA with potential to be impacted by the Project are listed below, along with anticipated impacts under each of the Project Alternatives. The USFWS and NOAA would ultimately determine the potential Projects on each species and species' critical habitat during ESA Section 7 consultation. USFWS and NOAA ESA Section 7 effects determinations for each species may be No Effect, May Effect but Not Likely to Adversely Effect, May Affect and Likely to Adversely Affect, or Likely to Jeopardize the Continued Existence of the Species. USFWS and NOAA may also determine whether the Project will result in adverse modification of designated critical habitat. ESA-listed fish species are discussed collectively in this section.

### Canada Lynx - Threatened

- ModPRO2 (Proposed Action): Anticipated direct and indirect impacts to modeled habitat are 194 acres and 70,745 acres, respectively (USFS 2022a).
- Johnson Creek Route Alternative: Anticipated direct and indirect impacts to modeled habitat are 175 acres and 70,650 acres, respectively. Under Alternative 2, the Johnson Creek Route would be used instead of the Burntlog Route under the ModPRO2. This would eliminate the disturbance of 15 miles of habitat adjacent to the FCRNRW and avoid the impacts of noise, light, and traffic on Canada lynx in the FCRNRW area where suitable current habitat is mapped. However, it is expected that transient Canada lynx would still cross Project area roadways, including the Johnson Creek Route. Traffic levels on Stibnite Road and Johnson Creek Road



(both part of the Johnson Creek Route) would increase by about 167 percent and 71 percent, respectively, during operations. Therefore, there would still be a chance of wildlife mortality under the Johnson Creek Route Alternative.

 No Action Alternative: There have been no recent observations of Canada lynx in the SDEIS Operations Area Boundary, existing Utilities Area, and off-site facilities; although, if there are transient Canada lynx in the region, they could potentially use these areas as they have in the past. Because some of the existing roadways in the Canada lynx analysis area bisect potential linkage areas, they also would likely continue to affect transient Canada lynx through habitat fragmentation and potential vehicle-wildlife collisions (USFS 2022a).

#### Northern Idaho Ground Squirrel - Threatened

- ModPRO2 (Proposed Action): Anticipated direct impacts to NIDGS modeled habitat across the wildlife analysis area would be approximately 63 acres. Using a 1-mile buffer on SGP components, the indirect area of impacts on modeled NIDGS suitable habitat is approximately 5,248 acres. The Burntlog Route would not cross modeled suitable habitat, and construction would therefore not impact NIDGS habitat (USFS 2022a).
- Johnson Creek Route Alternative: Anticipated direct impacts to NIDGS modeled habitat across the wildlife analysis area would be approximately 63 acres. Using a 1-mile buffer on SGP components, the indirect area of impacts on modeled NIDGS suitable habitat is approximately 5,248 acres. These impacts are the same as under the ModPRO2. The Johnson Creek Route does not cross modeled suitable habitat, although it is in closer proximity to modeled suitable habitat than the Burntlog Route which would be used under the ModPRO2.
- No Action Alternative: While modeled habitat for the NIDGS occurs in the region, no NIDGS are known or estimated to occur in the SDEIS Operations Area Boundary, thus no current impacts are occurring or would occur under the No Action Alternative in this area. Habitat fragmentation and vehicle-wildlife collisions would still be present for NIDGS, if they occur in suitable habitats in the future, due to existing roadways under the No Action Alternative (USFS 2022a).

# Summer Chinook Salmon – Threatened with Designated Critical Habitat, Snake River Basin steelhead – Threatened with Designated Critical Habitat, and Columbia River bull trout – Threatened with Designated Critical Habitat

Potential Project impacts to Summer Chinook salmon, Basin steelhead, and Columbia River bull trout and their designated critical habitat are detailed in SDEIS Section 4.12. Chinook salmon Critical Habitat in the active mine area would be impacted by various activities including active mining, diversions, barrier removal, and stream restoration. The impacts would be related to physical stream channel changes, accidental hazardous material spills, and changes in WCIs - most importantly barriers, stream flow, and water temperature. Chinook salmon Critical Habitat outside the mine site also would be directly affected by culvert installations and would be at risk of accidental hazardous materials spills in the streams adjacent to the access roads. Nearly 26 km of Chinook salmon Critical Habitat are blocked above the Yellow Pine pit cascade barrier, with just over 23 km upstream from the box culvert in the EFSFSR under baseline conditions. Under the ModPRO2 (Proposed Action) and Alternative 2 (Johnson Creek Route Alternative), these barriers would be removed as early as Mine Year -1 to provide upstream access for Chinook salmon. This would result in a net increase in access to Chinook salmon Critical Habitat, as there would be an increase from access to upstream habitat that was not previously volitionally accessible. Under the ModPRO2 and Alternative 2, activities on Meadow Creek would eliminate potential access to much of the stream, including over 6.6 km of modeled Critical Habitat (USFS 2022a).



There is no steelhead trout Critical Habitat upstream from the Yellow Pine pit cascade barrier, but there is Critical Habitat below the barrier. The gradient barrier at the Yellow Pine pit lake cascade is currently restricting access for steelhead trout to habitat upstream. The removal of the Yellow Pine pit barrier at Mine Year -1 under the ModPRO2 and The Johnson Creek Route Alternative would provide access to fish to naturally move upstream. This would increase the quantity and quality of available habitat regardless of the lack of identified Critical Habitat for steelhead trout upstream of the Yellow Pine pit barrier. Although there would be no change in access to steelhead Critical Habitat because there is no Critical Habitat upstream from the Yellow Pine pit lake, NMFS may have an opportunity to designate Critical Habitat in the upper watershed following the establishment of passage into the upper watershed (USFWS 2022a).

Nearly 20 km of bull trout Critical Habitat are blocked for migratory bull trout above the Yellow Pine pit under baseline conditions but are occupied by non-migratory bull trout. Under the ModPRO2 and the Johnson Creek Route Alternative, this barrier would be removed before mine operations begin to allow access for fluvial and adfluvial bull trout above these barriers. An existing barrier to bull trout in Meadow Creek upstream from East Fork Meadow Creek would be removed under the ModPRO2 and the Johnson Creek Route Alternative, but the existing barrier would be replaced by a pipeline along the TSF during operations and then a gradient barrier post-closure. This barrier would block passage to the headwaters of Meadow Creek, but not eliminate suitable habitat for any bull trout currently present.

Impacts that differ among the Project Alternatives are discussed below.

ModPRO2 (Proposed Action): The Burntlog Route is located within 100 feet of streams for 1.69 miles. Burntlog Route construction would cause potential sedimentation impacts at 21 stream crossing locations along Burntlog Creek, East Fork Burntlog Creek, the EFSFSR, Johnson Creek, Landmark Creek, Peanut Creek, Rabbit Creek, Riordan Creek, Trapper Creek, and 12 unnamed waterbodies. A total of 18 km of Chinook salmon and steelhead critical habitat along the Burntlog Route may be affected (USFS 2022a).

While the likelihood of a spill under the ModPRO2 is uncertain, the magnitude of impacts could be substantial to individual fish exposed to harmful concentrations of hazardous materials, making impacts of spills moderate, temporary, and localized depending on the type of material releases, the location of the spill, and the presence of fish and aquatic species in the affected area. The ModPRO2 would entail less use of the Johnson Creek Route access roads compared to Alternative 2, resulting in less fugitive dust generation and wear and tear on the Johnson Creek Road surface. The ModPRO2 would also entail two fewer years of construction. The resulting surface water quality impacts from erosion and sedimentation would therefore differ in location and extent compared to the Johnson Creek Route Alternative but would be similar in magnitude (USFS 2022a).

 Johnson Creek Route Alternative: The Johnson Creek Route is located within 100 feet of streams for 6.5 miles, so the potential for fuel and hazardous chemical spills impacting surface water quality is higher than for travel on the Burntlog Route under the ModPRO2, which is within 100 feet of a stream for 1.69 miles. The potential magnitude and duration of effects of spills associated with the Johnson Creek Route Alternative on surface water and potentially on fish and aquatic habitat would depend on the spill location (USFS 2022a).

Use of the Johnson Creek Route for site access under the Johnson Creek Route Alternative would avoid construction-related impacts from sedimentation at 21 different streams compared to the Burntlog Route under the ModPRO2. The Johnson Creek Route Alternative would entail greater use of the Johnson Creek Route access roads, and more fugitive dust generation and greater


wear and tear on the road surface. In addition, use of the Johnson Creek Route would require 2 additional years of construction. The resulting surface water quality impacts from erosion and sedimentation would therefore differ in location and extent compared to the ModPRO2 but would be similar in magnitude. Overall, traffic-related dust and erosion/sedimentation under Alternative 2 would be within the normal range of properly maintained NFS roads (USFS 2022a).

 No Action Alternative: There would be no open pit mining or ore processing to extract gold, silver, and antimony, and no underground exploration or sampling or related operations and facilities on NFS lands. Perpetua Resources could continue to conduct previously approved surface exploration. There would be no SGP-caused impacts on physical stream channels, WCIs, individual fish (including federally listed and forest service species sensitive species), or fish habitat (USFS 2022a).

### Whitebark Pine – Threatened

- ModPRO2 (Proposed Action): Impacts to approximately 259.4 acres of occupied whitebark pine habitat and removal of an estimated 1,236 individual trees, 23 of which would be mature, conebearing individuals (USFS 2022a).
- Johnson Creek Route Alternative: Impacts to approximately 108.4 acres of occupied whitebark pine habitat and removal of an estimated 767 individual trees, 23 of which would be mature, cone-bearing individuals (USFS 2022a).
- No Action Alternative: The mining, ore processing, and related activities under the two action alternatives would not take place and there would be no direct or indirect effects to vegetation and no changes to current conditions for vegetation in the analysis area from the SGP. However, existing and approved activities (i.e., approved exploration activities and associated reclamation obligations) would continue. Perpetua Resources would be required to continue to comply with reclamation and monitoring commitments included in the applicable Golden Meadows Exploration Project Plan of Operations and Environmental Assessment (USFS 2015), which include reclamation of the drill pads and temporary roads by backfilling, re-contouring, and seeding using standard reclamation practices, and monitoring to ensure that sediment and stormwater BMPs are in place and effective so that impacts to vegetation are avoided or minimized (USFS 2022a).

# 5.2.2 Fish, Crustaceans, Mollusks, and other Aquatic Organisms in the Food Web (40 CFR 230.31)

Aquatic organisms in the food web include, but are not limited to, finfish, crustaceans, mollusks, insects, annelids, planktonic organisms, and the plants and animals on which they feed and depend upon for their needs.

Releases of hazardous materials could adversely affect soils, vegetation, water quality, wildlife, and fish, including lower trophic level aquatic organisms (e.g., bacteria and algae). Impacts could include degraded soil and water quality, fish and wildlife habitat contamination, and toxicity, injury, or mortality to fish and other aquatic organisms, depending on the type and volume of material released, location, proximity to streams, timing, spill response, etc. The only differences between the two action alternatives related to hazardous materials would be the location of long-term access to the Project. All other characteristics of hazardous materials matters would be the same for both alternatives (USFS 2022a).



### ModPRO2 (Proposed Action)

Close proximity of access roads to surface water resources increases the potential for spilled material on the roadways to enter water, thus increasing the potential consequences of a spill. Under the ModPRO2 (Proposed Action), the Burntlog Route crosses 37 streams and includes 9 miles of road that are within 0.5 mile of surface water resources. Under Alternative 2 (Johnson Creek Route Alternative), the Johnson Creek Route crosses 43 different streams and includes 27 miles of road that are within 0.5 mile of surface water resources, including several miles that parallel the fishbearing EFSFSR and Johnson Creek waterways. The Johnson Creek Route includes significantly greater proximity to water resources. The potential consequences from trucking spills would thus be greater along the Johnson Creek Route under that would be utilized during construction of the Burntlog Route (USFS 2022a).

Under the ModPRO2, fish and other aquatic organisms may be impacted by land disturbance activities, streamflow reductions, channel modifications and rerouting, and utility stream crossings. However, impacts will be minimized through BMPs and EDFs implemented for fish, wildlife, and water resources protection, as described in SDEIS Section 2.4.9. Reclamation of new segments of the Burntlog Route and post-closure stream restoration actions and removal of barriers to increase fish access, volitional passage, and habitat connectivity described in the CMP (Tetra Tech 2023) are anticipated to offset temporal losses of stream functions affecting fish and other aquatic species. Based on the incorporation of BMPs and EDFs and stream restoration mitigation actions, the ModPRO2 would comply with this factor of the Guidelines.

### Johnson Creek Route Alternative

Under the Johnson Creek Route Alternative, Johnson Creek Road would be used for the long-term access route to the Project and the Burntlog Route would not be constructed. The use, storage, and disposal of hazardous materials during the construction, operations, and closure and reclamation phases would be the same as those described for the ModPRO2. However, the Johnson Creek Route has both a higher spill risk than the Burntlog Route due to increased presence of landslides, rockfalls, and avalanche paths, and higher potential consequences from a spill due to the route's closer proximity to surface water resources (within 100 feet of streams for 6.5 miles under the Johnson Creek Route Alternative compared to 1.69 miles under the ModPRO2 The overall environmental impacts from potential releases of hazardous materials under the Johnson Creek Route Alternative would depend on the type of material released and the location of the spill (USFS 2022a).

Under the Johnson Creek Route Alternative, fish and other aquatic organisms may be impacted by land disturbance activities, streamflow reductions, channel modifications and rerouting, and utility stream crossings. However, impacts will be minimized through BMPs and EDFs implemented for fish, wildlife, and water resources protection, as described in SDEIS Section 2.4.9. Post-closure stream restoration actions and removal of barriers to increase fish access, volitional passage, and habitat connectivity described in the CMP (Tetra Tech 2023) are anticipated to offset temporal losses of stream functions affecting fish and other aquatic species. Based on the incorporation of BMPs and EDFs and stream restoration mitigation actions, Alternative 2 would comply with this factor of the Guidelines. However, habitat affected by road improvements along the Johnson Creek Route would remain in an altered state after mine closure. Additionally, the risk of potential impacts to fish and other aquatic organisms due to accidental spills is higher under the Johnson Creek Route Alternative due to greater proximity to streams.



### **No Action Alternative**

Under the No Action Alternative, the continuation of approved exploration activities by Perpetua Resources would result in the continued use of the existing man camp, office trailers, truck maintenance shop area, potable water supply system, wastewater treatment facility, helipad and hangar, and airstrip. Consequently, there would be little change in the current use of hazardous materials at the site including fuel, oils, antifreeze, propane, and equipment maintenance products (SDEIS Table 3.7-1). Small amounts of used oil and waste maintenance materials would continue to be produced and shipped from the site for offsite disposal (USFS 2022a).

### 5.2.3 Other Wildlife (40 CFR 230.32)

"Other Wildlife" associated with aquatic ecosystems are resident and transient mammals, birds, reptiles, and amphibians.

The SGP may impact wildlife in the Project area through habitat disturbance, noise, introducing movement barriers, and potentially increasing the risk of direct injury or mortality (USFS 2022a). Species listed as threatened or endangered under the ESA and general fish species are addressed in **Sections 5.2.1 and 5.2.2** of this document, respectively. SDEIS Section 4.13 describes potential Project impacts to these taxa and other wildlife, including species proposed for listing and candidates for listing under the ESA, USFS Region 4 Sensitive Species, Management Indicator Species, Idaho Species of Greatest Conservation Concern, general wildlife species, big game species, migratory bird species, and bald and golden eagles (USFS 2022a). Impacts to wildlife from mining activities in the Project area under the ModPRO2 and Alternative 2 are expected to be the same. Differences in impacts to wildlife relating to construction and use of the Burntlog Route under the ModPRO2 compared to road improvements and increased usage of Johnson Creek Route under Alternative 2 are described below.

### ModPRO2 (Proposed Action)

Construction of 15 miles of new road for the Burntlog Route would likely fragment habitat for wildlife species and may act as a barrier to movement for some species. The new 15-mile-long section of Burntlog Route would be constructed and plowed year-round and have an annual average daily traffic (AADT) level of 50 vehicles, which would likely directly disrupt wildlife movements. The intensity of this impact could range from minor displacement to mortality. The duration ranges from temporary road construction to short-term. It is not expected that the increased risk of injury or mortality would become permanent, because the new segment of the Burntlog Route would be reclaimed, and traffic levels on the existing roads would return to current levels. The geographic extent of these impacts would be limited to the vicinity of the access road (USFS 2022a).

Although additional roadways could expose general wildlife species to increased hunting pressure from humans in the wildlife analysis area, hunting or discharge of firearms during construction and operations within the SDEIS Operations Area Boundary by SGP employees and contractors would be prohibited. Legal public hunting along public access roads would continue to be allowed. All staff and contractors would be trained to reduce wildlife collisions. Perpetua Resources would develop a wildlife mortality-reporting procedure and form to be used for reporting accidental Project-related wildlife mortality. Any adverse wildlife encounters would be reported to appropriate state and federal wildlife managers, and in accordance with state and federal laws. Roadways also are used as corridors by predators such as wolves, which could indirectly increase predation of some general mammal species (USFS 2022a).





Light, noise, and fugitive dust impacts associated with road construction, maintenance, and vehicle traffic are likely to disturb or displace common wildlife species. Project design features would help reduce these impacts, but not eliminate them. The estimated noise levels from Project-related traffic on the Burntlog Route during the operations phase would be 49 dBA. The estimated SGP-related noise level from road maintenance activity on the mine access road would range from 88 dBA during the summer months to 90 dBA during the winter months, when snow removal is required (USFS 2022g).

It is anticipated that Project habitat disturbance and fragmentation, noise, lighting, and increased potential for road mortality associated with discharge under the ModPRO2 would impact "other wildlife" associated with the aquatic ecosystem. Potential impacts to wildlife would be reduced after mine closure and reclamation activities due to decreased noise, lighting, vehicle usage, Project workforce presence, and habitat restoration. The risk of vehicle mortalities along new portions of the Burntlog Route will be eliminated post-closure, as these road segments will be decommissioned and reclaimed. The WHMP (Tetra Tech, 2021b) describes Perpetua Resources' proposed plan to rehabilitate, restore, and enhance upland wildlife habitats, including those previously disturbed by historical mining and wildfires and those designed to offset unavoidable impacts from the Project on wildlife habitats. Based on the implementation of wildlife protection EDFs described in SDEIS Table 2.4-13 and wildlife habitat mitigation and restoration efforts described in the WHMP (Tetra Tech 2021b) and CMP (Tetra Tech 2023), the ModPRO2 would comply with this factor of the Guidelines.

#### Johnson Creek Route Alternative

Under the Johnson Creek Route Alternative, the Burntlog Route would not be built. This would avoid effects of noise disturbance, fugitive dust, habitat loss, habitat fragmentation, and traffic along the Burntlog Route corridor. However, wildlife that currently utilize habitats along the Johnson Creek Route would likely be more impacted due to increased fugitive dust and noise disturbance from increased traffic (USFS 2022a).

It is anticipated that Project habitat disturbance and fragmentation, noise, lighting, and increased potential for road mortality associated with discharge under the Johnson Creek Route Alternative would impact "other wildlife" associated with the aquatic ecosystem. Potential impacts to wildlife would be reduced after mine closure and reclamation activities due to decreased noise, lighting, vehicle usage, Project workforce presence, and habitat restoration. The risk of vehicle mortalities along improved portions of Johnson Creek Road under the Johnson Creek Route Alternative would be reduced post-closure due to decreased Project vehicle usage, though these portions of road would not be closed or reclaimed. The WHMP (Tetra Tech, 2021b) describes Perpetua Resources' proposed plan to rehabilitate, restore and enhance upland wildlife habitats, including those previously disturbed by historical mining and wildfires and those designed to offset unavoidable impacts from the Project on wildlife habitats. Based on the implementation of wildlife protection EDFs described in SDEIS Table 2.4-13 and wildlife habitat mitigation and restoration efforts described in the WHMP (Tetra Tech 2021b) and CMP (Tetra Tech 2023), the Johnson Creek Route Alternative would comply with this factor of the Guidelines. However, unlike the ModPRO2, impacts to wildlife habitat associated with permanent road improvements along the Johnson Creek under the Johnson Creek Route Alternative would remain after closure.

### **No Action Alternative**

Under the No Action Alternative, wildlife would continue to use the Project area as they currently do. Existing access roads would continue to affect wildlife through habitat fragmentation and vehiclewildlife collisions and noise, light, and fugitive dust impacts from traffic. No new transmission lines or communication towers would be constructed, so there would be no new loss of habitat or source of



noise and light impacts. There would be no new loss of habitat or source of noise and light impacts due to off-site facilities (USFS 2022a).

### 5.3 Subpart E – Potential Effects on Special Aquatic Sites

### 5.3.1 Sanctuaries and Refuges (40 CFR 230.40)

Sanctuaries and refuges consist of areas designated under state and federal laws or local ordinances to be managed principally for the preservation and use of fish and wildlife resources. There are no sanctuaries or refuges in the Project area. No potential Project impacts to sanctuaries or refuges are anticipated.

### 5.3.2 Wetlands (40 CFR 230.41)

Wetlands consist of areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands adjacent to open water generally constitute the transition to upland. Wetland vegetation consists of plants that require saturated soils to survive (obligate wetland plants) as well as plants, including certain trees, that gain a competitive advantage over others because they can tolerate prolonged wet soil conditions and their competitors cannot. In addition to plant populations and communities, wetlands are delimited by hydrological and physical characteristics of the environment.

Construction of the TSF, TSF Buttress, open pits, new roads and improvements to existing roads, transmission lines and associated access roads, borrow sites, new off-site facilities, and other surface disturbances in the Project area would result in impacts to wetlands and riparian areas and their associated functions. Losses of wetland and riparian areas and their functions would occur throughout the construction and operation phases. Acres of wetlands and riparian areas that would be directly lost and linear feet of streams that would be lost at the mine site are shown in SDEIS Table 4.11-1. All wetland and RCA impacts at the mine site would occur within the Headwaters East Fork SFSR watershed (USFS 2022a).

The Project mine site and utilities would be constructed and operated the same under the ModPRO2 and the Johnson Creek Route Alternative. As a result, impacts to wetlands and riparian areas from mining activities would be the same under the ModPRO2 and the Johnson Creek Route Alternative, and differences between the two action alternatives would be due to the differences in access routes, as described below.

### ModPRO2 (Proposed Action)

Under the ModPRO2 (Proposed Action), the magnitude of impacts is expected to be greater on roads used for the SGP, including the Burntlog Route, than would be expected on standard roads due to frequency of travel, size of equipment, and use across seasons. In addition, the Burntlog Route would be near Mud Lake, which is characterized by IDFG as a poor fen (IDFG 2004). Indirect impacts of road improvements and vehicle travel (i.e., increased dust) are likely to impact this fen and degrade its function as habitat for a fen-specific special status plant, Rannoch-rush, which is described in SDEIS Section 4.10. Although the impact of dust deposition has not been quantified, effects would likely be small but measurable and limited to the life of the SGP (USFS 2022a).

The total extent of wetland losses would be approximately 119.8 acres at the mine site and 76.3 acres outside the mine site. Losses of RCAs would occur on 618.9 acres at the mine site and 300 acres outside the mine site. New roads would bisect 39 total individual wetlands. Fragmentation effects could occur as a result of these impacts (USFS 2022a).



Wetland impacts would be minimized through stormwater and sediment control BMPs and wetland, soils, reclamation, and water resources protection EDFs described in SDEIS Section 2.4.9. The loss of 196.1 acres of wetlands under the ModPRO2 would be offset through compensatory mitigation actions designed to replace functional losses caused by authorized and unavoidable impacts to streams and wetlands, as described in the CMP (Tetra Tech 2023). Based on the implementation of BMPs and EDFs to minimize impacts to wetlands, along with compensatory mitigation actions designed to offset unavoidable impacts to wetlands, the ModPRO2 would comply with this factor of the Guidelines.

### Johnson Creek Route Alternative

Acres of impacts to wetlands, RCAs, and streams in the off-site focus area under the Johnson Creek Route Alternative are shown in SDEIS Table 4.11-6. Impacts to wetlands and riparian areas associated with widening, maintenance, and use of the Johnson Creek Route would be similar to the wetland impacts associated with the Burntlog Route under the ModPRO2. These include direct loss, fragmentation, and indirect effects such as dust. Wetlands and riparian areas along Johnson Creek are lower in their respective watershed (i.e., farther downstream) as the route is largely located along the EFSFSR. Thus, the road impacts would affect wetlands and riparian areas at the confluences of several drainages that feed into the EFSFSR, which would have a larger effect on the river. In comparison, the construction of the Burntlog Route under the ModPRO2 would cross through several drainages but would generally be perpendicular to those waters (USFS 2022a).

Under the Johnson Creek Route Alternative, the total extent of wetland losses would be approximately 119.8 acres at the mine site (the same amount as under the ModPRO2 [Proposed Action]) and 71.2 acres outside the mine site. Losses of RCAs would occur on approximately 618.9 acres at the mine site (the same amount as under the ModPRO2) and 353 acres outside the mine site. New roads would bisect six total individual wetlands. Fragmentation effects could occur as a result of these impacts (USFS 2022a).

The magnitude of indirect impacts on wetland and riparian functions from changes in hydrology, water quality, and increase in fugitive dust are expected to be greater along the Johnson Creek Route than would be expected on standard roads due to frequency of travel, size of equipment, and use across seasons. However, the potential impacts of these indirect effects would be less than for the Burntlog Route under the ModPRO2, as the Johnson Creek Route is not near Mud Lake and would not have impacts on the fen. Although the impact of dust deposition has not been quantified, effects would likely be small but measurable, and limited to the life of the SGP (USFS 2022a).

Wetland impacts would be minimized through stormwater and sediment control BMPs and wetland, soils, reclamation, and water resources protection EDFs described in SDEIS Section 2.4.9. The loss of 191.0 acres of wetlands under Alternative 2 would be offset through compensatory mitigation actions designed to replace functional losses caused by authorized and unavoidable impacts to streams and wetlands, as described in the CMP (Tetra Tech 2023). Based on the implementation of BMPs and EDFs to minimize impacts to wetlands, along with compensatory mitigation actions designed to offset unavoidable impacts to wetlands, The Johnson Creek Route Alternative would comply with this factor of the Guidelines. However, the Johnson Creek Route Alternative has greater indirect environmental risk from potential spill contamination to wetlands compared to the ModPRO2, since primary access routes under the Johnson Creek Route Alternative are in greater proximity to streams and associated fringe and floodplain wetlands.



### No Action Alternative

Under the No Action Alternative, there would be no SGP-related direct or indirect effects to wetlands or riparian areas. Wetlands and riparian areas in the mine site area would continue to be affected by existing natural events such as landslides and fires and human-induced effects from existing sources of sedimentation (e.g., East Fork Meadow Creek), and contamination (e.g., legacy mining, including tailings in floodplains, and stream diversions). Wetlands would continue to function within natural ecosystem processes that include these natural events as they have evolved with those events and are adapted to the ongoing disturbance regime. Ecological succession would continue to occur in these areas, with changes driven by disturbance and species maturation (USFS 2022a).

The approximately 847 acres of the mine site and vicinity modified by human activity and considered highly disturbed would continue to affect wetland and waterway functions through sedimentation and erosion into wetlands and riparian areas. East Fork Meadow Creek would continue to contribute sediment and erosion to downstream waters and wetlands. Perpetua Resources' permitted exploration activities would continue to occur and could include small, localized impacts to wetlands and riparian areas (USFS 2022a).

### 5.3.3 Mud Flats (40 CFR 230.42)

Mud flats are broad flat areas along the sea coast and in coastal rivers to the head of tidal influence and in inland lakes, ponds, and riverine systems. The substrate of mud flats contains organic material and particles smaller in size than sand. They are either unvegetated or vegetated only by algal mats. There are no mudflats in the Project area. No potential Project impacts to mudflats are anticipated.

### 5.3.4 Vegetated Shallows (40 CFR 230.43)

Vegetated shallows are permanently inundated areas that under normal circumstances support communities of rooted aquatic vegetation, such as turtle grass and eelgrass in estuarine or marine systems as well as a number of freshwater species in rivers and lakes. There are no vegetated shallows in the Project area. No potential Project impacts to vegetated shallows are anticipated.

### 5.3.5 Coral Reefs (40 CFR 230.44)

Coral reefs consist of the skeletal deposit, usually of calcareous or siliceous materials, produced by the vital activities of anthozoan polyps or other invertebrate organisms present in growing portions of the reef. There are no coral reefs in the Project area. No potential Project impacts to coral reefs are anticipated.

### 5.3.6 Riffle and Pool Complexes (40 CFR 230.45)

Steep gradient sections of streams are sometimes characterized by riffle and pool complexes. Such stream sections are recognizable by their hydraulic characteristics. The rapid movement of water over a coarse substrate in riffles results in a rough flow, a turbulent surface, and high dissolved oxygen levels in the water. Pools are deeper areas associated with riffles. Pools are characterized by a slower stream velocity and steam flow, a smooth surface, and a finer substrate. Riffle and pool complexes are particularly valuable habitat for fish and wildlife.

Major drainages in the SDEIS wetlands and riparian resources analysis area are described in SDEIS Table 3.11-3. Drainages noted to contain riffle habitat include Meadow Creek and East Fork Meadow Creek. As part of Project closure and reclamation, Perpetua Resources would restore appropriately designed meandering stream channels (Meadow Creek and tributaries) within a stream and



floodplain corridor across the top of the lined TSF surface (Rio ASE 2021). Pools and riffles would be constructed within the channel. Measures to create aquatic habitat would include side channels, oxbows, boulder clusters, root wads, and large woody debris. This would allow for the post-closure development of riparian habitat, convey water off the facility, and minimize potential interaction of surface water with the underlying tailings. Given the nature of the surface of the TSF, the constructed channel would have a shallow gradient.

### ModPRO2 (Proposed Action)

The ModPRO2 (Proposed Action) would entail 21 stream crossings that would not be crossed under Alternative 2 (Johnson Creek Route Alternative). These streams include Burntlog Creek, East Fork Burntlog Creek, the EFSFSR, Johnson Creek, Landmark Creek, Peanut Creek, Rabbit Creek, Riordan Creek, Trapper Creek, and 12 unnamed waterbodies (USFS 2022a). There is potential for impacts to riffle and pool complexes at the stream crossing locations. Newly constructed portions of the Burntlog Route would be decommissioned and reclaimed, and the currently existing portions of the road would be returned to their prior use (USFS 2022a).

Impacts during construction and mining operations include land disturbance, stream flow reductions, channel modifications, and utility crossings across aquatic habitat. Some of these impacts occur in aquatic habitat containing riffle and pool complexes. As such the ModPRO2 is expected to result in impacts to riffle and pool complexes of the aquatic ecosystem. However, post-closure reclamation activities to restore and create aquatic habitat, including designed meandering stream channels with pools and riffles would limit the temporal loss of these features in the local environment. With the implementation of stream restoration and reclamation measures to replace riffle and pool habitat impacted by the Project, the ModPRO2 would comply with this factor of the Guidelines.

#### Johnson Creek Route Alternative

Forty-three streams would be crossed along the Johnson Creek Route under the Johnson Creek Route Alternative. The 21 stream crossings associated with the Burntlog Route of the ModPRO2 would not be constructed under the Johnson Creek Route Alternative. However, the Johnson Creek Route, adjacent to Johnson Creek and the EFSFSR, would be widened and upgraded under this alterative, which may result in impacts to riffle and pool complex habitat. The improvements to the Johnson Creek Route conducted under Alternative 2 would remain after mine operations end. Johnson Creek Road and Stibnite Road would not be returned to the pre-mine width. Rock cuts, 9-foot-high retaining walls, one hundred eighty-two 18-inch culverts, and the two 60-inch culverts would remain.

Impacts during construction and mining operations include land disturbance, stream flow reductions, channel modifications, and utility crossings across aquatic habitat. Some of these impacts occur in aquatic habitat containing riffle and pool complexes. As such, the Johnson Creek Route Alternative is expected to result in impacts to riffle and pool complexes of the aquatic ecosystem. However, post-closure reclamation activities to restore and create aquatic habitat, including designed meandering stream channels with pools and riffles, would limit the temporal loss of these features in the local environment. With the implementation of stream restoration and reclamation measures to replace riffle and pool habitat impacted by the Project, The Johnson Creek Route Alternative would comply with this factor of the Guidelines. However, unlike the ModPRO2, impacted riffle and pool complex habitat along improved portions of Johnson Creek Route would not be restored after mine closure.

#### **No Action Alternative**

Under the No Action Alternative, there would be no large-scale mine operations by Perpetua Resources, and water resources would continue to be impacted by currently permitted Perpetua



Resources drilling activities for exploration. Permitted exploration activities could include small, localized impacts to riparian areas (USFS 2022a), though no substantial impacts to riffle and pool complex habitat from the approved exploration drilling activities are anticipated.

### 5.4 Subpart F: Potential Effects on Human Use Characteristics

### 5.4.1 Municipal and Private Water Supplies (40 CFR 230.50)

Municipal and private water supplies consist of surface water or ground water which is directed to the intake of a municipal or private water supply system.

There are no active domestic groundwater wells used for residential drinking water within 15 miles of the SGP (USFS 2022a). Because groundwater is not currently used as a public drinking water source at the SGP and is assumed to be unlikely to be used as a drinking water source in the future, the ATSDR Public Health Assessment conducted for the existing mine site eliminated the groundwater as drinking water pathway from consideration as a public health concern (ATSDR 2003). There are three permitted wells on the mine site which are controlled by Perpetua Resources: the Gestrin Airstrip mining well, the original temporary camp water supply well, and the new camp water supply well. Use of these wells for drinking water supply would require water treatment for arsenic and antimony removal (USFS 2022a).

All IDEQ-inventoried waterbodies at the proposed mine site (except for West End Creek) are listed under Section 303(d) of the federal CWA as "impaired" due to water quality. The causes for listing of these waters are associated with elevated concentrations of arsenic, antimony, and mercury. Each of the 303(d)-listed waterbodies has designated beneficial uses of "cold water communities," "salmonid spawning," and "primary contact recreation," and all (except Sugar Creek) have designated beneficial uses of "drinking water supply." Although certain waterways in the Stibnite Mining District have drinking water supply as a designated use (e.g., Meadow Creek, Garnet Creek, Fiddle Creek, and Midnight Creek), and Idaho groundwater quality standards apply throughout the Stibnite Mining District, there are no current, contemplated, or likely future public water supply intakes or wells in the zones at the SGP where metals levels exceed applicable standards. Surface water available for tribal use in the area would not be impacted above human drinking water standards by the SGP (USFS 2022a). Water quality of surface flow departing from the SDEIS Operations Area Boundary would be the same or better than baseline conditions (USFS 2022k).

Sources of water are required for ore processing, surface and underground exploration, dust control, and potable use. Water for industrial and mining uses would be supplied from water pumped from the dewatering wells located around the Hangar Flats, Yellow Pine, and West End pits; industrial water supply wells; contact water storage ponds; a surface water supply intake on the EFSFSR; and process water recycled within the ore processing and tailings circuit. Dedicated wells would provide potable water for worker consumption and sanitary use. Projected water use for the SGP is described in SDEIS Table 2.4-10 (USFS 2022a).

Ore processing facility operations would represent approximately 97 percent of water use associated with the SGP. A separate wellfield of up to four wells would be developed in the EFSFSR drainage adjacent to the worker housing facility to provide potable water for the housing facility. The use of water from pit dewatering, contact water from precipitation runoff, surface water, and development of separate wellfields for supplemental industrial water and potable water at the worker housing facility would require permitting through the IDWR as new water rights or transfer of the place of use for one of Perpetua Resources' existing water rights. Perpetua Resources has submitted an



application to IDWR for a total diversion of up to 9.6 cfs (4,308 gpm) for use by the SGP (USFS 2022a).

### ModPRO2 (Proposed Action)

Water supply needs and uses would be common to the ModPRO2 (Proposed Action) and Alternative 2 (Johnson Creek Route Alternative). The potential for erosion and sedimentation impacts to surface water along the Burntlog Route associated with the ModPRO2 would be minimized by BMPs and EDFs. Water quality of surface flow departing from the SDEIS Operations Area Boundary would be the same or better than baseline conditions (USFS 2022k). Surface water available for tribal use in the area would not be impacted above human drinking water standards by the SGP (USFS 2022a). Water supply usage under the ModPRO2 would comply with IDWR permit requirements. Based on these conditions, the ModPRO2 would comply with this factor of the Guidelines.

### Johnson Creek Route Alternative

Water supply needs and uses would be common to the ModPRO2 (Proposed Action) and the Johnson Creek Route Alternative. The potential for erosion and sedimentation impacts to surface water along the Johnson Creek Route associated with the Johnson Creek Route Alternative would be minimized by BMPs and EDFs. Water quality of surface flow departing from the SDEIS Operations Area Boundary would be the same or better than baseline conditions (USFS 2022k). Surface water available for tribal use in the area would not be impacted above human drinking water standards by the SGP (USFS 2022a). Water supply usage under the Johnson Creek Route Alternative would comply with IDWR permit requirements. Based on these conditions, the Johnson Creek Route Alternative would comply with this factor of the Guidelines.

### No Action Alternative

Approved exploration drilling and reclamation activities are not anticipated to have noticeable impacts on water quantity or quality in the SGP area. The condition of municipal and private water supplies under the No Action Alternative is therefore expected to remain consistent with baseline levels.

### 5.4.2 Recreational and Commercial Fisheries (40 CFR 230.51)

Recreational and commercial fisheries consist of harvestable fish, crustaceans, shellfish, and other aquatic organisms used by man.

There are many fishing opportunities throughout the SDEIS recreation resources analysis area in lakes, streams, rivers, and reservoirs (Figures 6-1a through 6-1e of the SGP Recreation Specialist Report [USFS 2022h]). The BNF river and stream fishing as well as lake and pond fishing throughout the district are noted as excellent for fishing. The IDFG oversees fishing licenses for the State of Idaho, and the SDEIS recreation resources analysis area falls within the IDFG Southwest Region (USFS 2022a). There are many species of fish for harvest within the IDFG Southwest Region, details of the species available, special rules by species, as well as limits by species can be found is the Idaho Fishing Season and Rules (IDFG 2021).

The Project would impact endangered salmon, other fish species, and essential fish habitat. Harm to fish, wildlife, and habitat would in turn impact availability and harvestability of these resources by Tribes at their usual and accustomed fishing places and traditional hunting and gathering places. The SDEIS also identified concerns that the SGP would impact the Tribes' fisheries restoration efforts. The USFS concluded that the SGP would have adverse impacts to tribal rights and interests under the ModPRO2 (Proposed Action) or Alternative 2 (Johnson Creek Route Alternative) (USFS 2022a). Culturally important fish species in the analysis area include Chinook salmon, steelhead



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trout, bull trout, westslope cutthroat trout, mountain whitefish (*Prosopium williamsoni*), Pacific lamprey (*Lampetra tridentata*), longnose dace (*Rhinichthys cataractae*), speckled dace (*Rhinichthys osculus*) and western pearlshell mussel (*Unionida*) (Battaglia 2018; Walker 2019).

If wildlife does not re-populate the Project Area after reclamation, there would be a reduction in wildlife-related recreation opportunities, including fishing. Fish species composition and/or relative populations within the creeks in the Project area may change after reclamation, as anticipated habitat may favor steelhead over Chinook salmon, and there would be a decrease in habitat for bull trout and westslope cutthroat trout and Chinook salmon. Therefore, fishing opportunities may be altered after reclamation as well (USFS 2022a).

There is potential for changes in water quality, water temperature, and streamflow to occur in streams within the SDEIS recreation resources analysis area, during construction through reclamation, all of which could impact fish and local habitat potential for fish. Fishing access to the streams within the Project Area would also be restricted until reclamation is completed. Long term, the reclamation activities should improve the quality of the aquatic habitat and sport fishing compared to the current conditions. There would be no substantial stream flow changes to streams along either the Burntlog Route under the ModPRO2 or the Johnson Creek Route under Alternative 2, but there is potential for sediment and contaminants from roadway construction, vehicle traffic, and maintenance along these streams. Any reduction in fish populations could affect the success and experience of the recreational fisherman. Impacts to fish and fish habitat are discussed in SDEIS Section 4.12 and additional detail is provided in the Fisheries and Aquatic Habitat Specialist Report (USFS 2022b).

Impacts to recreational and commercial fisheries from mining activities in the Project area under the ModPRO2 and Alternative 2 are expected to be the same. Differences in impacts to recreational and commercial fisheries relating to construction and use of the Burntlog Route under the ModPRO2 compared to road improvements and increased usage of Johnson Creek Route under The Johnson Creek Route Alternative are described below.

### ModPRO2 (Proposed Action)

Under the ModPRO2 (Proposed Action), fish adjacent to the Burntlog Route may be affected by increased sediment and could be affected if a spill were to occur (SDEIS Section 4.12). There may be decreased recreational fishing success immediately along the Burntlog Route, but there would continue to be opportunities for fishing within the creeks crossed by the Burntlog Route.

Under the ModPRO2, fishing access to streams within the Project Area would be restricted until reclamation is completed. However, ample fishing opportunities on USFS lands outside of the Project Area would continue to be available during Project mining operations and after Project reclamation activities are complete. Project reclamation activities should improve the overall quality of aquatic habitat and sport fishing compared to existing conditions (USFS 2022a). Based on these considerations, the ModPRO2 would comply with this factor of the Guidelines.

### Johnson Creek Route Alternative

Under the Johnson Creek Route Alternative, fish adjacent to the Johnson Creek Route may be affected by increased sediment and could be affected if a spill were to occur. While there may be injury or mortality to individual fish, population-level effects are not expected. There may be decreased fishing success along the Johnson Creek Road, but there would continue to be opportunities for fishing in the adjacent areas. Impacts from the Johnson Creek Route to fishing recreation are anticipated, and the duration of impacts along Johnson Creek and the EFSFSR in



areas of permanent road improvements would continue through closure and reclamation (USFS 2022a).

Under Alternative 2, fishing access to streams within the Project Area would be restricted until reclamation is completed. However, ample fishing opportunities on USFS lands outside of the Project Area would continue to be available during Project mining operations and after Project reclamation activities are complete. Project reclamation activities should improve the overall quality of aquatic habitat and sport fishing compared to existing conditions (USFS 2022a). Based on these considerations, The Johnson Creek Route Alternative would comply with this factor of the Guidelines.

### No Action Alternative

Under the No Action Alternative, traditional cultural uses of the analysis area would continue, including for tribal fishing, hunting, gathering, and spiritual practices. Access to public land in the area would continue as governed by law, regulation, policy, and existing and future landownership constraints. Overall, impacts to recreation under the No Action Alternative would include modifications to the recreation setting in the Project Area from continued surface exploration and construction equipment operation, continued low level of unauthorized motorized use, and increased winter motorized access and use. These impacts could lead to changes in the designated Recreation Opportunity Spectrum class and/or estimated Recreation Opportunity Spectrum physical setting (towards Semi-Primitive Motorized or Roaded Natural from Semi-Primitive Non-Motorized) of some areas due to additional motorized use both in the summer and winter. Activities, facilities, and uses allowed under current recreation-related special use permits would continue until the end of the permit term. Changes to the recreation setting due to additional motorized use may result in shifts in the use areas for permittees, particularly for non-motorized uses such as trail rides, fishing, and hunting, among others (USFS 2022a).

### 5.4.3 Water-Related Recreation (40 CFR 230.52)

Water-related recreation encompasses amusement and relaxation activities. Activities encompass two broad categories of use: consumptive, e.g., harvesting resources by hunting and fishing; and non-consumptive, e.g., canoeing and sight-seeing.

Project impacts to recreation resources are discussed in SDEIS Section 4.19. The Project may cause changes to recreation setting, access, facilities, and opportunities. Impacts to recreation in the Project area may include changes in motorized access, recreation physical setting, recreation facilities, recreation use, and recreation opportunities (USFS 2022a). Figures of existing recreation facilities under operational conditions in both the summer and winter for each alternative and routes available in both the winter and summer for the action alternatives are provided in the Recreation Specialist Report (USFS 2022h).

The ModPRO2 (Proposed Action) is similar to the Johnson Creek Route Alternative, with the main differences that affect recreation consisting of the primary Project access route (the Burntlog Route under the ModPRO2 and the Johnson Creek Route under the Johnson Creek Route Alternative, a change in the location of the Landmark Maintenance Facility, and use of helicopters for construction and maintenance of cell towers and repeater sites in IRAs managed for backcountry/restoration under the Johnson Creek Route Alternative (USFS 2022a). These changes would result in different impacts to recreation, as described below.

### ModPRO2 (Proposed Action)

Under the ModPRO2 (Proposed Action), the segment of Burntlog Route near Riordan Creek and Black Lake would be within 0.5 mile of the FCRNRW border (shown on Figure 7-2d of the Recreation



Specialist Report [USFS 2022h]). These activities may require temporary road closures and/or detours along these roads, thereby temporarily reducing access along these roadways to both sites/areas along the roadway as well as trails/areas accessed from these roads and roads/trails that cross these roadways. This temporary reduction in access also may temporarily reduce recreation opportunities along Burnt Log Road, including at the Mud Lake and Burntlog dispersed camping areas, as well as on roads/trails and in the areas accessed from Burnt Log Road, including the Pistol Lake Trailhead into the FCRNRW (USFS 2022a).

Activities related to construction of the new sections of Burntlog Route (approximately 14.9 miles) including noise, use of borrow and staging areas, temporary trailer camps, vegetation clearing, road building, and traffic, may affect the recreation setting for users within visual (2 to 3 miles east and less than 1 mile west) and audible (1 mile) distance of construction activities and facilities, including the Mud Lake dispersed camping area, Burntlog dispersed camping area, Thunder Mountain/Riordan Trailhead, Meadow Creek/Summit Trailhead, Meadow Creek Lookout, and Landmark. Changes in the recreation setting along the Burntlog Route construction corridor (road corridor and surrounding areas) could lead to displacement of dispersed recreational use, particularly related to non-motorized activities, wilderness activities, wildlife-related recreation activities (due to wildlife displacement), and dispersed recreation camping at the Mud Lake and Burnt Log dispersed camping areas, which currently typically occur in a quieter, less-developed setting. Camping at Mud Lake would be particularly affected as construction activity would be located within 100 feet of the camping area. Construction impacts would be localized to the Burntlog Route area and recreation facilities/areas currently accessed from the Burnt Log Road (USFS 2022a).

Fish adjacent to the Burntlog Route may be affected by increased sediment and could be affected if a spill were to occur (SDEIS Section 4.12). There may be decreased recreational fishing success immediately along the Burntlog Route, but there would continue to be opportunities for fishing within the creeks crossed by the Burntlog Route (USFS 2022a).

Helicopters used during drilling and other construction-related activities may be visible and/or audible from nearby recreation areas, including the FCRNRW, which would impact the recreation setting, particularly for wilderness users. The presence of helicopters nearby would reduce feelings of remoteness and solitude in the wilderness, potentially impacting the recreation experience of wilderness visitors (USFS 2022a).

Impacts to water-related recreation would be minimized through EDFs implemented to protect recreation, transportation and access, water resources, and fish and wildlife, as described in SDEIS Section 2.4.9. Under the ModPRO2, recreation opportunities and experiences may be directly impacted until mine closure and completion of reclamation activities. However, ample recreation opportunities on USFS lands outside of the Project Area would continue to be available during Project mining operations and after Project reclamation activities are complete. Impacts to recreation along new portions of the Burntlog Route would be lessened post-closure once the road segments are decommissioned and reclaimed. Based on these considerations, the ModPRO2 would comply with this factor of the Guidelines.

### Johnson Creek Route Alternative

The Burntlog Route and Burntlog Maintenance Facility would not be constructed under the Johnson Creek Route Alternative; therefore, there would be no construction impacts related to those facilities. Use of Johnson Creek and Stibnite roads as the route to the Project during construction, operations, and reclamation and closure would result in impacts to the recreation setting of the existing recreation sites/areas along these roads due to increased noise, traffic, and safety-related issues



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from mine-related traffic (USFS 2022g, 2022i), leading to a change in recreation experiences for some visitors. Traffic on Johnson Creek and Stibnite roads would substantially increase (almost two times the current traffic conditions, respectively), thereby increasing the noise and activity near campgrounds and trailheads adjacent to these roads (USFS 2022a).

Recreation facilities affected by the increase in traffic and traffic noise would include Burntlog and Quartz Creek Trailheads; Buck Mountain, Trout Creek, Ice Hole, Golden Gate, and Yellow Pine Campgrounds; Twin Bridges dispersed camping area; and Johnson Creek Cabin. The recreation setting of these facilities would be altered to a more developed setting due to an increase in the sights and sounds of humans, which would displace recreationists to avoid noise associated with activities and traffic along Johnson Creek and Stibnite roads, particularly recreationists participating in non-motorized activities. Wildlife-related recreation opportunities also would decrease along these roadways due to wildlife displacement from traffic and noise (USFS 2022a).

Fish adjacent to the Johnson Creek Route may be affected by increased sediment and could be affected if a spill were to occur. While there may be injury or mortality to individual fish, population-level effects are not expected (SDEIS Section 4.12). There may be decreased fishing success immediately along the Johnson Creek Road, but there would continue to be opportunities for fishing within the creeks in the adjacent areas.

Development of the Landmark Maintenance Facility would reduce recreation opportunities due to physical removal of acreage for the facility (3.5 acres). Noise associated with Landmark Maintenance Facility construction activities could reduce opportunities for noise-sensitive recreation activities at and around the maintenance facility location (up to 1.1 miles away) (AECOM 2019b), including wildlife-related recreation activities, because wildlife may be displaced. Some recreationists may choose to visit other areas or sites to avoid delays or noise from Landmark Maintenance Facility construction activities. Any reduction in recreation opportunities, displacement of dispersed recreational use, or changes in access would be temporary until maintenance facility construction was completed (USFS 2022a).

Construction of repeater sites and the cell tower in areas outside of IRAs would result in the same impacts as those described under the ModPRO2 (Proposed Action). Constructing repeater sites in an IRA managed for backcountry/restoration, noise, and disruption from the use of helicopters for construction may temporarily affect the recreation setting for users within visual and audible distance of the helicopters. Impacts would be localized to the repeater sites in IRAs. Changes in the recreation setting around these repeater sites could lead to a temporary displacement of dispersed recreational use, particularly related to non-motorized activities, wilderness activities, and wildlife-related recreation activities (due to wildlife displacement), which currently typically occur in a quieter, non-motorized setting in these areas compared to existing conditions. Additionally, use of helicopters would eliminate the impacts of new access roads to the repeater sites (e.g., changes in the recreation setting along access route that could lead to displacement of dispersed recreational use, particularly related to non-motorized activities, and wildlife-related recreational use, non-motorized activities, and wildlife-related recreational use, particularly related to non-motorized activities, and wildlife-related recreational use, non-motorized activities, and wildlife-related recreation activities) as described under the ModPRO2.

Under the Johnson Creek Route Alternative, there could be potential access delays to areas utilized by the hunting community which would be focused on the Johnson Creek Route during construction of the upgraded roads and mine traffic throughout operations, closure, and reclamation. There would be no impacts in the Burntlog Route area as these roadways would not be utilized. Potential impacts to fish and fishing in other areas would be the same as the ModPRO2 (Proposed Action), but the duration of potential impacts along Johnson Creek and the EFSFSR would continue through closure and reclamation. There could be indirect impacts to recreational river users setting (i.e., visual



changes and noise) for the duration of operations, closure, and reclamation from mine traffic utilizing Warm Lake and Johnson Creek roads (USFS 2022a).

Impacts to water-related recreation would be minimized through EDFs implemented to protect recreation, transportation and access, water resources, and fish and wildlife, as described in SDEIS Section 2.4.9. Under the Johnson Creek Route Alternative, recreation opportunities and experiences may be directly impacted until mine closure and completion of reclamation activities. However, ample recreation opportunities on USFS lands outside of the Project Area would continue to be available during Project mining operations and after Project reclamation activities are complete. Based on these considerations, The Johnson Creek Route Alternative would comply with this factor of the Guidelines. Unlike the ModPRO2, impacts to recreation setting caused by permanent improvements to road segments along the Johnson Creek Route would remain after closure, as these segments would not be reclaimed.

### **No Action Alternative**

Under the No Action Alternative, no construction, operation, or reclamation of the SGP components would occur. Previously approved surface exploration and associated activities on NFS lands would continue. Current uses on Perpetua Resources patented mine/mill site claims would continue, which include mineral exploration and dispersed recreation.

Current access to the area via Johnson Creek Road and Stibnite Road would remain unimpeded. Apart from the SDEIS Operations Area Boundary, existing recreation opportunities, access, and use would continue in the existing recreation setting. In the SDEIS Operations Area Boundary, continued exploration and construction of the ASAOC Phase 1 remedial actions may alter the recreation setting in the immediate SGP area to have a more elevated level of the sights and sounds of humans. Motorized winter use has expanded in recent years, and may continue to expand in the future, resulting in additional OSV routes, winter recreation opportunities, and additional areas receiving winter motorized use. Some unauthorized motorized use may continue to occur off existing roads and motorized trails but would likely continue to be fairly limited in extent. Activities, facilities, and uses allowed under current recreation-related special use permits would continue until the end of the permit term. Changes to the recreation setting due to additional motorized use may result in shifts in the use areas for permittees, particularly for non-motorized uses such as trail rides, fishing, and hunting.

### 5.4.4 Aesthetics (40 CFR 230.53)

Aesthetics consists of the perceiving beauty by one or a combination of the senses of sight, hearing, touch, and smell. Aesthetics of aquatic ecosystems apply to the quality of life enjoyed by the general public and property owners.

Construction and operation of Project infrastructure may impact scenic integrity and quality and may result in change of the Forest Plan Visual Quality Objectives. Potential impacts to scenic resources include changes in landscape character, scenic quality and integrity, nighttime lighting, and the context of impacts, including the context directed by Forest Plan standards and guidelines (USFS 2022a). Additional details on the direct and indirect effects to scenic resources can be found in the SGP Scenic Resources Specialist Report (USFS 2022j).

Noise impacts from construction of mine facilities, roads, and the transmission line upgrade, as well as mine operations, mine traffic on haul roads, and mine traffic on area access roads, may affect area residents and recreationists. Anticipated Project noise impacts are described in the Noise Specialist Report (USFS 2022g).



Impacts to aesthetics from mining activities in the Project Area under the ModPRO2 and the Johnson Creek Alternative are expected to be the same. Differences in impacts to aesthetics relating to construction and use of the Burntlog Route under the ModPRO2 compared to road improvements and increased usage of Johnson Creek Route under the Johnson Creek Alternative are described below.

### ModPRO2 (Proposed Action)

Under the ModPRO2 (Proposed Action), visibility of the Burntlog Route would generally extend up to 3 miles to the east and less than 1 mile to the west. Construction activity associated with the Burntlog Route would introduce short-term visual contrast. During operations, long-term visual effects associated with improvements to Burnt Log Road (FR 447) would occur from Landmark to Trapper Flat, which would require grading and removal of vegetation to accommodate a travel width of 20 feet and total width of up to 26 feet (but less in some locations), including shoulders. New segments of the Burntlog Route would introduce approximately 15 miles of new road that would be a viewing platform for areas of the forest, providing views to portions of the forest that are not currently afforded any viewing opportunity by a road or trail (USFS 2022a).

Upon Project closure and reclamation, upgraded portions of Burnt Log Road (FR 447) would be reclaimed to existing conditions and new portions of the Burntlog Route would be removed from use and reclaimed. Soil nail walls and the 140-foot-tall road cut near the Project are proposed to remain in place after decommissioning and their appearance would continue to introduce strong visual contrast with the surrounding landscape. Post-mine closure, traffic would likely return to a pre-mining level of use. Permanent visual contrast to the characteristic landscape generally would be minimal to moderate because the road would be returned to its previous width although the flatter grades and smoother curves would be retained. Changes to the landscape from removal of mature vegetation would remain evident for several years after reclamation activities. The remaining soil nail walls would be an exception; these areas would introduce strong visual contrast; however, the geographic extent of these changes would be localized. The Stibnite Road (CR 50-412) to Thunder Mountain Road (FR 50375) link would be reclaimed, and those areas would appear similar to the reclaimed areas of Burnt Log Road (FR 447). Impacts would be permanent, localized, and minor to moderate (USFS 2022a).

Road construction activities along the Burntlog Route would involve upgrading existing roads (Burnt Log Road and Thunder Mountain Road) and constructing a new section of roadway to connect the Burnt Log Road to Thunder Mountain Road. Road construction would include cut and fill; embankment stabilization; laying road base and surfacing material; installing new bridges, drainage channels and culverts; replacing or upgrading existing bridges, culverts, and drainages; and associated activities. Construction noise would be short term, intermittent, and transitory in any one location (USFS 2022a).

During the first year of the construction phase under the ModPRO2, Project-related traffic volumes on the Johnson Creek Route access roads are estimated at 65 AADT. Heavy vehicles are estimated at 45 AADT and light vehicles at 20 AADT (Midas Gold 2016a; Perpetua Resources 2021). Vehicles per peak hour were assumed to be 10 percent of AADT (Washington State Department of Transportation 2018). Based on the estimated traffic volumes and vehicle mix, and typical vehicle speeds of 25 mph, estimated average hourly noise levels from SGP-related traffic on the mine access route during the construction phase would be 48 dBA equivalent sound level ( $L_{EQ}$ ) at 50 feet from the roadway, which is well below the SDEIS noise impact threshold level of 55 dBA (USFS 2022a).



The estimated total average hourly noise levels from construction on the Burntlog Route would be 91 dBA L<sub>EQ</sub> at the reference distance of 50 feet. Noise from access road construction would attenuate to the SDEIS noise impact threshold of 55 dBA approximately 0.57 mile from the source of activity based on distance alone. Accounting for ground absorption and atmospheric absorption, noise from access road construction would attenuate to 55 dBA approximately 0.28 mile from the source of activity. Road construction and associated noise would be limited to daytime hours (between 7:00 a.m. and 10:00 p.m.) (USFS 2022a). A complete list of the major noise sources and estimated maximum noise levels on the Burntlog Route during the construction phase is provided in the Noise Specialist Report (USFS 2022g).

After construction of the Burntlog Route is completed, Project-related traffic would move from the Johnson Creek Route solely to the Burntlog Route. Project-related traffic volumes during this portion of the construction phase are estimated at 68 AADT (48 heavy vehicles and 20 light vehicles; vehicles per hour is assumed to be 10 percent of AADT for peak hour traffic). Estimated average hourly traffic noise levels would be approximately 49 dBA LEQ at 50 feet from the roadway, also below the impact threshold of 55 dBA. Noise impacts from SGP-related traffic on the Burntlog Route during the construction phase would be negligible, short-term, and localized. A 5.3-mile segment of the Burntlog Route would be along Riordan Creek, which would be the closest segment to the FCRNRW. Use of this road segment would potentially create elevated noise levels extending into the FCNRNW. (USFS 2022a).

The Project would cause impacts to landscape character, scenic quality and integrity, noise, nighttime lighting, and traffic. Impacts to aesthetics associated with the aquatic ecosystem would be minimized by EDFs implemented for visual and water resources, as described in SDEIS Section 2.4.9. Landscape qualities at the mine site would be consistent with existing conditions, as the area is currently characterized by mining disturbance. The overall aesthetic quality of these areas would be improved in the long term through reclamation and restoration. Impacts to aesthetic values associated with construction and use of new portions of the Burntlog Route are anticipated, though these impacts would be lessened post-closure once these road segments are decommissioned and reclaimed. Based on the incorporation of EDFs and reclamation measures, the ModPRO2 would comply with this factor of the Guidelines.

### Johnson Creek Route Alternative

Under the Johnson Creek Route Alternative, the Burntlog Route under the ModPRO2 would not be used for mine access. The visual impacts associated with Burntlog Route under the ModPRO2 would not occur under Alternative 2. However, visual impacts would occur as a result of the upgrades to. and year-round mine use of, the Johnson Creek Route under the Johnson Creek Route Alternative. Short-term visual effects associated with construction activities under the Johnson Creek Route Alternative would occur as a result of upgrades to the Johnson Creek Route. Major road widening and/or straightening of curves, with associated cut and fill, would be required for the Johnson Creek Road (CR 10-413) portion of the Johnson Creek Route. Construction of retaining walls and culverts would require vegetation removal and would expose large areas of native soil and rock that would visually contrast with surrounding vegetation and the rugged, varied topography. Further, traffic along the road from construction vehicles and equipment for widening the Stibnite Road portion of the route would introduce additional movement and dust from vehicle traffic along Johnson Creek Road compared to existing conditions. There would be visual impacts to the characteristic landscape associated with the Johnson Creek Route Alternative, because the widened and straightened roads would visually contrast with the topography. Modifications to landform would be evident, and vegetation would be cleared along the roadway. The Johnson Creek Route under the Johnson Creek



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Route Alternative would consist of all existing roads; therefore, the level of visual change introduced to the landscape would be lower than that experienced as a result of the Burntlog Route under the ModPRO2 (USFS 2022a).

During the construction phase, Project-related traffic volumes on the Johnson Creek Route access road under the Johnson Creek Route Alternative is estimated at 65 AADT. Heavy vehicles are estimated at 45 AADT and light vehicles at 20 AADT (Perpetua Resources 2021). Based on the estimated traffic volumes and vehicle mix, and typical vehicle speeds of 25 mph, estimated average hourly noise levels from Project-related traffic on the mine access route during the construction phase would be 48 dBA LEQ at a distance of 50 feet from the roadway, which is well below the SDEIS noise impact threshold level of 55 dBA (USFS 2022a). The potential noise impacts at dispersed recreational resource areas within the FCRNRW would be the same as reported for the ModPRO2 during construction, provided in terms of predicted noise level and noise level increases over existing at distances between 500 and 8,000 feet; however, the primary access road would access the Project Area from the north along the existing Stibnite Road and would approach close to the FCRNRW for a very limited distance about midway between the SDEIS Operations Area Boundary and the village of Yellow Pine, which would represent a much more limited exposure than the Burntlog Route under the ModPRO2. Project-related road maintenance activities under the Johnson Creek Route Alternative are expected to increase daytime noise levels at some SDEIS NSR sites to as high as 75 to 84 dBA. Noise impacts at those locations would be localized, temporary and periodic, and minor (USFS 2022a).

Project mining activities would impact landscape character, scenic quality and integrity, noise, nighttime lighting, and traffic levels. Impacts to aesthetics associated with the aquatic ecosystem would be minimized by EDFs implemented for visual and water resources, as described in SDEIS Section 2.4.9. Landscape qualities at the mine site would be consistent with existing conditions, as the area is currently characterized by mining disturbance. The overall aesthetic quality of these areas would be improved in the long term through reclamation and restoration. Based on the incorporation of EDFs and reclamation measures, the Johnson Creek Route Alternative would comply with this factor of the Guidelines. Unlike the ModPRO2, impacts to aesthetic values associated with permanent improvements along the Johnson Creek Route under the Johnson Creek Route Alternative would remain after closure, as these areas would not be decommissioned and reclaimed.

### **No Action Alternative**

Under the No Action Alternative, the overall aesthetic qualities of the Project area landscape would remain consistent with existing conditions. No development of the Project or supporting facilities would occur or be introduced. The existing scenic resources environment as described in SDEIS Section 3.20 would remain as it currently exists. Existing disturbances associated with legacy mining activities in the Project area would still be visible to sensitive use areas, but there would be no changes to the PNF and BNF characteristic landscape. Project reclamation activities would not be performed and permanent changes to the landscape in the area of the legacy mine activities would dominate the landscape. However, reclamation associated with authorized exploration under the Meadow Creek Exploration Project would be conducted (USFS 2015). Existing Visual Quality Objective classifications would remain the same. The existing disturbances associated with legacy mining activities do not meet the Partial Retention Visual Quality Objective and would continue under the No Action Alternative (USFS 2022a).

Existing noise from exploration-related activities of the Golden Meadows Exploration Project (USFS 2015) would continue through reclamation of disturbances. These approved activities include construction of several temporary roads (approximately 0.32 mile of temporary roads) to access drill



sites (total of 28 drill sites), drill pad construction (total of 182 drill pads) and drilling on both NFS and private lands in the Project vicinity. Noises associated with these activities include continued use of the existing man camp, office trailers, truck maintenance shop area, potable water supply system, wastewater treatment facility, helipad and hangar, and airstrip (USFS 2022a).

### 5.4.5 Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves (40 CFR 230.54)

These preserves consist of areas designated under federal and state laws or local ordinances to be managed for their aesthetic, educational, historical, recreational, or scientific value.

The Project would primarily occupy NFS-managed lands, with the majority of impacts on PNF lands. The Project may impact the quality of wilderness character in designated or recommended wilderness areas based on the distance of Project facilities and activities to designated or recommended wilderness areas. No structures or human facilities would be developed inside the FCRNRW for the Project. However, Project operations would affect soundscapes, natural dark skies, and natural wildlife distribution within the FCRNRW, impacting the untrammeled quality of wilderness. The Project would also result in emissions that could affect air quality in the FCRNRW. However, emissions would be below NAAQS thresholds (USFS 2022a).

The Project may affect WSRs by impacting water quality, ORVs for which eligible and suitable WSRs are designated or nominated, and by potentially changing the classification of eligible and suitable WSR segments as Wild, Scenic, or Recreational. The Project may impact roadless character IRAs and lands contiguous to unroaded areas by placing roads and facilities in IRAs or contiguous unroaded lands. Project mining activities would be located downgradient of streams that flow through RNAs or would be in watersheds that do not contain streams that flow through RNAs. Project mining activities would not change water chemistry, temperature, or quality in the stream segments that flow through the RNAs. However, Project access roads may impact research values or ecosystem conditions within RNAs by changing vegetation community composition and structure, increasing vehicle usage and human activities, or changing water quality or quantity. (USFS 2022a).

Impacts to parks, wilderness areas, and similar preserves from mining activities in the Project area under the ModPRO2 and the Johnson Creek Route Alternative are expected to be the same. No impacts to WSR free-flowing conditions are anticipated under either action alternative. Additionally, under either action alternative, the Heritage ORV of Johnson Creek may be adversely affected by the upgrade of the existing transmission line or the upgrade of Johnson Creek Road, which could potentially impact historic properties located in the vicinity.

Differences in impacts to these resources relating to construction and use of the Burntlog Route under the ModPRO2 compared to road improvements and increased usage of Johnson Creek Route under the Johnson Creek Route Alternative are described below.

### ModPRO2 (Proposed Action)

Under the ModPRO2 (Proposed Action), construction and use of the Burntlog Route near the FCRNRW could increase noise and lights in adjacent wilderness areas. the ModPRO2 may impact water quality in Burntlog Creek as a result of increased sedimentation from the Burntlog Route construction, winter maintenance, and increased traffic from heavy vehicles. Increased sedimentation into fish spawning habitat in the creek may adversely impact the fish ORV of Burntlog Creek. The wild segment of Burntlog Creek would be adversely impacted by noise and visual effects from the extension, widening, and mine traffic usage of Burnt Log Road (FR 447). The recreational



segment of Burntlog Creek could be adversely impacted if a proposed borrow source (i.e., gravel quarry) is sited at the only road access to the recreational segment of this creek (USFS 2022a).

Construction and use of the Burntlog Route under the ModPRO2 would directly impact the Meadow Creek, Black Lake, and Burnt Log IRAs. Reconstructing approximately 3 miles of Burnt Log Road (FR 447) for the Burntlog Route under the ModPRO2 would remove vegetation within 100 to 3,100 feet of the Chilcoot Peak RNA. Interim reclamation and vehicles could provide opportunities for non-native plant species to become established and spread into the RNA. Establishment of non-native species would negatively impact the Chilcoot Peak RNA research and ecological process values. Increased human activities could also increase the risk of human ignited fires. Changes in the fire regime could cause additional loss of research and ecological process values within the Chilcoot Peak RNA (USFS 2022a).

Under the ModPRO2, installation of culverts on the Burntlog Route could change the movement of sediment, woody debris, and other organic material. Culverts could change water quantity or hydrologic connection and indirectly impact ecological processes in areas adjacent to the Chilcoot Peak RNA (USFS 2022a).

The ModPRO2 would affect the untrammeled quality of a portion of the FCRNRW, would have direct impacts on IRAs, and would have potential direct and/or indirect effects on WSRs and RNAs. Impacts to these sites would be minimized through BMPs and EDFs established for wilderness, vegetation, water, and scenic resources, as described in SDEIS Tables 2.4-12 and 2.4-13. These impacts may reduce the aesthetic, educational, historical, recreational and/or scientific qualities of these sites but would not eliminate the uses for which the sites are set aside and managed. Therefore, the ModPRO2 would comply with this factor of the Guidelines.

### Johnson Creek Route Alternative

Under the Johnson Creek Route Alternative, use of the Johnson Creek Route would eliminate potential noise and light increases in the FCRNRW that would occur from construction and use of the Burntlog Route under the ModPRO2 (Proposed Action). However, the volume of traffic and potential delays along Johnson Creek Route under the Johnson Creek Route Alternative could result in forest visitors avoiding FCRNRW trailheads accessed from Stibnite Road (CR 50-412). Indirectly, recreation use in recommended wilderness areas and other areas of the FCRNRW could increase. Water quality in Burntlog Creek would not be impacted under the Johnson Creek Route Alternative as the Burntlog Route would not be built. However, increased heavy vehicle traffic could increase sedimentation rates and therefore decrease water quality in Johnson Creek due to use of Johnson Creek Road for all Project-related traffic. Improvements and use of only the Johnson Creek Route for mine access under the Johnson Creek Route Alternative would eliminate impacts within the Black Lake and Burnt Log IRAs and within portions of the Meadow Creek IRA that are associated with the Burntlog Route under the ModPRO2. Under the Johnson Creek Route Alternative, the Chilcoot Peak RNA ecological process values would remain consistent with existing conditions (USFS 2022a).

The Johnson Creek Route Alternative would affect the untrammeled quality of a portion of the FCRNRW, would have direct impacts on IRAs, and would have potential direct and/or indirect effects on WSRs and RNAs. Impacts to these sites would be minimized through BMPs and EDFs established for wilderness, vegetation, water, and scenic resources, as described in SDEIS Tables 2.4-12 and 2.4-13. These impacts may reduce the aesthetic, educational, historical, recreational, and/or scientific qualities of these sites but would not eliminate the uses for which the sites are set aside and managed. Therefore, the Johnson Creek Route Alternative would comply with this factor of the Guidelines.



### No Action Alternative

Under the No Action Alternative, the use and character of the FCRNRW and recommended wilderness areas would continue as projected in the FCRNRW Plan and the Payette and Boise Forest Plans. Under the No Action Alternative, none of the approved exploration activities would be conducted within the FCRNRW boundary or recommended wilderness boundaries. There would be no measurable effects under the No Action Alternative on the five qualities of wilderness character in the FCRNRW or recommended wilderness areas (USFS 2022a).

Current uses by Perpetua Resources on patented mine/millsite claims, and on the PNF and BNF would continue. Concurrent uses of NFS lands include mineral exploration, and dispersed and developed recreation, such as pleasure driving, hunting, OHV use, camping, hiking, snowmobiling, bird watching, target shooting, firewood cutting, and other forms of recreation. Traditional cultural uses of the Project area would continue, including hunting, fishing, and the collection of plants for basket-making, food, and medicinal uses. Existing road access to recreational river segments would not change, and existing effects to wild segments would continue, including ongoing noise and sediment impacts from existing summer use (USFS 2022a).

Approved mineral exploration adjacent to, but not within, Meadow Creek, Horse Heaven, and Sugar Mountain IRAs would continue. The roadless character within the 13 IRAs within five miles of the Project area would be the same as existing conditions (USFS 2022a). Belvidere Creek, the RNA nearest to the Project operations area, is approximately 6 miles north. Fugitive dust generated from vehicles and reclamation activities associated with approved exploration activities would attenuate within 300 feet of unpaved roads (Watson 2000). The distance of approximately 6 miles between the Belvidere Creek RNA and approved exploration, reclamation, and monitoring activities precludes the potential for fugitive dust and non-native invasive plant species establishment that could result in the loss of research values, ecological site conditions, and ecological processes within this RNA (USFS 2022a).

Under the No Action Alternative, the character of the FCRNRW, WSRs, IRAs, and RNAs would be consistent with existing conditions. No measurable impacts to the aesthetic, educational, historical, recreational, and/or scientific qualities of these sites are anticipated.

# 5.5 Subpart G: Evaluation and Testing

### 5.5.1 General Evaluation of Dredged or Fill Material (40 CFR 230.60)

The purpose of these evaluation procedures and the chemical and biological testing sequence outlined in § 230.61 (Section 5.5.2) is to provide information to reach the determinations required by § 230.11. Where the results of prior evaluations, chemical and biological tests, scientific research, and experience can provide information helpful in making a determination, these should be used.

Various types of earth and rock material would be used from borrow sources for construction, maintenance, closure, and reclamation activities. Most of these materials can be sourced at the Project site from existing development rock dumps, legacy spent heap leach ore, and from development rock removed as part of proposed surface mining and underground exploration activities. Overall, the naturally high background levels of trace metals at the Project site represent a challenge with regards to the suitability of Reclamation Cover Material (RCM) and reclamation-related revegetation efforts. Perpetua Resources has proposed 3,000 parts per million arsenic limit for suitable root zone material. In addition to root zone limits, the USFS also will require limits on the growth media (that overlays the root zone material) for arsenic, mercury, and antimony based on the



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range of baseline concentrations in site soils (SDEIS Section 3.5.4.7) and would require a sampling and analysis plan that would include in-situ screening of soils as well as laboratory testing (USFS 2022a). Fill material and RCM testing processes proposed for the Project are described in **Section 5.5.2**.

Based on the establishment of limits for arsenic, mercury, and antimony in reclamation growth media and a sampling and analysis plan for RCM, the ModPRO2 and the Johnson Creek Route Alternative would comply with this factor of the Guidelines.

### 5.5.2 Chemical, Biological, and Physical Evaluation and Testing (40 CFR 230.61)

Fill material and RCM would be subject to physical and chemical testing to determine suitability for use (USFS 2022a). Tailings and contaminated soil and fill material from historical mining activities would be identified through testing and visual observation and separated from suitable soils prior to and during soil excavation activities. Testing for contamination would focus on the presence and leachability of metals from these materials (e.g., arsenic, antimony, and mercury). When encountered during growth media/seed bank material salvage, these materials would be excavated separately and reprocessed, repurposed for construction purposes (if suitable), and/or disposed of into the TSF (USFS 2022k).

During closure and reclamation, RCM (e.g., growth media) would be used as surface material to support vegetation growth and slope stability. The RCP (Tetra Tech 2021c) includes appropriate types and concentrations of material that would be protective of human receptors when identifying suitable RCM. RCM used in places including but not limited to the TSF and TSF Buttress would be evaluated for contaminants prior to use during reclamation. Acceptable metal/contaminant concentrations and sampling and testing methodology would be documented in a sampling and analysis plan developed prior to reclamation (USFS 2022a).

Soils used for reclamation would be screened based on their concentrations of arsenic, antimony, and mercury to exclude materials with metal concentrations outside the range of natural baseline conditions or with metal leaching potential. While natural baseline metal concentrations at times exceed health-based screening values, the reclaimed site would not pose an increased human health risk compared to the existing site conditions. The exposure risk associated with existing site conditions is not expected to result in any adverse effects (ATSDR 2003). Exposure risk could be further reduced through administrative controls such as excluding the public from private land portions of the reclaimed site and enforcing PNF camping stay limits on public lands (USFS 2022a).

The reclamation process is expected to lead to an overall reduction in chemical impacts to surface soil by removing potential sources of metals leaching into the soils, removing sources of erosion and sedimentation, reducing erosion of soils and sedimentation, and reducing downstream sediment transport. Thus, potential negative impacts to soil due to mining disturbance would be largely offset by positive impacts from reclamation of legacy contamination (USFS 2022a). Based on the cover and fill material evaluation, screening, and testing procedures, and maintaining or reducing soil metal concentration levels compared to existing conditions through legacy material removal and reclamation activities, the ModPRO2 and the Johnson Creek Route Alternative would comply with this factor of the Guidelines.



# **Section 6**

# Subpart H – Actions to Minimize Adverse Effects

The following section includes reference to 40 CFR Section 230.71 through 230.77 to be considered as described in the Guidelines. As discussed in **Section 4.1.2** above, Perpetua Resources considered and reviewed many alternatives for Project components to minimize and avoid environmentally sensitive resources. Project EDFs instituted to avoid and/or minimize adverse environmental impacts are described in SDEIS Tables 2.4-12 and 2.4-13 (USFS 2022a). Perpetua Resources has also identified mitigation and monitoring measures to minimize adverse effects, which are described in the CMP (Tetra Tech 2023), FMP (Brown and Caldwell, McMillen Jacobs, and BioAnalysts 2021a), FOMP (Brown and Caldwell, McMillen Jacobs, and BioAnalysts 2021b), RCP (Tetra Tech 2021c), and Chapter 4 of the SDEIS (USFS 2022a).

# 6.1 Actions Concerning the Location of the Discharge (40 CFR Section 230.70)

After submittal of the PRO, Perpetua Resources continued to refine the Proposed Action, resulting in a reduction of the overall Project footprint and reduced wetland impacts. Compared to the PRO, the ModPRO2 reduced the volume of the Hangar Flats pit by 70 percent, the overall area of disturbance from open pits by 7 percent, and the overall area of on-site disturbance by 168 acres. Facility and plan design environmental protection measures described in the ModPRO2 include minimizing the overall disturbance and impacts to undisturbed areas by siting, to the extent practicable, proposed facilities and roads on previously disturbed ground (Perpetua Resources 2021).

As stated in SDEIS Chapter 4.5.2.2, growth media stockpiles would be strategically placed and located around the Project area to prevent erosion, disturbance, and/or contamination. Salvaged material from the Project area would be redistributed directly on disturbed areas to the extent possible or stockpiled in designated areas for later use.

Figure 6-1 of the CMP shows existing streams and wetlands that overlap anticipated Project disturbance. Appendix B of the CMP contains a link to and description of a webmap that illustrates how existing streams and wetlands overlap anticipated off-site facilities and infrastructure disturbance, as well as Project site disturbance.

# 6.2 Actions Concerning the Material to be Discharged (40 CFR Section 230.71)

As stated in SDEIS Chapter 4.5.2.2, suitable RCM within the Project Area would be salvaged for subsequent use in reclamation.

SDEIS Table 2.4-12 contains the following regarding cover material and borrow sources:

• RCM (e.g., growth media) used in places including but not limited to the TSF and TSF Buttress would be evaluated for contaminants prior to use during reclamation. Acceptable



metal/contaminant concentrations and sampling and testing methodology would be documented in a sampling and analysis plan prior to reclamation.

• Clean borrow and gravel sources on USFS lands should be maintained as noxious weed free through an inspection and treatment program. Off-Forest inspections and treatments would be coordinated with county weed agents.

# 6.3 Actions Controlling the Material after Discharge (40 CFR Section 230.72)

As stated in SDEIS Chapter 4.5.2.2: Stockpiles would be stabilized with an interim seed mix to minimize erosion.

As stated in SDEIS Chapter 4.2.2.2: All of the new tailings from the proposed milling operations would be deposited in a modern TSF, designed with a high factor of safety, and would be fully lined with a geosynthetic liner system.

SDEIS Table 2.4-12 includes the following regarding discharge controls: to minimize the degradation of watershed resource conditions, prior to expected water runoff, water management features would be constructed, installed, and/or maintained. Activities and features include, but are not limited to, water bars, rolling dips, seeding, grading, slump removal, barriers/berms, distribution of slash, and culvert/ditch cleaning in all applicable areas.

# 6.4 Actions Affecting the Method of Dispersion (40 CFR Section 230.73)

SDEIS Table 2.4-12 includes the following, regarding runoff and dispersion:

- Perpetua Resources would monitor stormwater runoff and stormwater BMPs as per the Stormwater Pollution Prevention Plan (SWPPP). Stormwater monitoring, inspections, and reporting would be conducted in accordance with the Idaho Pollution Discharge Elimination System Multi-Sector General Permit and the SWPPP.
- To minimize sediment runoff from the temporary roads and roadbeds, water management features would be constructed, installed, and/or maintained on authorized temporary roads and roadbeds, on completion of use, before expected water runoff, or before seasonal shutdown. Activities and features could include, but would not be limited to, water bars, silt fencing, certified weed-free wattles, and/or weed-free straw bales, rolling dips, seeding, grading, slump removal, barriers/berms, distribution of slash, and culvert/ditch cleaning. These features would be installed in strategic downslope areas and in RCAs, where and when appropriate.
- Snow removal would be accomplished in accordance with the following standards of performance:
  - All debris, except snow and ice, that is removed from the road surface and ditches would be deposited away from stream channels at approved locations.
  - During snow removal operations, banks would not be undercut, and gravel or other surfacing material would not be bladed off the roadway surface.
  - Ditches and culverts would be kept functioning during and following plowing. Berms left on the shoulder of the road would be removed and/or drainage openings would be created and maintained. Drainage openings would be spaced to maintain satisfactory surface drainage without discharge on erodible fills.



- Culverts and stream crossings would be clearly marked before snow removal begins to avoid placing berm openings in locations that would allow runoff to enter drainages directly at the culverts or stream crossings. Excessive snow would not be plowed into locations that would impact operation of the culverts or prevent positive drainage from drainage areas. Some snow is necessary around culvert openings and in the bar ditches as this would insulate the ditch and culvert and would prevent the water in the ditch and culvert from freezing.
- No ice and snow removal chemicals would be used on roads.

As stated in SDEIS Chapter 4.8.2.2: Stormwater diversion outfalls would discharge to existing drainages and would incorporate BMPs such as sediment ponds, energy dissipation structures, or other erosion and sediment control measures.

# 6.5 Actions Related to Technology (40 CFR Section 230.74)

The Proposed Action will incorporate erosion, sediment, and stormwater BMPs to reduce water quality impacts. Presumably, the BMPs entail usage of up-to-date industry standard technologies.

As stated in SDEIS Chapter 4.9.2, Perpetua Resources "would be required to comply with specific design requirements as part of the Idaho Department of Water Resources Stream Channel Alteration Permit, such as line of approach, minimum bridge clearance and minimum culvert size and length, and anchoring on steep slopes. Bridges and culverts would be maintained to allow proper drainage and limit sediment delivery to area streams."

# 6.6 Actions Affecting Plant and Animal Populations (40 CFR Section 230.75)

The WHMP (Tetra Tech 2021b) describes Perpetua Resources' plan to rehabilitate, restore and enhance upland wildlife habitats, including those previously disturbed by historical mining and wildfires and those designed to offset unavoidable impacts from the Project on wildlife habitats. In addition, Perpetua Resources' revised RCP (Tetra Tech 2021c) describes the concurrent reclamation during mining operation and restoration of habitat during closure of the mine as required by USFS and Idaho Department of Lands regulations and policies. The WHMP furthers the RCP with the goal of producing a net environmental benefit for wildlife habitat in the mine area by further enhancing the ecological functions and values beyond the reclamation requirements established by the USFS and Idaho Department of Lands.

SDEIS Table 2.4-12 includes the following environmental design features intended to protect plant and animal populations:

- Surface water withdrawal intake hoses would be situated so as to prevent generation of turbidity in bottom sediments during pumping.
- If sensitive plants or their propagules are required to be collected, collection methods and other information will be under the direction of the Forest or Regional Botanist.
- For projects or activities that include application of insecticides, herbicides, fungicides, or rodenticides, degrading effects on sensitive plant species will be mitigated.
- In revegetation and seeding projects in occupied Threatened, Endangered, Proposed or Candidate plant habitat, a Forest botanist shall be consulted to ensure appropriate species are used.
- Mitigate, through avoidance or minimization, management actions within known winter roosting sites of TEPC species if those actions would adversely affect the survival of wintering or roosting



populations. During project planning, determine sites, periods, and appropriate mitigation measures to avoid or minimize effects.

- Mitigate management actions within known winter roosting sites or hibernacula (bats) of Sensitive species if those actions would measurably reduce the survival of wintering or roosting populations. Sites, periods, and mitigation measures will be determined during project planning.
- To mitigate impacts to known nesting or denning sites of Management Indicator Species or Sensitive species, land clearing activities in areas where complete vegetation removal is necessary greater than 0.5 acre would not occur, to the extent possible, until after the bird breeding season (April 1 through July 30) for migratory and resident birds. This design feature does not apply to the mine site, road construction or maintenance, hazard tree felling, or the power line upgrades and construction.

SDEIS Table 2.4-13 includes the following environmental design features beyond regulatory requirements that have been proposed and committed to by Perpetua Resources intended to protect plant and animal populations.

- To protect fish residing in, using, or potentially using the Yellow Pine Pit lake (Chinook salmon, steelhead trout, bull trout, westslope cutthroat trout, mountain whitefish), Perpetua Resources has developed a Fish Salvage and Release Plan to isolate the lake from upstream movement into the lake and salvage and release fish. The Fish Salvage and Release Plan would be refined in coordination with federal, state, and tribal agencies. Perpetua Resources would, in consultation with the USFWS and the NMFS (the Services), design, install, and operate a fish trap and one or two weirs designed to allow fish to leave the Yellow Pine pit lake but not allow fish to migrate upstream past the trap to ensure that the fewest number of individual ESA-listed fish species are present in the pit lake when the draining process begins. The timing for providing the upstream barrier to fish movement would be designed to minimize the number of fish in the Yellow Pine pit lake, particularly larger bull trout. Fish captured in the Yellow Pine pit lake would be immediately released downstream of the upstream fish movement barrier or in another location determined by the appropriate regulatory agencies. The Yellow Pine pit lake would be partially drained to recover the remaining fish and relocate them prior to final draining of the pit lake.
- Access and Project haul road crossings of fish bearing streams would be designed such that structures installed or constructed allow fish passage.
- Perpetua Resources would be responsible for noxious weed control within areas disturbed by Project activities.
- Perpetua would salvage and preserve the growth media and seedbank materials of wetlands and riparian areas that would be impacted by the SGP. These salvaged soils, containing native seed banks, would be used to aid in establishment of wetland and riparian vegetation in the stream and wetland reclamation areas.

The SDEIS also includes the following statements regarding wildlife protections:

- Chapter 2.4.9
  - "Lighting BMPs would be used to reduce indirect effects on sensitive wildlife species."
  - "Noise-reduction strategies would be used to reduce indirect effects on bald eagles."
- Chapter 4.12.2.2
  - Potential Project-related sediment impacts on fish would include temporary turbidity increases during runoff events and localized deposition of fine sediment in stream channels.



Turbidity increases during runoff events have the potential to temporarily change fish behavior but are unlikely to be severe enough, relative to baseline fluctuations, to cause fish mortality or health impacts.

- The effects of the Proposed Action on sediment and turbidity on Chinook salmon, steelhead, bull trout, and westslope cutthroat trout would be moderate, permanent, and localized.
- Chapter 4.13.2.2
  - All staff and contractors would be trained to reduce wildlife collisions in modeled habitat known to support NIDGS populations.

### 6.7 Actions Affecting Human Use (40 CFR Section 230.76)

As stated in SDEIS Executive Summary, both action alternatives would result in impacts to recreation access, settings, opportunities, use, facilities, and recreation-related special use permits. The Project would remove the mine area from recreation use and alter the recreation setting in the surrounding area due to visual changes and noise. Construction of Project facilities may have temporary impacts to recreation (access, opportunities, use) and may alter the recreation setting of the areas within and adjacent to these facilities. The Project would also affect access to operating areas of three outfitters and guides, affect their ability to provide activities, and may degrade customer's recreation experiences.

Unlike the Proposed Action, impacts from use of the Johnson Creek Route under the Johnson Creek Route Alternative would continue through operations and closure/reclamation instead of ending once the Burntlog Route was completed (except for impacts from road closures as these would not occur during operations or closure/reclamation). The maintenance facility would be located at Landmark, increasing recreation impacts in that area. Impacts to recreation in the winter from the Johnson Creek Route would be similar to the Proposed Action, except plowing of Johnson Creek Road and grooming of the over-snow vehicle route along Johnson Creek Road would continue through closure and reclamation. In addition, under the Johnson Creek Route Alternative, the Johnson Creek over-snow vehicle route would be longer. After reclamation under the Johnson Creek Route Alternative, Stibnite Road improvements would remain and could increase access for more vehicles and affect the recreation setting.

# 6.8 Other Actions (40 CFR Section 230.77)

### 6.8.1 Water Quality

### 6.8.1.1 Surface Water

Streams that run through areas proposed for mining related disturbance would be diverted to prevent generation of contact water or commingling of contact and non-contact water, keeping clean water clean; and to prevent flooding of mine facilities by runoff generated off site.

Streams would be temporarily diverted around mine site facilities within constructed surface water channels. Diversion channel segments constructed in erodible materials would be lined with riprap or other erosion-resistant lining to prevent erosion. Rock-cut channels would be constructed on steep slopes and in areas with shallow or at-surface bedrock, would have low erosion potential and not require riprap lining. Channel segments constructed over fill or excavated in permeable materials would additionally be lined with a geosynthetic liner to minimize seepage. A geotextile and/or transition layer of sand/gravel followed by riprap or similar would be placed over the liner for erosion



protection. Certain diversion sections would be piped as dictated by terrain or the need to limit warming of water.

### 6.8.1.2 Groundwater

Groundwater not permitted for a beneficial use (seeps and springs) would be diverted away from mine facilities. Contact water (groundwater pumped from alluvial or bedrock wells or from pit dewatering) would be treated to protect water quality.

### 6.8.2 Water Temperature

During mine operations, summer low flows in perennial diversion channels around the TSF impoundment and buttress (Meadow Creek), Yellow Pine pit (Hennessy Creek and EFSFSR tunnel), and West End pit (West End Creek) would be piped underground as a design feature to maintain cold stream temperatures. Eight- to 12-inch-diameter pipes would be installed under the diversion channels in the riprap channel lining or under the adjacent access road to carry low flows. The low-flow pipe would be sized to convey August baseflow. Stream flow would enter pipes through inlets at the same locations stream and tributary inflows are diverted into the constructed channel. Some diversions, such as portions of Hennessy and West End Creeks, and EFSFSR tunnel, would be entirely underground, in which case conduits would be larger and sized for high flows.

### 6.9 Discussion

Any draft or final permit issued for the SGP will include general and special conditions addressing specific actions necessary to ensure minimization of adverse project related impacts, if necessary, beyond those identified here, in the ModPRO2 (Perpetua Resources 2021), or the Project mitigation and monitoring documents including the CMP (Tetra Tech 2023), FMP (Brown and Caldwell, McMillen Jacobs, and BioAnalysts 2021a), FOMP (Brown and Caldwell, McMillen Jacobs, and BioAnalysts 2021b), WHMP (Tetra Tech 2021b), and RCP (Tetra Tech 2021c). With the application of EDFs, mitigation actions, and special permit conditions to avoid, minimize, and compensate for adverse effects on the aquatic ecosystem, the Project would comply with the factors of the Guidelines described in **Sections 6.1 through 6.8**.



# Section 7

# Determination of Cumulative Effects on the Aquatic Ecosystem

According to 40 CFR Part 1508.7, cumulative impacts are the impacts on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative effects of the Project are detailed in SDEIS Chapter 5. Information from the SDEIS cumulative effects analysis regarding impacts to the aquatic ecosystem are summarized below.

# 7.1 Surface Water and Groundwater Quantity

Past and present actions that may have impacted water quantity through short-term water use include historical mining and reclamation activities in the area, as well as the Golden Meadows Exploration Project, which requires water for borehole drilling and other purposes. The active Valley County Quarry (located near the village of Yellow Pine and about 7 miles to the west of the Project area) may require some groundwater consumption, but since the quarry is located in a different subwatershed from the Project that is outside the SDEIS cumulative effects analysis area (CEA), it would not contribute to cumulative groundwater quantity impacts (USFS 2022a).

There are no reasonably foreseeable future actions (RFFAs) that have or would affect surface water and groundwater quantity in the CEA. In making this determination, a number of other nearby projects that have the potential to affect surface water and groundwater quantity were considered. These include Big Creek area's small-scale hydroelectric projects plus the Morgan Ridge Exploration Project and Stallion Gold Horse Heaven Project. Although these projects could affect the surface water and groundwater systems within their respective watersheds, activities identified to date are located within a different sub-watershed from the Project and lack direct communication via waterways to combine and result in cumulative water quantity effects (USFS 2022a).

# 7.2 Surface Water and Groundwater Quality

Past and present actions that have, or are currently, affecting surface water quality include development projects, transportation projects, mineral exploration and mining activities, and mine closure and reclamation projects. Past and present actions that have or are currently affecting the mine site groundwater quality mainly include historical mining activity and recent mineral exploration undertaken by Perpetua Resources (USFS 2022a).

### ModPRO2 (Proposed Action)

Compared to Alternative 3 (No Action Alternative), the ModPRO2 (Proposed Action) would remove additional legacy mining materials and further reduce their impacts on water quality but would also contribute new sources of mine waste material to the EFSFSR drainage. However, the new mine waste materials would be handled with current technologies and design features (e.g., liner and cover systems) to reduce their impacts. Other RFFAs in the SDEIS surface water and groundwater quality CEA would mainly contribute sediment loading to adjacent streams. Although most of these



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future actions would likely have sediment control measures in place, the cumulative effect across the watershed may still include higher sediment loads in the EFSFSR and its tributaries.

### Johnson Creek Route Alternative

Compared to the No Action Alternative) and the ModPRO2 (Proposed Action), cumulative effects to stream sediment concentrations from RFFAs would be affected by mine access because the Johnson Creek Route Alternative would require all mine-related traffic during construction, operations, and reclamation to use the Johnson Creek Route. This would increase traffic on Johnson Creek Route during the mine operational and reclamation period, leading to potentially higher erosion rates from the road surface along the Johnson Creek Route. The cumulative effect from this change could combine with other planned activities in the Johnson Creek watershed to increase the sediment load in Johnson Creek. This consideration is especially important given that Johnson Creek Road primarily follows the course of Johnson Creek (USFS 2022a).

### No Action Alternative

Elevated arsenic and antimony concentrations would persist as a cumulative impact with inputs from other historical sources (e.g., SODA) and inputs from natural sources that would continue to cause contaminant loading to the environment and influence Meadow Creek and EFSFSR stream water quality.

Cumulative surface water quality impacts also could occur in the SDEIS surface water and groundwater quality CEA due to continuing surface exploration for the Golden Meadows Exploration Project. The continuation of approved exploration activities by Perpetua Resources could cumulatively increase stream sediment levels resulting from surface disturbance and erosion. Exploration activities also could cause cumulative surface water quality impacts through accidental spills of diesel, gasoline, and jet fuel stored in the Project area in aboveground tanks.

# 7.3 Wetlands and Riparian Resources

The SDEIS wetlands and riparian resources CEA is the same extent as the analysis area for direct and indirect impacts to these resources (SDEIS Section 4.11.2), which is the watersheds containing the Project components (displayed on SDEIS Figure 3.11-1).

### ModPRO2 (Proposed Action)

The ModPRO2 (Proposed Action) would result in temporary and permanent losses of approximately 119.8 acres of wetlands in the SDEIS mine site focus area, 76.3 acres outside the mine site, and 1,054.4 wetland functional units (375.9 of which would be high-value functional units) (USFS 2022I). Revised numbers on WOTUS impacts are summarized in **Appendix A** and **Section 4** above. As described in the CMP (Tetra Tech 2023), compensatory wetland mitigation would replace all permanently lost wetland acreages and functions, and therefore this alternative would not contribute to cumulative losses of wetland acreages or functions in the wetland and riparian resources cumulative effects analysis area.

### Johnson Creek Route Alternative

The Johnson Creek Route Alternative would result in temporary and permanent losses of approximately 119.8 acres of wetlands at the mine site, 71.2 acres outside the mine site, and 1,028.3 wetland functional units (370.6 of which would be high-value functional units) (USFS 2022I). As stated in the SDEIS, it is assumed that required compensatory wetland mitigation would replace all permanently lost wetland acreages and functions, and therefore this alternative would not



contribute to cumulative losses of wetland acreages or functions in the wetland and riparian resources CEA (USFS 2022a).

### No Action Alternative

No new impacts to wetlands would occur. Existing elevated arsenic, antimony, and mercury concentrations would continue to contribute to contaminant loading to surface water, affecting adjacent and downstream wetlands. Perpetua Resources would continue to comply with reclamation and monitoring commitments included in the applicable Golden Meadows Exploration Project Plan of Operations (Midas Gold 2011) and Environmental Assessment (USFS 2015), which includes reclamation of the drill pads and temporary roads by backfilling, re-contouring, and seeding using standard reclamation practices. However, as described in the Golden Meadows Environmental Assessment (USFS 2015), the exploration and subsequent reclamation activities would have only a small direct effect on wetland and riparian resources, as the disturbance footprint is confined to exploration holes (USFS 2022a).

### 7.4 Fish Resources and Fish Habitat

Cumulative effects consider the range of existing and foreseeable activities and their potential effects with respect to fish and aquatic habitat when combined with the potential direct and indirect impacts of the Project. Past and present actions that have, or are currently, affecting fish and aquatic habitat include past and current mining activities (including exploration), infrastructure projects, ongoing USFS management projects, recreation, fishing, transportation projects, water diversions, hydropower projects, and wildland fires (USFS 2022a).

RFFAs that could cumulatively contribute to fisheries and aquatic habitat impacts in the SDEIS fish resources and fish habitat analysis area include:

- South Fork Restoration and Access Management Plan (RAMP)
- East Fork RAMP
- Granite Meadows
- Stallion Gold Horse Heaven Project
- Burntlog Route Geophysical Investigation
- Stibnite ASAOC

### ModPRO2 (Proposed Action)

RFFAs with potential cumulative impacts to fish resources and fish habitat are described in SDEIS Table 5.1-2. These RFFAs would occur in the same watershed and are expected to have similar types of impacts to fish and aquatic habitat as described for the ModPRO2, including increases in sediment and stream temperatures, stream flow reductions, and stream channel changes. However, these RFFAs appear to be at a smaller scale than the Project, and therefore the RFFA impacts would be less. These RFFAs could also have beneficial effects on fish and aquatic habitat in the long-term (USFS 2022a).

The South Fork RAMP and the East Fork RAMP include numerous actions related to watershed reclamation within the SFSR watershed and are therefore expected to have a long-term beneficial effect on habitat conditions for fish. The PNF's Wildlife Conservation Strategy would affect fish because one of its objectives is to actively reclaim or maintain conditions for sensitive fish and CWA 303(d) listed impaired waterbodies. Cumulative effects from large-scale management of Forest vegetation could include short-term disturbance of fish habitats and increases in sediment; but would be beneficial in the long-term. SDEIS Table 5-12-1 provides a general description of effects on



fish and aquatic resources from the other types of projects that are expected to occur in the SDEIS fish resources and fish habitat CEA (USFS 2022a).

When combined with the potential impacts and duration of the ModPRO2, the duration and scale of cumulative impacts on fish and aquatic habitat would be larger because all these actions would occur during the same time period. The resulting cumulative effect on fish and aquatic habitat in the SDEIS fish resources and fish habitat CEA would be temporal losses or degradation of habitat and behavioral disturbances, along with some long-term beneficial effects from habitat improvements (USFS 2022a).

### Johnson Creek Route Alternative

The cumulative effects and RFFAs discussed for the ModPRO2 (Proposed Action) would also occur under the Johnson Creek Route Alternative. The use of the Johnson Creek Route under the Johnson Creek Route Alternative rather than the construction of the Burntlog Route under the ModPRO2 would increase the risk of spills and sedimentation in Johnson Creek and the EFSFSR. Therefore, the cumulative effects from the Johnson Creek Route Alternative would be greater in degree with regards to spills and sediment compared to the ModPRO2 but would be comparable with regard to other effects (USFS 2022a).

### No Action Alternative

Elevated arsenic and antimony concentrations would persist as a cumulative impact with inputs from other historical sources (e.g., SODA) and inputs from natural sources that would continue to cause contaminant loading to the environment and influence Meadow Creek and EFSFSR water quality. Cumulative impacts to fisheries also could occur in the Project area due to continuing surface exploration for the Golden Meadows Exploration Project. These previously approved activities include construction of approximately 0.32 mile of temporary roads to access a total of 28 drill sites, construction of 182 drill pads, and drilling on both USFS and private lands at and in the vicinity of the Project. The continuation of approved exploration activities in the Project Area by Perpetua Resources could cumulatively increase stream sediment levels resulting from surface disturbance and erosion. Exploration activities also could cause cumulative surface water quality impacts through accidental spills of diesel, gasoline, and jet fuel stored in the Project area in aboveground tanks. Similarly, exploration activities associated with the Stallion Gold Horse Heaven Project could contribute as well.



# Section 8

# Determination of Secondary Effects on the Aquatic Ecosystem

Secondary effects are effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill material. Examples of secondary effects on an aquatic ecosystem include fluctuating water levels in an impoundment and downstream associated with the operation of a dam, septic tank leaching and surface runoff from residential or commercial developments on fill, and leachate and runoff from a sanitary landfill located in WOTUS. Activities to be conducted on features land created by the discharge of dredged or fill material in WOTUS may have secondary impacts within those waters which should be considered in evaluating the impact of creating those features. There is significant overlap between indirect effects, as defined in NEPA, and secondary effects as defined in the Guidelines. Secondary or indirect effects of the Project are detailed in SDEIS Section 4. Information from the SDEIS indirect effects analysis regarding impacts to the aquatic ecosystem are summarized below.

# 8.1 Surface Water and Groundwater Quality

Secondary impacts to surface water and groundwater quality are detailed in the Water Quality Specialist Report (USFS 2022e).

### ModPRO2 (Proposed Action)

The Project would have the potential to impact wetland and riparian area water quality, primarily associated with sedimentation and traffic-related incidents, including those along the Burntlog Route which would be constructed under the ModPRO2 (Proposed Action). These effects would be minimized through best management practices, spill prevention, and spill response measures. Effects of sedimentation and fugitive dust would be within normal range of properly maintained Forest Service roads (USFS 2022a).

### Johnson Creek Route Alternative

Water quality effects on wetlands and riparian areas would be the same as under the ModPRO2 (Proposed Action), though under the Johnson Creek Route Alternative, no construction or use of Burntlog Route would eliminate water quality impacts in that area but would increase the impacts along the Johnson Creek Route that is parallel and near EFSFSR and Johnson Creek (USFS 2022a).

### No Action Alternative

Secondary impacts to surface water and groundwater quality under Alternative 3 (No Action Alternative) are expected to be consistent with existing conditions (USFS 2022a).

# 8.2 Wetlands and Riparian Resources

Project construction and operation could affect long-term wetland and riparian productivity by changing groundwater hydrology, increasing sedimentation from erosion and increasing the amount of pollutants and fine-grained sediments delivered to receiving waters (including wetlands) via



surface water runoff. Mitigation measures required by both the USFS and the USACE are expected to reduce the amount of sedimentation-caused wetland impacts (USFS 2022a). Compensatory mitigation for wetland impacts is described in the CMP (Tetra Tech 2023).

Long-term impacts on wetland productivity could result from indirect impacts on wetlands adjacent to the mine site or new/improved access roads. Fragmentation, disruption of wetland hydrologic inputs, and changes to vegetation composition would reduce the functional capacity of remaining wetlands, which would permanently reduce wetland productivity in the area (USFS 2022a). Wetland fragmentation impacts across the Project alternatives are cited below.

### ModPRO2 (Proposed Action)

Thirty-nine wetlands would be crossed by new roads (USFS 2022a).

### Johnson Creek Route Alternative

Six wetlands would be crossed by new roads (USFS 2022a).

### No Action Alternative

The Project would not be approved and no mining, ore processing, or related activities would occur. As such, no Project roads would be constructed that cross wetlands.

### 8.3 Fish Resources and Fish Habitat

The Project would impact fish habitat and result in secondary effects to fish species, including federally listed fish species and aquatic habitat and/or critical habitat within and downstream of the Project area. The following secondary impacts to fish resources and fish habitat would occur under the ModPRO2 (Proposed Action) and the Johnson Creek Route Alternative:

- Diversion of stream channels, elimination of the Yellow Pine Pit lake, the fish tunnel, and new barriers would affect fish occupancy and habitat during construction and operations (USFS 2022a).
- During operations, summer maximum stream water temperatures in Meadow Creek and the EFSF are predicted to decrease by up to 3.7 °C due to diversion of Meadow Creek around the TSF and TSF Buttress. Upon closure and routing of Meadow Creek to the restored stream channel on top of the reclaimed TSF, summer maximum stream temperatures are predicted to increase by up to 6.8 °C due to the time needed for revegetation to result in riparian shading of the stream. Over time, summer maximum stream temperatures are predicted to decline to near or below baseline conditions except for the Meadow Creek upstream of East Fork Meadow Creek which is predicted to remain 1.1 °C above existing conditions (USFS 2022a).
- Removal of the box culvert in the EFSFSR would provide additional access to approximately 6 km of intrinsic potential habitat for Chinook salmon and steelhead, with the removal of the barrier at the Yellow Pine Pit lake cascade adding more than an additional 2.5 km for Chinook salmon. Removal of these barriers will improve access to nearly 33 km of habitat for bull trout and westslope cutthroat trout, thus improving genetic integration. Removal of barriers in the downstream end of Fiddle Creek would provide an additional 2 km of habitat for bull trout and westslope cutthroat trout. Creation of a partial gradient barrier in East Fork Meadow Creek would provide additional access to habitat for bull trout and westslope cutthroat trout. The removal and addition of barriers in Meadow Creek would ultimately result in a reduction in access to the Meadow Creek headwaters (USFS 2022a).



- Changes in stream flow (USFS 2022a):
  - EFSFSR Upstream from Sugar Creek: up to 24.8% flow reduction during Project operations; no flow reduction post-closure.
  - EFSFSR at Stibnite: up to 20.4 percent flow reduction during Project operations; no flow reduction post-closure.
  - EFSFSR upstream from Meadow Creek: up to 3.8 percent flow reduction during Project operations; up to 2 percent flow reduction post-closure.
  - Meadow Creek: up to 36.4 percent flow reduction during Project operations; less than 1% flow reduction post-closure.

Differences in potential secondary impacts to fish resources and fish habitat across the Project alternatives are described below.

### ModPRO2 (Proposed Action)

Sediment and turbidity from construction of temporary roads and transmission lines have the potential to cause secondary impacts to fish resources and fish habitat. Under the ModPRO2 (Proposed Action), access roads would cross 43 streams and transmission lines would cross 37 streams. During construction, 6.5 miles (18 percent of routes) would be within 100 feet of streams. During operations, 1.56 miles (4 percent) of routes would be within 100 feet of streams. Sedimentation and fugitive dust from these routes are predicted to be within the normal range of properly maintained USFS roads. Effects of chemical contaminants associated with potential spills would be managed via application of USFS requirements and Project design features (SDEIS Tables 2.4-12 and 2.4-13) to minimize effects. Additionally, culvert replacements on the Burntlog Route may increase or re-establish habitat access for native and non-native fish species (USFS 2022a).

### Johnson Creek Route Alternative

Potential secondary impacts to fish resources and fish habitat due to sediment and turbidity from construction of temporary roads and transmission lines under the Johnson Creek Route Alternative are the same as for the ModPRO2 (Proposed Action), except 6.5 miles (18 percent of routes) would be within 100 feet of streams during operations under Alternative 2, compared to 1.56 miles (4 percent) of routes under the ModPRO2. Effects from spills would be potentially more significant under the Johnson Creek Route Alternative due to the greater proximity to streams compared to the ModPRO2. The use of existing roads and culverts under Alternative 2 would limit potential changes to fish habitat access that would occur under the ModPRO2.

#### **No Action Alternative**

The Project would not be approved and no mining, ore processing, or related activities would occur. Physical stream structure, water temperatures, sediment and turbidity levels, contaminant spill risk, and accessibility and amount of available fish habitat would remain consistent with existing conditions.



# Section 9 Findings

# 9.1 Status of Other Authorizations and Legal Requirements

**Water Quality Certification**: It is anticipated that the IDEQ will review the Project pursuant to Section 401 of the CWA. A 401 Water Quality Certification for the Project has not been issued.

Coastal Zone Management Consistency Determination: The Project is not located in a coastal zone.

**Compliance with Section 106 of the National Historic Preservation Act**: Consultation and coordination with consulting parties to resolve adverse effects to historic properties in accordance with Section 106 of the National Historic Preservation Act are ongoing. A Programmatic Agreement is being developed by the USFS in discussions with the consulting parties to ensure that the requirements of Section 106 are satisfied. The USFS intends to complete the Programmatic Agreement in the same timeframe as the Final EIS and Record of Decision (USFS 2022a).

**Compliance with the ESA**: The USFS is consulting with the USFWS and NOAA (National Oceanic and Atmospheric Administration)/NMFS to comply with consultation procedures intended to satisfy their requirements under the ESA and NEPA. Informal Section 7 ESA Consultation with the USFWS is ongoing (USFS 2022a). The USFS is communicating and collaborating with Perpetua Resources, USFWS, NOAA/NMFS, and other state and local agencies to gather important information while developing the Project's biological assessment (BA). Once the final BA is submitted to the USFWS and NOAA/NMFS, and the two federal agencies accept the BA as complete, Section 7 formal consultation will begin to address potential effects to federally listed species.

**Compliance with the Clean Air Act**: IDEQ determined that the Project would not require a Title V operating permit. This determination was based on the complete air emissions inventory for stationary sources submitted by Perpetua Resources as part of its application for an air quality permit. On February 18, 2022, Perpetua Resources submitted a Permit to Construct application and emission inventory. On June 17, 2022, IDEQ issued a final Permit to Construct and Statement of Basis stating that the Project will not require a Title V operating permit (USFS 2022a).

**Other State and/or local authorizations**: A list of additional key permits and/or authorizations likely required for the Project is provided is SDEIS Table 1.7-2.

# 9.2 Evaluation of Compliance with 404(b)(1) Guidelines (restrictions on discharge, 40 CFR 230.10).

There are no available, practicable alternatives having less adverse impact on the aquatic ecosystem and without other significant adverse environmental consequences that do not involve discharges into WOTUS or at other locations within these WOTUS. The No Action Alternative is practicable but it would not meet the basic Project purpose (**Section 1.3**) or the overall Project purpose (**Section 1.5**). The Johnson Creek Route Alternative is practicable and would result in fewer acres of direct impacts to WOTUS than the ModPRO2 (Proposed Action), but the Johnson Creek Route Alternative has potential risks of adverse impacts to the aquatic ecosystem, as outlined in SDEIS Section 2.7.

Although the Project is not water-dependent (**Section 1.4**), the Project disturbance footprint includes special aquatic sites, e.g., wetlands. However, no practicable alternative sites are available because


the Project footprint location is constrained by the locations of the Yellow Pine, Hangar Flats, and West End ore deposits. There are no practicable alternatives for mining gold, silver, and antimony from these ore deposits in a manner that would avoid special aquatic sites. Ore bodies are located beneath streams and wetlands where surface mining techniques are the only practicable methods for meeting the Project need.

The Project would not violate state water quality standards because projects that may result in a discharge to WOTUS require Water Quality Certification under Section 401 of the CWA that the discharge is consistent with the CWA and applicable water quality standards. IDEQ is the regulatory authority for Section 401 permitting in Idaho. The IDEQ must grant (with or without conditions), deny, or waive Section 401 certification for any project in Idaho that requires a federal permit or license under the CWA before the federal permit or license can be granted, including the Section 404 permit issued by the USACE. Perpetua Resources would obtain state water quality standard certification for the Project.

The Project is not expected to violate toxic effluent standards under Section 307 of the CWA. Discharge of toxic effluent is not anticipated. Project procedures and EDFs described in SDEIS Tables 2.4-12 and 2.4-13 include 1) locating and designing waste facilities using best conventional geochemical and geotechnical predictive tools to ensure mass stability and prevent the release of acid or toxic materials; 2) transporting hazardous materials on the Forest in accordance with 49 CFR 171 in order to reduce the risk of spills of toxic materials and fuels during transport through RCAs; 3) locating new facilities for storage of fuels and other toxicants would be located outside of occupied Threatened, Endangered, Proposed, or Candidate plant habitat; 4) storing fuels and other toxicants or refueling sites within RCAs shall be approved by the responsible official and have an approved spill containment plan commensurate with the amount of fuel; and 5) removing all reagents, petroleum products, solvents, and other hazardous or toxic materials from the site and disposing of the materials according to applicable state and federal regulations (USFS 2022a).

The Project is not expected to jeopardize endangered species or their critical habitat. The USFS has preliminarily determined that the Project 1) would affect but would not adversely affect Canada lynx and NIDGS; 2) would impact whitebark pine but would not jeopardize the continued existence of the species; and 3) may directly impact wolverine individuals and habitat resulting in adverse impacts but would not jeopardize the continued existence of the species (USFS 2022a).

Regarding threatened and endangered fish species, following closure and reclamation, the overall net effect from the Project would be a net increase in available habitat for Chinook salmon, including a beneficial effect on access to critical habitat. However, flows and temperatures make the additional habitat less optimal. The Project is expected to result in minor, long-term, and localized impacts to the steelhead critical habitat, though the net effect of the Project would be an increase in both the quantity and quality of steelhead trout habitat. Critical habitat for bull trout in the active mine area would be impacted by various activities including active mining, diversions, barrier removal, and stream restoration. An existing barrier to bull trout in Meadow Creek upstream from East Fork Meadow Creek would be removed but would be replaced by a pipeline along the TSF during operations and then a gradient barrier post-closure. This barrier would block passage to the headwaters of Meadow Creek, but not eliminate suitable habitat for any bull trout currently present. Overall, the effects of the Project on bull trout access to critical habitat within the mine area would be major, permanent, and localized. The Project is expected to result in minor, permanent, and localized benefits to occupancy probability and the available habitat for occupancy potential for bull trout.



The Project would not impact marine sanctuaries. Therefore, the Project would not violate standards set by the Department of Commerce to protect marine sanctuaries.

The proposed Project discharge meets Guidelines testing criteria. As described in **Section 5.5.2**, fill material and RCM would be subject to physical and chemical testing to determine suitability for use, and acceptable metal/contaminant concentrations and sampling and testing methodology would be documented in a sampling and analysis plan developed prior to reclamation (USFS 2022a).

The proposed Project discharge is not expected to contribute to significant degradation of WOTUS. Adverse impacts to human health or welfare through effects on municipal water supplies, fish, shellfish, wildlife, and special aquatic sites would be avoided, minimized, and/or addressed with compensatory mitigation. There are no active domestic groundwater wells used for residential drinking water within 15 miles of the SGP (USFS 2022a). Because groundwater is not currently used as a public drinking water source at the SGP and is assumed to be unlikely to be used as a drinking water source in the future, the AATSDR Public Health Assessment conducted for the existing mine site eliminated the groundwater as drinking water pathway from consideration as a public health concern (ATSDR 2003). Impact avoidance and minimization measures for fish and aquatic and terrestrial wildlife and habitat are described in Section 5.2. Impacts to streams, wetlands, and other special aquatic sites are discussed in **Section 5.3**. These impacts would be partially offset through closure and reclamation activities described in SDEIS Section 2.4.7, with additional compensation achieved through mitigation actions detailed in the EMMP (Brown and Caldwell 2021a), FMP (Brown and Caldwell, McMillen Jacobs, and BioAnalysts 2021a), FOMP (Brown and Caldwell, McMillen Jacobs, and BioAnalysts 2021b), and CMP (Tetra Tech 2023). Project impacts to recreational, aesthetic, and economic values are described in SDEIS Sections 4.19 through 4.21 and summarized in Sections 5.4.2 through 5.4.4 of this document. Due to the changes in the recreation setting from Project operations, some visitors may choose to participate in recreation opportunities elsewhere in the area or the surrounding management areas where Project operations would not be visible or audible. Impacts on recreation opportunities at and around the Project would begin during construction and continue until the mine is decommissioned and the area reopened to dispersed recreation use. Some visitors may choose to remain at their displacement location rather than return to the Project area due to permanent changes in the recreation setting within the SDEIS Operations Area Boundary (USFS 2022a).

All appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem. Project EDFs were established to avoid and minimize impacts to the extent practicable. Project EDFs instituted based on prominent regulatory and Forest Plan requirements are listed in SDEIS Table 2.4-12. Project EDFs proposed by Perpetua Resources are listed in SDEIS Table 2.4-13.

## 9.3 Findings of Compliance or Non-compliance with the Restrictions on Discharge (40 CFR Section 230.12)

Perpetua Resources believes that **Section 4** describes appropriate and practicable conditions to mitigate Project pollution or adverse effects to the affected ecosystem. The impact avoidance, minimization, and compensatory mitigation actions described in **Section 4** are included as part of the ModPRO2 (Proposed Action) or will be required by special conditions of the DA permit or other Project permit authorizations. The ModPRO2 is the LEDPA.



# Section 10 Summary of Conclusions

Following its review of the environmental impacts evaluated in the SDEIS, the USFS identified the ModPRO2 (Proposed Action [named in the SDEIS as the 2021 MMP]) as their Preferred Alternative (USFS 2022a). The ModPRO2 and Alternative 2 (Johnson Creek Route Alternative) would reasonably accomplish the overall Project purpose, which is defined by the USACE in SDEIS Section 1.6.2 as "to mine gold, silver, and antimony from ore deposits associated with the SGP." Alternative 3 (No Action Alternative) would not meet the overall Project purpose.

#### The Selected Alternative is the LEDPA

Perpetua Resources believes that the ModPRO2 is the LEDPA that would meet the overall project purpose. Perpetua Resources believes that the ModPRO2 is the LEDPA, since it is a practicable alternative with less environmental impacts than the Johnson Creek Route Alternative because the ModPRO2:

- Reduces the geotechnical stability, hazardous materials transport, and public health and safety transportation risks during operations (2021 MMP: 26 landslides/rockfalls and 38 avalanche paths versus Johnson Creek Route Alternative: 45 landslides/rockfalls and 94 avalanche paths).
- Reduces potential for spill contamination, sedimentation, and turbidity to aquatic resources during operations (ModPRO2: 9 miles of travelway within 0.5 miles of streams, 37 stream crossings, 1.6 miles of travelway within 100 feet of streams versus Alternative 2: 27 miles of travelway within 0.5 mile of streams, 43 stream crossings, and 6.5 miles of travelway within 100 feet of streams).
- Reduces acres of WOTUS riparian areas lost within the SDEIS off-site focus area (ModPRO2: 299.5 acres versus the Johnson Creek Route Alternative: 352.6 acres).
- Reduces the volume of timber resources removed (ModPRO2: 595 acres versus the Johnson Creek Route Alternative: 733 acres), as well as acres of timberland permanently converted to non-productive land use (ModPRO2: 66 acres versus the Johnson Creek Route Alternative: 282 acres).
- Reduces public safety risks and potential accidents during operations (Johnson Creek Route Alternative has steeper topography and terrain requiring wider roads, more cut/fill sections and more switchbacks; traffic including heavy equipment would be routed through the village of Yellow Pine for the duration of the SGP; general public would utilize same roads as large mining equipment).
- Reduces potential impacts such as access to tribal fisheries restoration activities along Johnson Creek Road during operations.

Adverse impacts on the aquatic environment resulting from the Project would be compensated for by the mitigation actions described in the CMP (Tetra Tech 2023), which include a combination of mitigation bank credits and off-site mitigation through fish passage improvement in the North Fork Payette subbasin, permittee-responsible on-site mitigation within South Fork Salmon subbasin, and off-site mitigation in the Upper Lemhi River watershed within the Upper Salmon River subbasin. Stream and wetland mitigation would occur within the subbasin where the Project impacts occur.



#### No Significant Degradation

The proposed discharge under the ModPRO2 is not expected to contribute to significant degradation of WOTUS. Fill material will be free of contaminants. Physical and chemical testing of legacy materials would determine if the materials were suitable for construction uses and inform fill material placement determinations (USFS 2022a). Project reclamation and closure activities would rehabilitate WOTUS impacted during mining operations. Legacy material removal activities would likely result in overall improvement to the ecological functions and values of WOTUS compared to existing conditions. Surface water flow diversion of portions of the EFSFSR, Garnet Creek, Meadow Creek, Midnight Creek, and Hennessy Creek would be reclaimed and incorporated into constructed wetlands (USFS 2022a). Compensation for unavoidable and permanent loss of WOTUS resulting from the Project will be achieved through mitigation bank and permittee-responsible mitigation actions described in the CMP (Tetra Tech 2023).

All appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem. Project EDFs were established to avoid and minimize impacts to the extent practicable. Project EDFs instituted based on prominent regulatory and Forest Plan requirements are listed in SDEIS Table 2.4-12. Project EDFs proposed by Perpetua Resources are listed in SDEIS Table 2.4-13.

The proposed discharge, with the standard conditions placed on DA permits and other special conditions would comply with the guidelines promulgated by the Administrator of the EPA pursuant to Section 404(b) of the CWA.



## Section 11 Evaluation Responsibility

PREPARED BY:

**REVIEWED BY:** 

APPROVED BY:



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### Appendix A: Alternatives Comparison Spreadsheet of Alternatives Environmental Factors

Live spreadsheet provided under separate cover

