# Stibnite Gold Project

## Wetlands and Riparian Resources Specialist Report

**Prepared by:**
USDA Forest Service
Payette National Forest

**for:**
Payette and Boise National Forests

August 2022

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# List of Acronyms and Abbreviations

| | |
|---|---|
| AA | Assessment area |
| BMP | Best Management Practice |
| BNF | Boise National Forest |
| Boise Forest Plan | Boise National Forest Land and Resource Management Plan |
| BT | Bull trout |
| CFR | Code of Federal Regulations |
| CE | Categorical Exemption |
| CH | Chinook Salmon |
| CMP | Conceptual Mitigation Plan |
| CWA | Clean Water Act |
| DOC | U.S. Department of Commerce |
| East Fork SFSR | East Fork South Fork Salmon River |
| EA | Environmental Assessment |
| EIS | Environmental Impact Statement |
| EMMP | Environmental Monitoring and Management Plan |
| EPA | U.S. Environmental Protection Agency |
| ESA | Endangered Species Act |
| FHWA | Federal Highway Administration |
| Forest Service | U.S. Forest Service |
| FP | Forest Plan |
| GMS | Growth media stockpile |
| HDR | HDR, Inc. |
| HUC | Hydrologic Unit Code |
| IDAPA | Idaho Administrative Procedures Act |
| IDEQ | Idaho Department of Environmental Quality |
| IDFG | Idaho Department of Fish and Game |
| IDL | Idaho Department of Lands |
| IDT | Idaho Transportation Department |
| IDWR | Idaho Department of Water Resources |
| MMP | Modified Mine Plan |

| | |
|---|---|
| MWAM | Montana Wetland Assessment Method |
| MWH | MWH Americas, Inc. |
| NEPA | National Environmental Policy Act |
| NFS | National Forest System |
| NMFS | National Marine Fisheries Service |
| NOA | Notice of Availability |
| NOAA | National Oceanic and Atmospheric Administration |
| NWI | National Wetlands Inventory |
| OHWM | Ordinary high-water mark |
| OSHA | Occupational Safety and Health Administration |
| OSV | Over-snow vehicle |
| PAB | Palustrine aquatic bed |
| Payette Forest Plan | Payette National Forest Land and Resource Management Plan |
| PEM | Palustrine emergent |
| Perpetua | Perpetua Resources Idaho Inc. |
| PFO | Palustrine forested |
| PNF | Payette National Forest |
| PSS | Palustrine scrub-shrub |
| RCA | Riparian Conservation Area |
| RFFA | Reasonably Foreseeable Future Action |
| ROW | Right-of-way |
| SFSR | South Fork Salmon River |
| SGLF | Stibnite Gold Logistics Facility |
| SGP | Stibnite Gold Project |
| SODA | Spent ore disposal area |
| SOPA | Schedule of Proposed Actions |
| SPCC | Spill Prevention, Control and Countermeasure |
| ST | Steelhead Trout |
| TSF | Tailings Storage Facility |
| U.S. | United States |
| USACE | U.S. Army Corps of Engineers |

| | |
|---|---|
| USDA | U.S. Department of Agriculture |
| USFWS | U.S. Fish and Wildlife Service |
| USGS | U.S. Geological Survey |
| VHF | Very high frequency |
| WCT | Westslope Cutthroat Trout |
| WFLHD | Western Federal Lands Highway Division |
| WOTUS | Waters of the United States |

# 1.0 Introduction

The United States (U.S.) Department of Agriculture Forest Service (Forest Service) received the Stibnite Gold Project (SGP) Plan of Restoration and Operations, (Midas Gold Idaho, Inc. 2016) for review and approval in accordance with regulations at 36 Code of Federal Regulations (CFR) 228 Subpart A for the proposed SGP in central Idaho. A revised Plan, also known as ModPRO,[1] was submitted to the Forest Service in 2019 (Brown and Caldwell 2019). A further modified Plan, also known as ModPRO2,[2] was then submitted in October of 2021 (Perpetua 2021a). Midas Gold changed their name to Perpetua Resources Idaho Inc. (Perpetua[3]) in February 2021.

The SGP would consist of mining operations, including an open pit hard rock mine and associated processing facilities, located within Valley County in central Idaho on federal, state, and private lands (**Figure 1-1**). The SGP would produce gold and silver doré, and antimony concentrate, for commercial sale by Perpetua. The SGP would have a life (construction, operation, closure, and reclamation), not including post-reclamation monitoring, of approximately 20 years, with active mining and ore processing occurring over approximately 15 years.

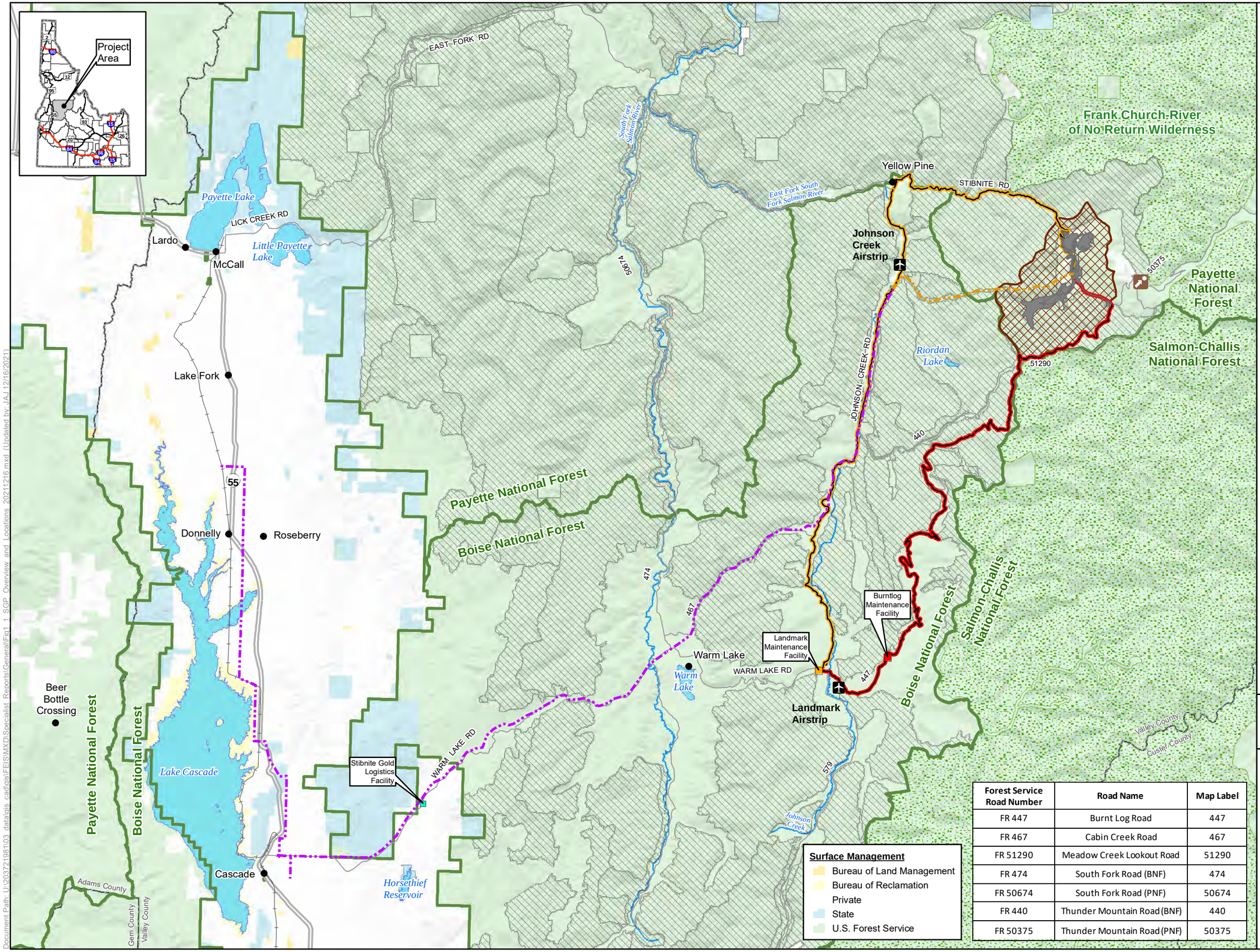
This specialist report describes the geographic extent and general conditions of wetlands, open waters, and riparian areas within the vicinity of the SGP under existing (baseline) conditions (**Section 6.0**). The potential effects that the SGP would have on these resources is then described in **Section 7.0**. In addition, to provide context to the discussion of riparian areas, this specialist report lists the quantity and type of streams within the vicinity of the SGP under baseline conditions and the amount of each type that would potentially be affected by the SGP. A full description of the baseline condition of streams and potential effects is provided in the Fisheries and Aquatic Habitat specialist report (Forest Service 2022a). Wetland and riparian systems are also influenced by underlying soils, hydrology, and vegetation. Detailed discussions of hydrology are provided in specialists reports for Water Quality and Water Quantity (Forest Service 2022b, 2022c, respectively). Soils are discussed in the Soils and Reclamation Cover Materials specialist report (Forest Service 2022d). Vegetation is discussed in the General Vegetation Communities, Botanical Resources, and Non-Native Plants specialist report (Forest Service 2022e).

Wetlands are defined in the Clean Water Act (CWA) regulations (33 Code of Federal Regulations (CFR) § 328.3) as, “Those 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 generally include swamps, marshes, bogs, and similar areas.” The Boise National Forest (BNF) Land and Resource Management Plan (Boise Forest Plan; Forest Service 2010) and the Payette National Forest Land and Resource Management Plan (Payette Forest Plan) (Forest Service 2003) define riparian areas as, “Terrestrial areas where the vegetation complex and microclimate conditions are products of the combined presence and influence of perennial and/or intermittent water, associated with high water tables, and soils that exhibit some wetness characteristics.” Riparian areas are located along streams and rivers providing a transition zone between aquatic conditions and upland conditions.

[1] Associated project documents may reference the Revised Plan as the ModPRO.

[2] Associated project documents may reference the Modified Plan as the ModPRO2.

[3] Documents provided by Perpetua prior to the February 2021 name change will still be cited and referenced as Midas Gold.




**LEGEND**

**Project Components**
- SGP Features
- Operations Area Boundary

**Access Roads and Trail System**
- Burntlog Route *
- Johnson Creek Route

**Utilities**
- Upgraded Transmission Line
- New Transmission Line

**Offsite Facilities**
- Burntlog Maintenance Facility *
- Landmark Maintenance Facility **
- Stibnite Gold Logistics Facility

**Other Features**
- U.S. Forest Service
- Wilderness
- IRA and/or Forest Plan Special Area
- County
- City/Town
- Monumental Summit
- Airport/Landing Strip
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir

**Surface Management**
- Bureau of Land Management
- Bureau of Reclamation
- Private
- State
- U.S. Forest Service

| Forest Service Road Number | Road Name | Map Label |
|---|---|---|
| FR 447 | Burnt Log Road | 447 |
| FR 467 | Cabin Creek Road | 467 |
| FR 51290 | Meadow Creek Lookout Road | 51290 |
| FR 474 | South Fork Road (BNF) | 474 |
| FR 50674 | South Fork Road (PNF) | 50674 |
| FR 440 | Thunder Mountain Road (BNF) | 440 |
| FR 50375 | Thunder Mountain Road (PNF) | 50375 |

* Associated with 2021 MMP only
** Associated with Johnson Creek Route Alternative only
Note:
The McCall – Stibnite Road (CR 50-412) consists of Lick Creek Road, East Fork South Fork Salmon River Road (East Fork Road) and Stibnite Road.

0 2 4 Miles
1 inch = 4 miles when printed at 11x17

# Figure 1-1
# SGP Overview and Location
# Stibnite Gold Project
# Stibnite, ID

*Base Layer:*
*Other Data Sources: Perpetua; State of Idaho Geospatial Gateway (INSIDE Idaho); Boise National Forest; Payette National Forest*

Map Date: 12/16/2021

Document Path: U:\2037216\1\03_data\gis_cad\gis\FEIS\MXD\Specialist Reports\General\Fig1_1_SGP_Overview_and_Locations_20211216.mxd (Updated by: JAJ 12/16/2021)

Wetlands and riparian resources form a connection between terrestrial and aquatic ecosystems. As ecotones (i.e., a transition area between two adjacent ecological communities) they have features of both terrestrial and aquatic environments. They support a broad array of functions and services, including, but not limited to flood attenuation, sediment filtration, nutrient/toxicant uptake, biological diversity, recreation and cultural services, and climate regulation (Keddy 2010). A detailed list and description of wetland and riparian functions is presented in **Section 6.1.3.1** and **Appendix A**. Wetlands and riparian areas are essential to many fish, amphibians, birds, invertebrates, and other wildlife (Forest Service 2003, 2010). For example, approximately 10 percent of Idaho's birds are completely dependent upon these habitats and are rarely found elsewhere (Murphy 2012).

# 2.0 Alternatives, including the Proposed Action

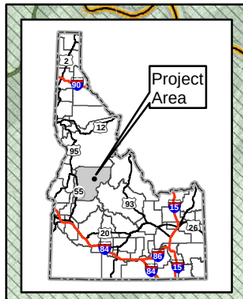
The SGP 2021 Modified Mine Plan (MMP) Alternatives Report (Forest Service 2022f) contains the details of the alternatives that are being considered and fully analyzed in this report. For reader usability, the alternatives are briefly summarized here.

## 2.1 No Action Alternative

The No Action Alternative provides an environmental baseline for comparison of the action alternatives. Under the No Action Alternative, the mining, ore processing, and related activities under the 2021 MMP or the Johnson Creek Route Alternative would not take place. In addition, certain legacy and existing mining impacts would be addressed as directed in the 2021 Administrative Settlement Agreement and Order on Consent (ASAOC), including installation of stream diversion ditches designed to avoid contact of water with sources of contamination and removal of development rock and tailings currently impacting water quality. However, existing and approved activities (i.e., approved exploration activities and associated reclamation obligations) would continue and Perpetua would not be precluded from subsequently submitting another plan of operations pursuant to the General Mining Law of 1872.

## 2.2 2021 MMP

The 2021 MMP is based upon Perpetua's Revised Plan (ModPRO2) and is considered the Proposed Action. The description of this alternative has been updated per the Revised Plan submitted in 2021 (Perpetua 2021a). The SGP operations footprint has been modified but would still be within the previously identified Operations Area Boundary (**Figure 2-1**).




**Surface Land Management**
- Private
- U.S. Forest Service

North Security Gate
Stibnite Lake
West End Pit
Yellow Pine Pit & Backfill
Midnight Backfill
Midnight Pond
Growth Media Stockpile
Crusher ROM Stockpile Area
Scout ROM Stockpile Area
Process Plant Area
Substation
Explosives Facility
Cell Tower
Water Treatment Plant
Laydown
Truck Shop Area
Hangar Flats Pit Backfill, & Stockpiles
Transmission Line
TSF Embankment
TSF Buttress
TSF Impoundment
SODA Pond
Radio Communications Tower
Main Gate
Worker Housing Facility
Growth Media Stockpile
Radio Communications Tower

East Fork South Fork Salmon River
Sugar Creek
West End Creek
Midnight Creek
Hennessy Creek
Fiddle Creek
Garnet Creek
Rabbit Creek
Blowout Creek
Meadow Creek
STIBNITE RD

T19NR09E
T19NR10E
T18NR09E
T18NR10E

Frank Church-River of No Return Wilderness
Boise National Forest
Payette National Forest
Payette National Forest
Salmon-Challis National Forest

## LEGEND

**Project Components ***

**SGP Features**
- Pit Backfill
- Growth Media Stockpile
- Mining Pit
- Laydown
- Plant Site
- TSF Buttress
- TSF Liner
- Alluvial Stockpile
- Workers Housing
- Stockpile
- Explosive Facility
- Operations Area Boundary
- Patented Claim Boundary
- Tailings Pipeline
- Clean Water Diversion **
- Clean Water Diversion - Piped **
- East Fork South Fork Salmon River Tunnel ***
- Stream ****
- Pond
- Stibnite Lake
- Light Vehicle Road
- Haul Road
- Helicopter Pad

**Access Roads**
- Burntlog Route
- Johnson Creek Route
- Cell Tower Access Road
- Public Access Road *****

**Utilities**
- Transmission Line
- Substation ******
- New Cell Tower
- Existing Communication Tower

**Other Features**
- U.S. Forest Service
- Wilderness
- IRA and Forest Plan Special Areas
- Monumental Summit
- Road

* Project Components are associated with all Alternatives
** Some surface clean water diversions are not discernible at this figure scale (e.g., the diversions associated with the TSF/buttress north, Fiddle culvert, Midnight Outfall, Scout ROM). Please refer to Figures 2.4-14 and 2.4-15 which provide greater detail regarding the Water Management Plan and its facility/diversion locations.
*** The East Fork South Fork Salmon River Tunnel would only be utilized as a contingency to manage high flows upon completion of the restoration of the East Fork SFSR across the backfill in the Yellow Pine Pit.
**** Perennial streams are not depicted for the entire map area. Only perennial streams within the Operations Area Boundary are depicted.
***** Public Access Road associated with 2021 MMP
****** Substation locations are approximate.

0 0.35 0.7 Miles
1 inch = 0.7 miles when printed at 11x17

# Figure 2-1
# Mine Site Layout
# Stibnite Gold Project
# Stibnite, ID

*Base Layer: Hillshade derived from LiDAR supplied by Midas Gold*
*Other Data Sources: Perpetua; State of Idaho Geospatial Gateway (INSIDE Idaho); Boise National Forest; Payette National Forest*

Map Date: 4/10/2022

Document Path: U:\2037\216\103_data\gis_cad\gis\FEIS\MXD\Specialist Reports\General\Fig2_4-2_SGP_MineSite_Layout_20220407.mxd (Updated by JAJ 4/6/2022)

The following mine components would be common to the action alternatives:

- Mine pit locations, areal extents, and mining and backfilling methods
- Transportation management on existing and proposed roads
- Pit dewatering, surface water management, and water treatment
- Ore processing
- Lime generation
- Tailing storage facility (TSF) construction and operation methods
- TSF Buttress construction methods
- Water supply needs and uses
- Management of mine impacted water and stormwater runoff
- Electrical transmission lines
- Stibnite Gold Logistics Facility (SGLF)
- A road maintenance facility
- Surface and underground exploration
- SGP worker housing facility

For access, the 2021 MMP would utilize Warm Lake Road, Johnson Creek Road, and Stibnite Road during construction of the Burntlog Route; then once constructed, the Burntlog Route would be utilized during operations and reclamation. The actions proposed under the 2021 MMP would take place over a period of approximately 20 years, not including the long-term, post-closure environmental monitoring or potential long-term water treatment.

## 2.3 Johnson Creek Route Alternative

The Johnson Creek Route Alternative was developed to evaluate potential reductions in impacts to various resources. The mining portion of this alternative would be the same as under the 2021 MMP. Therefore, the primary focus of the Johnson Creek Route Alternative would be using an existing road for mine access through operations and reclamation instead of the Burntlog Route that under the 2021 MMP requires new road construction in Inventoried Roadless Areas. The Johnson Creek Route Alternative would require extensive upgrades to both Johnson Creek Road and Stibnite Road. Construction schedule for upgrading the roads and construction of the SGP would increase from 3 years to 5 years.

The action alternatives are summarized in **Table 2-1**.

**Table 2-1 Action Alternatives Summary**

| SGP Phase | Component/ Subcomponent | 2021 MMP | Johnson Creek Route Alternative |
|---|---|---|---|
| All Phases | SGP timeline | • Construction: Approximately3 years.<br>• Operations: Approximately 15 years.<br>• Exploration: Approximately 17 years (during construction and operations).<br>• Reclamation: Approximately 5 years (except for the TSF which would require an additional 9 years for tailings dewatering and consolidation).<br>• Closure/Post-Closure Water Treatment: Approximately through Mine Year 40.<br>• Environmental Monitoring: As long as needed. | Same as 2021 MMP except:<br>• Construction: Approximately 5 years (upgrading the existing Johnson Creek and Stibnite Roads to provide permanent mine access). |
| All Phases | Access Roads | Construction/Operations:<br>• Warm lake road from State Highway (SH) 55 to Johnson Creek Route intersection (34 miles).<br>• Johnson Creek Route for SGP access during early construction with minor improvements within the road prism.<br>• Burntlog Route (38 miles) for SGP access during last year of construction, mining and ore processing operations, and closure and reclamation. Includes improvements of existing segments (23 miles) and road construction for new segments (15 miles).<br>• Up to eight borrow areas developed along Burntlog Route for materials needed for road improvements and maintenance.<br>• Access route around the Yellow Pine pit for public access.<br>Closure and Reclamation:<br>• New sections of Burntlog Route to be reclaimed after the closure and reclamation period. | • Warm lake road from SH 55 to Johnson Creek Route intersection (34 miles).<br>• Johnson Creek Route (39 miles: Johnson Creek Road 25 miles, Stibnite Road 14 miles) upgraded and used for access throughout life of mine (LOM) instead of the Burntlog Route.<br>• Access route around the Yellow Pine pit for public access, employee access, and deliveries of supplies and equipment to the processing, warehouse, worker housing facility, and administration areas.<br>• No improvements or construction of new segments for Burntlog Route.<br>• Up to seven borrow sources developed along the Johnson Creek Route for materials needed for road improvements and maintenance.<br>Closure and Reclamation:<br>• Improved Johnson Creek and Stibnite roads would not be reclaimed to pre-existing conditions. |

| SGP Phase | Component/ Subcomponent | 2021 MMP | Johnson Creek Route Alternative |
|---|---|---|---|
| All Phases | Public Access | Construction:<br>• Temporary groomed over-snow vehicle (OSV) trail on the west side of Johnson Creek from Trout Creek to Landmark while Burntlog Route is constructed (8 miles).<br>• OSV trail on west side of Johnson Creek from Wapiti Meadows to Trout Creek campground closed during construction (9 miles).<br>• OSV trail from Warm Lake to Landmark closed during construction through operations (8.5 miles).<br>• Cabin Creek Road Groomed OSV trail (11 miles).<br>• Public roads remain open through the SGP with temporary closures as needed to accommodate construction.<br>Operations:<br>• Groomed OSV trail moves from west side of Johnson Creek Road to Johnson Creek Road from Landmark to Wapiti Meadows (16.7 miles).<br>• Stibnite Road (County Road [CR] 50-412) / Thunder Mountain Road (FR 50375) closed through the SGP.<br>• Seasonal public access through the Operations Area Boundary provided by constructing new road through Yellow Pine pit and below mine haul road to link Stibnite Road (FR 50412) to Thunder Mountain Road (FR 50375).<br>• Public access allowed on Burntlog Route to Thunder Mountain Road (FR 50375).<br>Closure and Reclamation:<br>• New road constructed over the Yellow Pine Backfill (backfilled Yellow Pine pit) connecting Stibnite Road (FR 50412) to Thunder Mountain Road (FR 50375). | Construction and Operations:<br>Same as 2021 MMP except:<br>• OSV trail on the west side of Johnson Creek from Wapiti Meadows to Trout Creek campground would be closed from construction through mine closure (9 miles).<br>• Groomed OSV trail on the west side of Johnson Creek from Trout Creek to Landmark lasting from construction through mine closure.<br>Closure and Reclamation:<br>Same as 2021 MMP. |

| SGP Phase | Component/ Subcomponent | 2021 MMP | Johnson Creek Route Alternative |
|---|---|---|---|
| Operations | Utilities – Transmission Lines | • Upgrade approximately63 miles of the existing 12.5 kilovolt (kV) and 69 kV transmission lines.<br>• New approximate 9-mile, 138 kV line would be constructed from the Johnson Creek substation to a new substation at the mine site.<br>• Upgrade the substations located at Oxbow Dam, Horse Flat, McCall, Lake Fork, and Warm Lake.<br>• Reroute approximately 5.4 miles of transmission line to avoid the Thunder Mountain Estates subdivision.<br>• Reroute approximately 0.9 miles of transmission line between Cascade and Donnelly to use an old railroad grade on private property.<br>• Installation of approximately 3 miles of new underground distribution line along Johnson Creek Road from the Johnson Creek substation south to Wapiti Meadows. | Same as 2021 MMP. |
| Operations | Utilities - Communication Towers and Repeater Sites | • One cell tower located north of the Hangar Flats pit.<br>• Locations along Burntlog Route for very high frequency (VHF) repeater sites.<br>• Use existing access roads to repeater site locations along Burntlog Route.<br>• Communication site at the SGLF.<br>• Upgrades to existing communication site. | Same as 2021 MMP except:<br>• Cell tower sites constructed and maintained using helicopter (instead of constructing access roads) for sites within IRAs managed for Backcountry/Restoration.<br>• Locations along Johnson Creek route for repeater sites. |
| Operations | Off-site Maintenance Facility | • SGLF located along Warm Lake Road.<br>• Burntlog Maintenance Facility located at one of the borrow source locations 4.4 miles east of the junction of Johnson Creek Road and Warm Lake Road along the proposed Burntlog Route. | • SGLF same as 2021 MMP<br>• Landmark Maintenance Facility located at junction of Warm Lake Road at Johnson Creek Road. |
| Closure and Reclamation | Access road segments | • Removal and reclamation of new road segments constructed for Burntlog Route.<br>• Return of previously existing road segments to pre-construction width and condition. | • No removal or reclamation of pre-existing access routes. |

Source: Perpetua 2021a

## 2.4 Environmental Design Features

The SGP must comply with all laws and regulations that apply to the proposed activities (Forest Service 2022f). Standards and guidelines in the Payette and Boise National Forest Land and Resource Management Plans (Forest Service 2003, 2010) that are designed to reduce or prevent undesirable impacts resulting from proposed management activities are incorporated into the action alternatives by reference. In addition, best management practices outlined in the Best Management Practices for Mining in Idaho (Idaho Department of Lands 1992) would be implemented where appropriate and applicable for operations to minimize site disturbance from mining and drilling activities.

In the design of the 2021 MMP, Perpetua has already considered many of the potential environmental impacts that might be caused by the SGP. This has led to an internal evaluation of project design features and operational characteristics that may have the effect of reducing and/or eliminating potential environmental impacts of the SGP. Such project-specific measures intended by a proponent to inherently reduce and/or avoid potential environmental impacts of a proposed action are referred to as environmental "design features".

Based on the application of permits and regulatory compliance requirements (Forest Service 2022f) to the project, regulatory requirements, standards and guidelines, best management practices, and likely permit conditions are listed in **Table 2-2**. The environmental design features that have been proposed and committed to by the proponent are listed in **Table 2-3**. All of these environmental design measures have been assumed to be effective in conducting the environmental analysis presented in **Section 7.0**.

**Table 2-2 Prominent Regulatory and Forest Plan Requirements for Wetlands and Riparian Resources**

| Description | Type | Reference |
|---|---|---|
| Prohibit solid and sanitary waste facilities in RCAs. If no alternative to locating mine waste (waste rock, spent ore, tailings) facilities in RCAs exists, then:<br>a) Analyze waste material using the best conventional methods and analytic techniques to determine its chemical and physical stability characteristics.<br>b) Locate and design waste facilities using the best conventional geochemical and geotechnical predictive tools to ensure mass stability and prevent the release of acid or toxic materials. If the best conventional technology is not sufficient to prevent such releases and ensure stability over the long term, and such releases or instability would result in exceedance of established water quality standards or would degrade surface resources, prohibit such facilities in RCAs.<br>c) Monitor waste and waste facilities to confirm predictions of chemical and physical stability and make adjustments to operations as needed to avoid degrading effects to beneficial uses and native and desired non-native fish and their habitats.<br>d) Reclaim and monitor waste facilities to ensure chemical and physical stability and revegetation to avoid degrading effects to beneficial uses and native and desired non-native fish and their habitats.<br>e) Require reclamation bonds adequate to ensure long-term chemical and physical stability and successful revegetation of mine waste facilities. | FP Component | BNF and PNF: MIST09 |
| To accommodate floods, including associated bedload and debris, new culverts, replacement culverts, and other stream crossings will 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. | FP Component | BNF and PNF: FRST02 |

| Description | Type | Reference |
|---|---|---|
| Do not authorize storage of fuels and other toxicants or refueling within RCAs unless there are no other alternatives. Storage of fuels and other toxicants or refueling sites within RCAs shall be approved by the responsible official and have an approved spill containment plan commensurate with the amount of fuel. | FP Component | BNF and PNF: SWST11 |
| 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. | Design Feature | Design Feature developed for compliance with BNF and PNF: SWGU06 |
| Measures such as, but not limited to, segregating and stockpiling topsoil, implementing stormwater and sediment BMPs, backfilling, revegetation and concurrent reclamation would be conducted, where possible and practical, for areas where the soil has been exposed by ground-disturbing activities. These areas/sites include, but are not limited, to burrow sites, utility corridors, skid trails, firebreaks, temporary roads, cut and fill slopes, and areas where construction activities have occurred. | Design Feature | Design Feature developed for compliance with BNF and PNF: SWST03, SWGU05 |
| Mitigate degrading effects from locatable mining operations situated within RCAs by identifying reasonable locations for access, processing, and disposal facilities outside of RCAs, wherever possible. | FP Component | BNF and PNF: MIST04, LSST07, MIST08, FRGU05 |
| Snow removal will be accomplished in accordance with the following standards of performance:<br>• 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.<br>• During snow removal operations, banks would not be undercut, and gravel or other surfacing material would not be bladed off the roadway surface.<br>• 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.<br>• Dozers would be used on an as-needed basis for plowing snow. The dozer operator would maintain an adequate snow floor over the gravel road surface.<br>• Snow would not be totally removed to the gravel road surface. Appropriate snow floor depth would be maintained to protect the roadway.<br>• Damage of roads from, or as a result of, snow removal would be repaired in a timely manner.<br>• 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.<br>• No ice and snow removal chemicals would be used on roads. | Design Feature | |

| Description | Type | Reference |
|---|---|---|
| • Traction material would be 3/8-inch diameter gravel or greater. | | |
| Road rutting from operations, outside the mine site, would be minimized by construction and maintenance of surface drainage structures, application of surfacing material, and by restricting road use when conditions are unacceptable due to moisture that is leading to the onset of rutting and concentrated turbid flow. (Note typical guidance is 'no use' if ruts deeper than 4" are created.) This design feature does not apply to the mine site. | Design Feature | Design Feature developed for compliance with BNF and PNF: SWST02 SWST03 |
| Dust abatement chemicals would be used in accordance with applicable road maintenance Biological Assessment. Apply dust- abatement additives and stabilization chemicals (typically MgCl2, CaCl2, or lignin sulphonates) to avoid run-off of applied dust abatement solutions to streams. Spill containment equipment would be available during chemical dust abatement application. Where the road surface is within 25 feet (slope distance) of surface water, dust abatement would only be applied to a 10-foot swath down the centerline of the road. The rate and quantity of application will be regulated to insure all of the chemical is absorbed before leaving the road surface. | Design Feature | |
| Pumps will be turned off when not in use and water conservation practices will be implemented. | Design Feature | |
| A Spill Prevention, Containment, and Control Plan (SPCC) shall be prepared in accordance with 49 CFR parts 171 through 180, including packaging, transportation, incident reporting, and incident response.<br>Include the following items within the SPCC Plan:<br>• During off-loading of fuel from fuel vehicles or during refueling operations have a standard marine-type fuel containment boom (which would be of sufficient length for a worst-case discharge), spill prevention kit, and fire kit readily available on site.<br>• Store two or more spill containment/response caches along each of the fuel delivery routes.<br>• Spill response team will carry sufficient containment equipment for one full fuel tanker.<br>• Include the Forest Service as a party to be notified in the event of a hazardous materials spill.<br>• Intake pumps, engines, fuel storage, fuel containment site, and other equipment with fuel or lubricants would be inspected at each refueling and periodically between refueling for leakage or spillage.<br>• Pilot and emergency spill response vehicles would carry appropriate containment and first aid equipment.<br>• All fuel containers would be marked with contents, owner's name and contact information.<br>• Material Safety and Data Sheets for all products would be posted and available on site with the SPCC plan.<br>• Intake pumps would not be situated within the active stream/ditch channel and would be placed within containment vessels capable of holding 120 percent of the pump engine's fuel, engine oil and hydraulic fluid. The smallest practical pump and intake hose would be used.<br>• Following large storm events, the intake pumps would be inspected to determine if stream flow has encroached into the pump area and if the pump needs to be moved so it remains above flowing water. | Regulatory Requirement and Design Features | 49 CFR 171 |

| Description | Type | Reference |
|---|---|---|
| • A spill prevention and clean-up kit would be placed at the intake pump site and would consist of absorbent pads and/or boom (which would be sufficient length for a worst-case discharge), drip pan, a shovel, and a fire extinguisher.<br>• Spare fuel for the water intake pump would be stored in approved [29 CFR 1926.152(a)(1)] fuel storage containers placed into a secondary containment vessel capable of holding at least 120 percent of the volume of the fuel in the fuel container.<br>A copy of the SPCC plan would be kept at an appropriate on-site facility. | | |
| All activities would be conducted in accordance with Idaho environmental anti-degradation policies, including IDEQ water quality regulations at IDAPA 58.01.02 and applicable federal regulations. | IDAPA 58.01.02 | |
| The operator will immediately report any fuel, oil, or chemical discharges or spills greater than 25 gallons on land, or any spill directly in a stream to IDEQ, Forest Service, USFWS, and NOAA Fisheries as required by applicable federal and state regulations by phone and/or fax (or as soon as possible after on-site containment efforts are implemented as per the Spill Prevention, Control, and Countermeasures [SPCC] plan), and initiate emergency consultation. | Regulatory Requirement | 50 CFR 402.05 Joint regulation: USFWS, NOAA, NMFS, DOC |

**Table 2-3 Proponent Proposed Environmental Design Features for Wetlands and Riparian Resources**

| Description |
|---|
| Following permanent cessation of mining activities at the Yellow Pine pit, Perpetua would backfill the pit and route the East Fork South Fork Salmon River (East Fork SFSR) over the backfilled pit with a longer, lower-gradient channel with higher intrinsic potential for Chinook salmon and steelhead spawning and rearing than the channel that exists presently. The floodplain area along the constructed channel would include side-channels and other off-channel features and would be revegetated to restore wetland and riparian habitat providing long-term shade/cover favorable to fish. |
| The Meadow Creek channel would be routed over the final TSF and TSF Buttress, resulting in a long, relatively flat surface and a short, steep face. On top of the TSF/TSF Buttress surface, Meadow Creek would be contained within a broad floodplain corridor bound laterally by erosion-resistant terraces and vertically by a subsurface armor layer over an impermeable stream liner. |
| Perpetua would stabilize and restore Blowout Creek. Blowout Creek wetland restoration would consist of restoring and enhancing palustrine aquatic bed (PAB), palustrine emergent (PEM), palustrine scrub-scrub (PSS) wetlands that were impacted when a historical dam failed on Blowout Creek. Headcutting and shallow aquifer dewatering have impaired and reduced functions of the wetland vegetation classes. A grade control and groundwater cutoff structure is proposed to raise the water level in Blowout Creek as well as recharge the shallow groundwater system and reduce stream headcutting.<br>A coarse rock drain would be constructed within the chute downstream of the failed dam to isolate the flow of Blowout Creek from the actively eroding chute side slopes and to prevent further erosion of the gully bottom, facilitating subsequent restoration of a surface channel on top of the drain.<br>Perpetua would stabilize the steep, confined, erosive middle reach to address the significant fine sediment load currently produced from this reach and restore the downstream, relatively low-gradient reach. |
| Perpetua would lead annual site visits for U.S. Army Corps of Engineers (USACE), U.S. Environmental Protection Agency (EPA), Idaho Department of Fish and Game (IDFG), and other interested agency personnel as needed to facilitate agency review of mitigation areas if desired. Final reporting and data archival requirements would be subject to permit conditions; however, at a minimum, it is anticipated that monitoring reports would be prepared by Perpetua annually and submitted to USACE Walla Walla District, EPA, IDFG, Idaho Department of Lands (IDL), National Oceanic and Atmospheric Administration (NOAA) Fisheries, USFWS, the Forest Service, and other interested agencies, SGP partners, and stakeholders. |

| Description |
|---|
| Perpetua would repair and rehabilitate areas adversely affected by historical mining impacts in the SGP area. |
| Perpetua or its designated contractor(s) would perform long-term maintenance as necessary, including maintaining and monitoring the Mitigation Area (including stream and wetlands) in perpetuity once the final performance standards are met or until such responsibility is relinquished to an appropriate third party (Forest Service, etc.) as approved by the USACE. |
| Perpetua would plant stream reclamation reaches and wetland reclamation areas with native plant species that are present in palustrine aquatic bed, palustrine emergent, palustrine scrub-shrub, and palustrine forested wetlands and riparian areas along streams throughout the Mitigation Area. |
| To address stream temperature, riparian planting widths along restored and enhanced stream reaches would be 18 feet wide. Taller and denser vegetation such as spruce trees will be planted. Further, the creation of Stibnite Lake, a feature similar in size to the present Yellow Pine pit lake, would replace the function of the existing Yellow Pine pit lake in buffering stream temperature extremes and reduce maximum stream temperatures in East Fork SFSR in and downstream of the SGP. |
| Runoff generated from direct precipitation on the TSF would be retained in the TSF water pool for reclaim to the ore processing circuit. |
| Riparian fringe and floodplain wetlands would be established on the broad, gently sloping floodplains on both sides of the reclaimed stream channels. |
| Valley margin wetlands would only be established where there is an upgradient water source sufficient to produce enough saturation and near surface water tables for wetland conditions. |
| Wetland reclamation would begin after the end of mine construction, with the first reclaimed wetlands occurring in the Blowout Creek drainage. Additional reclamation will occur in and after operational year 7 and continue through operational year 18. |
| Salvaged O and A horizon soils from wetland or hydric soils (seed bank materials over or in combination with mineral soils uplands and wetland subsoils (growth media) would be used to create wetland soil conditions. |
| During Burntlog Route and mine site haul road construction and use, Perpetua would install and maintain sediment control measures and devices, such as culverts, culvert inlet protection devices, ditching, silt fencing, straw wattles, straw bales, and sediment catch basins. |
| Placing sub-base material and surfacing with gravel and localized sections of road with binders to provide a stable long-term roadway and reduce sediment runoff would occur. |
| During winter road maintenance, Perpetua would remove snow from the Burntlog Route and haul roads at the mine site and the temporary construction access Johnson Creek Route. Perpetua would avoid disposal of snow in riparian areas, wetlands, or areas where snowmelt might cause road damage or erosion during spring melt. Care would also be taken to dispose of collected snow, which may contain sand or gravel, in a manner that avoids impacts to nearby streams and rivers. |
| Perpetua would use coarse sand for winter sanding of the main access road and mine site haul roads in combination with gravel as needed. |
| 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. |
| Soil would be amended with additional compost and other sources of organic matter necessary to successfully reclaim wetlands at the SGP. |

In addition to the environmental design features listed in **Table 2-3** that are specific to wetlands and riparian resources, Perpetua has proposed additional environmental protection measures for the SGP as described in the following documents:

- Stibnite Gold Mitigation Plan (Perpetua 2021b)
- Fisheries and Aquatic Resources Mitigation Plan (Brown and Caldwell, Rio Applied Science and Engineering, and BioAnalysts, Inc. 2021a)
- Fishway Operations and Management Plan (Brown and Caldwell, McMillen Jacobs Associates, and BioAnalysts, Inc. 2021b)
- Conceptual Stream and Wetland Mitigation Plan (Tetra Tech 2021a)

The measures described in the above documents are applicable to all action alternatives, except as noted. Following the Record of Decision, Perpetua would integrate all required compliance measures (**Table 2-2**), design features (**Table 2-3**) and additional Forest Service required mitigation commitments into an Environmental Monitoring and Management Plan (EMMP). The EMMP consists of a program framework and appendices containing component monitoring and management plans. Perpetua would use the EMMP 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.

# 3.0 Relevant Laws, Regulations, and Policy

## 3.1 Land and Resource Management Plan

The Payette Forest Plan and the Boise Forest Plan include management direction for wetlands and riparian areas. They include guidelines for Riparian Conservation Areas (RCAs), which are defined as "traditional riparian corridors, perennial and intermittent streams, wetlands, lakes, springs, reservoirs, and other areas where proper riparian functions and ecological processes are crucial to maintenance of the area's water, sediment, woody debris, nutrient delivery system, and associated biotic communities and habitat."

Aquatic resources on National Forest System (NFS) lands are managed to achieve a desired condition that supports a broad range of biodiversity and social and economic opportunity. Desired conditions are descriptions of how forest resources should look and function to provide diverse and sustainable habitats, settings, goods, and services. Taken together, the desired conditions should present an integrated vision of a properly functioning forest that supports a broad range of biodiversity and social and economic opportunities.

The desired condition for wetland and riparian resources is described in the Payette Forest Plan (Forest Service 2003) as follows:

- "Riparian and aquatic ecosystems have appropriate types and amounts of vegetation.
- There is sufficient large woody debris that is appropriate for land and stream channel forms to maintain water quality, filter sediment, aid floodplain development, improve floodwater retention and groundwater recharge, and contribute to diverse habitat components.

- Management actions result in no long-term degradation of soil, water, riparian, and aquatic resources conditions.
- Instream flows are sufficient to support healthy riparian and aquatic habitats, the stability and effective function of stream channels, and the ability to route flood discharges, and provide for downstream uses.
- Wetlands and floodplains are maintained where they are properly functioning and restored where degraded."

The desired condition for wetland and riparian resources is also described in the Boise Forest Plan (Forest Service 2010) as follows:

- "Ecosystems on the forest have ecological and watershed integrity, meaning they have a viable combination of all the diverse elements and processes needed to sustain the systems and perform desired functions; they are resilient and resistant to natural and human-caused disturbances.
- Streams and lakes provide clean water, appropriate temperatures, and a variety of connected habitats to support native and desired non-native aquatic species.
- Riparian plant communities are in a desired range of variability for composition, structure, patterns, and processes. Vegetation forms a diverse network of habitats and connective corridors for wildlife, and provides desired levels of snags, coarse woody material, and soil organic matter. They support species diversity, with emphasis on maintaining or restoring threatened, endangered and sensitive species, rare and unique plant communities, and species of cultural, commercial, and recreational importance.
- Riparian areas connect upland and aquatic habitats and promote stable and diverse stream channel conditions. Existing noxious weed populations are not expanding, and new invasive species are not becoming established.
- Riparian areas have their own disturbance processes that influence vegetation dynamics, with an almost continual readjustment in successional stages.
- Sufficient large woody debris that is appropriate for land and stream channel forms exists to maintain water quality, filter sediment, aid floodplain development, improve floodwater retention and groundwater recharge, and contribute to diverse habitat components.
- Instream flows are sufficient to support healthy riparian and aquatic habitats, the stability and effective function of stream channels, and the ability to route flood discharges and provide for downstream uses. Wetlands and floodplains are maintained where they are properly functioning and are restored where degraded."

# 3.2 Federal Laws, Regulations, and Policy

## 3.2.1 Clean Water Act

Federal regulations governing discharges of dredged or fill material into waters of the U.S. (WOTUS), including wetlands, streams, and open waters, are promulgated under Section 404 of the CWA, as administered by the U.S. Army Corps of Engineers (USACE). Under Section 404 of the CWA; WOTUS, fall under the jurisdiction of the USACE. Thus, any discharge of dredged or fill material into

jurisdictional wetlands or other WOTUS in the SGP area would require a Department of the Army Authorization.

Additionally, Section 404(b)(1) guidelines (Guidelines) promulgated by the U.S. Environmental Protection Agency (EPA), in conjunction with the USACE, apply to an applicant's proposed disposal site(s) for discharges of dredged or fill material into WOTUS. The Guidelines prohibit, for example, the authorization of a proposed discharge that would cause or contribute to the violation of an applicable water quality or toxic effluent standard or jeopardize a listed threatened or endangered species. The Guidelines also prohibit the authorization of a proposed discharge which will cause or contribute to significant degradation of the aquatic ecosystem. Findings of significant degradation must be based upon specific factual determinations, evaluations, and tests identified in the Guidelines. These include the evaluation of direct, indirect, and cumulative effects of the proposed discharge and alternatives on specific resources including fish, wildlife, and special aquatic sites.

These Guidelines state that no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge that would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences. The Guidelines also state that no discharge of dredged or fill material is permitted unless appropriate and practicable steps have been taken to minimize potential adverse effects to the aquatic ecosystem. Subpart H of the Guidelines identifies many possible steps to avoid, minimize, and compensate for direct and secondary adverse impacts. Taken together, these steps form the mitigation sequence: a mandatory, sequential process undertaken to "minimize potential adverse impacts of the discharge on the aquatic ecosystem." Demonstrating compliance with the Guidelines requires identifying the appropriate and practicable steps that will be taken to avoid impacts, and then minimize and compensate for any remaining unavoidable impacts associated with discharges subject to the Guidelines.

For unavoidable impacts to wetlands, streams, and other WOTUS, the 404(b)(1) Guidelines require appropriate and practicable compensatory mitigation to offset unavoidable impacts. In 2008, the USACE and the EPA issued a final rule for Compensatory Mitigation for Losses of Aquatic Resources. This final rule contains the regulations that govern compensatory mitigation for activities that require a permit from the USACE (USACE and EPA 2008). Compensatory mitigation is defined as the restoration, establishment, enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts that remain after all appropriate and practicable avoidance and minimization has been achieved.

Section 402 of the CWA, which authorizes the National Pollution Discharge Elimination System permit program, controls water pollution by regulating point sources that discharge pollutants other than dredged and fill material into WOTUS. On June 5, 2018, EPA approved the Idaho Pollutant Discharge Elimination System Program and authorized the transfer of permitting authority to the state beginning on July 1, 2018.

# 3.3 Executive Orders

## 3.3.1 Executive Order 11990

Executive Order 11990 requires that federal agencies, to the extent permitted by law, shall avoid undertaking or providing assistance for new construction located in wetlands, unless the head of the federal agency trying to work in wetlands finds that: 1) no practicable alternative to such construction exists; and 2) the project would include all practicable measures to minimize harm to wetlands that may result from such use (42 Federal Register 26961, 3 Code of Federal Regulation, 1977 Comp, p. 121).

## 3.4 State and Local Policy

### 3.4.1 State Regulations

Projects that may result in a discharge to WOTUS require Water Quality Certification under Section 401 of the CWA. Section 401 gives the authority to issue this certification, ensuring that the discharge complies with state water quality standards. The Idaho Department of Environmental Quality (IDEQ) is the regulatory authority for Section 401 permitting in Idaho. 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 issued. This Water Quality Certification is made to ensure that a proposed project would comply with state water quality standards for surface water and any other water quality requirements under state law.

The Idaho Department of Water Resources (IDWR) regulates stream channels under the Idaho Stream Channel Protection Act. This act requires that a Stream Channel Alteration Permit be obtained from the IDWR before any type of alteration work, including removal and/or fill and installation of in-water or over-water structures with the potential to affect flow, within the beds and banks of a continuously flowing stream.

The Emergency Wetlands Resources Act of 1986 requires that states develop prioritized lists of wetlands that meet the criteria of 1) supporting rare or declining wetland types; 2) having identifiable threats of loss or degradation of wetland functions; and 3) having diverse and important functions and values (including recreation), or especially high value for specific functions. To meet the requirements of the Emergency Wetlands Resources Act, Idaho Fish and Game (IDFG) maintains a Wetland Conservation Prioritization Plan (IDFG 2012) and a list of wetland sites in need of acquisition for long-term conservation and management.

### 3.4.2 Valley County Regulations

Valley County reviews development proposals for consistency with the County's Land Use Development Ordinance. When permits are required by other agencies for all or parts of the application, evidence of the permit and compliance with the provisions of the permit are to be a condition of the land use approval. This includes permits to alter wetlands, permits to construct in flood prone areas, and in other situations where the review and issuance of the permit would assure the Valley County Commission that the proposal would be technically feasible.

# 4.0 Issues and Resource Indicators

## 4.1 Significant Issues

Significant issues are those which are used to formulate alternatives to the Proposed Action and to develop mitigation measures. Wetlands and riparian resources were identified as a significant issue .

## 4.2 Resource Issues and Indicators

The analysis of effects to wetlands and riparian resources includes the following issues and indicators:

**Issue:** Construction and operation of mine infrastructure would remove wetlands and riparian resources, impact ecological function, and fragment wetland habitat.

**Indicators:**

- Acres of wetland and riparian habitat permanently lost through construction of Project components.
- Acres of wetland and riparian habitat temporarily lost through construction of Project components.
- Functional units of high-value wetlands lost due to project construction, as demonstrated using the functional assessment method.
- Area of wetlands that would be affected by new or improved roads.
- Qualitative analysis of effects of wetland and riparian habitat fragmentation in affected areas.

**Issue:** The SGP may affect water balance, which could reduce seasonal water input frequency and duration for wetlands adjacent to and downstream of SGP features.

**Indicator:** Acres of wetland that would be within the footprint of groundwater drawdown.

**Issue:** SGP-related activities may affect wetlands and riparian areas through changes to water temperature, and concentration of key contaminants.

**Indicator:** Qualitative analysis of estimated changes in water quality parameters based on predictive water modelling in wetland areas.

# 5.0 Methodology

Aquatic Resources, to include wetlands, have been delineated within the analysis area as part of multiple baseline studies conducted between 2011 and 2019. The results are documented in several reports, which are listed in **Table 5-1**. The data from these reports is used to describe the baseline condition relative to the distribution and quantity of wetlands, streams, open waters, and riparian areas.

In addition to delineating wetlands, wetland functions and values were assessed using the Montana Wetland Assessment Method (MWAM) (Berglund and McEldowney 2008). The MWAM is a functional assessment approach for quantifying wetland impacts and mitigation that is regionally appropriate for Idaho. The functional assessments are documented in three reports (**Table 5-2**). The first report evaluated wetland functions within the preliminary disturbance boundary (HDR 2016a). That analysis was then amended with additional information on new wetlands and an updated analysis that included Idaho-specific special status species information in the functional assessment (Tetra Tech 2018). Wetlands included in these first two reports were grouped into 44 wetland assessment areas (AA) based on watershed, hydrogeomorphic class, and level of disturbance (e.g., evidence of recent burns, etc.) (Tetra Tech 2018). The most recent report, Tetra Tech (2021a) synthesized and simplified all available information on wetlands function and values into one inclusive document (in addition to providing new information on previously unstudied wetlands). This included reevaluating AA's to ensure consistency in approach and consolidating some AA's to more clearly express the types and locations within the watershed. This resulted in 21 AAs and is explained in further detail in Tetra Tech (2021a). Greater detail on wetland functional assessment methodology and results is presented in **Section 6.1.3.1**.

**Table 5-1 Baseline Study Reports for Streams and Wetlands**

| Report | Field Work Year(s) | Reference | Associated Major Drainages | Summary of Area Covered |
|---|---|---|---|---|
| Wetland Resources Baseline Study, Stibnite Gold Project | 2011 and 2012 | HDR 2013 | Meadow Creek, East Fork Meadow Creek (Blowout Creek), Fiddle Creek, Garnet Creek, Midnight Creek, Hennessy Creek, Rabbit Creek, West End Creek, Sugar Creek, East Fork SFSR | Proposed mine site and nearby waters beyond the mine site boundary. |
| Wetland Resources Baseline Study Addendum #1, Stibnite Gold Project | 2013 | HDR 2014a | East Fork SFSR, Cabin Creek, Trout Creek, Johnson Creek | Proposed access roads including Burntlog Route, Cabin/Trout Creek Route, Thunder Mountain Road, Riordan Road, Johnson Creek Road (north of the Riordan and Thunder Mountain Alternatives), and Stibnite Road. |
| Wetland Resources Baseline Study Addendum #2, Stibnite Gold Project | 2014 | HDR 2014b | Meadow Creek, No Mans Creek, Riordan Creek, Johnson Creek, Cabin Creek, Warm Lake Creek, SFSR, Curtis Creek, Big Creek | 1) The transmission line corridor between the SGP and the western boundary of the Boise National Forest; 2) a revised segment of the Burntlog Route access road; and 3) additional areas of potential impact within the SGP. |
| Wetland Resources Baseline Study Addendum #3, Stibnite Gold Project | 2015 | HDR 2015 | Pearsol Creek, Beaver Creek, Center Canal/Cascade Lake, Gold Fork Canal, Gold Fork River, Willow Creek, Boulder Creek, Lake Fork Creek | Portions of the transmission line corridor located on private lands (using NWI wetland data methods). |
| Wetland Resources Baseline Study Addendum #4, Stibnite Gold Project | 2016 | HDR 2016a | East Fork Burntlog Creek, East Fork SFSR, Johnson Creek, Meadow Creek (Blowout Creek) | 1) Proposed Burntlog Route revisions; 2) Off-highway vehicle access trail; 3) Potential Meadow Creek growth media stockpile areas; 4) Potential West End Creek development rock storage facility; and 5) Potential location of Landmark Maintenance Facility. |
| Summary of Project Wetland Resource Baseline Studies | 2011 to 2016 | HDR 2017a | All | Summary of all previous wetland baseline reports. |
| Wetland Resources Baseline Study for Logistics Center Site, Stibnite Gold Project | 2016 and 2017 | HDR 2017b | Big Creek (tributary of North Fork of the Payette River) | Potential SGLF site. |
| Wetland Resources Baseline Study Addendum #5, | 2018 and 2019 | Tetra Tech 2021b | Meadow Creek, Fiddle Creek, Big Creek, Burntlog Creek, Cabin Creek, Curtis Creek, Johnson Creek, North Fork of | Data gaps in the mine area near Fiddle Creek and Meadow Creek, Option 8a, Burntlog Route, and along the transmission line from |

| Report | Field Work Year(s) | Reference | Associated Major Drainages | Summary of Area Covered |
|---|---|---|---|---|
| Stibnite Gold Project | | | the Payette River, Riordan Creek, Trail Creek, Trout Creek. | Stibnite to the transmission terminus near Lake Fork. |

Source: HDR 2013, 2014a, 2014b, 2015, 2016a, 2017a, 2017b, Tetra Tech 2021b
East Fork SFSR = East Fork South Fork Salmon River, SFSR = South Fork Salmon River, SGLF = Stibnite Gold Logistics Facility.

**Table 5-2 Wetland Functional Assessment Reports and Addendums Prepared for the Proposed SGP**

| Report | Field Work Year(s) | Reference | Associated Major Drainages | Summary of Area Covered |
|---|---|---|---|---|
| The Stibnite Gold Project, Wetland Functional Assessment Report | 2012-2016 | HDR 2016b | Meadow Creek (Blowout Creek), East Fork SFSR, Fiddle Creek, Garnet Creek, Midnight Creek, Hennessy Creek, Rabbit Creek, West End Creek, Sugar Creek | Proposed mine site and primary access road alternative routes. |
| Additional Information to Amend the 2016 HDR Wetlands Functions and Values Assessment | N/A | Tetra Tech 2018 | All | Updated previous assessments and added new wetland areas that were not delineated previously by HDR at the mine site. Also added wetland assessment units for the SGLF, transmission line route, and the Landmark Maintenance Facility. |
| 2021 Wetlands Functions and Values Report | 2018-2019 | Tetra Tech 2021c | All | Data gaps in the mine area near Fiddle Creek and Meadow Creek, Option 8a, Burntlog Route, and along the transmission line from Stibnite to the transmission terminus near Lake Fork. Simplified all available information on wetland functions and values by combining AAs. |

Source: HDR 2016b; Tetra Tech 2018, Tetra Tech 2021c
N/A = Not Applicable, East Fork SFSR = East Fork South Fork Salmon River, SGLF = Stibnite Gold Logistics Facility.

# 5.1 Analysis Area

The analysis area for wetland and riparian resource includes the area where effects (direct/indirect and cumulative) may be caused by the proposed activities (FSH.1909.15, 15.2a).

## 5.1.1 Direct/Indirect Effects Boundaries

The analysis area for direct/indirect effects is shown on **Figure 5-1**. It encompasses the following seven watersheds (hydrologic unit code [HUC] 10): Big Creek North Fork Payette River, Gold Fork River, Indian Creek, Johnson Creek, Lake Fork-North Fork Payette River, Upper East Fork South Fork Salmon River, and Upper South Fork Salmon River. Within these watersheds, the analysis area includes a mine site focus area (**Figure 5-2**) and an off-site focus area (**Figures 5-3a-f**, **5-4a-f**, and **5-5a-o**), which includes off-site components of the SGP, such as access roads, transmission line infrastructure, a Logistics Facility, and the Landmark Maintenance Facility. The mine site focus area is where most wetland impacts would occur under the SGP, and where a substantial portion of the affected watershed has been evaluated for wetland presence. The off-site focus area includes the linear, narrow corridors associated with the SGP where wetlands were evaluated. Wetlands were not evaluated within the larger surrounding watersheds for the off-site corridors or areas not associated with the SGP.

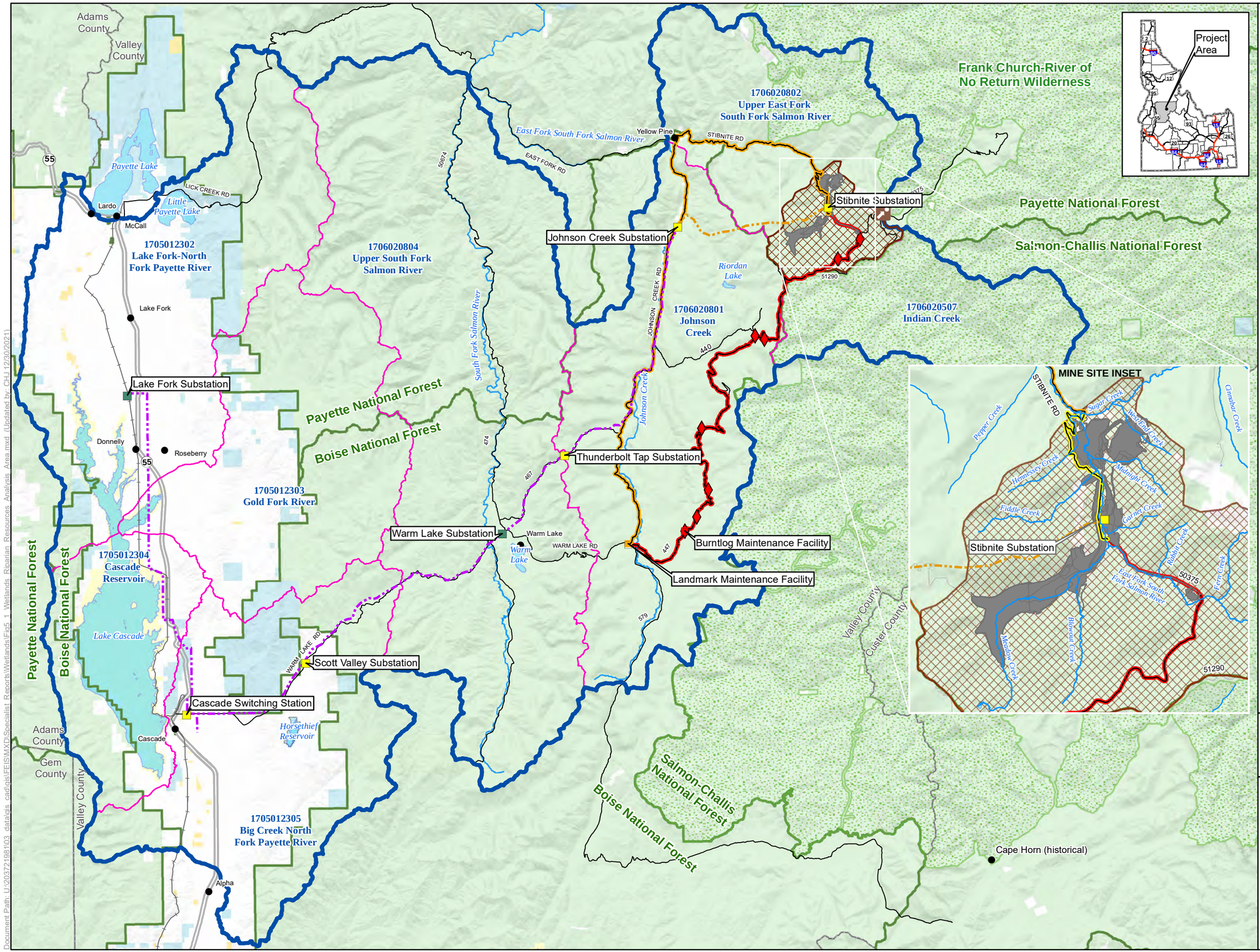
## 5.1.2 Cumulative Effects Boundaries

Effects of other past, present, and reasonably foreseeable future actions (RFFAs) may cumulatively impact a resource if these actions overlap spatially with the potential direct and indirect effects of a proposed project. As such, the cumulative effects analysis area for wetlands and riparian resources is the same extent as the analysis area for direct and indirect impacts to these resources, which is the watersheds containing the SGP, access roads, transmission lines, and off-site facilities (**Figure 5-1**).

# 5.2 Analysis Area Methodology

The analysis area at the mine site focus area includes the contributing basins for the drainages contained within the SGP. Within the mine site focus area, wetlands were grouped into AAs by geographic location and by position on the landscape and include wetland AAs 1-10, 15, 19, and 20. **Figure 5-2** shows the mine site focus area and the AAs that fall within this area. The mine site focus area allows for quantification of wetlands that would be affected by the SGP at the mine site. Due to the degree of proposed landscape modification and wetland impacts that could occur at the mine site, evaluating wetland impacts within the context of the existing disturbed landscape condition is an important aspect of the area presented in **Section 6.1.1.1**.

All other wetland AAs (11-14, 16-18, and 21) are included in the off-site focus area that extends outside the mine site focus area of the SGP. For SGP components located outside of the mine site area, the focus area for wetlands and riparian resources extends to the 5th field (10-digit HUC) watersheds that overlap potential SGP disturbance areas (**Figure 5-1**). The off-site focus area extent was selected to account for the watersheds that could be affected by off-site activities associated with the SGP. These watersheds provide geographic context for potential hydrologically connected off-site wetland and riparian resources. AAs in the off-site focus area span large geographic areas that were not designed for in the MWAM. Despite some loss of detail, the larger size of the AAs was justified to simplify the impact analysis (Tetra Tech 2021c).




## LEGEND

- Wetland Analysis Area
- Watershed Boundary (USGS HUC* 10)

**Project Components**

- SGP Features
- Burntlog Route
- Burntlog Maintenance Facility
- Johnson Creek Route
- Landmark Maintenance Facility

**Utilities**

- Upgraded Transmission Line
- New Transmission Line
- New Substation
- Existing Substation

**Other Features**

- U.S. Forest Service
- Wilderness
- City/Town
- Monumental Summit
- County
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir

**Surface Land Management**

- Bureau of Land Management
- Bureau of Reclamation
- Private
- State
- U.S. Forest Service

* US Geological Survey Hydrologic Unit Code
**Project Components are associated with both alternatives.

Note:
East Fork Meadow Creek is also known as Blowout Creek.
The McCall – Stibnite Road (CR 50-412) consists of Lick Creek Road, East Fork South Fork Salmon River Road (East Fork Road) and Stibnite Road.

0 2.5 5 Miles
1 inch = 4.83 miles when printed at 11x17

N

**Figure 5-1**
**Wetlands and Riparian Resources Analysis Area**
**Stibnite Gold Project**
**Stibnite, ID**

*Base Layer:*
*Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest*

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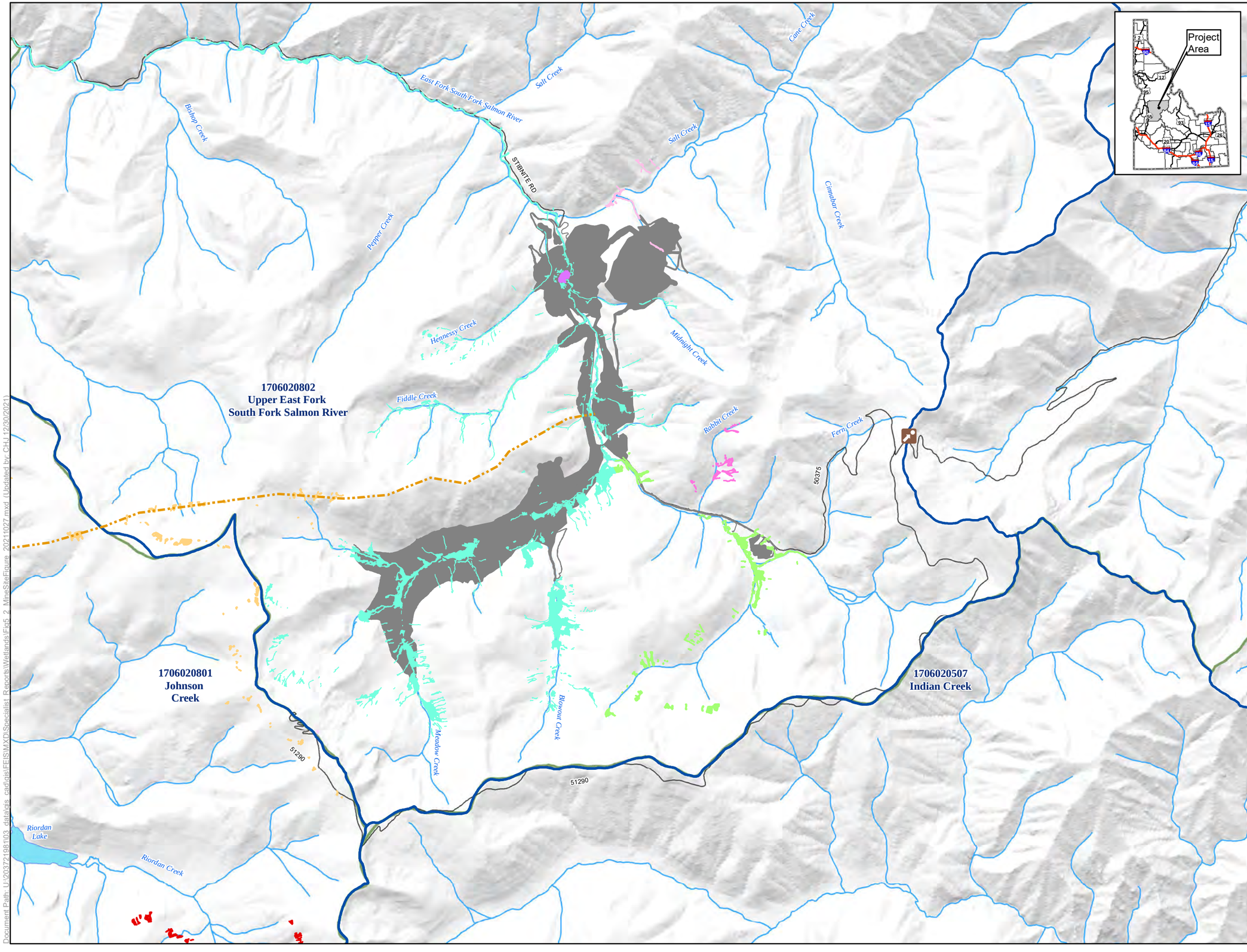


## LEGEND

- Watershed Boundary (USGS HUC* 10)
- Wetlands

**Functional AAs**

- AA-10
- AA-12
- AA-15
- AA-16
- AA-19
- AA-20
- AA-21

**Project Components**

- SGP Features**

**Utilities**

- New Transmission Line

**Other Features**

- U.S. Forest Service
- City/Town
- Monumental Summit
- County
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir

*US Geological Survey Hydrologic Unit Code
**Project Components are associated with both Alternatives.

Note:
East Fork Meadow Creek is also known as Blowout Creek.
The McCall – Stibnite Road (CR 50-412) consists of Lick Creek Road, East Fork South Fork Salmon River Road (East Fork Road) and Stibnite Road.

0 0.5 1 Miles

1 inch = 0.85 miles
when printed at 11x17

# Figure 5-2
# Wetland Analysis
# Mine Site Map
# Stibnite Gold Project
# Stibnite, ID

*Base Layer: USGS Shaded Relief Service*
*Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest*

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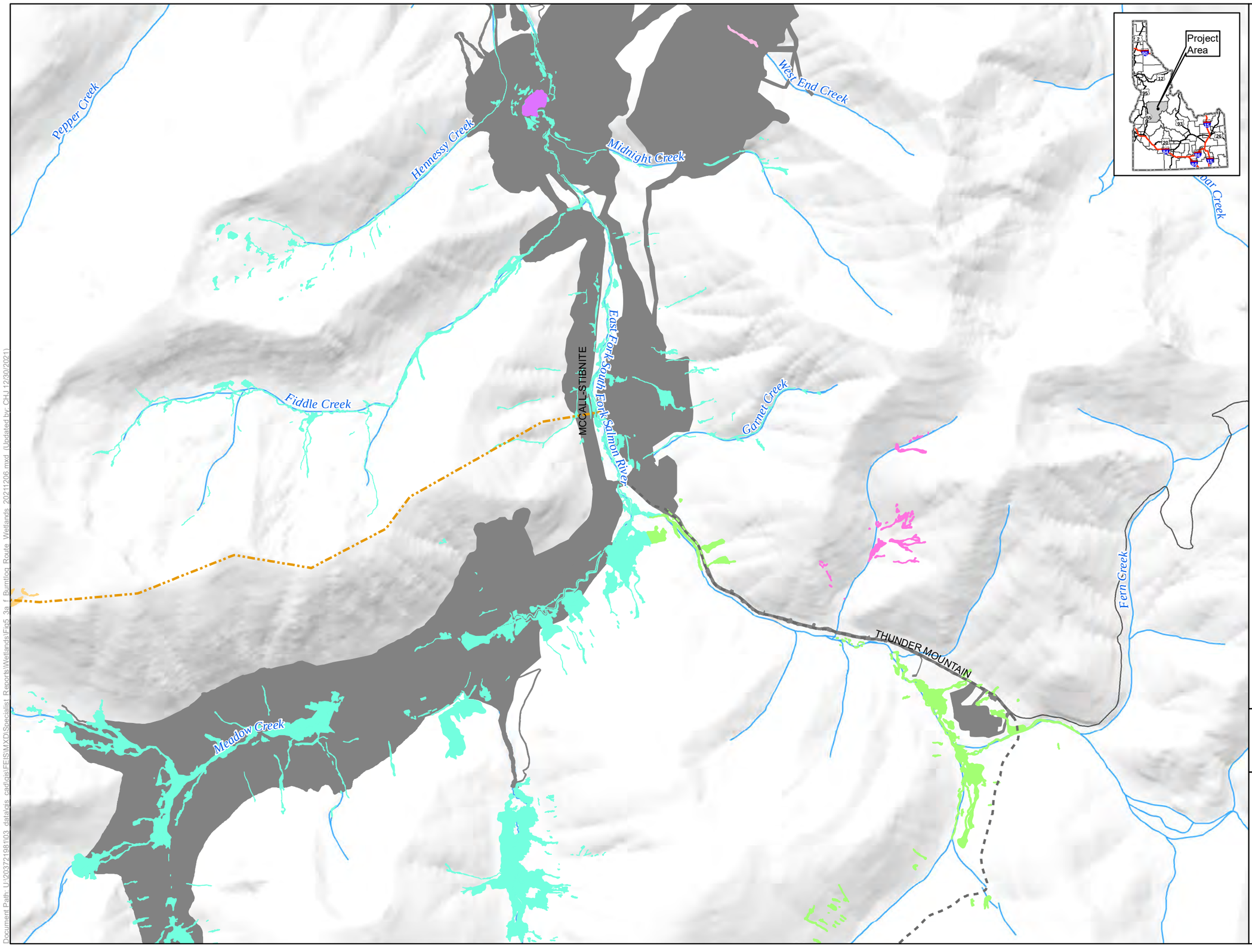


## LEGEND

- Watershed Boundary (USGS HUC* 10)
- Wetlands

**Functional AAs**

- AA-10
- AA-12
- AA-15
- AA-19
- AA-20

**Project Components**

- SGP Features
- Burntlog Route

**Utilities**

- New Transmission Line

**Other Features**

- U.S. Forest Service
- City/Town
- Monumental Summit
- County
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir

5-3a
5-3b
5-3c
5-3d
5-3e
5-3f

*US Geological Survey Hydrologic Unit Code

Note:
East Fork Meadow Creek is also known as Blowout Creek.
The McCall – Stibnite Road (CR 50-412) consists of Lick Creek Road, East Fork South Fork Salmon River Road (East Fork Road) and Stibnite Road.

0 1,000 2,000 Feet

1 inch = 2,000 feet
when printed at 11x17

# Figure 5-3a
# Burntlog Route Wetlands
# Stibnite Gold Project
# Stibnite, ID

*Base Layer: USGS Shaded Relief Service*
*Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest*

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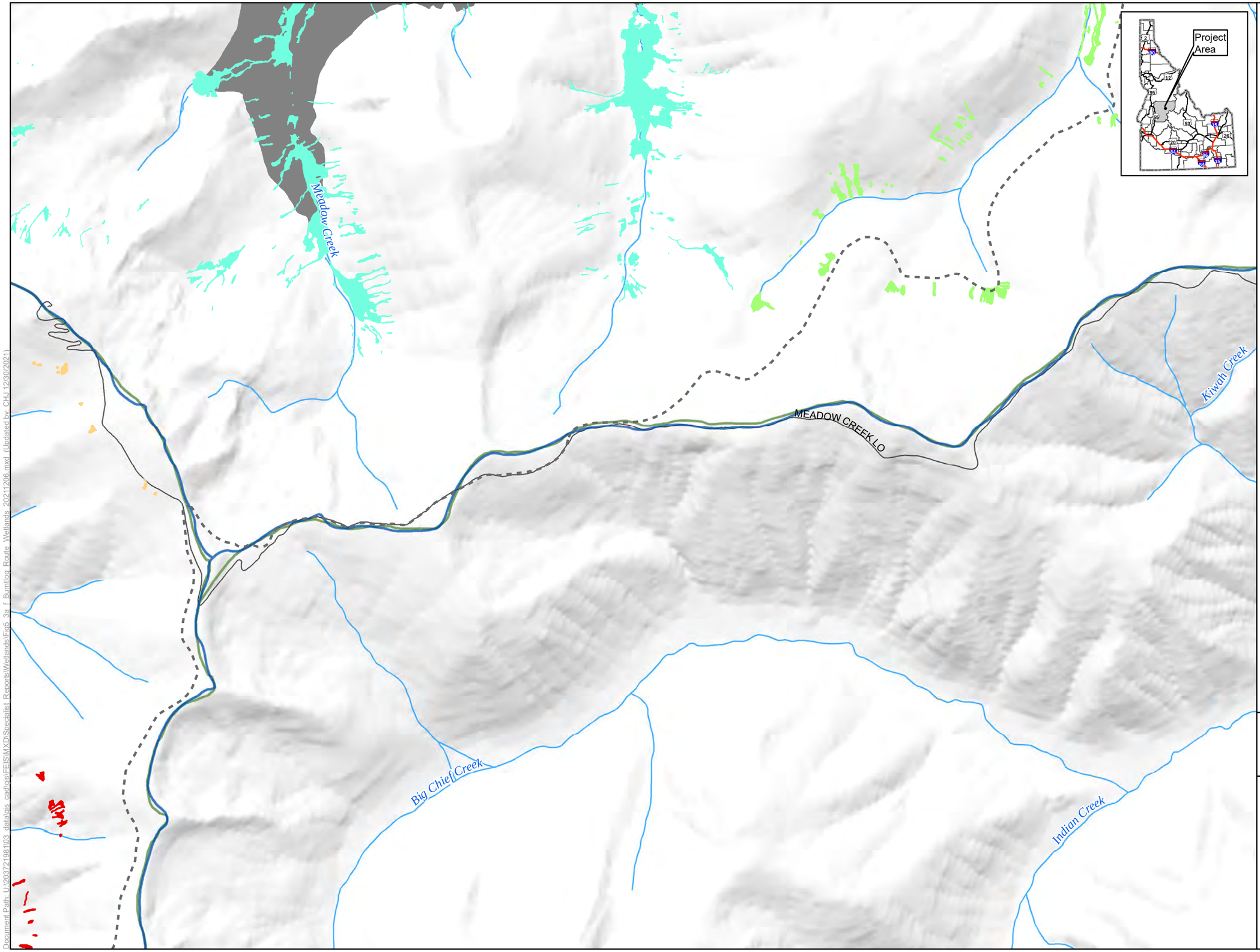



## LEGEND

- Watershed Boundary (USGS HUC* 10)
- Wetlands

**Functional AAs**

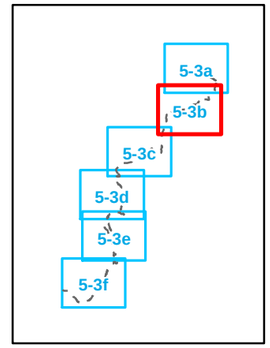
- AA-12
- AA-15
- AA-21

**Project Components**

- SGP Features
- Burntlog Route

**Other Features**

- U.S. Forest Service
- City/Town
- Monumental Summit
- County
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir




*US Geological Survey Hydrologic Unit Code

Note:
East Fork Meadow Creek is also known as Blowout Creek.
The McCall – Stibnite Road (CR 50-412) consists of Lick Creek Road, East Fork South Fork Salmon River Road (East Fork Road) and Stibnite Road.

0 1,000 2,000 Feet

1 inch = 2,000 feet
when printed at 11x17

# Figure 5-3b
# Burntlog Route Wetlands
# Stibnite Gold Project
# Stibnite, ID

*Base Layer: USGS Shaded Relief Service*
*Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest*

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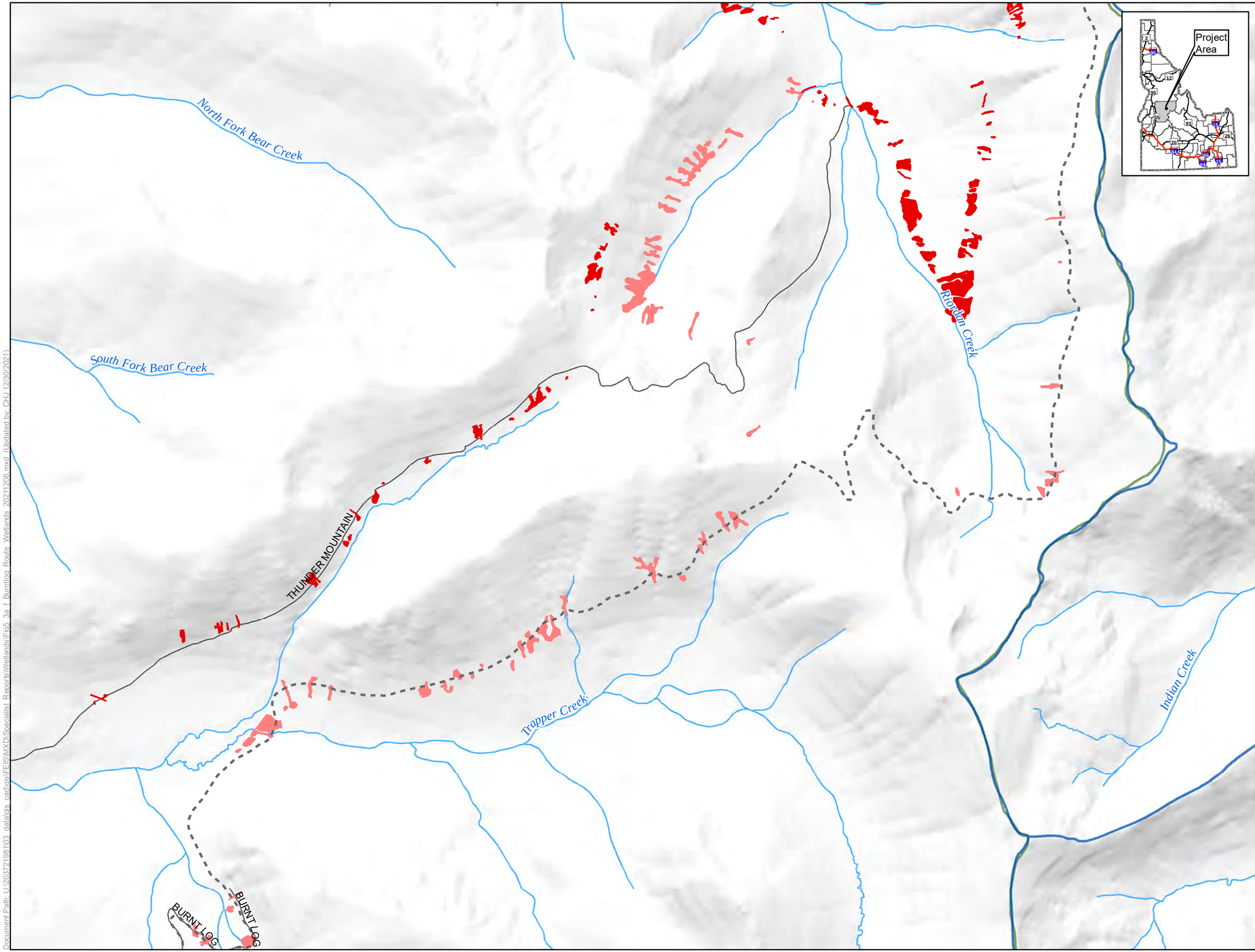



## LEGEND

- Watershed Boundary (USGS HUC* 10)
- Wetlands

**Functional AAs**

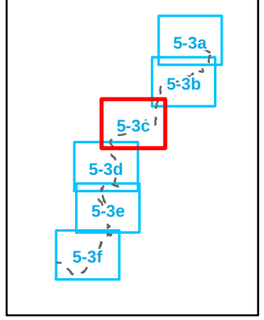
- AA-11
- AA-21

**Project Components**

- SGP Features
- Burntlog Route

**Other Features**

- U.S. Forest Service
- City/Town
- Monumental Summit
- County
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir




*US Geological Survey Hydrologic Unit Code

Note:
East Fork Meadow Creek is also known as Blowout Creek.
The McCall – Stibnite Road (CR 50-412) consists of Lick Creek Road, East Fork South Fork Salmon River Road (East Fork Road) and Stibnite Road.

0 1,000 2,000 Feet

1 inch = 2,000 feet
when printed at 11x17

# Figure 5-3c
# Burntlog Route Wetlands
# Stibnite Gold Project
# Stibnite, ID

*Base Layer: USGS Shaded Relief Service*
*Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest*

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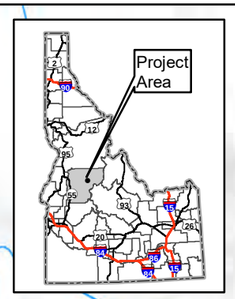
THUNDER MOUNTAIN

Buck Creek

Burntlog Creek

East Fork Burntlog Creek

BURNT LOG




## LEGEND

- Watershed Boundary (USGS HUC* 10)
- Wetlands

**Functional AAs**

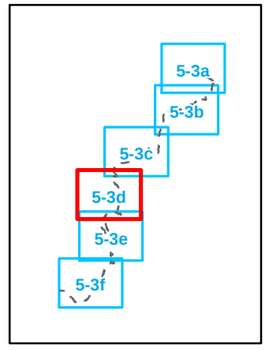
- AA-11

**Project Components**

- SGP Features
- Burntlog Route

**Other Features**

- U.S. Forest Service
- City/Town
- Monumental Summit
- County
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir




*US Geological Survey Hydrologic Unit Code

Note:
East Fork Meadow Creek is also known as Blowout Creek.
The McCall – Stibnite Road (CR 50-412) consists of Lick Creek Road, East Fork South Fork Salmon River Road (East Fork Road) and Stibnite Road.

0 1,000 2,000 Feet

1 inch = 2,000 feet
when printed at 11x17

# Figure 5-3d
# Burntlog Route Wetlands
# Stibnite Gold Project
# Stibnite, ID

*Base Layer: USGS Shaded Relief Service*
*Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest*

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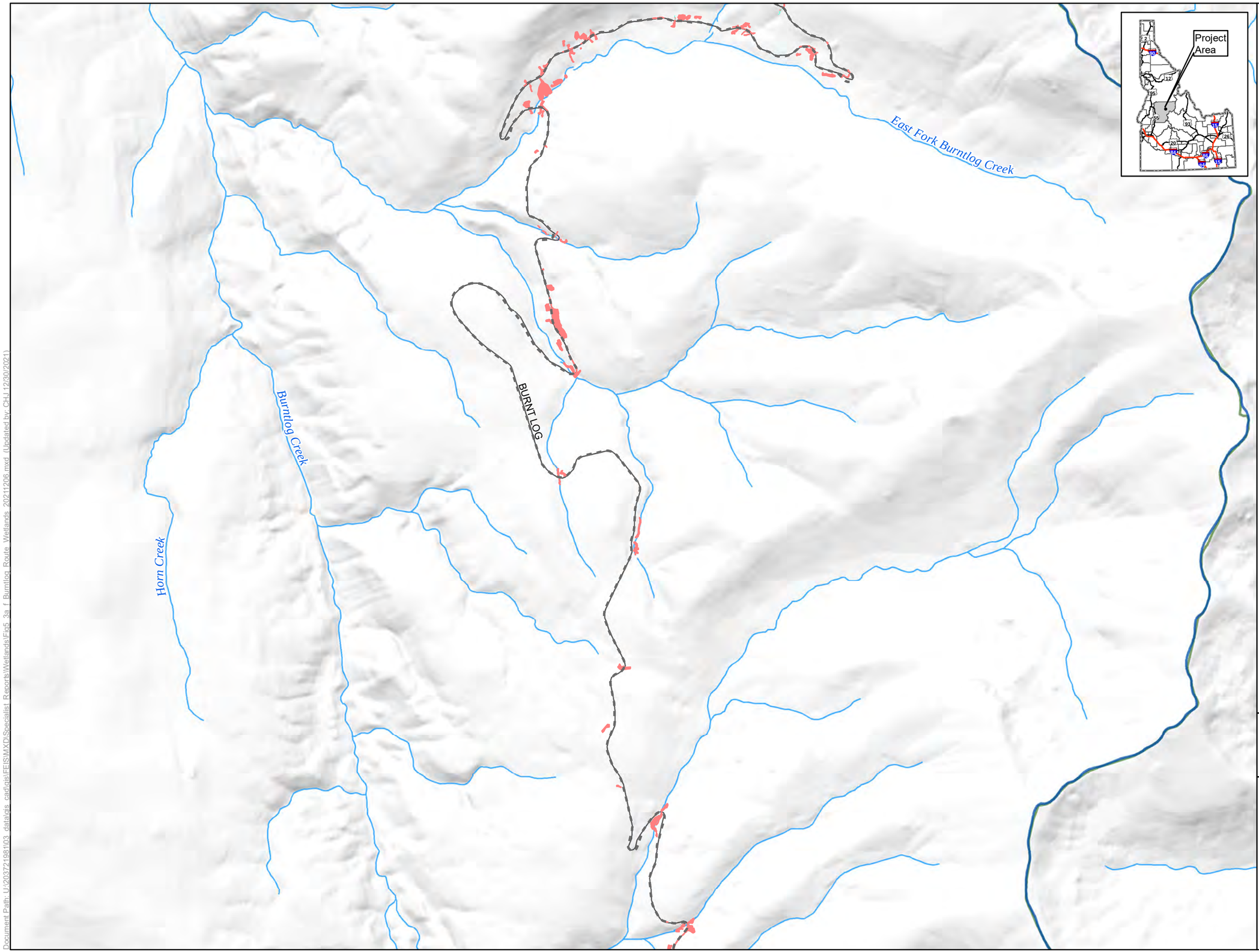



## LEGEND

- Watershed Boundary (USGS HUC* 10)
- Wetlands

**Functional AAs**

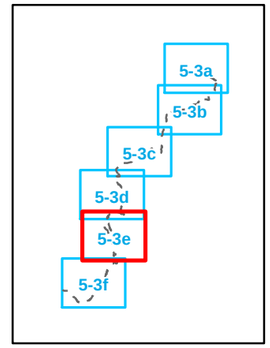
- AA-11

**Project Components**

- SGP Features
- Burntlog Route

**Other Features**

- U.S. Forest Service
- City/Town
- Monumental Summit
- County
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir




*US Geological Survey Hydrologic Unit Code

Note:
East Fork Meadow Creek is also known as Blowout Creek.
The McCall – Stibnite Road (CR 50-412) consists of Lick Creek Road, East Fork South Fork Salmon River Road (East Fork Road) and Stibnite Road.

0 1,000 2,000 Feet

1 inch = 2,000 feet
when printed at 11x17

# Figure 5-3e
# Burntlog Route Wetlands
# Stibnite Gold Project
# Stibnite, ID

*Base Layer: USGS Shaded Relief Service*
*Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest*

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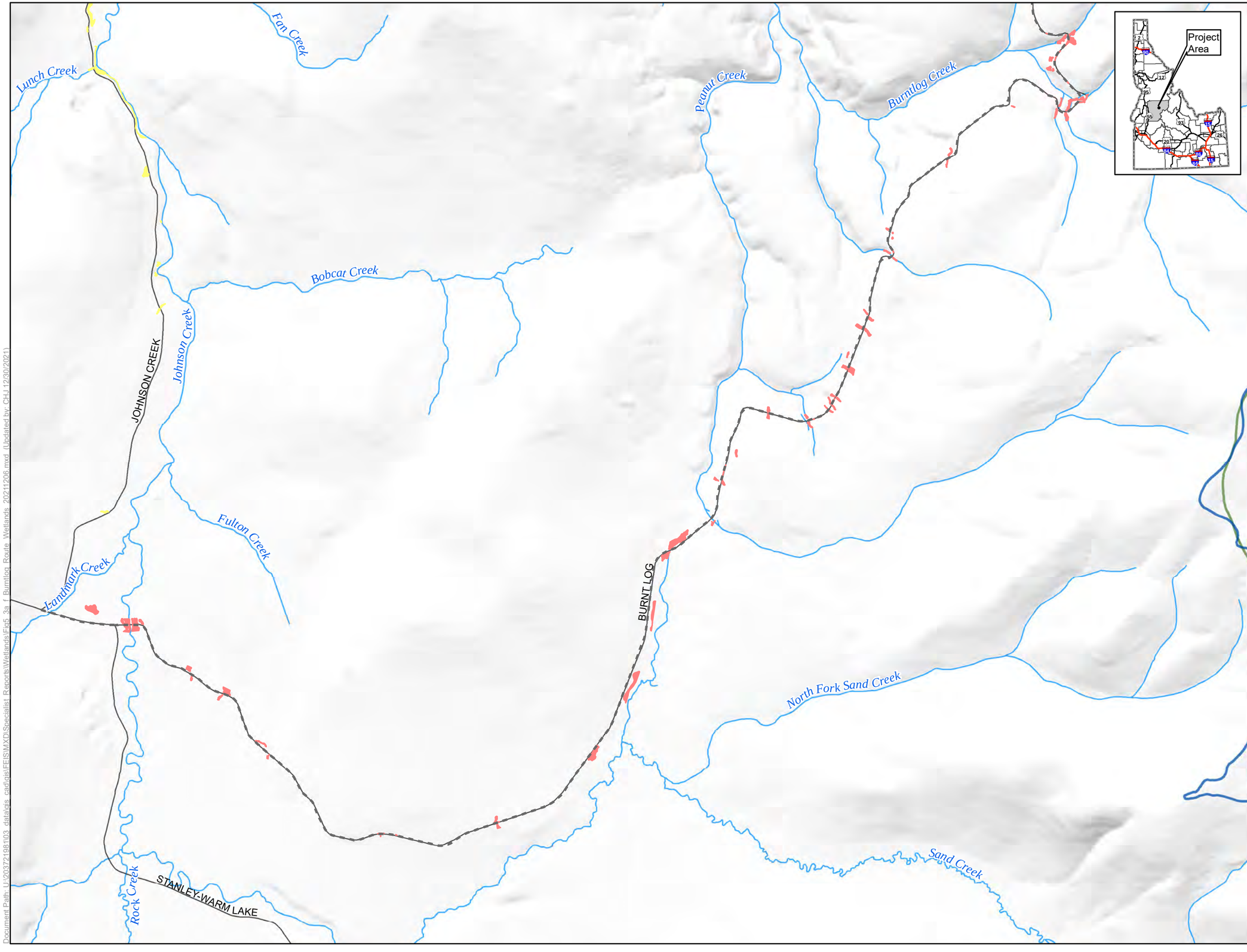


## LEGEND

- Watershed Boundary (USGS HUC* 10)
- Wetlands

**Functional AAs**

- AA-11
- AA-13

**Project Components**

- SGP Features
- Burntlog Route

**Other Features**

- U.S. Forest Service
- City/Town
- Monumental Summit
- County
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir

5-3a
5-3b
5-3c
5-3d
5-3e
5-3f

*US Geological Survey Hydrologic Unit Code

Note:
East Fork Meadow Creek is also known as Blowout Creek.
The McCall – Stibnite Road (CR 50-412) consists of Lick Creek Road, East Fork South Fork Salmon River Road (East Fork Road) and Stibnite Road.

0 1,000 2,000 Feet

1 inch = 2,000 feet
when printed at 11x17

# Figure 5-3f
# Burntlog Route Wetlands
# Stibnite Gold Project
# Stibnite, ID

*Base Layer: USGS Shaded Relief Service*
*Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest*

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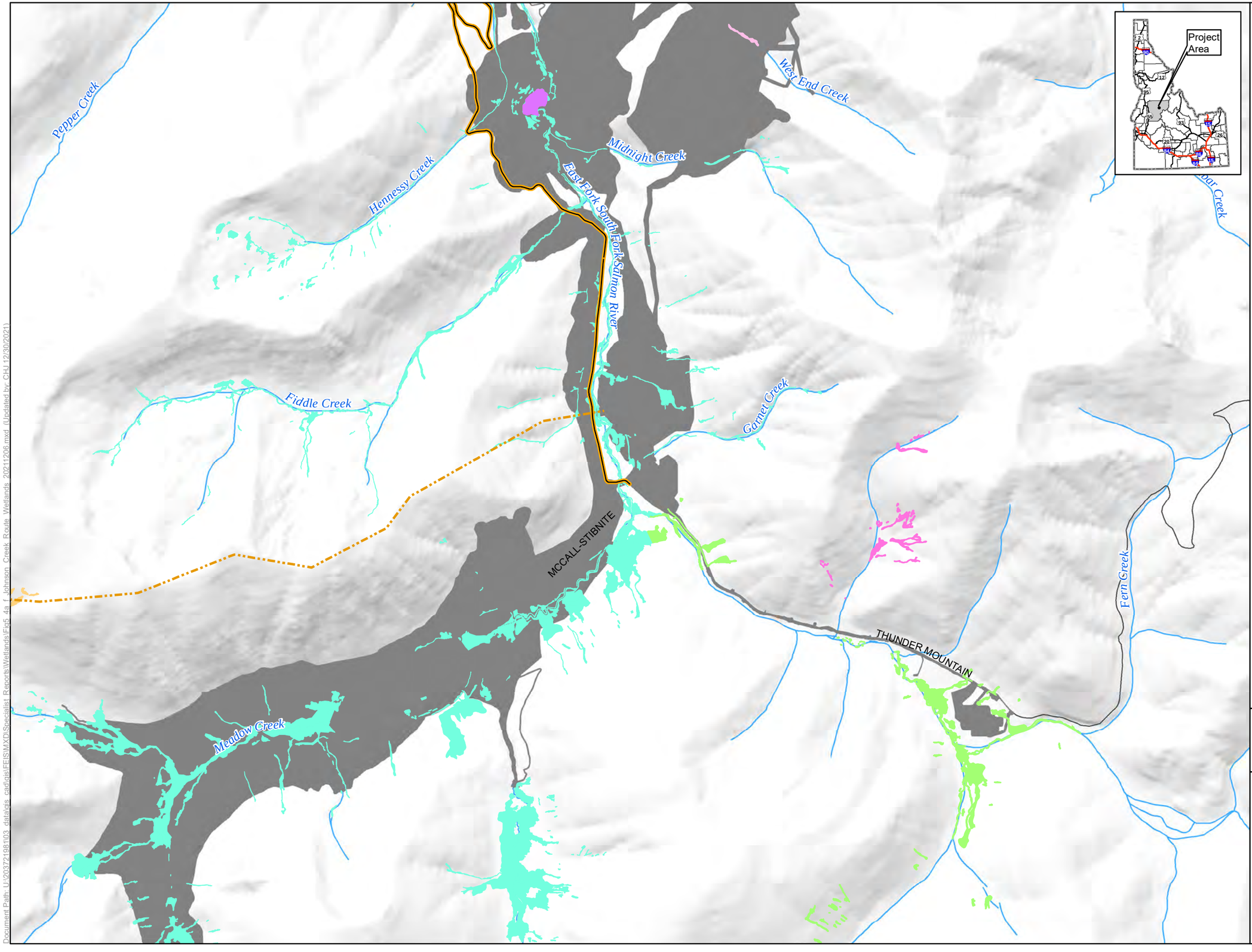



## LEGEND

- Watershed Boundary (USGS HUC* 10)
- Wetlands

**Functional AAs**

- AA-10
- AA-12
- AA-15
- AA-19
- AA-20

**Project Components**

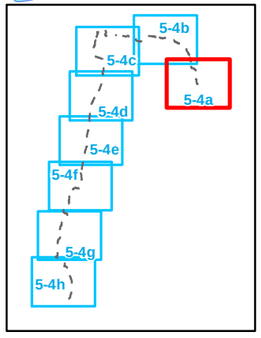
- SGP Features
- Johnson Creek Route

**Utilities**

- New Transmission Line

**Other Features**

- U.S. Forest Service
- City/Town
- Monumental Summit
- County
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir




*US Geological Survey Hydrologic Unit Code

Note:
East Fork Meadow Creek is also known as Blowout Creek.
The McCall – Stibnite Road (CR 50-412) consists of Lick Creek Road, East Fork South Fork Salmon River Road (East Fork Road) and Stibnite Road.

0 1,000 2,000 Feet

1 inch = 2,000 feet
when printed at 11x17

# Figure 5-4a
# Johnson Creek Route Wetlands
# Stibnite Gold Project
# Stibnite, ID

*Base Layer: USGS Shaded Relief Service*
*Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest*

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Profile Creek

Tamarack Creek

Whiskey Creek

Salt Creek

East Fork South Fork Salmon River

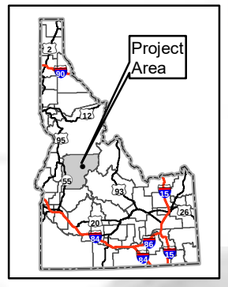
Pepper Creek

Bishop Creek

MCCALL-STIBNITE

Sugar Creek

Harness Creek




## LEGEND

- Watershed Boundary (USGS HUC* 10)
- Wetlands

**Functional AAs**

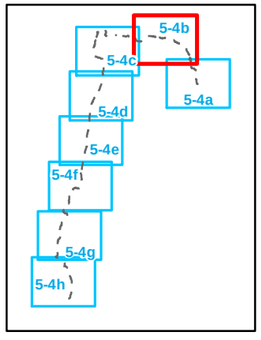
- AA-16
- AA-19

**Project Components**

- SGP Features
- Johnson Creek Route

**Other Features**

- U.S. Forest Service
- City/Town
- Monumental Summit
- County
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir




*US Geological Survey Hydrologic Unit Code

Note:
East Fork Meadow Creek is also known as Blowout Creek.
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0 1,000 2,000 Feet

1 inch = 2,000 feet
when printed at 11x17

N

# Figure 5-4b
# Johnson Creek Route Wetlands
# Stibnite Gold Project
# Stibnite, ID

*Base Layer: USGS Shaded Relief Service*
*Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest*

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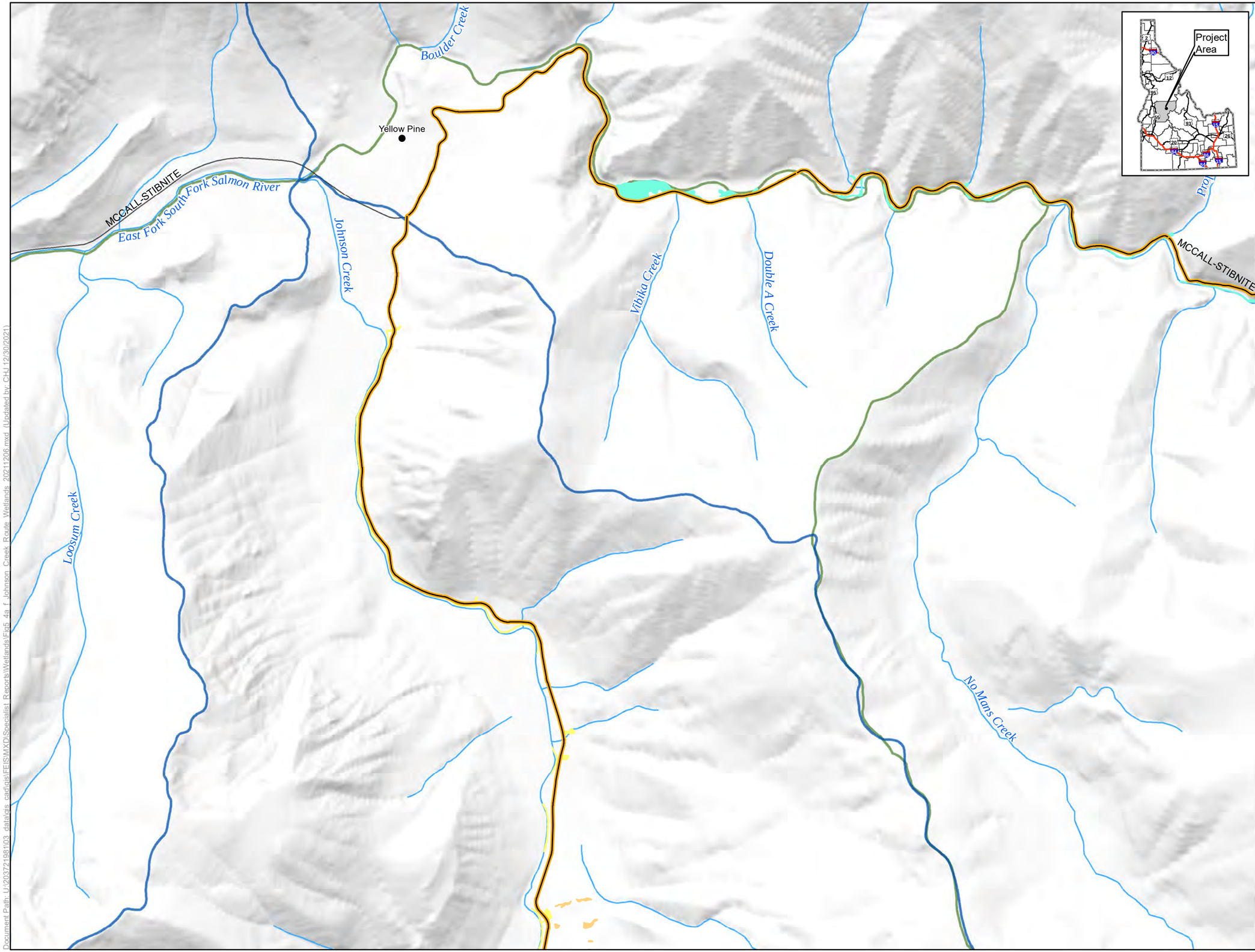






## LEGEND

- Watershed Boundary (USGS HUC* 10)
- Wetlands

**Functional AAs**

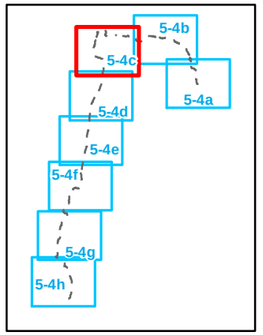
- AA-12
- AA-13
- AA-16

**Project Components**

- SGP Features
- Johnson Creek Route

**Other Features**

- U.S. Forest Service
- City/Town
- Monumental Summit
- County
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir




*US Geological Survey Hydrologic Unit Code

Note:
East Fork Meadow Creek is also known as Blowout Creek.
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0 1,000 2,000 Feet

1 inch = 2,000 feet
when printed at 11x17

N

# Figure 5-4c
# Johnson Creek Route Wetlands
# Stibnite Gold Project
# Stibnite, ID

*Base Layer: USGS Shaded Relief Service*
*Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest*

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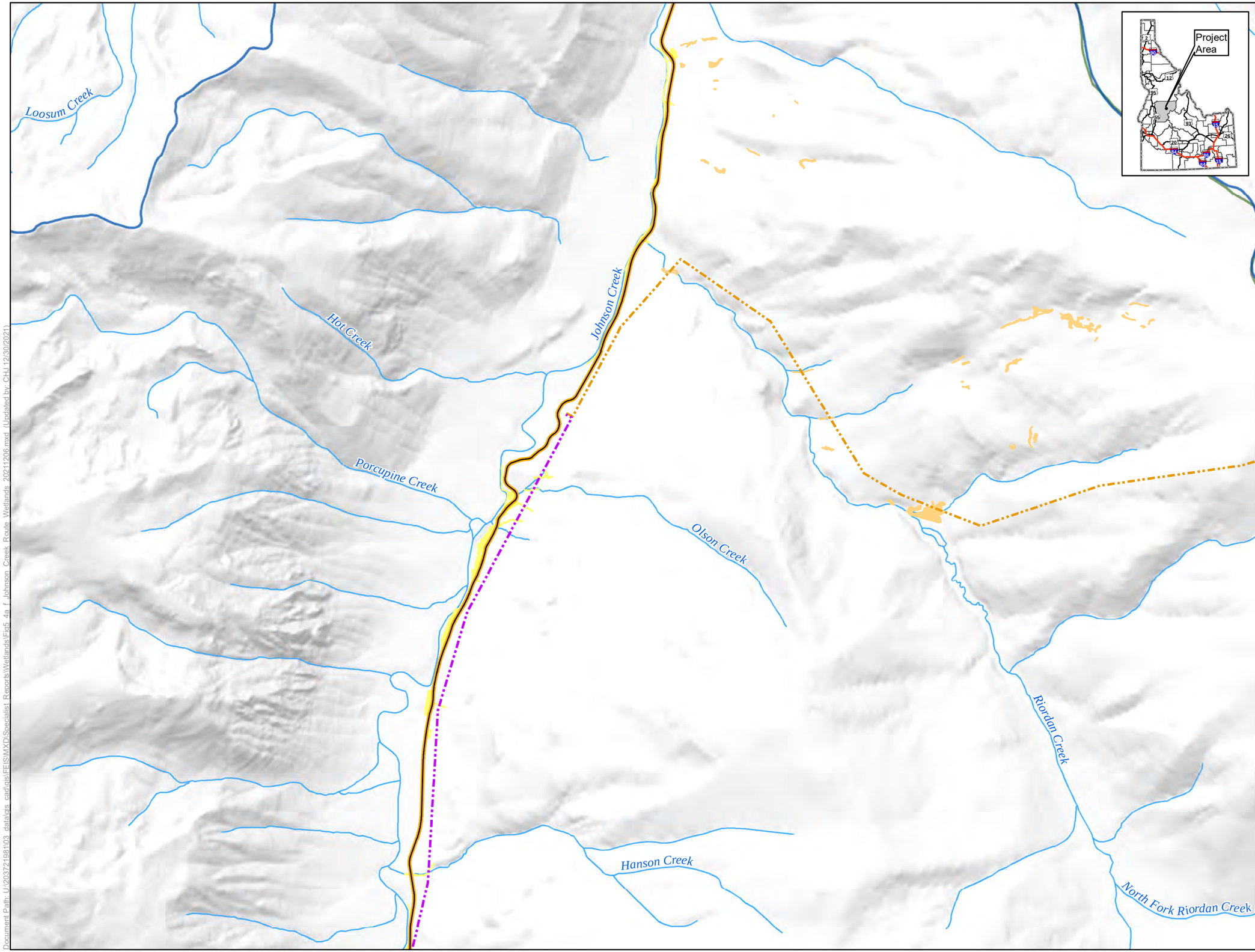



## LEGEND

- Watershed Boundary (USGS HUC* 10)
- Wetlands

**Functional AAs**

- AA-12
- AA-13

**Project Components**

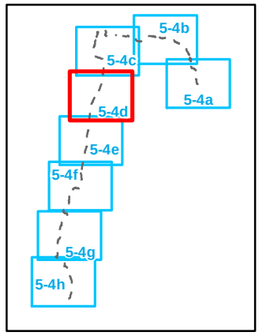
- SGP Features
- Johnson Creek Route

**Utilities**

- Upgraded Transmission Line
- New Transmission Line

**Other Features**

- U.S. Forest Service
- City/Town
- Monumental Summit
- County
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir




*US Geological Survey Hydrologic Unit Code

Note:
East Fork Meadow Creek is also known as Blowout Creek.
The McCall – Stibnite Road (CR 50-412) consists of Lick Creek Road, East Fork South Fork Salmon River Road (East Fork Road) and Stibnite Road.

0 1,000 2,000 Feet

1 inch = 2,000 feet
when printed at 11x17

N

# Figure 5-4d
# Johnson Creek Route Wetlands
# Stibnite Gold Project
# Stibnite, ID

*Base Layer: USGS Shaded Relief Service*
*Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest*

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Hanson Creek

Forstrum Creek

Johnson Creek

Cox Creek

Moose Creek

JOHNSON CREEK

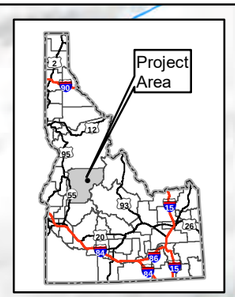
Bear Creek

North Fork Bear Creek

Wardenhoff Creek

Trapper Creek

South Fork Bear Creek




## LEGEND

- Watershed Boundary (USGS HUC* 10)
- Wetlands

**Functional AAs**

- AA-13
- AA-21

**Project Components**

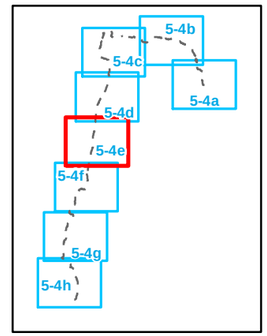
- SGP Features
- Johnson Creek Route

**Utilities**

- Upgraded Transmission Line

**Other Features**

- U.S. Forest Service
- City/Town
- Monumental Summit
- County
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir




*US Geological Survey Hydrologic Unit Code

Note:
East Fork Meadow Creek is also known as Blowout Creek.
The McCall – Stibnite Road (CR 50-412) consists of Lick Creek Road, East Fork South Fork Salmon River Road (East Fork Road) and Stibnite Road.

0 1,000 2,000 Feet

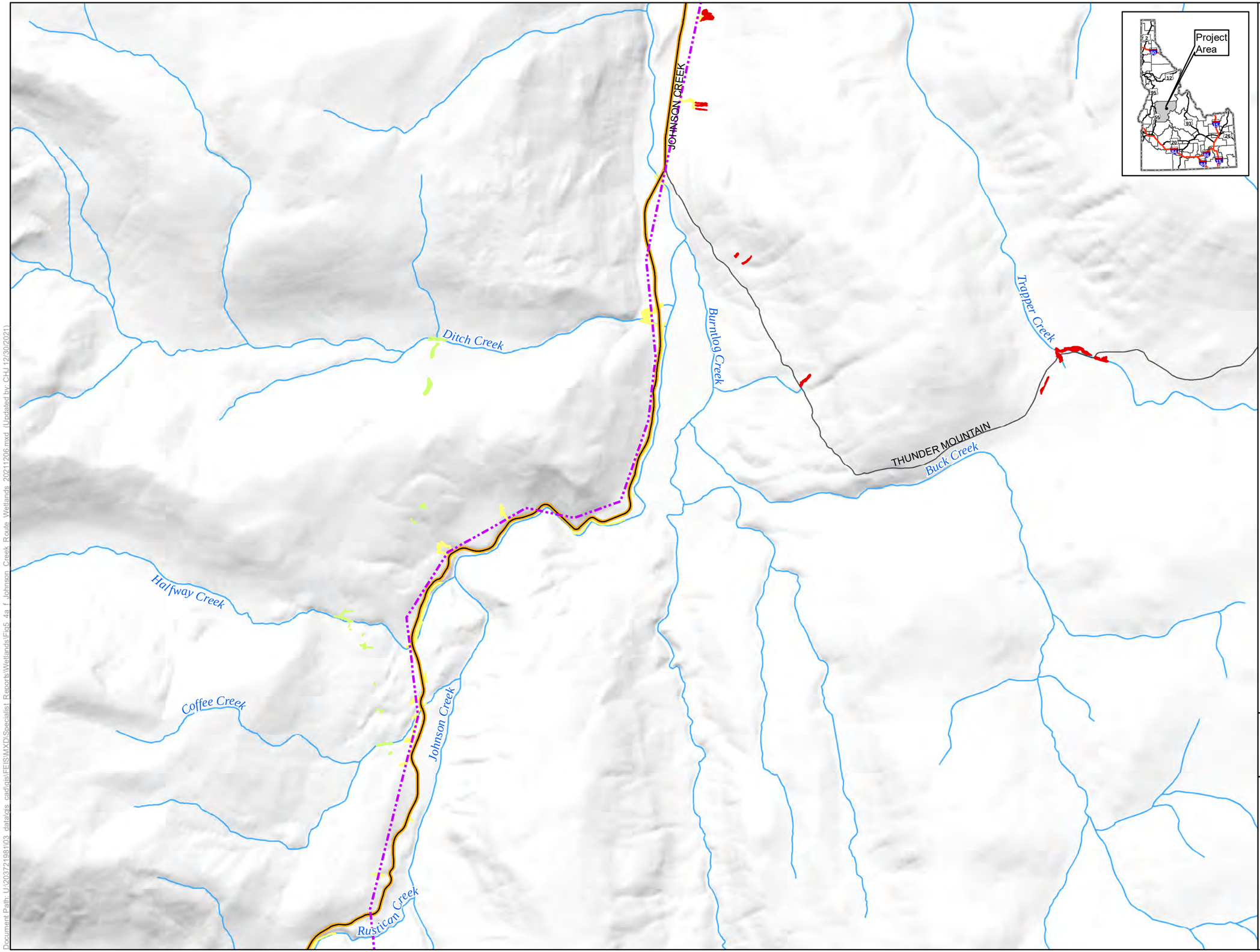
1 inch = 2,000 feet
when printed at 11x17

N

# Figure 5-4e
# Johnson Creek Route Wetlands
# Stibnite Gold Project
# Stibnite, ID

*Base Layer: USGS Shaded Relief Service*
*Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest*

Document Path: U:\2037\198\03_data\gis_cad\gis\FEIS\MXD\Specialist Reports\Wetlands\Fig5_4a_f_Johnson_Creek_Route_Wetlands_20211206.mxd (Updated by: CHJ 12/30/2021)




## LEGEND

- Watershed Boundary (USGS HUC* 10)
- Wetlands

**Functional AAs**

- AA-13
- AA-14
- AA-21

**Project Components**

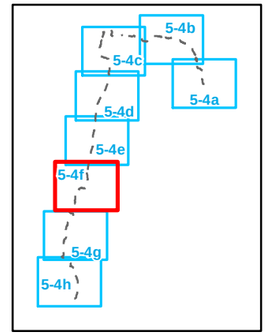
- SGP Features
- Johnson Creek Route

**Utilities**

- Upgraded Transmission Line

**Other Features**

- U.S. Forest Service
- City/Town
- Monumental Summit
- County
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir




*US Geological Survey Hydrologic Unit Code

Note:
East Fork Meadow Creek is also known as Blowout Creek.
The McCall – Stibnite Road (CR 50-412) consists of Lick Creek Road, East Fork South Fork Salmon River Road (East Fork Road) and Stibnite Road.

0 1,000 2,000 Feet

1 inch = 2,000 feet
when printed at 11x17

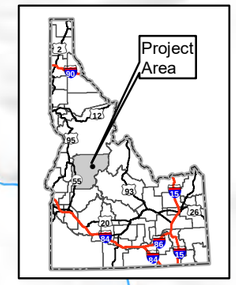
N

# Figure 5-4f
# Johnson Creek Route Wetlands
# Stibnite Gold Project
# Stibnite, ID

*Base Layer: USGS Shaded Relief Service*
*Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest*

Document Path: U:\2037\219\103_data\gis_cad\gis\EIS\MXD\Specialist Reports\Wetlands\Fig5_4a_f_Johnson_Creek_Route_Wetlands_20211206.mxd (Updated by: CHJ 12/30/2021)

Rustican Creek
Trout Creek
CABIN CREEK
Johnson Creek
Park Creek
Pid Creek
Sheep Creek
East Fork Burntlog Creek
Burntlog Creek
Horn Creek




## LEGEND

- Watershed Boundary (USGS HUC* 10)
- Wetlands

**Functional AAs**

- AA-13
- AA-14

**Project Components**

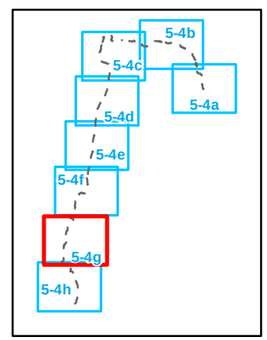
- SGP Features
- Johnson Creek Route

**Utilities**

- Upgraded Transmission Line

**Other Features**

- U.S. Forest Service
- City/Town
- Monumental Summit
- County
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir




*US Geological Survey Hydrologic Unit Code

Note:
East Fork Meadow Creek is also known as Blowout Creek.
The McCall – Stibnite Road (CR 50-412) consists of Lick Creek Road, East Fork South Fork Salmon River Road (East Fork Road) and Stibnite Road.

0 1,000 2,000 Feet

1 inch = 2,000 feet
when printed at 11x17

# Figure 5-4g
# Johnson Creek Route Wetlands
# Stibnite Gold Project
# Stibnite, ID

*Base Layer: USGS Shaded Relief Service*
*Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest*

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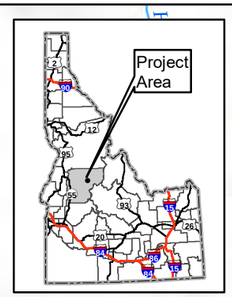



## LEGEND

- Watershed Boundary (USGS HUC* 10)
- Wetlands

**Functional AAs**

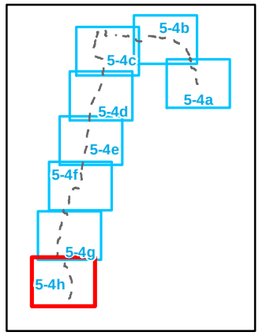
- AA-11
- AA-13

**Project Components**

- SGP Features
- Johnson Creek Route

**Other Features**

- U.S. Forest Service
- City/Town
- Monumental Summit
- County
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir




*US Geological Survey Hydrologic Unit Code

Note:
East Fork Meadow Creek is also known as Blowout Creek.
The McCall – Stibnite Road (CR 50-412) consists of Lick Creek Road, East Fork South Fork Salmon River Road (East Fork Road) and Stibnite Road.

0 1,000 2,000 Feet

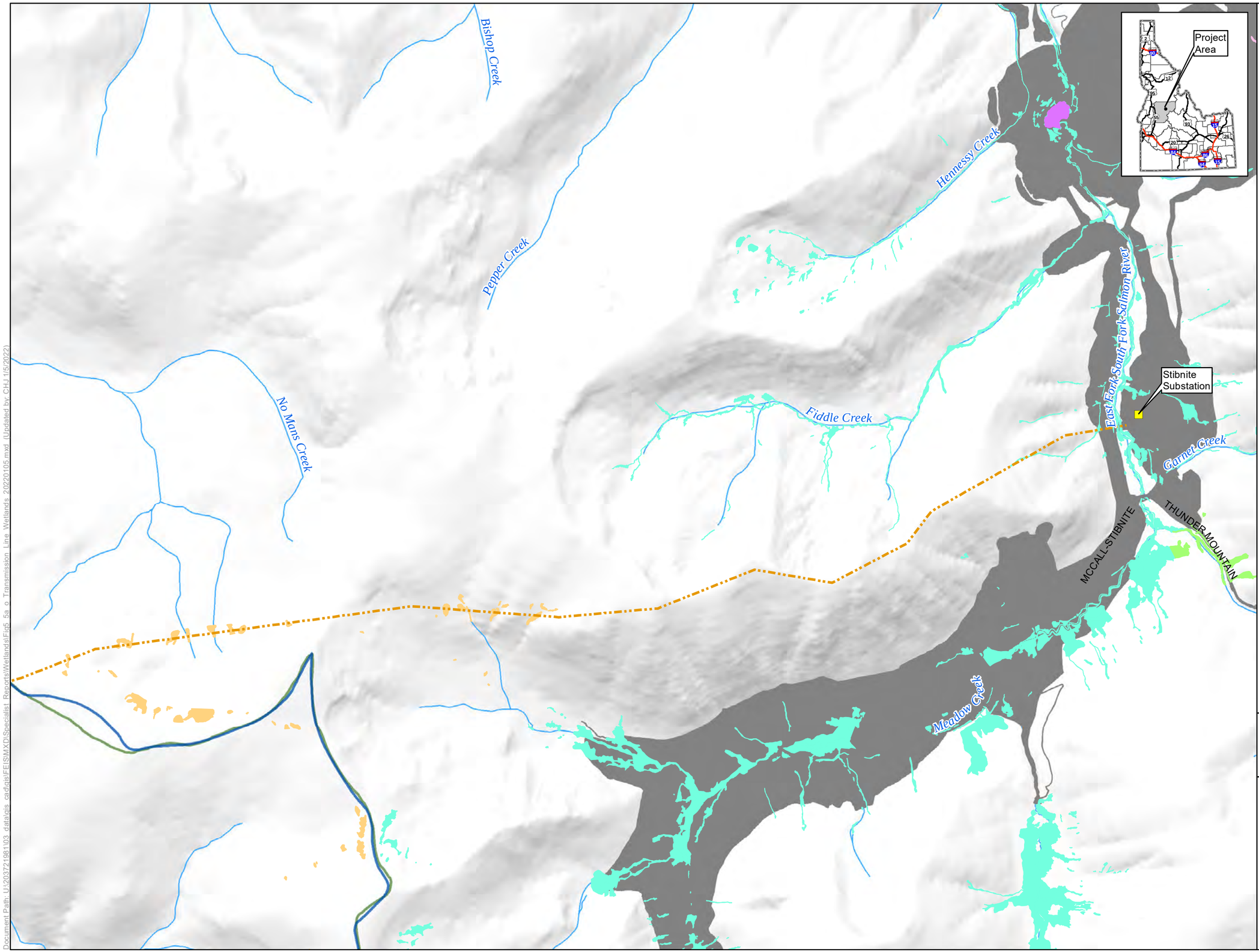
1 inch = 2,000 feet
when printed at 11x17

# Figure 5-4h
# Johnson Creek Route Wetlands
# Stibnite Gold Project
# Stibnite, ID

*Base Layer: USGS Shaded Relief Service*
*Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest*

Sheep Creek
Fan Creek
Johnson Creek
Bobcat Creek
Lunch Creek
Fulton Creek
Landmark Creek
JOHNSON CREEK
STANLEY-WARM LAKE
BURNT LOG

Document Path: U:\2037\21981\03_data\gis_cad\gis\FEIS\MXD\Specialist_Reports\Wetlands\Fig5_4a_Johnson_Creek_Route_Wetlands_20211206.mxd (Updated by: CHJ 12/30/2021)




## LEGEND

- Watershed Boundary (USGS HUC* 10)
- Wetlands

**Functional AAs**

- AA-10
- AA-12
- AA-15
- AA-19

**Project Components**

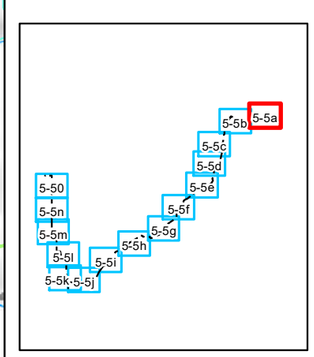
- SGP Features

**Utilities**

- New Transmission Line
- New Substation

**Other Features**

- U.S. Forest Service
- City/Town
- Monumental Summit
- County
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir




*US Geological Survey Hydrologic Unit Code

Note:
East Fork Meadow Creek is also known as Blowout Creek.
The McCall – Stibnite Road (CR 50-412) consists of Lick Creek Road, East Fork South Fork Salmon River Road (East Fork Road) and Stibnite Road.

0 1,000 2,000 Feet

1 inch = 2,000 feet
when printed at 11x17

N

# Figure 5-5a
# Transmission Line Wetlands
# Stibnite Gold Project
# Stibnite, ID

*Base Layer: USGS Shaded Relief Service*
*Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest*

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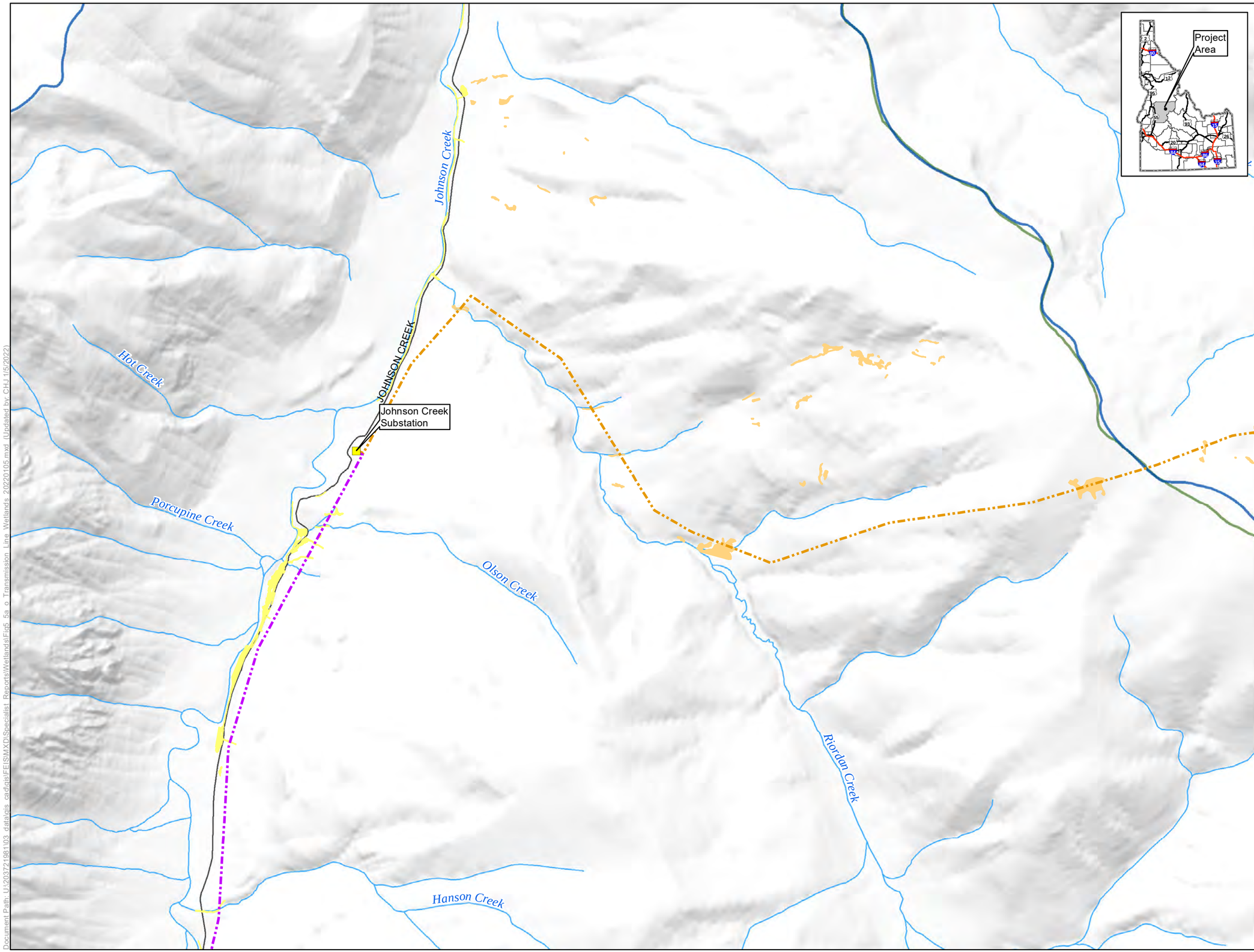



## LEGEND

- Watershed Boundary (USGS HUC* 10)
- Wetlands

**Functional AAs**

- AA-12
- AA-13

**Project Components**

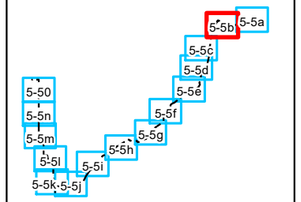
- SGP Features

**Utilities**

- Upgraded Transmission Line
- New Transmission Line
- New Substation

**Other Features**

- U.S. Forest Service
- City/Town
- Monumental Summit
- County
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir




*US Geological Survey Hydrologic Unit Code

Note:
East Fork Meadow Creek is also known as Blowout Creek.
The McCall – Stibnite Road (CR 50-412) consists of Lick Creek Road, East Fork South Fork Salmon River Road (East Fork Road) and Stibnite Road.

0 1,000 2,000 Feet

1 inch = 2,000 feet
when printed at 11x17

# Figure 5-5b
# Transmission Line Wetlands
# Stibnite Gold Project
# Stibnite, ID

*Base Layer: USGS Shaded Relief Service*
*Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest*

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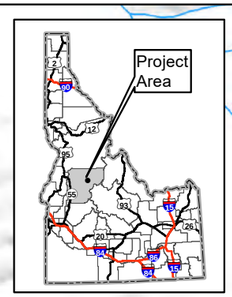
Hanson Creek
Forstrum Creek
Johnson Creek
Cox Creek
Moose Creek
Caton Creek
Wardenhoff Creek
JOHNSON CREEK
Bear Creek
Trapper Creek




## LEGEND

- Watershed Boundary (USGS HUC* 10)
- Wetlands

**Functional AAs**

- AA-13
- AA-21

**Project Components**

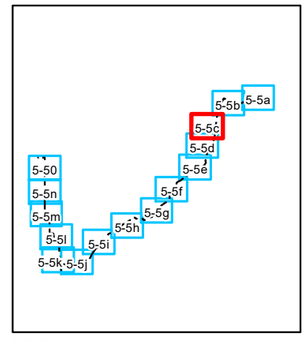
- SGP Features

**Utilities**

- Upgraded Transmission Line

**Other Features**

- U.S. Forest Service
- City/Town
- Monumental Summit
- County
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir




*US Geological Survey Hydrologic Unit Code

Note:
East Fork Meadow Creek is also known as Blowout Creek.
The McCall – Stibnite Road (CR 50-412) consists of Lick Creek Road, East Fork South Fork Salmon River Road (East Fork Road) and Stibnite Road.

0 1,000 2,000 Feet

1 inch = 2,000 feet
when printed at 11x17

N

# Figure 5-5c
# Transmission Line Wetlands
# Stibnite Gold Project
# Stibnite, ID

*Base Layer: USGS Shaded Relief Service*
*Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest*

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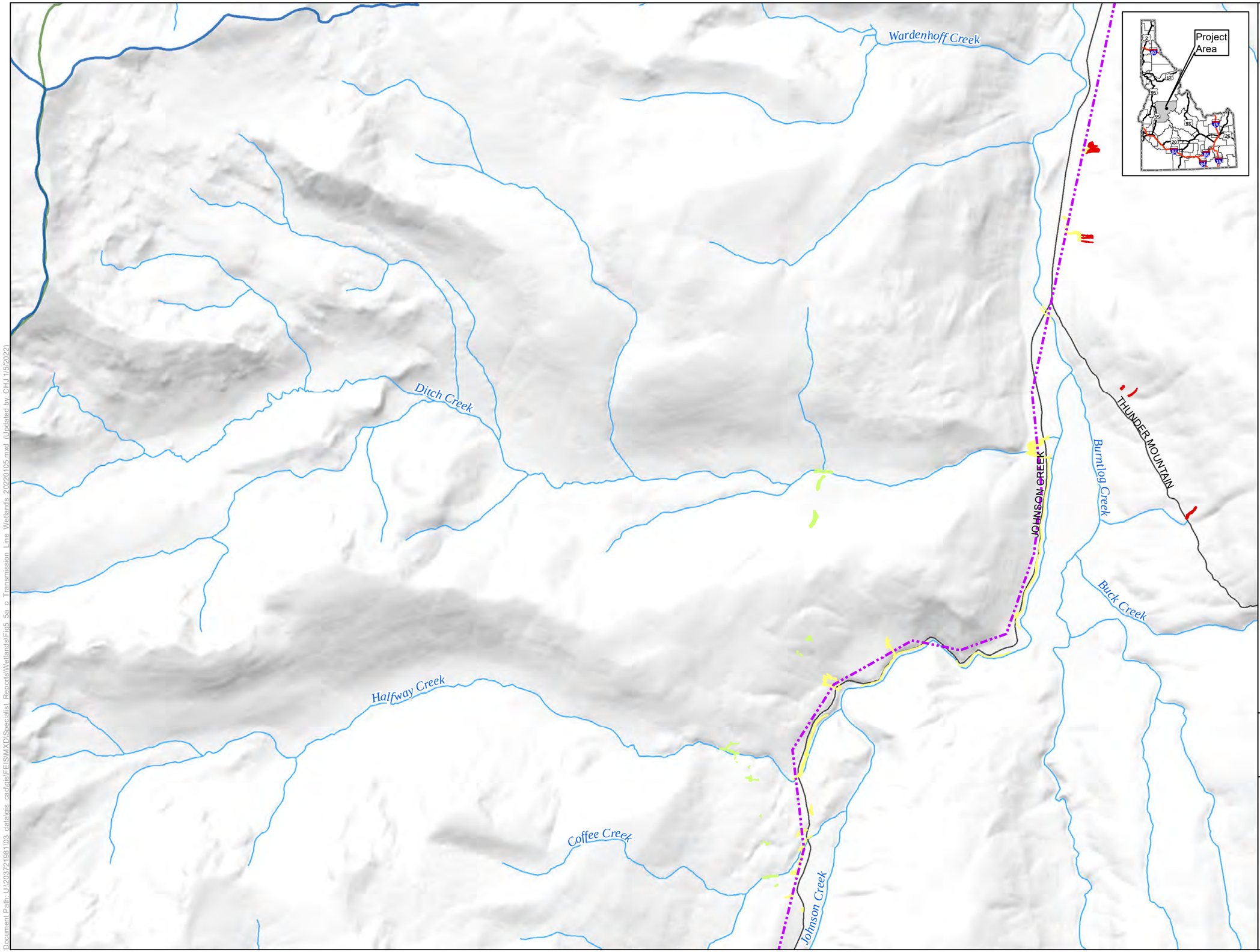



## LEGEND

- Watershed Boundary (USGS HUC* 10)
- Wetlands

**Functional AAs**

- AA-13
- AA-14
- AA-21

**Project Components**

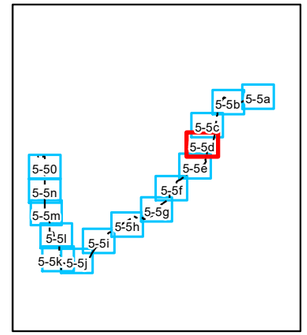
- SGP Features

**Utilities**

- Upgraded Transmission Line

**Other Features**

- U.S. Forest Service
- City/Town
- Monumental Summit
- County
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir




*US Geological Survey Hydrologic Unit Code

Note:
East Fork Meadow Creek is also known as Blowout Creek.
The McCall – Stibnite Road (CR 50-412) consists of Lick Creek Road, East Fork South Fork Salmon River Road (East Fork Road) and Stibnite Road.

0 1,000 2,000 Feet

1 inch = 2,000 feet
when printed at 11x17

N

# Figure 5-5d
# Transmission Line Wetlands
# Stibnite Gold Project
# Stibnite, ID

*Base Layer: USGS Shaded Relief Service*
*Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest*

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Goat Creek
Coffee Creek
Johnson Creek
Rustican Creek
JOHNSON CREEK
CABIN CREEK
Park Creek
Trout Creek
Pid Creek
Thunderbolt Tap Substation

Project Area

## LEGEND

- Watershed Boundary (USGS HUC* 10)
- Wetlands

**Functional AAs**

- AA-13
- AA-14

**Project Components**

- SGP Features

**Utilities**

- Upgraded Transmission Line
- New Substation

**Other Features**

- U.S. Forest Service
- City/Town
- Monumental Summit
- County
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir

5-5a
5-5b
5-5c
5-5d
5-5e
5-5f
5-5g
5-5h
5-5i
5-5j
5-5k
5-5l
5-5m
5-5n
5-5o

*US Geological Survey Hydrologic Unit Code

Note:
East Fork Meadow Creek is also known as Blowout Creek.
The McCall – Stibnite Road (CR 50-412) consists of Lick Creek Road, East Fork South Fork Salmon River Road (East Fork Road) and Stibnite Road.

0 1,000 2,000 Feet

1 inch = 2,000 feet
when printed at 11x17

N

# Figure 5-5e
# Transmission Line Wetlands
# Stibnite Gold Project
# Stibnite, ID

*Base Layer: USGS Shaded Relief Service*
*Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest*

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Thunderbolt Tap Substation

Project Area

Hayes Creek

Dollar Creek

Nickel Creek

Dime Creek

South Fork Salmon River

Six-bit Creek

Two-bit Creek

SOUTH FORK SALMON RIVER

CABIN CREEK

Cabin Creek

Knox Creek

Reeves Creek

Sheep Creek

## LEGEND

- Watershed Boundary (USGS HUC* 10)
- Wetlands

**Functional AAs**

- AA-14

**Project Components**

- SGP Features

**Utilities**

- Upgraded Transmission Line
- New Substation

**Other Features**

- U.S. Forest Service
- City/Town
- Monumental Summit
- County
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir

5-5a, 5-5b, 5-5c, 5-5d, 5-5e, 5-5f, 5-5g, 5-5h, 5-5i, 5-5j, 5-5k, 5-5l, 5-5m, 5-5n, 5-5o

*US Geological Survey Hydrologic Unit Code

Note:
East Fork Meadow Creek is also known as Blowout Creek.
The McCall – Stibnite Road (CR 50-412) consists of Lick Creek Road, East Fork South Fork Salmon River Road (East Fork Road) and Stibnite Road.

0 1,000 2,000 Feet

1 inch = 2,000 feet when printed at 11x17

# Figure 5-5f
# Transmission Line Wetlands
# Stibnite Gold Project
# Stibnite, ID

*Base Layer: USGS Shaded Relief Service*
*Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest*

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Six-bit Creek
Two-bit Creek
SOUTH FORK SALMON RIVER
CABIN CREEK
Cabin Creek
Warm Lake Substation
STANLEY-WARM LAKE
South Fork Salmon River
Warm Lake Creek
Warm Lake
Warm Lake
CASCADE-WARM LAKE
Trail Creek
Curtis Creek
SOUTH FORK SALMON RIVER
Bear Creek

Project Area

## LEGEND

- Watershed Boundary (USGS HUC* 10)
- Wetlands

**Functional AAs**

- AA-14
- AA-17

**Project Components**

- SGP Features

**Utilities**

- Upgraded Transmission Line
- Existing Substation

**Other Features**

- U.S. Forest Service
- City/Town
- Monumental Summit
- County
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir

5-5a
5-5b
5-5c
5-5d
5-5e
5-5f
5-5g
5-5h
5-5i
5-5j
5-5k
5-5l
5-5m
5-5n
5-5o

*US Geological Survey Hydrologic Unit Code

Note:
East Fork Meadow Creek is also known as Blowout Creek.
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0 1,000 2,000 Feet
1 inch = 2,000 feet
when printed at 11x17

N

# Figure 5-5g
# Transmission Line Wetlands
# Stibnite Gold Project
# Stibnite, ID

*Base Layer: USGS Shaded Relief Service*
*Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest*

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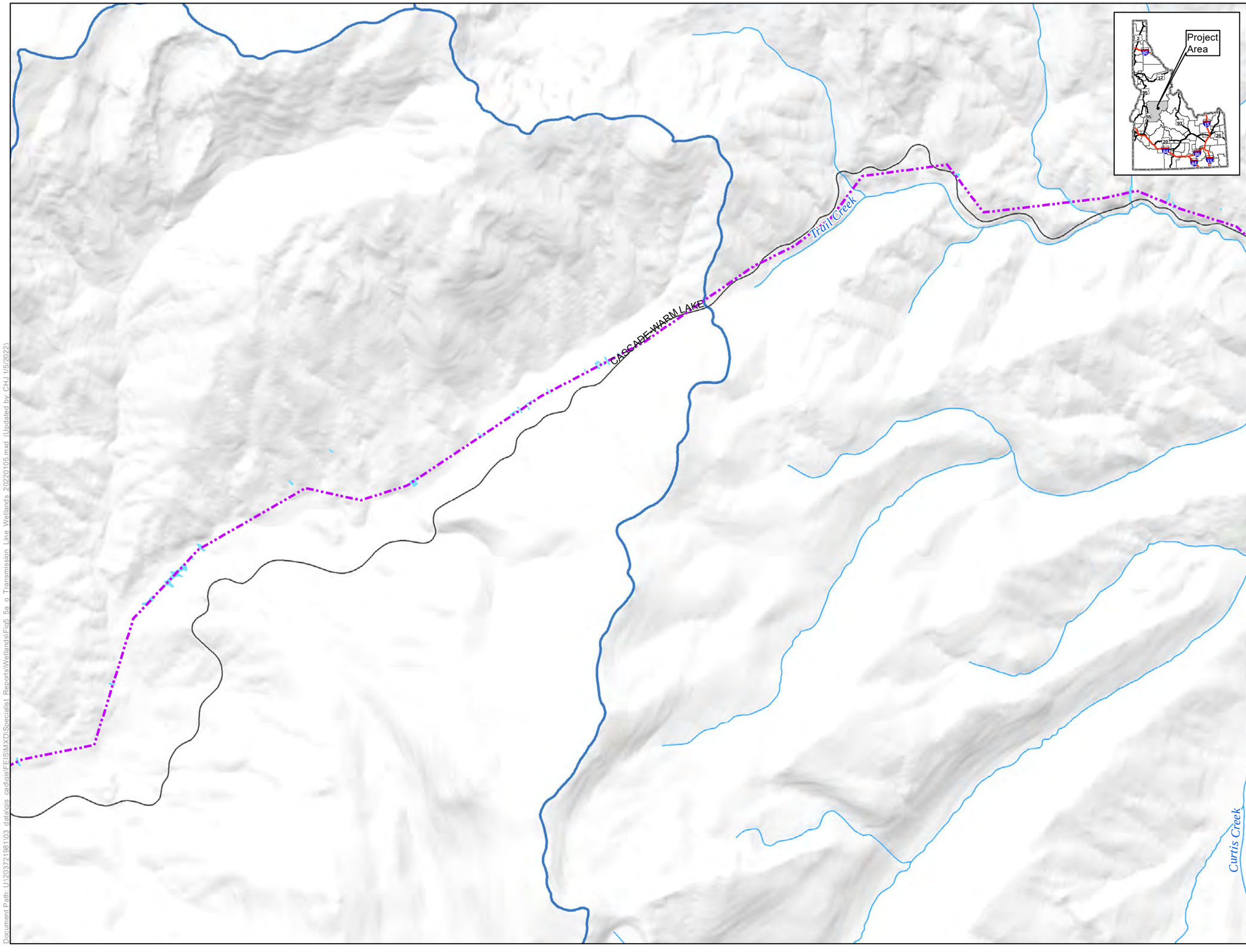






## LEGEND

- Watershed Boundary (USGS HUC* 10)
- Wetlands

**Functional AAs**

- AA-17

**Project Components**

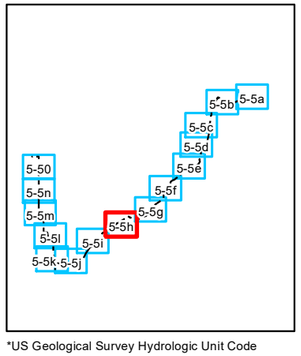
- SGP Features

**Utilities**

- Upgraded Transmission Line

**Other Features**

- U.S. Forest Service
- City/Town
- Monumental Summit
- County
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir




*US Geological Survey Hydrologic Unit Code

Note:
East Fork Meadow Creek is also known as Blowout Creek.
The McCall – Stibnite Road (CR 50-412) consists of Lick Creek Road, East Fork South Fork Salmon River Road (East Fork Road) and Stibnite Road.

0 1,000 2,000 Feet

1 inch = 2,000 feet
when printed at 11x17

# Figure 5-5h
# Transmission Line Wetlands
# Stibnite Gold Project
# Stibnite, ID

*Base Layer: USGS Shaded Relief Service*
*Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest*

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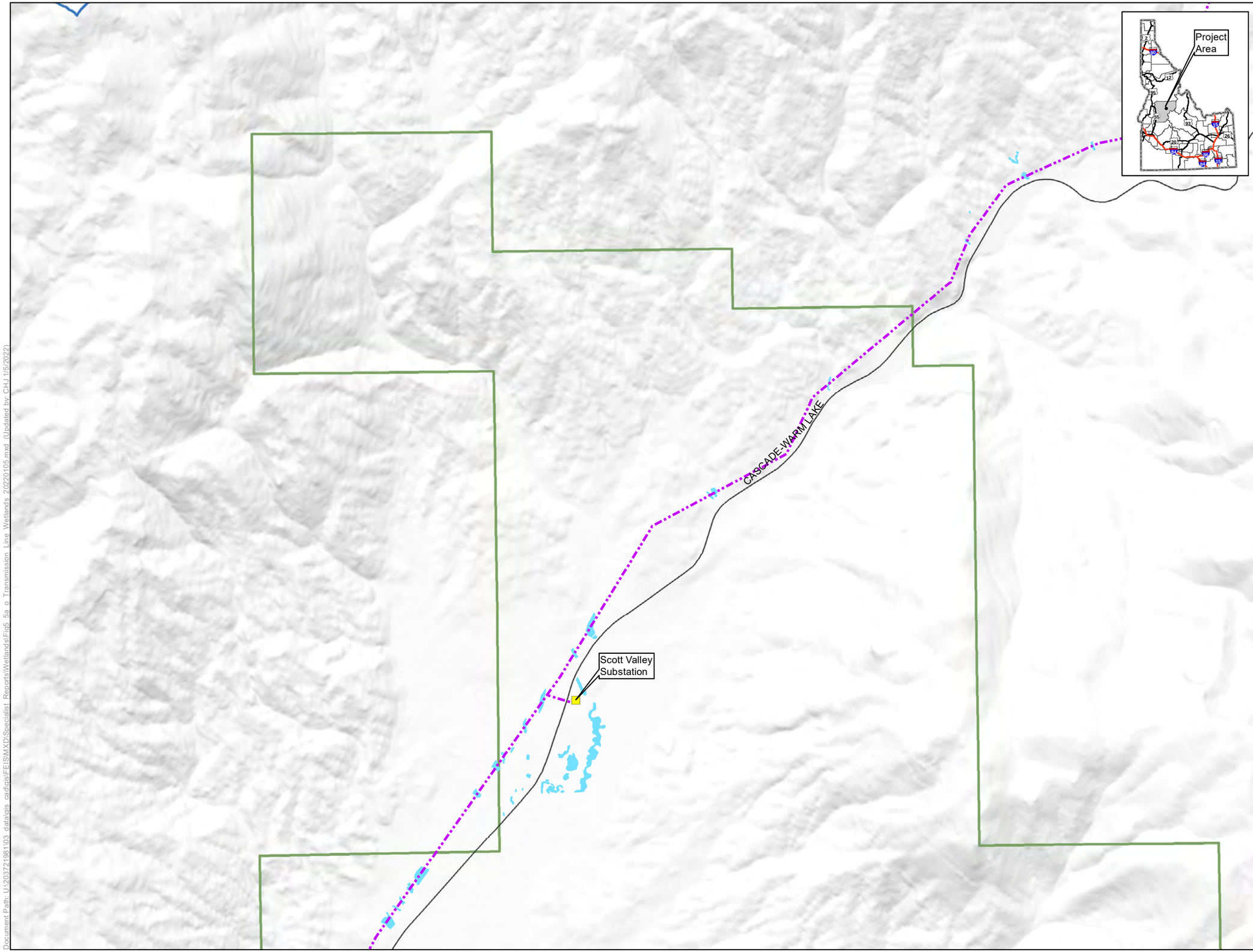



## LEGEND

- Watershed Boundary (USGS HUC* 10)
- Wetlands

**Functional AAs**

- AA-17

**Project Components**

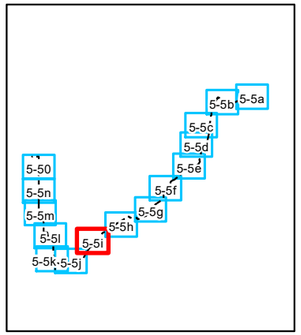
- SGP Features

**Utilities**

- Upgraded Transmission Line
- New Substation

**Other Features**

- U.S. Forest Service
- City/Town
- Monumental Summit
- County
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir




*US Geological Survey Hydrologic Unit Code

Note:
East Fork Meadow Creek is also known as Blowout Creek.
The McCall – Stibnite Road (CR 50-412) consists of Lick Creek Road, East Fork South Fork Salmon River Road (East Fork Road) and Stibnite Road.

0 1,000 2,000 Feet

1 inch = 2,000 feet
when printed at 11x17

N

# Figure 5-5i
# Transmission Line Wetlands
# Stibnite Gold Project
# Stibnite, ID

*Base Layer: USGS Shaded Relief Service*
*Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest*

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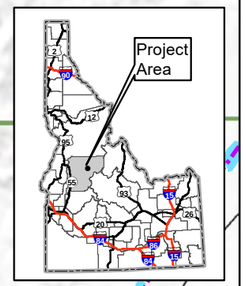



## LEGEND

- Watershed Boundary (USGS HUC* 10)
- Wetlands

**Functional AAs**

- AA-17
- AA-18

**Project Components**

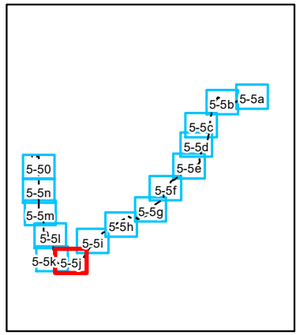
- SGP Features

**Utilities**

- Upgraded Transmission Line
- Transmission Line Segments to be Removed

**Other Features**

- U.S. Forest Service
- City/Town
- Monumental Summit
- County
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir




*US Geological Survey Hydrologic Unit Code

Note:
East Fork Meadow Creek is also known as Blowout Creek.
The McCall – Stibnite Road (CR 50-412) consists of Lick Creek Road, East Fork South Fork Salmon River Road (East Fork Road) and Stibnite Road.

0 1,000 2,000 Feet

1 inch = 2,000 feet
when printed at 11x17

N

# Figure 5-5j
# Transmission Line Wetlands
# Stibnite Gold Project
# Stibnite, ID

*Base Layer: USGS Shaded Relief Service*
*Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest*

PAYETTE NATIONAL FOREST

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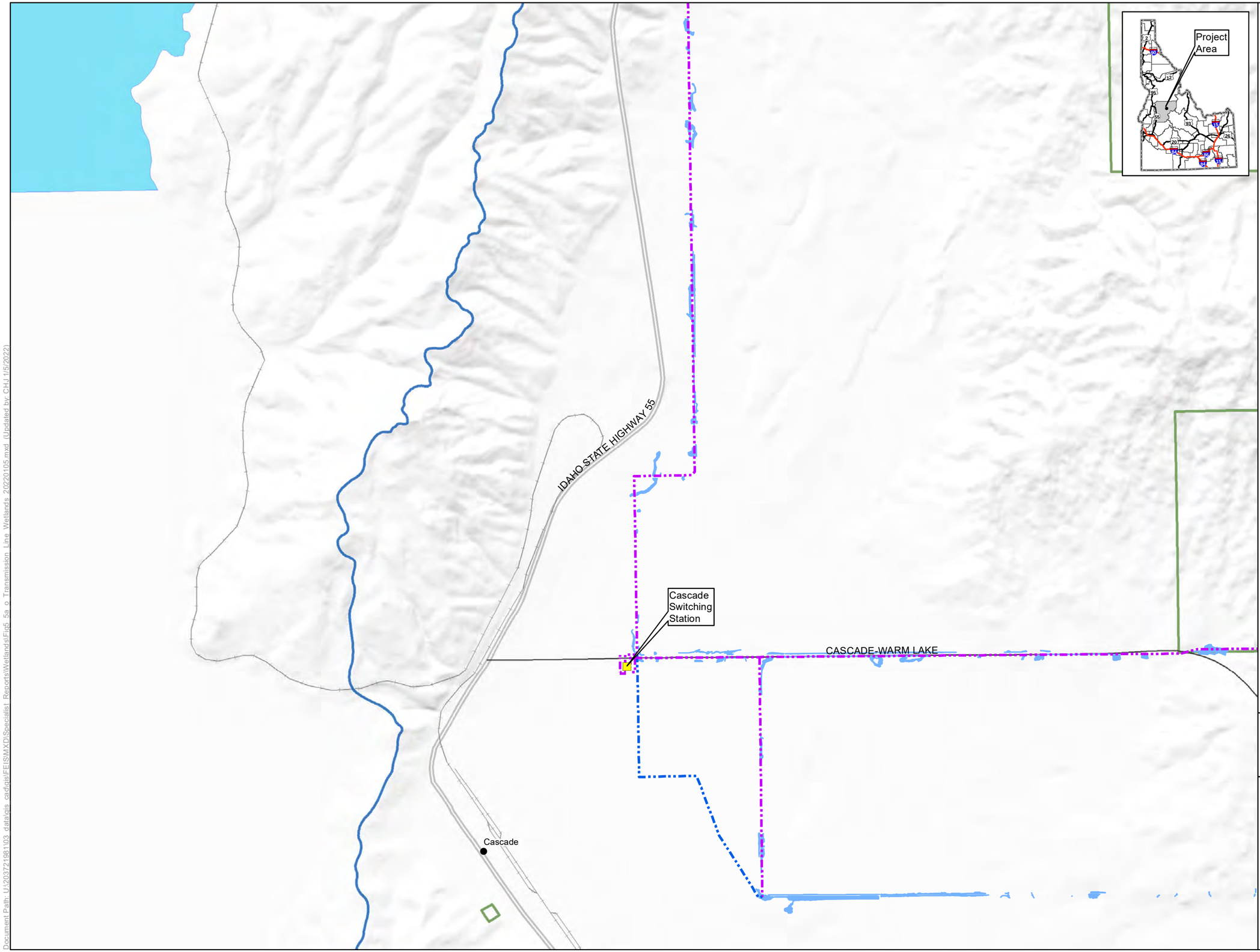






## LEGEND

- Watershed Boundary (USGS HUC* 10)
- Wetlands

**Functional AAs**

- AA-18

**Project Components**

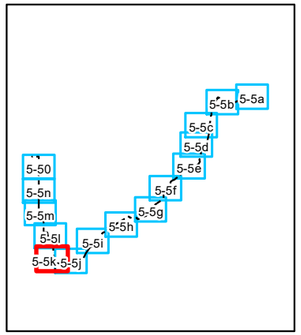
- SGP Features

**Utilities**

- Upgraded Transmission Line
- Transmission Line Segments to be Removed
- New Substation

**Other Features**

- U.S. Forest Service
- City/Town
- Monumental Summit
- County
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir




*US Geological Survey Hydrologic Unit Code

Note:
East Fork Meadow Creek is also known as Blowout Creek.
The McCall – Stibnite Road (CR 50-412) consists of Lick Creek Road, East Fork South Fork Salmon River Road (East Fork Road) and Stibnite Road.

0 1,000 2,000 Feet

1 inch = 2,000 feet
when printed at 11x17

# Figure 5-5k
# Transmission Line Wetlands
# Stibnite Gold Project
# Stibnite, ID

*Base Layer: USGS Shaded Relief Service*
*Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest*

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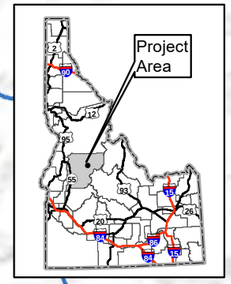
IDAHO STATE HIGHWAY 55




## LEGEND

- Watershed Boundary (USGS HUC* 10)
- Wetlands

**Functional AAs**

- AA-18

**Project Components**

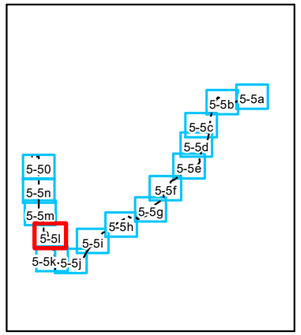
- SGP Features

**Utilities**

- Upgraded Transmission Line

**Other Features**

- U.S. Forest Service
- City/Town
- Monumental Summit
- County
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir




*US Geological Survey Hydrologic Unit Code

Note:
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The McCall – Stibnite Road (CR 50-412) consists of Lick Creek Road, East Fork South Fork Salmon River Road (East Fork Road) and Stibnite Road.

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1 inch = 2,000 feet
when printed at 11x17

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# Figure 5-5l
# Transmission Line Wetlands
# Stibnite Gold Project
# Stibnite, ID

*Base Layer: USGS Shaded Relief Service*
*Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest*

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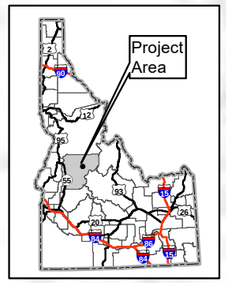



## LEGEND

- Watershed Boundary (USGS HUC* 10)
- Wetlands

**Functional AAs**

- AA-18

**Project Components**

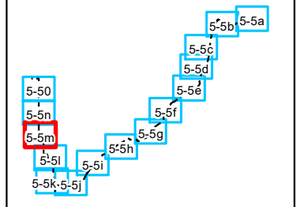
- SGP Features

**Utilities**

- Upgraded Transmission Line
- Transmission Line Segments to be Removed

**Other Features**

- U.S. Forest Service
- City/Town
- Monumental Summit
- County
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir




*US Geological Survey Hydrologic Unit Code

Note:
East Fork Meadow Creek is also known as Blowout Creek.
The McCall – Stibnite Road (CR 50-412) consists of Lick Creek Road, East Fork South Fork Salmon River Road (East Fork Road) and Stibnite Road.

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1 inch = 2,000 feet
when printed at 11x17

N

# Figure 5-5m
# Transmission Line Wetlands
# Stibnite Gold Project
# Stibnite, ID

*Base Layer: USGS Shaded Relief Service*
*Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest*

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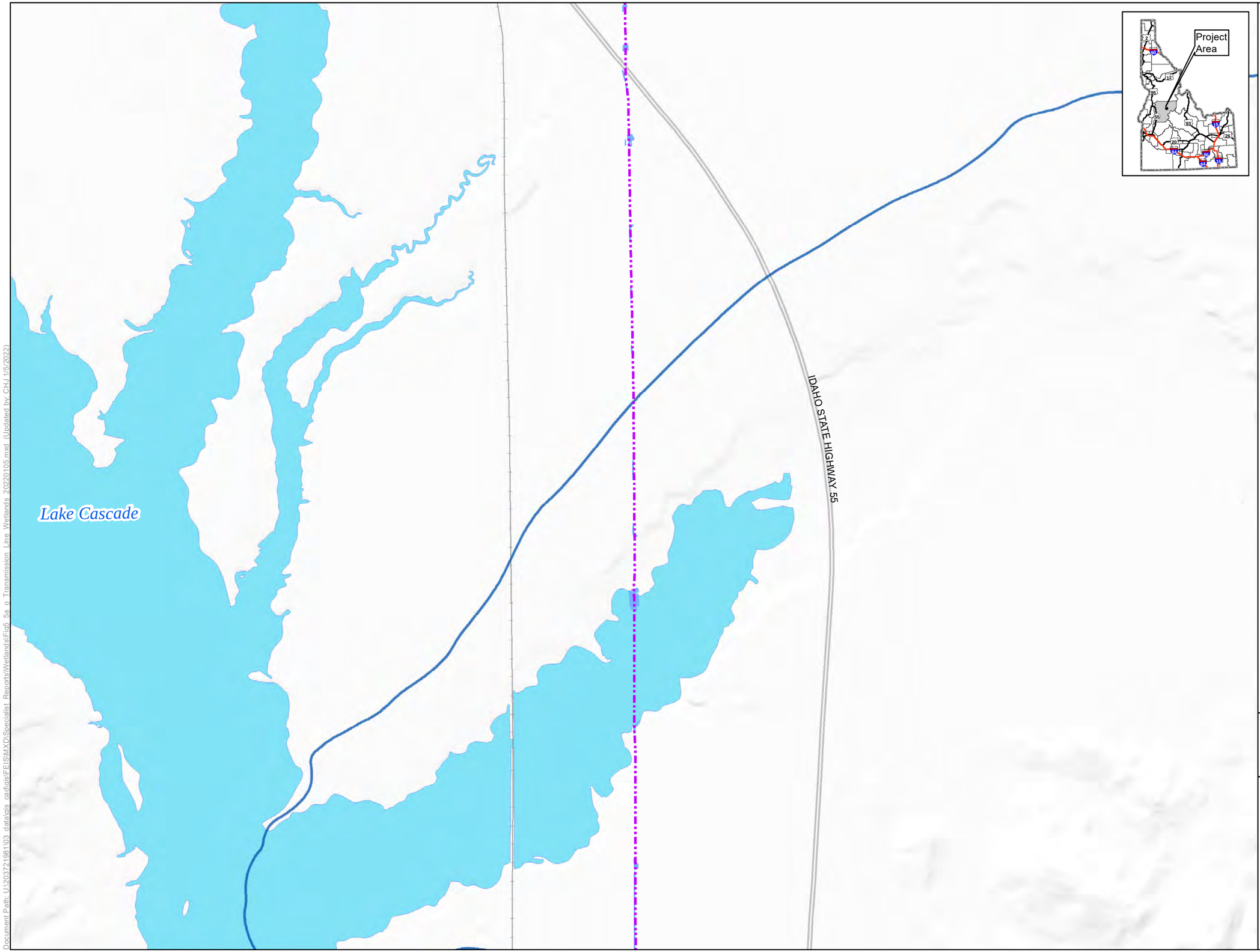



## LEGEND

- Watershed Boundary (USGS HUC* 10)
- Wetlands

**Functional AAs**

- AA-18

**Project Components**

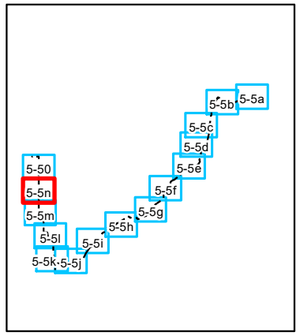
- SGP Features

**Utilities**

- Upgraded Transmission Line

**Other Features**

- U.S. Forest Service
- City/Town
- Monumental Summit
- County
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir




*US Geological Survey Hydrologic Unit Code

Note:
East Fork Meadow Creek is also known as Blowout Creek.
The McCall – Stibnite Road (CR 50-412) consists of Lick Creek Road, East Fork South Fork Salmon River Road (East Fork Road) and Stibnite Road.

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1 inch = 2,000 feet
when printed at 11x17

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# Figure 5-5n
# Transmission Line Wetlands
# Stibnite Gold Project
# Stibnite, ID

*Base Layer: USGS Shaded Relief Service*
*Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest*

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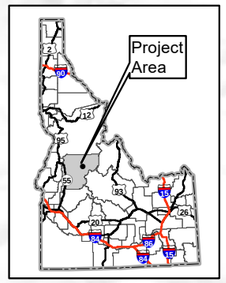



## LEGEND

- Watershed Boundary (USGS HUC* 10)
- Wetlands

**Functional AAs**

- AA-18

**Project Components**

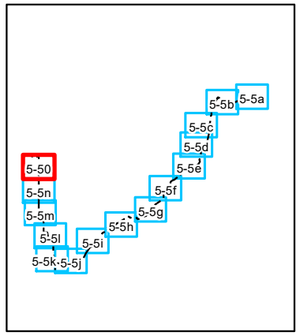
- SGP Features

**Utilities**

- Upgraded Transmission Line
- Existing Substation

**Other Features**

- U.S. Forest Service
- City/Town
- Monumental Summit
- County
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir




*US Geological Survey Hydrologic Unit Code

Note:
East Fork Meadow Creek is also known as Blowout Creek.
The McCall – Stibnite Road (CR 50-412) consists of Lick Creek Road, East Fork South Fork Salmon River Road (East Fork Road) and Stibnite Road.

0 1,000 2,000 Feet

1 inch = 2,000 feet
when printed at 11x17

N

# Figure 5-5o
# Transmission Line Wetlands
# Stibnite Gold Project
# Stibnite, ID

*Base Layer: USGS Shaded Relief Service*
*Other Data Sources: Midas Gold; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest*

Lake Fork Substation

IDAHO STATE HIGHWAY 55

Lake Cascade

Donnelly

Roseberry

# 6.0 Affected Environment

## 6.1 Existing Condition

This section presents an overview of general hydrologic conditions, followed by an inventory of existing wetlands, streams, open waters, and riparian areas. Wetland functions and values in the analysis area for wetlands is also described.

### 6.1.1 General Hydrologic Landscape Setting

#### 6.1.1.1 Mine Site Focus Area

The SGP is in the Salmon River Mountains. The terrain is generally characterized by narrow valleys surrounded by steep mountains; however, previous mining activities at the mine site have altered local topography by excavating pits and storing mine tailings in the Meadow Creek Valley. Elevations in this portion of the analysis area range from 6,000 to 6,600 feet above mean sea level, with surrounding mountains reaching elevations more than 8,500 feet above mean sea level.

The main drainage basin in the mine site focus area is the East Fork South Fork Salmon River (East Fork SFSR) watershed (HUC 1706020802) (**Figure 5-2**). The East Fork SFSR is joined by Johnson Creek near the village of Yellow Pine, downstream of the mine site. The SGP would be in several drainages that are all tributaries to the East Fork SFSR, including Meadow Creek, East Fork Meadow Creek (also known as Blowout Creek), Garnet Creek, Fiddle Creek, Hennessy Creek, Midnight Creek, West End Creek, and Sugar Creek. Wetlands located on slopes and tributary drainages within and near the mine site area are associated with hillside seeps and springs (HydroGeo 2012). 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 2017a). Snowmelt runoff and groundwater inputs also contribute to the hydrologic support of wetlands at the mine site (refer to the specialist reports for Water Quality and Water Quantity [Forest Service 2022b and 2022c, respectively] for more information regarding existing groundwater conditions in the SGP area).

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 (Forest Service 1994). Previous mine operators excavated and/or filled wetlands to construct mineral processing facilities, development rock storage facilities, tailing storage facilities, mine access and haul roads, town sites, and other mining-related developments. Most of these activities occurred before enactment of the CWA in 1972 and associated mitigation requirements. Within the mine site focus area approximately 847 acres have been modified by past human activity and are considered highly disturbed. This area represents approximately 49 percent of the proposed disturbance for the SGP mine site area. In addition, the history of excavation and mine tailings storage at the mine site has introduced areas of soil contamination, which are often in, or adjacent to, wetlands and riparian areas (Midas Gold Idaho, Inc. [Midas Gold] 2016). Soils in areas where vegetation is removed or disturbed are more susceptible to wind and water erosion (Forest Service 1994). As such, in disturbed areas the water quality and soil stabilizing properties of intact wetlands and riparian areas make them especially important in maintaining and improving watershed conditions. Additional detail on soil conditions at the mine site is provided in the Soils and Reclamation Cover Materials specialist report (Forest Service 2022d).

#### 6.1.1.2 Off-Site Focus Area

SGP features in the off-site focus area portion of the analysis area would cross several watersheds (**Figure 5-2**): Upper East Fork SFSR (HUC 1706020802), Johnson Creek (HUC 1706020801), Upper South Fork Salmon River (HUC 1706020804), Gold Fork River (HUC 1705012303), Big Creek North Fork Payette River (HUC 1705012305), Lake Fork-North Fork Payette River (HUC 1705012302), and Cascade Reservoir (HUC 1705012304). The Johnson Creek watershed drains to Johnson Creek, which flows northward. The Upper South Fork Salmon River watershed drains to the South Fork Salmon River, which flows northward. The Gold Fork River, Big Creek North Fork Payette River, Lake Fork-North Fork Payette River, and Cascade Reservoir watersheds all drain toward Cascade Lake and the North Fork Payette River.

The off-site focus area includes proposed access roads that would leave the mine site and travel west along East Fork SFSR, southwest along Burntlog Creek, and south along Johnson Creek towards Landmark. In these areas, wetlands along the roads include hillside seeps on slopes and valley-bottom riparian wetlands in narrow valleys (Forest Service 2010). Slope gradients range from very steep (80 percent on upper mountaintops) down to moderate (15 to 40 percent in bottomlands) (Forest Service 2010). Elevations generally decrease from south to north, ranging from 6,000 feet above mean sea level near Landmark down to 4,800 feet near the village of Yellow Pine (Forest Service 2010).

The transmission line corridor would pass along hill tops located between the mine site and Johnson Creek Road (County Road 10-413). The few wetlands in this area are generally limited to wetland seeps that act as the headwaters for ephemeral and intermittent streams. From the vicinity of Landmark, an existing transmission line continues west, crossing over hills and across stream valleys in the vicinity of Warm Lake. Approaching the City of Cascade, the general topography transitions from the Long Valley foothills down to the broad, Long Valley basin around Cascade Reservoir at 4,800 feet elevation. At this western end of the off-site focus area, the main geomorphic landforms are depositional plains with slope gradients averaging between 0 to 20 percent (Forest Service 2010). Large, wide arrays of wetland and riparian habitat are located along the bottomlands surrounding the Cascade Reservoir (Forest Service 2010). In many locations, aquatic habitats have been affected by roads, livestock grazing, timber harvest, and recreational use (Forest Service 2010). Historical impacts include streambank erosion, degradation, rapid deposition of eroded sediments, and stream channel modification (Forest Service 2010). Aquatic habitat is not functioning properly in some locations within the off-site focus area due to habitat fragmentation from roads and timber harvest, high sediment levels, and impacts to riparian areas (Forest Service 2010).

### 6.1.2 Wetlands

Wetlands were identified and delineated using the methods described in Corps of Engineers Wetlands Delineation Manual (Corps 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) (HDR 2017a). According to the Corps Manual, identification of wetlands is based on a three-factor approach involving indicators of hydrophytic vegetation, hydric soil, and wetland hydrology (Environmental Laboratory 1987). Wetlands were further classified and described by their vegetation structure per the Classification of Wetlands and Deepwater Habitats (Cowardin et al. 1979) or as “Open Water.” Brief descriptions of these wetland communities in the analysis area are provided in **Sections 6.1.2.1**, **6.1.2.2**, **6.1.2.3**, **6.1.2.4**. These descriptions are from the 2013 Wetland Resources Baseline Study (HDR 2013) which provide a detailed description of the wetland vegetation communities.

In **Tables 6-1** and **6-2**, wetlands are summarized by their Cowardin Classification for each drainage within the mine site focus area and each principal drainage in the off-site focus area. **Table 6-3** provides a summary of the wetlands delineated within portions of the Mine Site and Off-site Focus Areas for the entire analysis area. For additional discussion of wetland vegetation characteristics in the analysis area, refer to the specialist report for Vegetation Communities (Forest Service 2022e); for additional discussion of hydric soil conditions in the analysis area, refer to the specialist report for Soils and Reclamation Cover Materials (Forest Service 2022d); and for additional information on surface water hydrology, refer to specialist reports for Water Quality (Forest Service 2022b) and Water Quantity (Forest Service 2022c). Wetlands provide important ecological functions for associated streams and rivers. For example, they may protect fish by providing habitat during high flows, or they may remove nutrients and toxicants from waters to improve water quality in streams and rivers. Because of their ecological relationship with streams and rivers, the presence or absence of federally protected fish species is noted for each associated river or stream in **Tables 6-1** and **6-2**. This is provided to help readers understand the sensitivity of various drainages and where impacts to wetlands may result in effects to fish habitat for those species. For additional discussion of fish resources and fish habitat, refer to the Fisheries and Aquatic Habitat specialist report (Forest Service 2022a).

**Table 6-1 Wetland Resources Identified in the Mine Site Focus Area**

| Drainage | PEM (acres) | PFO (acres) | PSS (acres) | Open Water (acres) | Total (acres) | Federally Listed Fish Present in Any Part of the Stream (Y/N and Species)[1] |
|---|---|---|---|---|---|---|
| East Fork Meadow Creek ("Blowout Creek") | 46.7 | 4.7 | 10.2 | 0 | 61.6 | Y - CS |
| East Fork SFSR | 27.0 | 53.3 | 48.6 | 4.6 | 133.5 | Y – BT, CS, SH |
| Fiddle Creek | 2.0 | 16.2 | 1.6 | 0.1 | 19.9 | Y – BT, CS |
| Garnet Creek | 1.2 | 0 | 3.3 | 0.0 | 4.5 | N |
| Hennessy Creek | 4.9 | 0.3 | 4.5 | 0.2 | 9.9 | N |
| Meadow Creek | 44.0 | 81.2 | 61.1 | 0.5 | 186.8 | Y – BT, CS |
| Midnight Creek | 0.4 | 0.9 | 1.9 | 0 | 3.2 | N |
| Rabbit Creek | 2.2 | 1.1 | 1.8 | 0 | 5.1 | N |
| Sugar Creek | 0.2 | 0 | 1.8 | 0 | 2.0 | Y – BT, CS, SH |
| West End Creek | 0.2 | 0 | 2.1 | 0 | 2.3 | N |
| Mine Site Totals | 128.8 | 157.7 | 136.9 | 5.4 | 428.8 | N/A |

Source: HDR 2013, 2014a, 2014b, 2015, 2016a, 2017a, 2017b, Tetra Tech 2021b

[1] Species presence was reported in MWH 2017. For more details refer to the Fisheries and Aquatic Habitat specialist report (Forest Service 2022a).

Any apparent discrepancies between totals are due to rounding of numbers.

East Fork SFSR = East Fork South Fork Salmon River; PEM = palustrine emergent; PFO = palustrine forested; PSS = palustrine scrub-shrub; BT = Bull trout; CS = Chinook salmon; SH = Steelhead/Redband/Rainbow trout; N/A = Not Applicable.

**Table 6-2 Wetland Resources Identified in the Off-Site Focus Area**

| Drainage | PEM (acres) | PFO (acres) | PSS (acres) | Open Water (acres) | Total (acres) | Federally Listed Fish Present in Any Part of the Stream (Y/N and Species)[1] |
|---|---|---|---|---|---|---|
| Beaver Creek | 4.3 | 0 | 0.9 | 0 | 5.2 | No data |
| Big Creek | 570.3 | 0 | 18.0 | 100.9 | 689.1 | Y – BT, CS, SH |
| Boulder Creek | 426.9 | 23.0 | 7.2 | 0.8 | 475.9 | No data |
| Burntlog Creek | 19.1 | 1.0 | 4.9 | 0 | 25.0 | Y – BT, CS, SH |
| Center Canal | 135.3 | 0 | 0.9 | 4.7 | 140.9 | No data |
| Curtis Creek | 0.2 | 0.1 | 1.4 | 0 | 1.6 | No data |
| East Fork SFSR | 0.2 | 4.5 | 21.2 | 0 | 25.9 | Y – BT, CS, SH |
| Gold Fork Canal | 147.9 | 0 | 0 | 0 | 147.9 | No data |
| Gold Fork River | 3.4 | 0 | 4.6 | 221.0 | 229.0 | Y – BT |
| Johnson Creek | 4.3 | 6.9 | 41.6 | 0.1 | 52.9 | Y – BT, CS, SH |
| Lake Fork | 16.2 | 72.3 | 0.5 | 0.5 | 89.4 | No |
| Lunch Creek-Johnson Creek | 0.5 | 0 | 0.2 | 0 | 0.8 | No data |
| Mahala Ditch | 1.1 | 0 | 0 | 0 | 1.1 | No data |
| Meadow Creek | 2.0 | 0 | 0.1 | 0 | 2.1 | Y – BT, CS |
| No Mans Creek | 4.3 | 5.8 | 0 | 0 | 10.1 | No data |
| Profile Creek | 0 | 0 | 0.1 | 0 | 0.1 | Y – BT, CS, SH |
| Riordan Creek | 46.4 | 16.1 | 12.9 | 5.6 | 81.0 | Y – BT, CS, SH |
| Sand Creek | 2.5 | 0 | 1.6 | 0 | 4.1 | No data |
| Six-bit Creek | 0.3 | 0 | 0.1 | 0 | 0.4 | No data |
| Sugar Creek | 0 | 0 | 0.02 | 0 | 0.02 | Y – BT, CS, SH |
| Tamarack Creek | 0 | 0 | 0.1 | 0 | 0.1 | |
| Trapper Creek | 10.1 | 6.5 | 17.7 | 0 | 34.4 | Y – BT, CS, SH |
| Trout Creek | 10.1 | 4.0 | 18.5 | 0 | 32.6 | Y – BT |
| Warm Lake Creek | 29.2 | 38.1 | 28.2 | 0 | 95.5 | Y – BT, CS |
| Willow Creek | 3.9 | 0 | 0 | 0 | 3.9 | No data |
| Off-Site Totals | 1,438.9 | 178.2 | 187.8 | 333.6 | 2,138.6 | N/A |

Source: HDR 2013, 2014a, 2014b, 2015, 2016a, 2017a, 2017b, Tetra Tech 2021b

[1] Species presence was reported in MWH 2017. For more details refer to the Fisheries and Aquatic Habitat specialist report (Forest Service 2022a).

Any apparent discrepancies between totals are due to rounding of numbers.

PEM = palustrine emergent; PFO = palustrine forested; PSS = palustrine scrub-shrub; BT = Bull trout; CS = Chinook salmon; SH = Steelhead/Redband/Rainbow trout; N/A = Not Applicable.

**Table 6-3 Wetland Resources Identified in the Analysis Area – Totals**

| Analysis Area | PEM (acres) | PFO (acres) | PSS (acres) | Open Water (acres) | Total (acres) |
|---|---|---|---|---|---|
| Mine Site Focus Area | 128.8 | 157.7 | 136.9 | 5.4 | 428.8 |
| Off-site Focus Area | 1,438.9 | 178.2 | 187.8 | 333.6 | 2,138.6 |
| Analysis Area (Total) | 1,567.7 | 335.9 | 324.7 | 339.0 | 2,567.3 |

Source: HDR 2013, 2014a, 2014b, 2015, 2016a, 2017a, 2017b, Tetra Tech 2021b
Any apparent discrepancies between totals are due to rounding of numbers.
PEM = palustrine emergent; PFO = palustrine forested; PSS = palustrine scrub-shrub

#### 6.1.2.1 Palustrine Emergent Wetland

The Palustrine Emergent (PEM) wetland community is often present in large sedge meadows or associated with hillside seeps. Vegetation primarily consists of various grasses, sedges, moss, and forbs, such as swordfern rush (*Juncus ensifolius*), beaked sedge (*Carex rostrata*), Nebraska sedge (*Carex nebrascensis*), angelica (*Angelica arguta*), cow parsnip (*Heracleum lanatum*), Fendler's meadow-rue (*Thalictrum fendleri*), horsetail (*Equisetum fluviatile* and *E. hyemale*), and monkeyflower *(Mimulus lewisii* and *M. guttatus*).

#### 6.1.2.2 Palustrine Scrub-Shrub Wetland

The Palustrine Scrub-Shrub (PSS) wetland community commonly includes alder (*Alnus* spp.), willow (*Salix* spp.), bog birch (*Betula glandulosa*), and currant (*Ribes* spp.) in the shrub stratum, with an herbaceous understory consisting of grasses, sedges, and forbs such as swordfern rush, beaked sedge, horsetails, and monkeyflowers. A thick moss mat is common in the wettest scrub-shrub communities.

#### 6.1.2.3 Palustrine Forested Wetlands

The PFO wetland community commonly includes Engelmann spruce (*Picea engelmannii*), subalpine fir (*Abies lasiocarpa*), and lodgepole pine (*Pinus contorta*) in the tree stratum (i.e., layer); alder, willows (*Salix boothii* and *S. drummondiana*), and currant in the shrub stratum; and various wetland forbs and grasses in the herb stratum.

#### 6.1.2.4 Fens

Fens are permanently saturated PSS or PEM wetlands that form where a thick layer of partially decomposed organic matter, called peat, accumulates under water-soaked conditions (at least 8 to 16 inches within the upper 31.5 inches of the soil profile). Fens receive a significant portion of their hydrologic input and nutrients from water that has percolated through mineral soil and bedrock, and because of their unique characteristics, they tend to support a diverse plant and wildlife community. Fens range from poor fens, which are acidic (pH 4.0 to 5.5) and support more bog-type species (e.g., sphagnum moss), to rich fens, which are less acidic and are dominated by sedges, other graminoids, and true mosses (IDFG 2005).

The wetland delineation and functional assessment surveys and reports prepared by HDR between 2011 and 2016 and amended by Tetra Tech in 2018 did not refer to any documented wetlands specifically as fens within areas surveyed. In 2017, Midas Gold reassessed the initial data collected by wetland delineators (HDR 2013, 2014a, 2014b, 2015, 2016b, 2016c) for the presence of fens and determined that the wetland datasheets did not indicate the presence of fens (Midas Gold 2017). However, based on the indication of peat in soils at the TSF dam location and the adjacent Hangar Flats Development Rock

Storage Facility in geotechnical reports prepared for the SGP (SRK 2012; Strata 2014, 2016, 2017; Tierra Group 2018), the Forest Service and USACE requested that Midas Gold reassess the sample plot datasheets from the wetland delineation surveys to determine if any wetlands encountered during those surveys had fen characteristics (e.g., appropriate geomorphic location, organic soils, prolonged near-surface water table, and associated plant species), and that Midas Gold provide a report to document the methods, data reviewed, and results of their reassessment. Midas Gold's contractor (Tetra Tech) reviewed datasheets in the vicinity of the TSF and the adjacent Hangar Flats Development Rock Storage Facility and determined that wetlands in these areas did not meet the characteristics of fens (Tetra Tech 2019). Wetland delineation datasheets for other SGP component areas were not reassessed for the presence of potential fens as part of the Tetra Tech (2019) review.

IDFG considers wetlands associated with Mud Lake, Tule Lake, and Warm Lake, to be poor fens (IDFG 2004a) (poor fens have pH levels as low as 4.0 and are low in nutrients [IDFG 2004b]). Mud Lake and its associated wetlands are designated as a Class I site under the Wetland Conservation Prioritization Plan (IDFG 2012), indicating that this area is in near pristine condition and likely provides habitat for high concentrations of state rare plant or animal species (IDFG 2004a). All these sites are within the analysis area for wetlands and riparian resources but outside of the construction footprint for the SGP. Mud Lake occurs near the existing Burnt Log Road (National Forest System Road 447) and Warm Lake and Tule Lake occur south of Warm Lake Road (County Road 10-579). For this analysis, wetlands associated with Mud Lake, Tule Lake, and Warm Lake are considered fens and impacts to these areas are assessed accordingly in **Section 7.0**.

### 6.1.3 Streams and Riparian Areas

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 (Forest Service 2003; Knutson and Naef 1997). Riparian areas often overlap with wetlands and the portions of floodplains and valley bottoms that support riparian vegetation. Vegetated riparian buffers trap sediment, shade stream corridors, provide migratory corridors for wildlife, contribute woody debris and litter to streams, improve water quality by intercepting runoff from adjacent uplands, provide important habitat for terrestrial and avian species, and stabilize streambanks to prevent erosion.

Appendix B of both the Payette Forest Plan and Boise Forest Plan provide an Aquatic Conservation Strategy, which describes the importance of riparian areas and presents a method for delineating RCAs. The Boise Forest Plan notes that RCAs contribute to maintaining the integrity of aquatic ecosystems by 1) influencing the delivery of coarse sediment, organic matter, and woody debris to streams; 2) providing root strength for channel stability; 3) shading the stream; and 4) protecting water quality.

RCAs are delineated along perennial and intermittent streams, and are determined either in the field, based on professional judgement of ecological function and process or, in the absence of field data, as follows (Forest Service 2003):

- For forested streams (perennial[4]), the RCA is defined as the land within a buffer of 300-feet slope distance from the ordinary high-water mark.
- For forested streams (intermittent), the RCA is defined as the land within a buffer of 150-feet slope distance from the ordinary high-water mark.

[4] This includes intermittent streams providing seasonal rearing and spawning habitat (Forest Service 2003)

- For non-forested streams (perennial and intermittent), the RCA is defined as the land within a buffer equal to the extent of the flood prone width, or riparian vegetation, whichever is greatest.

Perennial and intermittent streams that support riparian and/or wetland vegetation along their streambanks occur throughout the analysis area. RCAs within the Mine Site and Off-site Focus Areas associated with perennial and intermittent streams mapped within the analysis area are presented in **Table 6-4**. The major drainages in the analysis area are described in **Table 6-5**. Note that since many riparian areas may also include delineated wetlands, there is overlap in the acreages of RCAs listed in **Table 6-4** and wetlands listed in **Table 6-3**. General descriptions of riparian habitats taken from the primary drainages documented in available stream evaluations for the SGP (HDR 2016a; Rio Applied Science and Engineering 2019) are presented below. The most common riparian vegetation species that have been observed surrounding drainages in the analysis area include alder, willow, currant, and red-osier dogwood (*Cornus sericea*), with an understory of various forbs and grasses, particularly in open areas not otherwise dominated by shrubs (Forest Service 1994; HDR 2013). Portions of streams in the mine site focus area, and their associated riparian areas, have been affected by legacy mining-related activities (Forest Service 1994), including placement of development rock and tailings in floodplains and adjacent to streambanks, diversion of streams into rock-lined channels to move them away from mining activities, mining town sites and ore processing facilities adjacent to stream channels, and erosion from disturbed areas associated with mining.

**Table 6-4 Streams and RCAs in the Analysis Area**

| Analysis Area Component | Perennial (feet)[1] | Non-Perennial (feet)[1] | RCA (acres)[2] |
|---|---|---|---|
| Mine Site Focus Area | 208,302 | 110,224 | 2,655 |
| Off-Site Focus Area | 189,549 | 76,899 | 127,389 |

[1] Stream lengths listed come from multiple baseline studies as summarized in **Table 5-1** and Tetra Tech (2021b)

[2] RCA acres come from Forest Service RCA data intersected with SGP components (AECOM 2020). Because the RCA data comes from different data than the stream data and is only applicable to NFS land, RCA acres do not match directly with the stream acres listed.

**Table 6-5 Major Drainages in the Analysis Area**

| Major Drainages | SGP Component | Threatened/ Endangered Fish Species and/or Critical Habitat Present in any Part of the Stream[1] | Stream Description |
|---|---|---|---|
| Meadow Creek | Mine Site | Presence-<br>BT, CS<br>Critical Habitat-<br>BT, CS | Meadow Creek is a major tributary to the East Fork SFSR that flows through a flat-bottomed valley surrounded by steep mountains. Elevations range from approximately 6,200 feet above sea level in the lower reach to over 7,500 feet in the headwaters. Meadow Creek has been heavily impacted by legacy mining-related activities, including deposition of tailings and spent heap leach ore, ore processing facilities, heap leach pads, and other infrastructure, stream relocation into a straightened riprap channel, and construction of an airstrip (Midas Gold 2016). The downstream end of the valley shows remnant effects from early mining activities, along with a large outwash feature created by a dam failure in the East Fork Meadow Creek drainage south of the site of the Meadow Creek Mine. Portions of the creek have been modified over the years to improve conditions caused by past mining operations, including the regrading and revegetation of the 2 percent gradient lower reach of the creek in 2004 and 2005.<br>The middle reach of Meadow Creek is an engineered channel that was constructed to bypass the spent ore disposal area. The channel was lined with riprap over geotextile fabric and is confined between reinforced/engineered slopes with a gradient of less than 2 percent. This reach has a short section with a 9 percent gradient, shallow depths, and few pools, which may be a partial fish migration barrier at low flows. The channel includes low-gradient riffles, glides (section of the stream coming out of a pool) and runs. There is no side channel development or potential large woody debris recruitment.<br>The upper reach of Meadow Creek encompasses the headwaters downstream to the location of the proposed TSF Buttress. Upper Meadow Creek is confined and high gradient at the most upstream extent and low gradient and unconfined immediately upstream of the spent ore disposal area in lower Meadow Creek, transitioning from a gradient of 4 to 8 percent to 2 to 4 percent. Habitat is composed of riffles, step runs (sequence of runs separated by shorter riffle steps), and pools. The presence of side channels in some portions provide potential for lateral channel movement in the less confined sections. Immediately upstream of the spent ore disposal area, Meadow Creek is unconfined, with a gradient less than 1 percent. The reach is composed of low-gradient riffle, step run, and pool habitat. The floodplain is active with oxbow cutoffs, side channels, and backwater features. |

| Major Drainages | SGP Component | Threatened/ Endangered Fish Species and/or Critical Habitat Present in any Part of the Stream[1] | Stream Description |
|---|---|---|---|
| East Fork SFSR | Mine Site, McCall-Stibnite Road (CR 50-412) (temporary access), Utilities | Presence-<br>BT, SH, CS<br>Critical Habitat-<br>BT, SH, CS | This perennial headwater stream flows through most of the analysis area. The ordinary high-water mark (OHWM) is 2 to 3 feet deep by 25 to 30 feet wide. A human-made, open-water pond (approximately 4.5 acres) is located in the Yellow Pine pit. The steep cascade of the East Fork SFSR spilling into the pond cuts off fish passage. The stream has relatively abundant riparian vegetation, except in the vicinity of the Yellow Pine pit. Per the Payette Forest Plan, riparian vegetation in the Big Creek/Stibnite Management Area is at or near properly functioning condition, except for localized areas affected by mining, roads, and recreation. |
| Fiddle Creek | Mine Site, Access Roads | Presence-<br>None known | Fiddle Creek is a small tributary of the East Fork SFSR just upstream of Midnight Creek. Habitat conditions in the creek have been impacted as a result of legacy mining operations, road construction, and culvert installation (Midas Gold 2016). Fiddle Creek also was the site of a former water storage reservoir in the lower watershed, the construction and operation of which degraded portions of the stream.<br>The lower reach of Fiddle Creek has an approximate 37 percent gradient where it flows into the East Fork SFSR, creating a complete barrier to upstream fish passage (HDR 2016a). Upstream of this barrier, Fiddle Creek retains a relatively high gradient in a relatively narrow channel, with side channels (HDR 2016a). The creek has a thick tall-shrub overstory dominated in its lower portion by gray alder (*Alnus incana*). The uppermost section of Fiddle Creek flattens in gradient, becoming a slower meandering stream due to natural glacial topography. Large amounts of large woody debris occur throughout the creek, and the dominant streambed substrate consists of boulders, large cobble, and gravel (HDR 2016a). |

| Major Drainages | SGP Component | Threatened/ Endangered Fish Species and/or Critical Habitat Present in any Part of the Stream[1] | Stream Description |
|---|---|---|---|
| East Fork Meadow Creek ("Blowout Creek") | Mine Site | Presence-<br>CS | The East Fork Meadow Creek, also known as "Blowout Creek," is a tributary to Meadow Creek that has been severely impacted as a result of legacy mining-related activities and the failure of a dam constructed across its stream channel (Midas Gold 2016). The dam was constructed in 1929 to supply hydroelectric power for historical milling operations. The dam failed in 1965 due to record snow melt and runoff rates, depositing large volumes of sediment into Meadow Creek, the East Fork SFSR, and the Yellow Pine pit lake (MWH 2017). This stream is considered to be the largest source of sediment to the East Fork SFSR in the analysis area.<br>The middle reach of East Fork Meadow Creek flows through a lateral glacial moraine that eroded during the dam failure and is still considered unstable as it continues to deposit sediments into Meadow Creek and the East Fork SFSR. Upstream of this middle reach, East Fork Meadow Creek has a low-gradient pool-riffle reach flowing through a large meadow. This reach is incised and continues to headcut in response to the dam failure. There are few trees, and the banks have abundant grasses. The dominant streambed material is sand and gravel (MWH 2017). The East Fork Meadow Creek headwaters are high gradient (4 to 20 percent) with cascades, high-gradient riffle, and plunge-pool habitat.<br>Immediately downstream of the historical dam location, the creek has a slightly steeper (8 to 20 percent) gradient and is composed of cascade habitat. Near the confluence with Meadow Creek, the East Fork Meadow Creek passes through a multi-thread and unconfined alluvial fan with a 4 to 8 percent gradient. Sediment from the unstable slopes immediately upstream may contribute to the formation and maintenance of this alluvial fan. |
| Garnet Creek | Mine Site | Presence-<br>None known | Garnet Creek is a narrow, shallow, moderate-gradient tributary to East Fork SFSR approximately 0.3 mile downstream from the Meadow Creek confluence. The creek has been severely modified over the past 100 years to accommodate mining-related activities. It is still influenced by legacy mining infrastructure that was located across and adjacent to the stream channel, including portions of a town site; and is currently routed through several man-made ditches (Midas Gold 2016). Garnet Creek flows through an 85-foot-long corrugated metal pipe culvert near its confluence with the East Fork SFSR that presents a partial barrier to fish (HDR 2016a). |

| Major Drainages | SGP Component | Threatened/ Endangered Fish Species and/or Critical Habitat Present in any Part of the Stream[1] | Stream Description |
|---|---|---|---|
| Midnight Creek | Mine Site | Presence-<br>None known | Midnight Creek is a small tributary of the East Fork SFSR. The lower portion of the creek has as a narrow channel with extremely high gradient (approximately 90 percent) and dense overhanging vegetation. The high gradient presents a complete fish passage barrier to fish (HDR 2016a). Midnight Creek has been impacted by legacy mining activities, including open-pit mining, waste rock dumps, and road construction (Midas Gold 2016). |
| Unnamed Tributary ("Hennessy Creek") | Mine Site, Access Roads | Presence-<br>None known | Hennessy Creek historically flowed into the East Fork SFSR downstream of the Yellow Pine pit lake, but it has been diverted to flow into the East Fork SFSR downstream of Sugar Creek. It is a narrow, low-flow stream that flows in a constructed ditch alongside McCall-Stibnite Road (County Road 50-412), and then through a subterranean section under an adjacent waste rock dump before passing through a very high-gradient reach into the East Fork SFSR. The creek is not expected to support upstream fish passage because of an average channel gradient of 37 percent at its mouth (HDR 2016a). Hennessy Creek is densely vegetated and shallow. The lower portion of Hennessy Creek has been significantly impacted by legacy mine-related activities, including stream diversion, road construction that buried the stream channel, and mining infrastructure (Midas Gold 2016). |
| Rabbit Creek | Mine Site | Presence-<br>None known | This is a perennial tributary to the East Fork SFSR. The OHWM is 1 to 2 feet deep by 1 to 3 feet wide. |
| West End Creek | Mine Site, Access Roads | Presence-<br>None known | This is a tributary to Sugar Creek, large portions of which are non-perennial. The OHWM is 1 to 2 feet deep by 1 to 3 feet wide. This creek has been disturbed by mining-related activities, including rock deposition into the channel, diversion into a French drain, and in-channel mining. Upstream, the banks are well vegetated and steep with a Douglas-fir overstory. |

| Major Drainages | SGP Component | Threatened/ Endangered Fish Species and/or Critical Habitat Present in any Part of the Stream[1] | Stream Description |
|---|---|---|---|
| Sugar Creek | Mine Site | Presence-BT, SH, CS Critical Habitat-BT, SH, CS | Sugar Creek, a tributary to the East Fork SFSR, enters the river downstream of the Yellow Pine pit lake. It has a relatively low gradient. An officially closed road closely parallels Sugar Creek for nearly 2 miles before crossing the creek. This road may confine the movement of Sugar Creek, specifically in areas where the banks are bound with riprap rock material. Much of Sugar Creek has large aggregates of large woody debris. The dominant substrates are sand, gravel, and cobble. The creek has widened channels and excessive medial and lateral bar formation in response to past sediment inputs. In the 1940s, approximately 1 million cubic yards of glacial overburden was removed from the East Fork SFSR channel and placed in both Sugar Creek and other parts of the East Fork SFSR (Kuzis 1997). |
| Burntlog Creek | Access Roads | Presence-BT, SH, CS Critical Habitat-BT, SH, CS | This is a perennial tributary to Johnson Creek. The OHWM of crossings ranges from 2 to 3 feet deep and 25 feet wide to many small tributaries that are 0.5 feet deep and less than 3 feet wide. Burntlog Creek is a moderate-gradient stream that occupies a steep valley floor in its upper reaches and parallels Johnson Creek at its base. Woody debris is common in the upper reaches due to extensive burns in this area. Overhead canopy is minimal. |
| Johnson Creek | Access Roads; Existing Transmission Line | Presence-BT, SH, CS Critical Habitat-BT, SH, CS | This is a perennial tributary to the East Fork SFSR. The OHWM is 30 to 50 feet wide and up to 4 feet deep. |
| Riordan Creek | Access Roads; New Transmission Line | Presence-BT, SH, CS Critical Habitat-BT, SH, CS | This is a tributary to Johnson Creek. Riordan Lake, which was formed as a result of a large glacial landslide that dammed the creek, is located halfway down the creek. Upstream reaches of Riordan Creek are low-gradient and downstream reaches are high-gradient. |
| Trapper Creek | Access Roads; Existing Transmission Line | Presence-BT, SH, CS Critical Habitat-BT, SH, CS | This is a moderate gradient tributary to Johnson Creek. |

Source: Forest Service 2003, 2010; HDR 2012, 2013a, 2014a, 2014b, 2015, 2016a, 2016b; Midas Gold 2016; MWH 2017; Rio Applied Science and Engineering 2019

[1] Species presence was reported in MWH 2017. For more details refer to Fisheries and Aquatic Habitat specialist report (Forest Service 2022a).

East Fork SFSR = East Fork South Fork Salmon River, OHWM = ordinary high water mark.

CR = County Road, BT = Bull trout, CS = Chinook salmon, SH = Steelhead/Redband/Rainbow trout.

#### 6.1.3.1 Wetlands Functions and Values

This section summarizes the wetland functional assessments that have been conducted in the analysis area (watershed condition indicators, which include stream function, are documented in the Fisheries and Aquatic Habitat specialist report [Forest Service 2022a]). 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. Flood attenuation and provision of off-channel fish habitat are examples of wetland functions. Wetland values are those elements of a wetland that are valued by humans, such as flood hazard reduction or recreational/hunting uses (Berglund and McEldowney 2008). Wetland functions and values were assessed to evaluate the condition of existing wetland resources so that the potential impacts of activities associated with the SGP can be understood and disclosed.

The MWAM ranks wetland functions in four categories: I through IV, with Category I having the highest functional value. Descriptions of relevant categories are as follows (Berglund and McEldowney 2008):

- Category I wetlands are of exceptionally high quality and generally are rare to uncommon in the state or are important from a regulatory standpoint. They can provide primary habitat for sensitive species, represent a high-quality example of a rare wetland type, provide irreplaceable ecological functions, and/or exhibit high flood attenuation capability, or are assigned high ratings for most assessed values and functions.

- Category II wetlands are those that provide habitat for sensitive plants or wildlife, function at very high levels for wildlife/fish habitat, are unique in a given region, or are assigned high ratings for many of the assessed functions and values but are more common than Category I wetlands.

- Category III wetlands are common and generally are less diverse than Category I and II wetlands. They can provide many functions and values, although they may not be assigned high ratings for as many parameters as are Category I and II wetlands.

- Category IV wetlands generally are small, isolated, and lack vegetative diversity. These sites provide little in the way of wildlife habitat and often are indirectly disturbed.

Per the assessments conducted by HDR and Tetra Tech, 1 of the 21 evaluated wetland AAs rated as Category IV, 17 rated as Category III, and 3 rated as Category II (Tetra Tech 2021c).

Depending on the specific wetland being evaluated, up to 11 functions/values can be evaluated for each AA using MWAM (Berglund and McEldowney 2008) including:

- Habitat for federally listed or proposed threatened or endangered plants or animals: Whether or not an AA is known to or suspected to function as habitat for species receiving protection under provisions of the Endangered Species Act (ESA).

- General wildlife habitat: The general potential to provide wildlife habitat based on evidence of wildlife use and existence of generally desirable habitat features.

- General fish habitat: The general fish habitat quality. This function is assessed only if the AA is used by fish or if the existing situation is correctable such that the AA could be used by fish (e.g., fish use is blocked by inaccessible culvert or another barrier).

- Flood attenuation: The capability of wetlands in the AA to slow and disperse the potentially hazardous flow energy during high-water or flood events. This parameter only applies to AAs that occur within or contain a discernable floodplain.

- Long- and short-term surface water storage: The potential of the AA to capture, retain, and make available surface water originating from flooding, precipitation, upland surface (sheetflow) or subsurface (groundwater) flow.
- Sediment/nutrient/toxicant retention and/or removal: The ability of the AA to retain sediments and retain and remove excess nutrients and toxicants. This function is sometimes referred to as "water quality improvement." This parameter only applies to wetlands with potential to receive sediments and excess nutrients or toxicants through influx of surface water, groundwater, or direct input.
- Sediment/shoreline stabilization: The ability of an AA to dissipate flow or wave energy, reducing erosion. This function is only assessed if a wetland within an AA occurs on the banks for a river, stream, or other natural or manmade channel, or occurs on the shoreline of a standing water body that is subject to wave action.
- Production export/terrestrial and aquatic food chain support: The potential of an AA to produce and export food and/or nutrients for both terrestrial and aquatic organisms.
- Groundwater discharge/recharge: The potential for groundwater discharge and recharge at the AA.
- Uniqueness: The general uniqueness of an AA in terms of its replacement potential and habitat diversity, relative abundance in the same major watershed basin, and degree of human disturbance.
- Recreation/education potential: The general potential of an AA to support recreation or education activities.

Assessed wetlands at the mine site generally exhibit moderate to high levels of disturbance from historic mining activity, erosion, and fire. They do not support known populations of ESA-listed threatened or endangered plant species (HDR 2013, 2014a, 2014b; Tetra Tech 2018); however, potential habitat and occurrences of Forest Service Sensitive and Forest Watch plant species do occur in wetlands near the SGP (refer to the specialist report for Vegetation Communities and Sensitive and Forest Watch Species [Forest Service 2022e]). In addition, metal concentrations in some wetlands at the mine site exhibit the influence of the historical mining activity primarily through elevated arsenic and antimony concentrations (HDR 2017c).

Many of these wetlands were noted during surveys as having the potential to provide habitat for a variety of wildlife species managed by the Forest Service because of their sensitivity, including northern leopard frogs, fishers, boreal owls, western toads, black-backed woodpeckers, goshawks, and wolverines (Tetra Tech 2018). Wetlands rated as Category II generally received high scores due to the provision of habitat associated with sensitive species with potential to occur in the area.

Wetlands on slopes, generally resulting from groundwater seepage, function to deliver water, sediment, and nutrients to valley bottom wetlands below. These typically exhibit less water filtration or flood storage functions because water moves through these wetlands without being detained. However, they often provide valuable habitat for terrestrial species and they can contribute cool water to wetlands and streams in the valley bottoms.

Wetlands located along valley bottom drainages, both on and off the mine 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 deposits at the mine site, these water quality functions are an important aspect of stream health, both at, and downstream, of the mine site. During high flows, streamside wetlands also provide off-channel refuge for small fish that seek such areas when currents in the main channel become too strong for them.

A summary of the primary functions provided within each AA and the functional assessment scores for each AA can be found in **Appendix A** (**Table A-1**).

# 7.0 Environmental Consequences

This section describes potential impacts of the SGP on wetlands and riparian resources within the analysis area for the resources defined in **Section 6.0**. Impacts to the characteristics and habitats of surface waters are described in the specialist reports for Water Quality (Forest Service 2022b), Water Quantity (Forest Service 2022c), and Fisheries and Aquatic Habitat (Forest Service 2022a). Due to the large number of individual wetlands, some of the impacts described in this chapter are summarized by wetland AA, which may include several similarly situated wetlands. A summary of wetland impacts by AA is provided in **Appendix A**.

Potential impacts evaluated in this section include:

- Permanent and temporary loss of wetlands and riparian areas due to removal (i.e., excavation) and/or deposition of fill materials.
- Losses of wetland functional units (as defined through the MWAM) associated with losses of wetland acreages.
- Fragmentation of wetland and riparian areas associated with losses of acreages of these features and construction of new roads.
- Effects of mine pit dewatering and surface water diversions on hydrologically connected wetlands and riparian areas.
- Effects of SGP actions that could impact surface water quality on hydrologically connected wetlands and riparian areas.

## 7.1 Impact Definitions

The impacts definitions for intensity, duration (FSH 1909.15, 152b), and context are provided in **Table 7-1.**

**Table 7-1 Impact Definitions**

| Attribute | Term | Description |
|---|---|---|
| Intensity | Negligible | Impacts would result in a change in current conditions that would be too small to be physically measured using normal methods or would not be perceptible. There is no noticeable effect on the natural or baseline setting. There are no required changes in management or utilization of the resource. |

| Attribute | Term | Description |
|---|---|---|
| Intensity | Minor | Impacts would result in a change in current conditions that would be just measurable with normal methods or barely perceptible. The change may affect individuals of a population or a small portion of a resource, but it would not result in a modification in the overall population, or the value or productivity of the resource. There are no required changes in management or utilization of the resource. |
| Intensity | Moderate | Impacts would result in an easily measurable change in current conditions that is readily noticeable. The change affects a large percentage of a population, or portion of a resource which may lead to modification or loss in viability, value, or productivity in the overall population or resource. There are some required changes in management or utilization of the resource. |
| Intensity | Major | Impacts are considered significant. Impacts would result in a large, measurable change in current conditions that is easily recognized. The change affects a majority of a resource or individuals of a population, which leads to significant modification in the overall population, or the value or productivity of the resource. This impact may not be in compliance with applicable regulatory standards or impact thresholds, requiring large changes in management or utilization of the resource. |
| Duration | Temporary | Impacts that are anticipated to last no longer than 1 year. |
| Duration | Short-Term | Impacts that are anticipated to begin and end within the first 3 years during the construction phase. |
| Duration | Long-Term | Impacts lasting beyond 3 years to the end of mine operations and through reclamation, approximately 20 years. |
| Duration | Permanent | Impacts that would remain after reclamation is completed. |
| Context | Localized | Impacts would occur within the analysis area or the general vicinity of the Operations Area Boundary. |
| Context | Regional | Impacts would extend beyond the Operations Area Boundary and local area boundaries. |

*Intensity* is the severity or levels of magnitude of an impact.
*Duration* is the length of time an effect would occur.
*Context* is the effect(s) of an action that must be analyzed within a framework, or within physical or conceptual limits.

# 7.2 Direct and Indirect Effects

This section presents detailed analysis of impacts to wetlands and riparian resources by the issues and indicators described in **Section 4.0**. **Section 7.2.1** provides a general discussion of the type of effects that could occur under the action alternatives. **Sections 7.2.2**, **7.2.3**, and **7.2.4** then provide more detailed analysis by alternative. Analysis results are summarized in **Section 7.7**. The analysis of effects associated with wetlands and riparian resources is considered within the overall context of the relative importance of these features. Most wetlands and riparian resources in the SGP area are regulated under federal and state laws, and federal forest management plans because of their important functions, including provision of clean water, flood control, and habitat for a variety of fish and wildlife species, among others.

## 7.2.1 Action Alternatives

Wetland and riparian resources would be altered or lost under either of the action alternatives. Because wetlands and riparian areas provide a broad range of ecological functions, the loss or alteration of wetland and riparian acreages would have indirect effects on other resources within each of the affected drainage basins. The affected drainage basins and the SGP components they contain are presented in **Table 7-2**.

This table also identifies which of the drainage basins contribute to waters that are habitat for ESA-listed fish species.

Wetland and riparian losses would be most substantial within the mine site focus area, where both action alternatives would remove approximately 28 percent of the existing wetlands within the contributing basin for the East Fork SFSR watershed above the Sugar Creek/East Fork SFSR confluence. While some wetlands at the upper periphery of the mine site contributing basin would remain, their hydrologic connectivity to downstream waters and associated vegetation would be removed or altered. Based on a review of ecological functions provided by wetlands (Berglund and McEldowney 2008), potential indirect impacts would include reductions in water quality and water storage/recharge, as well as loss of habitat. For example, water quality would be affected downstream of the mine site because wetlands and riparian areas would not be present to absorb contaminants (including metals), remove excess nutrients, and filter sediments to reduce turbidity in waters. In addition, wetlands and riparian areas in valley bottoms along drainages would no longer have the potential to store high flows that are common in the late spring after rain-on-snow events, which can increase flow velocity and energy downstream. As a result, the potential for erosion and flood hazard risk would be increased. Similarly, wetlands and riparian areas wouldn't store water and slowly drain to streams in a manner that supports summer base flows for fish. Regarding habitat, numerous wetland-dependent species, including fish, amphibians, and birds would be displaced from the mine site into other areas that may or may not be available and may provide less suitable habitat.

Wetland and riparian impacts associated with off-site SGP components would have similar indirect effects as those described above for the mine site focus area, but the watershed context is different as roads and transmission line corridors would affect a relatively small portion of the wetlands and riparian areas contained within off-site watersheds. At off-site locations, wetlands and riparian areas would be primarily affected by linear fills, altered ground/surface water paths, or vegetation removal, which may directly affect only a portion of a wetland feature. As a result, the magnitude of effects to other resources would be reduced relative to effects within the mine site focus area. However, linear impacts do have the potential to alter flow paths for ground and surface water, which can indirectly result in larger changes than expected to the wetlands as well as affected watersheds.

To reduce the effects of wetland and riparian losses anticipated for the action alternatives, Perpetua has developed a Conceptual Stream and Wetland Mitigation Plan (CMP) (Tetra Tech 2021a). The CMP includes efforts to minimize the duration of losses by creating wetlands and enhancing riparian areas at the mine site concurrent with the SGP operation phase. Conceptual wetland mitigation would involve the placement of amended soils and planting of native wetland species to create wetlands in low-lying areas where water accumulates following mining-related ground disturbances. In many areas, wetlands are proposed to be created over geosynthetic liners to separate created wetlands from the underlying TSF. The USACE is working with Perpetua to address wetland impacts through compensatory mitigation, as described in **Section 7.3.1** and Tetra Tech (2021c). Perpetua has also prepared a Water Quality Management Plan (Brown and Caldwell 2020) to describe a means of protecting water quality throughout operations and beyond site closure and reclamation.

The following sections provide additional detail on the issues evaluated for the action alternatives in order to provide context for the anticipated resource losses and required mitigation.

**Table 7-2 Watersheds Containing SGP Features**

| Drainage Basin | Contains or Contributes to Waters with ESA-listed Species? | Analysis Area Portion | SGP Components |
|---|---|---|---|
| Headwaters East Fork SFSR | Yes | Mine Site Focus Area | Blowout Creek rock drain, East Fork SFSR diversion inlet, East Fork SFSR diversion outlet, embankment, exploration decline and explosives area, Hangar Flats pit, Hangar Flats reclamation/stockpile area, haul roads, main ore processing area, Midnight Creek diversion, growth media stockpiles, primary crusher/course ore stockpile, Worker Housing Facility, TSF, TSF Buttress diversion, West End pit, Yellow Pine pit, and explosives storage area |
| Big Creek-North Fork Payette River | Yes | Off-site Focus Area | Portions of Warm Lake Road; SGLF; portions of existing, new, and widened transmission line corridors |
| Cascade Reservoir | No | Off-site Focus Area | Portions of existing and widened transmission line corridors |
| Gold Fork River | Yes | Off-site Focus Area | Portions of existing transmission line corridors |
| Johnson Creek | Yes | Off-site Focus Area | Portions of Burntlog Route, including the Burntlog Maintenance Facility and associated borrow sites; Cabin Creek groomed snowmobile route; VHF repeater site access road; portions of the Johnson Creek Alternative Route, including the Landmark Maintenance Facility; portions of existing, new, and widened transmission line corridors |
| Lake Fork-North Fork Payette River | Yes | Off-site Focus Area | Portions of existing and widened transmission line corridors |
| Headwaters East Fork SFSR | Yes | Off-site Focus Area | Portions of Burntlog Route; VHF repeater site access road; portions of the Johnson Creek Alternative Route; portions of the new transmission line corridor |
| Headwaters South Fork Salmon River | **Yes** | **Off-site Focus Area** | **Cabin Creek groomed snowmobile route; portions of Warm Lake Road; portions of existing and widened transmission line corridors** |

Source: AECOM 2020; Table prepared using watershed boundaries (U.S. Geological Survey 2016) intersected with SGP components. Species presence was reported in MWH 2017. For more details refer to the specialist report for Fish Resources and Fish Habitat (Forest Service 2022a).

East Fork SFSR = East Fork South Fork Salmon River

ESA = Endangered Species Act

GMS = Growth Media Stockpile

VHF = Very High Frequency (refers to a radio repeaters)

#### 7.2.1.1 Issue: Construction and Operation of Mine Infrastructure would Remove Wetlands and Riparian Resources, Impact Ecological Function, and Fragment Wetland Habitat

##### *Loss of Wetland and Riparian Resources*

Construction of mine site components, construction of new access roads and widening of existing access roads (even if new roads or improvements are only temporary), construction of new transmission line segments, upgrades to existing transmission lines, and construction of off-site facilities would result in the direct removal of wetland and/or riparian resources due to excavation and fill. Due to the scale and location of their disturbance footprints, components such as the pits, TSF, and TSF Buttress are the primary features that would result in a direct loss of wetland and riparian resources. Direct loss due to access roads and transmission line construction would be on a smaller scale than the pits, TSF, and TSF Buttress. All SGP disturbance areas would be revegetated, except for new, permanent lakes or open water channels and portions of pit highwalls that are too steep for re-vegetation. However, even with revegetation of impacted areas and compensatory wetland mitigation, impacts to wetlands and riparian areas from pits, TSF, and TSF Buttress would be considered permanent as construction would remove soil and disrupt hydrology in ways that are likely to prohibit wetlands and riparian areas from reestablishing in these locations in the future.

Impacts from some roads and transmission line facility construction may cause only temporary to short-term loss or alteration as they would be restored as soon as possible following standard reclamation practices, including segregating and stockpiling topsoil, implementing stormwater and sediment BMPs, backfilling and placing topsoil, and revegetating. Although the full extent of temporary effects has not been quantified, temporary construction roads used for transmission line construction and the transmission line ROW are considered temporary effects for this analysis, with permanent structures such as poles considered permanent effects. In addition, areas of tall tree clearing where wetland conversion may occur are considered permanent, as discussed in the next paragraph. As design and engineering for the SGP advances, acreage estimates would be refined, temporary impacts would be better quantified, and the CMP revised accordingly (Tetra Tech 2021a). It is also important to note that 1) not all impacts would occur at the same time (i.e., some would occur during initial stages of construction, but others would not occur until later in the life of the project), and 2) all impacts would be mitigated as part of compensatory mitigation described in the CMP. The time period between the loss of wetlands and riparian areas (and their functions and values) and the restoration or replacement of these functions and values are termed temporal effects in the CMP and are discussed further in **Section 7.3.1**.

The SGP would not only result in direct loss of wetlands and riparian areas as described above, but there is the potential for wetlands and riparian areas to be lost or altered due to indirect impacts. Potential mechanisms for indirect impacts include dust and mercury deposition, hydrology changes, water quality changes, and the clearing of tall trees. Some indirect effects may lead to a loss of wetlands and riparian areas. For example, hydrology changes could dry up wetlands. However, other indirect effects may only result in impacts to function (i.e., dust deposition may impact wetland vegetation and reduce wetland function but may not lead to full wetland loss). The full extent of indirect effects due to dust and/or mercury deposition, hydrology changes, and water quality changes have not been quantified (Tetra Tech 2021a). As a result, these effects are only discussed qualitatively, with deposition related effects discussed in the following section on impacts to wetland function. Dust and/or mercury deposition resulting from SGP construction and operation (particularly road construction and use) are discussed in more detail in the specialist report for Vegetation Communities (Forest Service 2022e). Hydrology changes are discussed in **Section 7.2.1.2** and water quality changes in **Section 7.2.1.3**. Regarding the clearing of tall

trees, clearing within 50 feet of the centerline of transmission lines could impact wetlands and riparian areas due to the loss of overstory components. Loss of overstory in forested wetlands could lead to conversion to other wetland types even when reduction in total wetland acreage would not occur. Tall tree clearing would continue within existing portions of the transmission line segment after SGP closure and reclamation as these transmission line segments would remain in use by Idaho Power Company. Therefore, impacts of tall tree clearing on wetlands in these areas would be considered permanent and are quantified as wetland conversion losses for each alternative.

### *Impacts on Wetland and Riparian Functions*

As wetlands are lost, fragmented, reduced in area, have functional changes or otherwise impacted by SGP activities, their ability to serve as habitat for fish and wildlife; provide water filtration; water storage; and flow abatement, including groundwater recharge, is lost, reduced, or delayed. For example, the loss of riparian areas and clearing of trees in RCAs or forested wetlands in transmission line corridors would result in reductions of shade, flood energy dissipation, organic source material, support for benthic macroinvertebrates (e.g., insects eaten by fish), and soil stability. Loss of riparian areas also would result in changes in vegetative species composition and reductions of available nesting substrate, breeding habitat, forage for migratory birds, and reductions in available habitat, including connectivity, and forage for other wildlife species (e.g., large game animals).

Impacts to wetland and riparian area functions may occur due to direct effects (e.g., excavation and fill) or indirect effects such as changes to hydrology, changes to water quality (including the impacts of water temperature alteration), or dust and/or mercury deposition. Although the duration of impacts due to direct effects may vary in duration, except for temporary access roads used for transmission line construction and portions of the transmission line ROW, they are considered permanent for this analysis. Potential impacts and qualitative consequences for each wetland function/value are summarized in **Table 7-2**. As explained in the previous section, indirect effects to wetlands and riparian functions are difficult to quantify. In general, distance from the access roads and ROWs affects the consequences for wetland function. Movement of machinery and vehicles in the SGP area could create dust that could impact the metabolic processes of plants in nearby areas (Farmer 1993). Dispersal distance of dust depends on particle size, wind velocities, and wind direction (Everett 1980) as well as terrain, climate conditions, and vegetation community characteristics in the surrounding area (Etyemezian et al. 2004). A study by Waser et al. (2017) found that flowering plants approximately 3 to 7 feet from roadsides received substantially more dust and less pollen than those 131 to 164 feet from roadsides, and that most dust was deposited within 98 feet from the road. In addition, removal of vegetation and disturbance of soil also increases the susceptibility of an area to soil erosion, which results in a variety of effects that tend to limit vegetation reestablishment and growth in an area (Jiao et al. 2009). Further, road building has been shown to alter wetland hydrology at distances greater than 328 feet through such mechanisms as alteration of hydrologic fluxes, increased nutrient inputs, increased sedimentation rates, and facilitation of the spread of invasive exotic species (Jones 2003). For the SGP, the potentials for indirect impacts to wetlands and riparian functions from dust deposition, soil erosion, and hydrology alteration are likely to be higher in the immediate area of roads and other surface-disturbing actions but would diminish with distance from these actions. However, implementation of regulatory and Forest Plan Requirements plus project engineering design features would avoid and/or minimize these potential indirect impacts.

Duration of indirect effects may vary from temporary to permanent. Regarding dust and mercury deposition, SGP construction and operation (particularly road construction and use, as well operation of the process plant) could indirectly affect wetlands through increased dust and/or mercury deposition. Potential impacts of dust and mercury are described in the specialist reports for Water Quality and Air Quality (Forest Service 2022b, 2022g, respectively), but in general impacts could alter water quality

parameters and inhibit the metabolic processes of plants, which would result in impacts to individuals ranging from mild metabolic inhibition to mortality (Farmer 1993). A reduction in vegetation coverage would result in a loss of wetland and riparian functions as described in the previous paragraph. Climate change potentially adds uncertainty to the forecasting of losses in wetland and riparian function as related changes in water flows, soil moisture, and wildfire conditions could also affect vegetation and plant species distributions (Halofsky 2018).

**Table 7-2 Wetland and Riparian Area Function/Value and Qualitative Corresponding Potential Impacts and Consequences**

| Function / Value | Potential Impacts and Qualitative Consequences |
|---|---|
| Habitat for federally listed and proposed species | Loss, alternation, or degradation (i.e., invasive species encroachment, loss of standing surface water, temperature increases, fragmentation) of wetland and riparian areas could result in a loss of habitat suitability for listed species. |
| Habitat for general wildlife species | Loss, alternation, or degradation (i.e., invasive species encroachment, loss of standing surface water, temperature increases, fragmentation) of wetland and riparian areas could result in a loss of habitat suitability for wildlife. |
| Habitat for general fish species | Loss, alternation, or degradation (i.e., temperature increase, turbidity increase, invasive species encroachment, fragmentation) of wetland and riparian areas could result in a loss of habitat suitability for fish and other aquatic species. |
| Flood attenuation | Loss, alternation, or degradation (i.e., sedimentation, channel alteration/entrenchment, floodplain modifications) of wetland and riparian areas could result in new downstream flooding and/or more intense flooding within existing floodplains. |
| Long- and short-term surface water storage | Loss, alternation, or degradation (i.e., sedimentation, channel alteration, vegetation, pool depth) of wetland and riparian areas could result in new downstream flooding and/or more intense flooding within existing floodplains as well as changes to subsurface water recharge and surface water use by plants and wildlife. |
| Sediment/nutrient/ toxicant retention and/or removal | Loss, alternation, or degradation (i.e., increased sedimentation/nutrient load, loss of native vegetation, mercury dust accumulation) of wetland and riparian areas could result in lower water quality and/or increased toxic material levels within the aquatic resource area and downstream. |
| Sediment/shoreline stabilization | Loss, alternation, or degradation (i.e., channel alteration, loss of bank vegetation and structure) of wetland and riparian areas could result in increased flow rates downstream which may cause erosion. |
| Production export/terrestrial and aquatic food chain support | Loss, alternation, or degradation (i.e., invasive species encroachment, loss of standing surface water, loss of biodiversity) of wetland and riparian areas could result in a loss of habitat suitability and usefulness for wildlife. |
| Groundwater discharge/recharge | Loss, alternation, or degradation (i.e., soil compaction, channel alteration, sedimentation) of wetland and riparian areas could result in a reduced groundwater recharge or altered discharge. |
| Uniqueness | Loss, alternation, or degradation of any kind to wetland and riparian areas could result in a partial or complete loss of habitat and functional diversity within the watershed. |
| Recreation/ education potential | Loss, alternation, or degradation of any kind to wetland and riparian areas could result in a decreased usefulness for education and scientific study as well as recreation (i.e., wildlife viewing, canoeing, etc.). |

Source: Berglund and McEldowney 2008

Wetland functions were assessed using the MWAM. The purpose of this assessment methodology is to demonstrate where functional losses are anticipated based on the total number of wetland functional units within an area. For detailed explanation of the methodology used to calculate the wetland functional units associated with a given wetland AA see Tetra Tech (2018 and 2021a), and for additional detail on how losses of wetland functional units associated with a given AA were calculated refer to **Appendix A**, **Tables A-2** and **A-3**. For this analysis, losses of wetland functional units at the mine site are reported in the context of the mine site portion of the analysis area, and temporary and permanent losses of wetland functional units from transmission line construction, transmission line right-of-way widening, access road construction, or off-site facility construction are reported in the context of the subbasins in which they occur (**Table 7-2**).

Due to the large number of individual wetlands impacted under each action alternative, it is not possible to present analysis of impacts to wetland functions on a wetland-by-wetland basis in this section. Refer to **Appendix A**, **Tables A-2** and **A-3** for the extent of impacts to specific AAs under each alternative. These tables include a summary of dominant wetland functions attributed to each impacted AA.

#### *Wetland and Riparian Area Fragmentation*

Fragmentation of wetlands and riparian areas would occur at the mine site and in areas where new roads or transmission line crossings are constructed or altered. These affects would be direct (e.g., direct bisection of wetlands and/or riparian areas) or indirect (i.e., hydrological changes in wetland and/or riparian areas not immediately adjacent to the disturbance) based on the location of disturbance. As riparian corridors often provide cover for wildlife movement, these crossings could create breaks in several otherwise contiguous tree/shrub corridors, thereby potentially severing functional connectivity which could be direct (i.e., loss of flood attenuation potential) and/or indirect (i.e., avoidance of the area by wildlife). Hydrologic flows through riparian areas and wetlands would be affected by road crossings and culverts that would alter the current route of surface and subsurface flows and could reduce the delivery of woody material from riparian areas into streams. For example, forestry practices such as road building have been shown to alter wetland hydrology at distances greater than 328 feet (Jones 2003). To provide an estimate of fragmentation, the number of wetlands bisected by new roads is reported for each action alternative. It is possible that fragmentation could lead to indirect loss and/or changes in function of the wetland; however, this potential effect is unknown and is not quantified. New roads that would affect wetlands and riparian areas would be removed and their footprints reclaimed and revegetated after completion of the SGP; however, habitat fragmentation associated with the initial impacts to wetlands is considered long term for the purpose of this analysis due to the duration of the SGP.

### 7.2.1.2 Issue: the SGP May Affect Water Balance, which could Reduce Seasonal Water Input Frequency and Duration for Wetlands Adjacent to and Downstream of SGP Features

SGP construction and operation has the potential to alter hydrological conditions (e.g., amount and direction of groundwater and surface water flow). Components of the mine such as the pits, diversions, and storm water management features are examples of mine site developments that could result in hydrologic alterations. In the off-site focus area, roads are the primary feature that may result in hydrologic alterations, directly and/or indirectly. These alterations could affect the ability of portions of impacted wetlands outside the disturbance footprint to persist into the future due to changes (either reductions or increases) in seasonal water input frequency and duration for on-site and off-site, downstream wetlands. Potential impacts to wetlands from alterations such as roads are not quantified; however, examples of potential impacts and consequences are summarized in **Table 7-2**. Potential impacts due to changes in the mine site focus area are provided in the Revised Final Stibnite Gold Project

Hydrologic Model Proposed Action Report, which includes details of the hydrologic model (Brown and Caldwell 2018, 2021) and the various simulations completed to assess potential changes to the groundwater and surface water flow systems during the mine operational period.

Reduced seasonal water input is likely to result in areas that no longer support wetland soils or hydrophytic vegetation. Wetlands would be impacted by groundwater drawdown if they are within an area subject to drawdown, as this is likely to eliminate near-surface water table conditions that categorize areas as wetlands under the wetland delineation methodology (i.e., inundated or saturated soils at some point during the growing season; USACE 1987). The maximum extent of groundwater (alluvial and bedrock) drawdown under each of the action alternatives was used to estimate the acres of wetlands that would be impacted by reduced seasonal water input. All of the ground water drawdown impacts would occur within the Headwaters East Fork SFSR watershed.

#### 7.2.1.3 Issue: SGP-related activities may affect wetlands and riparian areas through changes to water temperature, and concentration of key contaminants.

SGP-related construction and operations may result in changes to water temperature, increases in concentration of key contaminants, and increases in sedimentation in surface waters. These impacts could reduce the functional capacity of wetlands and riparian areas to absorb contaminants, filter sediments, regulate water temperature, and provide clean habitat for fish and wildlife. The detailed analysis presented in the specialist report for Water Quality (Forest Service 2022b) was reviewed to inform the analysis of water quality impacts that could affect wetlands and riparian areas. This includes an assessment of the following impacts on surface water and groundwater quality:

- Effects of open pit mining, including exposed rock faces and material used to backfill open pits.
- Effects of tailings and development rock storage.
- Effects of tailings consolidation water and runoff from the TSF.
- Effects of ground disturbance and potential erosion.
- Effects of dust deposition.
- Effects of treated sanitary wastewater discharge.
- Effects of accidental spills of fuels and hazardous materials.
- Effects of new access road and utility corridor stream crossings.

The Water Quality Management Plan developed for the SGP (Brown and Caldwell 2020) includes several measures aimed at maintaining and improving water quality at the mine site. The plan describes how tailings would be removed, how best management practices would be used for erosion and sediment control, how existing waters would be diverted to avoid contact with contaminated/process water, how runoff from contaminated areas would be captured and treated, and how groundwater would be used to process ore, and how a long-term water treatment program would be operated and maintained. The potential for these actions to affect hydrologically connected wetlands and riparian areas is discussed qualitatively in the analysis for the action alternatives.

### 7.2.2 No Action Alternative

The SGP would not be implemented; therefore, there would be no SGP-related direct or indirect effects to wetlands or riparian areas. Wetlands and riparian areas in the mine site portion of the analysis 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., Blowout 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.

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. Blowout Creek would continue to contribute sediment and erosion to downstream waters and wetlands. Permitted exploration activities within the mine site would continue to occur and could include small, localized impacts to wetlands and riparian areas.

### 7.2.3 2021 MMP

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 analysis area would result in the type of impacts to wetlands and riparian areas and their associated functions as described in **Section 7.2.1** and subsequent sections. Losses of wetland and riparian areas and their functions would occur throughout the construction and operation phases (refer to **Section 7.2.1.1**). Wetland areas that would be impacted by the 2021 MMP are shown on **Figures 5-2**, **5-3a-f**, **5-4a-f**, and **5-5a-o** as wetlands that overlap SGP components.

#### 7.2.3.1 Issue: Loss of Wetland and Riparian Areas

##### *Mine Site Focus Area*

**Table 7-3** presents acres of wetlands and riparian areas (RCAs) that would be directly lost due to SGP actions within the mine site focus area under the 2021 MMP. Linear feet of streams that would be lost are also presented for context. **Table 7-3** also presents acres that would be indirectly lost due to wetland type conversion due to the clearing of tall trees around the transmission line. However, as described in **Section 7.2.1.1**, potential wetland and riparian area losses due to other indirect impacts (e.g., hydrology changes) would be contained within a 45.08-acre area of delineated wetlands within the mine dewatering drawdown area (Forest Service 2022c). This acreage represents an over-estimate of actual potential indirect effects as some of that area is accounted for within direct affects and dewatering drawdown would not affect wetlands unless they are hydraulically connected to the groundwater experiencing drawdown.

It is recognized that acreages presented in **Table 7-3** may be underestimated if these indirect impacts do occur. Losses under the 2021 MMP would be approximately 28 percent of the 428.8 acres of wetlands identified in the mine site focus area, 23 percent of the 2,655 acres of RCAs, 24 percent of the 208,302 linear feet of perennial streams, and 18 percent of the 110,224 linear feet of non-perennial streams. All wetland and RCA impacts at the mine site would occur within the Headwaters East Fork SFSR watershed. Impacts expected due to wetland and RCA losses would be as described in **Section 7.2.1.1**. The magnitude of impacts would be major (i.e., a large measurable change), localized, and the impacts would range from temporary to permanent as described in **Section 7.2.1.1**.

### *Off-Site Focus Area*

Acres of wetlands and riparian areas (RCAs) that would be directly impacted in the off-site focus area under the 2021 MMP are shown by SGP component in **Table 7-4** and by HUC 10 drainage basin in **Table 7-5.** For context, linear feet of streams that would be impacted are also shown in both tables. The greatest impacts in areas outside the mine site would occur in the Johnson Creek watershed, with fewer impacts in the other watersheds. Impacts on wetlands due to construction, maintenance, and use of the Burntlog Route (which includes alignment modifications and widening of existing portions and construction of new portions) would contribute the greatest proportion of direct impacts to wetlands due to access road construction as the width of this route would be approximately four times wider than standard roads in this area. As noted in **Section 7.2.1.1**, much of the transmission line disturbance would be considered localized and temporary. Of the disturbance listed in **Tables 7-4** and **7-5**, approximately 50.7 acres would be temporary.

Most indirect effects have not been quantified and it is acknowledged that indirect effects due to changes in hydrology and water quality may lead to wetland and riparian losses beyond estimates in **Tables 7-4** and **7-5** if these indirect impacts do occur. Although not quantified, the amount of additional loss from these mechanisms is expected to be minor (i.e., a change in conditions that would be measurable but slight). For examples, modifications to groundwater and surface water flows are not expected outside the mine area (Forest Service 2022c) while effects on water quality attributable to road usage are expected to be limited by applicable regulation, design features, and best management practices (Forest Service 2022b). Regarding the clearing of tall trees, clearing within 50 feet of the centerline of transmission lines could impact wetlands and riparian areas due to the of loss of overstory components. Loss of overstory in forested wetlands could lead to conversion to other wetland types even when reduction in total wetland acreage would not occur. Potential wetland conversion losses due to the clearing of tall trees are included in **Tables 7-4** and **7-5**.

**Table 7-3 2021 MMP Impacts to Wetlands, Streams, and RCAs in the Mine Site Focus Area**

| SGP Component | PEM Wetlands (acres) | PFO Wetlands (acres) | PSS Wetlands (acres) | Open Water (acres) | Total Wetlands (acres)[1] | Perennial Streams (feet) | Non-Perennial Streams (feet) | RCAs (acres)[2] |
|---|---|---|---|---|---|---|---|---|
| Blowout Access Road | <0.1 | | | | | | | 0.3 |
| Blowout Borrow | 1.4 | 4.3 | 6.7 | | 12.3 | 5,742.4 | 930.5 | 40.4 |
| Blowout Creek Rock Drain | 0.1 | | | | 0.1 | 1,779.7 | | 3.9 |
| Burntlog Route - Existing | 0.3 | | <0.1 | | 0.3 | 17.5 | 1,567.8 | 2.4 |
| Burntlog Route Cut/Fill | <0.1 | 0.5 | 0.3 | | 0.8 | 391.0 | 257.4 | 11.2 |
| East Fork SFSR Inlet | | <0.1 | 0.2 | | 0.3 | 494.8 | | 4.1 |
| East Fork SFSR Outlet | | | <0.1 | | <0.1 | 12.9 | | 3.3 |
| Fiddle GMS | | 0.8 | | | 0.8 | 1,407.6 | | 18.6 |
| Garnet Creek Restoration | 0.5 | | 0.5 | | 1.0 | 328.5 | | 2.1 |
| Hangar Flats Haul Road | 0.4 | <0.1 | 0.8 | | 1.2 | 955.6 | 812.0 | 6.3 |
| Hangar Flats Incidental | 0.1 | <0.1 | 1.4 | | 1.5 | 1,101.5 | 60.1 | 5.5 |
| Hangar Flats Pit | 0.7 | | 0.4 | | 1.0 | 241.2 | | 14.9 |
| Hangar Flats Stockpile | 0.8 | | 0.5 | 0.1 | 1.4 | | 1,737.2 | 3.0 |
| Midnight Diversion | <0.1 | | <0.1 | | <0.1 | 189.3 | 48.1 | 0.6 |
| Midnight Incidental | | | | | | | | 3.1 |
| Plant Diversion | <0.1 | | 0.1 | | 0.2 | | 388.5 | 1.0 |
| Plant Outfall | | | <0.1 | | <0.1 | | | 0.3 |
| Plant Site | 1.5 | 0.6 | 1.0 | <0.1 | 3.2 | 1,460.9 | 1,117.4 | 34.0 |
| Plant Site Access Road | | <0.1 | 1.3 | | 1.3 | | 478.7 | 7.5 |
| Plant Site Haul Road | 0.4 | 0.1 | 0.9 | <0.1 | 1.4 | 465.0 | 1,891.3 | 27.7 |
| Plant Site Haul Road Incidental | <0.1 | | 0.2 | | 0.3 | | 429.7 | 0.3 |
| Plant Site Stockpile | 1.3 | 0.5 | 1.0 | | 2.7 | | 711.7 | 1.1 |
| Pond Tunnel Area | | | 0.1 | | 0.1 | 260.6 | | 4.6 |
| Security Building | | | <0.1 | | <0.1 | | | |
| SODA | 0.6 | | | 0.1 | 0.7 | 2,037.6 | | 16.4 |
| Transmission Line Access - Minor Improvements | 0.1 | 0.1 | <0.1 | | 0.2 | | 34.6 | 0.9 |
| Transmission Line ROW - New | | 0.1 | 0.7 | | 0.8 | 197.7 | 418.1 | 1.0 |

| SGP Component | PEM Wetlands (acres) | PFO Wetlands (acres) | PSS Wetlands (acres) | Open Water (acres) | Total Wetlands (acres)[1] | Perennial Streams (feet) | Non-Perennial Streams (feet) | RCAs (acres)[2] |
|---|---|---|---|---|---|---|---|---|
| Truck Shop | 0.1 | | <0.1 | | 0.1 | 39.4 | | 14.5 |
| TSF | 4.0 | 41.1 | 13.2 | | 58.3 | 18,665.3 | 6,226.8 | 166.6 |
| TSF Buttress | 11.6 | | 2.0 | 0.3 | 13.9 | 4,639.6 | | 60.0 |
| TSF Diversion | <0.1 | 2.5 | 0.4 | | 2.9 | 363.9 | 265.2 | 5.6 |
| West End Construction Road | <0.1 | | 0.5 | | 0.6 | 1,599.7 | | 21.0 |
| West End Creek Outfall | | | <0.1 | | <0.1 | 25.9 | | 0.4 |
| West End Diversion | <0.1 | | | | <0.1 | | 151.2 | 2.9 |
| West End Pit | | | 0.6 | | 0.6 | | 857.0 | 26.4 |
| West End Pit Incidental | | | | | | | | 0.9 |
| West End Pond | | | | | | | | 2.6 |
| West End Restoration | | | | | | | | 0.4 |
| Workers Housing | <0.1 | | <0.1 | | <0.1 | | | 1.9 |
| Yellow Pine Access Road | <0.1 | | <0.1 | | <0.1 | 352.1 | | 5.9 |
| Yellow Pine Construction Road | | 0.1 | | | 0.1 | 283.4 | | 4.2 |
| Yellow Pine Construction Laydown | | | <0.1 | | <0.1 | 78.8 | | 5.2 |
| Yellow Pine Pit | 1.5 | 0.1 | 4.9 | 4.5 | 11.0 | 6,326.0 | 698.9 | 80.1 |
| Yellow Pine Pit Incidental | <0.1 | | 0.1 | | 0.1 | 734.2 | | 5.1 |
| Wetland Conversion Losses from Tall Tree Clearing[3] | | <0.1 | 0.1 | | 0.2 | | | |
| **Totals[1]** | 25.4 | 51.0 | 38.3 | 5.0 | 119.8 | 50,192.0 | 19,082.2 | 618.9 |

Source: AECOM 2020; Table prepared using wetland delineation data (HDR 2013, 2014a, 2014b, 2015, 2016a, 2017a, 2017b, Tetra Tech 2021b) and RCA spatial data intersected with SGP components.

[1] Due to rounding, numbers presented in this table may not add up precisely to the totals provided.

[2] RCA acres come from Forest Service RCA data intersected with SGP components (AECOM 2020). Because the RCA data comes from different data than the stream data and is only applicable to NFS land, RCA acres do not match directly with the stream acres listed.

[3] Tall tree clearing was only considered a possible impact to areas where tree species may grow (PFO and PSS wetlands). Information on tree presence in RCAs was not available at the time of analysis and therefore tree clearing in RCAs could not be quantified.

PEM = Palustrine emergent PFO = Palustrine forested PSS = Palustrine scrub-shrub RCA = Riparian Conservation Area
ROW = Right-of-Way GMS = Growth Media Stockpile SODA = Spent Ore Disposal Area

**Table 7-4 2021 MMP Impacts to Wetlands, Streams, and RCAs in the Off-site Focus Area**

| SGP Component | PEM Wetlands (acres) | PFO Wetlands (acres) | PSS Wetlands (acres) | Open Water (acres) | Total Wetlands (acres)[1] | Perennial Streams (feet) | Non-Perennial Streams (feet) | RCAs (acres)[2] |
|---|---|---|---|---|---|---|---|---|
| **Access Roads** | | | | | | | | |
| Yellow Pine Access Road | | | | | | 32.0 | <0.1 | <0.1 |
| Burntlog Route – Existing – Improvements | 0.5 | 0.1 | <0.1 | | 0.6 | 156.4 | 766.0 | 11.4 |
| **Access Road Cut/Fill** | | | | | | | | |
| Burntlog Route Cut/Fill | 3.1 | 1.2 | 1.7 | | 6.2 | 2,004.1 | 2,732.0 | 36.8 |
| **Access Road Work Areas** | | | | | | | | |
| Burntlog Route Borrow Source | 0.1 | | 0.6 | | 0.8 | | | 1.9 |
| Burntlog Route Staging Area | | | | | | | | 2.9 |
| **Off-Site Facilities** | | | | | | | | |
| Burntlog Maintenance Facility | | | 0.1 | | 0.1 | | | |
| Logistics Facility | 0.1 | | 0.6 | | 0.8 | | | |
| **OSV Routes** | | | | | | | | |
| OSV Route | <0.1 | | 0.2 | | 0.2 | 47.7 | 121.7 | 4.3 |
| **Transmission Line Access Roads** | | | | | | | | |
| Transmission Line Access - Bladed | 0.2 | | <0.1 | | 0.2 | 245.5 | | 1.9 |
| Transmission Line Access - Major Improvements | 0.4 | 0.3 | 1.0 | | 1.6 | 1,337.1 | 386.7 | 29.7 |
| Transmission Line Access - Minor Improvements | 0.8 | 0.1 | 0.4 | <0.1 | 1.3 | 2,081.1 | 1,526.4 | 26.2 |
| **Transmission Line ROW[3]** | | | | | | | | |
| Transmission Line ROW - Existing/Upgrade | 21.5 | 0.5 | 14.8 | 0.2 | 37.0 | 14,407.9 | 6,510.7 | 132.4 |
| Transmission Line ROW - New | 2.8 | 2.0 | 1.6 | <0.1 | 6.3 | 1,707.2 | 674.7 | 14.8 |
| **Transmission Line Work Areas** | | | | | | | | |
| Transmission Line Pulling and Tensioning Work Area | 0.7 | | 0.3 | | 1.0 | 247.2 | 856.9 | 11.2 |
| Transmission Line Staging Work Area | | | 0.6 | | 0.6 | | 422.2 | 10.7 |
| Transmission Line Structure Removal | 1.2 | | | | 1.2 | | | |
| Transmission Line Structure Work Area | 8.3 | <0.1 | 1.2 | <0.1 | 9.6 | 1,198.1 | 668.4 | 15.1 |

| SGP Component | PEM Wetlands (acres) | PFO Wetlands (acres) | PSS Wetlands (acres) | Open Water (acres) | Total Wetlands (acres)[1] | Perennial Streams (feet) | Non-Perennial Streams (feet) | RCAs (acres)[2] |
|---|---|---|---|---|---|---|---|---|
| Wetland Conversion Losses from Tall Tree Clearing[4] | | 2.1 | 6.8 | | 8.9 | | | |
| **Totals[1]** | 39.9 | 6.2 | 30.0 | 0.3 | 76.3 | 23,464.2 | 14,665.8 | 299.5 |

Source: AECOM 2020; Table prepared using wetland delineation data (HDR 2013, 2014a, 2014b, 2015, 2016a, 2017a, 2017b, Tetra Tech 2021b) and RCA spatial data intersected with SGP components.

[1] Due to rounding, numbers presented in this table may not add up precisely to the totals provided.

[2] RCA acres come from Forest Service RCA data intersected with SGP components (AECOM 2020). Because the RCA data comes from different data than the stream data and is only applicable to NFS land, RCA acres do not match directly with the stream acres listed.

[3] Disturbance includes both temporary and permanent effects associated with transmission line construction.

[4] Tall tree clearing was only considered a possible impact to areas where tree species may grow (PFO and PSS wetlands). Information on tree presence in RCAs was not available at the time of analysis and therefore tree clearing in RCAs could not be quantified.

PEM = Palustrine emergent

PFO = Palustrine forested

PSS = Palustrine scrub-shrub

RCA = Riparian Conservation Area

ROW = Right-of-Way

SGP = Stibnite Gold Project

**Table 7-5 Losses of Wetlands, Streams, and RCAs within the Off-site Focus Area by Watershed Under the 2021 MMP**

| Drainage Basin (HUC 10) | PEM Wetlands (acres) | PFO Wetlands (acres) | PSS Wetlands (acres) | Open Water (acres) | Total Wetlands (acres)[1] | Perennial Streams (feet) | Non-Perennial Streams (feet) | RCA (acres)[2] |
|---|---|---|---|---|---|---|---|---|
| Big Creek-North Fork Payette River | 8.8 | 0.7 | 6.6 | <0.1 | 16.1 | 4,028.6 | 2,927.3 | 33.2 |
| Cascade Reservoir | 15.9 | | <0.1 | | 16.0 | 218.1 | 477.5 | |
| Gold Fork River | 0.9 | | 0.8 | 0.2 | 1.9 | | | |
| Johnson Creek | 9.6 | 3.2 | 14.1 | | 26.9 | 11,736.3 | 7,240.3 | 182.3 |
| Lake Fork-North Fork Payette River | 2.2 | | 0.9 | | 3.1 | 283.1 | 365.3 | |
| Headwaters East Fork SFSR | 1.3 | 2.2 | <0.1 | | 3.5 | 1,500.7 | 626.8 | 4.2 |
| Upper South Fork Salmon River | 1.2 | <0.1 | 7.4 | | 8.7 | 5,715.0 | 3,028.5 | 79.8 |
| **Totals[1,3]** | **39.9** | **6.2** | **30.0** | **0.3** | **76.3** | **23,481.7** | **14,665.8** | **299.5** |

Source: AECOM 2020; Table prepared using wetland delineation data (HDR 2013, 2014a, 2014b, 2015, 2016a, 2017a, 2017b, Tetra Tech 2021b) and RCA spatial data intersected with SGP components.

[1] Due to rounding, numbers presented in this table may not add up precisely to the totals provided.

[2] RCA acres come from Forest Service RCA data intersected with SGP components (AECOM 2020). Because the RCA data comes from different data than the stream data and is only applicable to NFS land, RCA acres do not match directly with the stream acres listed.

[3] Disturbance includes both temporary and permanent effects associated with transmission line construction.

HUC = Hydrologic Unit Code

PEM = Palustrine emergent

PFO = Palustrine forested

PSS = Palustrine scrub-shrub

RCA = Riparian Conservation Area

#### 7.2.3.2 Issue: Impacts on Wetland and Riparian Functions

As described in **Section 7.2.1.1**, impacts to wetland and riparian area functions would occur due to both direct effects (e.g., excavation and fill) and indirect effects such as changes to hydrology, changes to water quality, or dust and/or mercury deposition. Wetland functional units that would be loss due to direct impacts and indirect impacts due to wetland conversion are presented in **Table 7-6**. An estimated total of 1,054.4 wetland functional units would be lost, approximately 375.9 of which would be due to impacts to high value wetlands. Refer to **Appendix A** (**Table A-2**) for impacts to acres and functions in each specific AA and what specific SGP components would be associated with these impacts under the 2021 MMP. Because some of the functional units that would be lost would be due to temporary impacts associated with transmission line construction, the estimated total of functional units that would be lost is greater than reported in the CMP (which only considered permanent effects see **Section 7.3.1**). Approximately 414.1 of the functional units lost would be temporary. As project design progresses, temporary loss would be better defined. **Figures 5-2**, **5-3a-f**, and **5-5a-o** show the AAs impacted under the 2021 MMP within the mine site focus area and the off-site focus area, respectively. Permanent and temporary losses would constitute a major effect. Impacts described generally in **Section 7.2.1.1** would occur as a result of these losses. Functional loss due to other indirect effects, including changes in hydrology, water quality, and increase dust and/or mercury deposition has been examined through inspection of dewatering drawdown and distance to roadways, but is difficult to quantify precisely. As a result, functional units that would be lost if these indirect effects occur, may be underestimated.

The type of effects that could occur due to dust and/or mercury deposition are described in **Section 7.2.1.1**. However, the magnitude is expected to be greater on roads used for the SGP 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 Idaho Fish and Game as a poor fen[5] (IDFG 2004a). 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 (*Scheuchzeria palustris*), which is described further in the specialist report for Vegetation Communities (Forest Service 2022e). Although the impact of dust deposition has not been quantified, effect magnitude would most likely be minor (small but measurable change) and long-term, limited to the life of the SGP. Effects from changes to hydrology (e.g., construction effects on local drainage and shallow groundwater paths) and water quality could range from negligible to moderate and could be long-term or permanent depending on the actual impact.

As explained previously, indirect effects to wetland and riparian functions have not been quantified, and although discussed qualitatively, are not represented in impact acreages reported for each action alternative. Duration of indirect effects may vary from temporary to permanent. Regarding dust and/or mercury deposition, SGP construction and operation (particularly road construction and use) could indirectly affect wetlands through increased dust and/or mercury deposition. Potential impacts of dust on vegetation are described in the specialist report for Vegetation Communities (Forest Service 2022e), but in general impacts could alter water quality parameters and inhibit the metabolic processes of plants, which would result in impacts to individuals ranging from mild metabolic inhibition to mortality (Farmer 1993). A reduction in vegetation coverage would result in a loss of wetland and riparian functions as described in the previous paragraph.

[5] Poor fens are extremely acidic, low nutrient, often sedge or sphagnum moss dominated wetlands (IDFG 2004b).

**Table 7-6 Losses of Wetland Acreages and Functional Units under the 2021 MMP**

| Assessment Area (AA) | AA Number | AA Category[1] | Impacted Wetland Area (acres) | Baseline Function | Impacted Habitat Value (FUs)[2] |
|---|---|---|---|---|---|
| Upper Meadow Creek | 1 | II | 52.2 | 6.7 | 349.7 |
| Upper Meadow Creek Seeps | 2 | II | 3.3 | 5.5 | 18.2 |
| Lower Meadow Creek | 3 | III | 33.9 | 4.5 | 152.6 |
| Lower Meadow Creek Seeps | 4 | III | 4.3 | 5.6 | 24.1 |
| East Fork Meadow Creek | 5 | III | 0.1 | 4.3 | 0.4 |
| EFSF Valley | 6 | III | 17.1 | 5.6 | 95.8 |
| Fiddle Creek | 7 | III | 0.9 | 5.4 | 4.9 |
| Hennessy Creek | 8 | III | 0.4 | 4.2 | 1.7 |
| Midnight Creek | 9 | III | 1.3 | 2.9 | 3.8 |
| West End Creek | 10 | III | 0.7 | 2.7 | 1.9 |
| Burntlog | 11 | III | 7.7 | 3.9 | 30.0 |
| Riordan Road Alternative and Powerline Corridor[3] | 12 | III | 6.1 | 4.2 | 25.6 |
| Johnson Creek Road Alternative[3] | 13 | III | 8.4 | 4.7 | 39.4 |
| Cabin Trout[3] | 14 | III | 14.7 | 5.5 | 80.9 |
| Upper East Fork SFSR | 15 | II | 0.4 | 6.7 | 2.7 |
| Stibnite Road Wetlands | 16 | III | | 3.8 | |
| Transmission Line and Warm Lake[3] | 17 | III | 11.4 | 5.7 | 65.0 |
| Transmission Line – Valley[3] | 18 | III | 29.5 | 5.0 | 146.0 |
| Yellow Pine Pit | 19 | IV | 4.5 | 2.6 | 11.7 |
| Rabbit Creek Slope Wetlands | 20 | III | | 4.0 | |
| Thunder Mountain Road | 21 | III | <0.1 | 5.4 | |
| Totals[4] | | | 196.9 | n/a | 1,054.4 |

Source: Tetra Tech (2021c). Refer to **Appendix A** (**Table A-2**) for AA-specific information.

[1] Wetland categories range from I (highest functional value) to IV (lowest functional value). No Category I wetlands were documented in the analysis area. Category II wetlands are considered high-value for the purposes of this analysis.

[2] Functional unit impacts were calculated based on percentage of AA impacted; this calculation assumes equal distribution of functions over the area of a wetland.

[3] Disturbance and function units impacted in these AAs includes both temporary and permanent effects associated with transmission line construction.

[4] Due to rounding, numbers presented in this table may not add up precisely to the totals provided.

AA = Assessment Area

### 7.2.3.3 Issue: Wetland and Riparian Area Fragmentation

Under the 2021 MMP, 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 approximately 619 acres at the mine site and 300 acres outside the mine site. New roads would bisect 39 total individual wetlands. Fragmentation effects, as described in **Section 7.2.1.1**, could occur as a result of these impacts.

#### 7.2.3.4 Issue: Alteration of Wetland and Riparian Areas Due to Changes in Water Balance

The 2021 MMP could affect hydrology due to changes in surface water or groundwater inputs. As described in **Section 7.2.1.1**, impacts due to surface water input changes have not been quantified. However, impacts to water balance through groundwater drawdown, which could reduce seasonal water input frequency and duration for on-site and off-site downstream wetlands was estimated based on groundwater modeling. Acres of wetlands in the maximum groundwater drawdown area under the 2021 MMP are presented in **Table 7-7**. These predicted acreages are subject to uncertainties in the numerical groundwater flow predictions. Sensitivity analyses for the extent of groundwater drawdown cones indicated there could be slight changes to the acreages of wetlands in the drawdown area associated with the selection of model parameters (Forest Service 2022c). The entirety of these wetlands also would be subject to direct impacts from SGP component construction, and the acreages presented below are already accounted for in the acreages presented in **Table 7-3**.

**Table 7-7 Acres and Types of Wetlands in the Maximum Drawdown Area under the 2021 MMP**

| | PEM Wetland | PFO Wetland | PSS Wetland | Open Water | Total Wetlands[1] |
|---|---|---|---|---|---|
| Acres of Wetlands | **7.2** | **7.0** | **28.4** | **4.2** | **46.7** |

Source: AECOM 2020; Merged simulated alluvial and bedrock groundwater drawdown contour (maximum drawdown area for all SGP years combined).

[1] Due to rounding, numbers presented in this table may not add up precisely to the totals provided.

PEM = Palustrine emergent

PFO = Palustrine forested

PSS = Palustrine scrub-shrub

#### 7.2.3.5 Issue: Alteration of Wetland and Riparian Areas due to Changes in Water Quality

Changes to water quality parameters would occur under the 2021 MMP during the construction and operation phases. The 2021 MMP would improve some of the existing water quality conditions observed in Meadow Creek and the East Fork SFSR by removing and repurposing legacy mine wastes. However, the 2021 MMP would have direct permanent impacts on water quality, as it would contribute new sources of mine waste material to the East Fork SFSR drainage.

Indirect effects to wetlands and riparian areas could occur under the 2021 MMP if the quantity and or quality of surface and groundwater flows, including the chemical characteristics of the waters, temperature characteristics of waters, change downstream of disturbance areas, and if those changes impact water quality or habitat conditions during active mining and after SGP closure. This could include the effects of placing the TSF and TSF Buttress in stream valleys, which could introduce contaminants or cause temporary changes to pH, temperature, and dissolved oxygen levels. The effects of the SGP on Water Quantity and Water Quality are described in companion specialist reports (Forest Service 2022c and 2022b).

### 7.2.4 Johnson Creek Route Alternative

Under the Johnson Creek Alternative, the mine site and utilities would be constructed and operated the same as under the 2021 MMP. As a result, impacts to wetlands and riparian areas would be the same in those areas and differences between the two action alternatives would be due to the differences in access routes. The following subsections provide details on the extent of impacts under the Johnson Creek Route Alternative.

#### 7.2.4.1 Issue: Loss of Wetland and Riparian Areas

##### *Mine Site Focus Area*

Within the mine site focus area, direct loss of wetlands and riparian areas and indirect loss due to wetland type conversion would be the same as for the 2021 MMP (**Table 7-3**). Although other indirect impacts are not quantified, because construction and operation of the mine site and utilities would be the same under both alternatives, indirect impacts would be the same as described for the 2021 MMP. Magnitude of impacts would be major (i.e., a large measurable change) and the impacts would range from temporary to permanent as described in **Section 7.2.1.1**.

##### *Off-Site Focus Area*

Acres of impacts to wetlands and RCAs in the off-site focus area under the Johnson Creek Route Alternative are shown in **Table 7-8**. Streams are also shown for reference. 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, as described under the 2021 MMP. 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 East Fork SFSR. Thus, the road impacts would affect wetlands and riparian areas at the confluences of several drainages that feed into the East Fork SFSR, which would have a larger effect on the river. In comparison, the construction of the Burntlog Route described under the 2021 MMP would cross through several drainages but would generally be perpendicular to those waters.

**Table 7-9** shows acres of impacts to wetlands and RCAs in the off-site focus area by HUC 10 drainage basin (i.e., watershed) under the Johnson Creek Route Alternative. The greatest extent of wetland and riparian impacts in areas outside the mine site would occur in the Johnson Creek watershed, with lesser extents of impacts to wetlands and riparian areas in the other watersheds. As noted in **Section 7.2.1.1**, much of the transmission line disturbance would be considered temporary. Of the disturbance listed in **Tables 7-8** and **7-9**, approximately 50.7 acres would be temporary.

**Table 7-8 Johnson Creek Route Alternative Impacts to Wetlands, Streams, and RCAs in the Off-site Focus Area**

| SGP Component | PEM Wetlands (acres) | PFO Wetlands (acres) | PSS Wetlands (acres) | Open Water (acres) | Total Wetlands (acres)[1] | Perennial Streams (feet) | Non-Perennial Streams (feet) | Total RCAs (acres)[2] |
|---|---|---|---|---|---|---|---|---|
| **Access Roads** | | | | | | | | |
| Yellow Pine Access Road | | | | | | 32.0 | | <0.1 |
| **Access Road Cut/Fill** | | | | | | | | |
| Johnson Creek Road Cut/Fill | 0.1 | 0.1 | 2.2 | | 2.4 | 506.4 | 577.3 | 87.5 |
| Stibnite Road Cut/Fill | <0.1 | | <0.1 | | <0.1 | 60.7 | 2.4 | 17.3 |
| **Off-Site Facilities** | | | | | | | | |
| Landmark Maintenance Facility | | | | | | | | 2.2 |
| Logistics Facility | 0.1 | | 0.6 | | 0.8 | | | |
| **OSV Routes** | | | | | | | | |
| OSV Route | <0.1 | | 0.3 | | 0.3 | 34.0 | 163.5 | 3.9 |
| **Transmission Line Access Roads** | | | | | | | | |
| Transmission Line Access - Bladed | 0.2 | | <0.1 | | 0.2 | 245.5 | | 1.8 |
| Transmission Line Access - Major Improvements | 0.4 | 0.3 | 0.9 | | 1.6 | 1,337.1 | 386.7 | 29.2 |
| Transmission Line Access - Minor Improvements | 0.8 | 0.1 | 0.4 | <0.1 | 1.3 | 2,081.1 | 1,526.4 | 26.1 |
| **Transmission Line ROW[3]** | | | | | | | | |
| Transmission Line ROW - Existing/Upgrade | 21.5 | 0.5 | 14.8 | 0.2 | 37.0 | 14,391.7 | 6,510.7 | 131.3 |
| Transmission Line ROW - New | 2.8 | 2.0 | 1.6 | <0.1 | 6.3 | 1707.2 | 674.7 | 14.8 |
| **Transmission Line Work Areas** | | | | | | | | |
| Transmission Line Pulling and Tensioning Work Area | 0.7 | | 0.3 | | 1.0 | 247.2 | 856.2 | 11.1 |
| Transmission Line Staging Work Area | | | 0.6 | | 0.6 | | 422.2 | 10.7 |

| SGP Component | PEM Wetlands (acres) | PFO Wetlands (acres) | PSS Wetlands (acres) | Open Water (acres) | Total Wetlands (acres)[1] | Perennial Streams (feet) | Non-Perennial Streams (feet) | Total RCAs (acres)[2] |
|---|---|---|---|---|---|---|---|---|
| Transmission Line Structure Removal | 1.2 | | | | 1.2 | | | |
| Transmission Line Structure Work Area | 8.3 | <0.1 | 1.2 | <0.1 | 9.6 | 1,198.1 | 668.4 | 15.0 |
| Wetland Conversion Losses from Tall Tree Clearing[4] | | 2.1 | 6.8 | | 8.9 | | | |
| **Totals[1]** | 36.1 | 5.1 | 29.8 | 0.3 | 71.2 | 21,841.0 | 11,788.5 | 352.6 |

Source: AECOM 2020; Table prepared using wetland delineation data (HDR 2013, 2014a, 2014b, 2015, 2016a, 2017a, 2017b, Tetra Tech 2021b) and RCA spatial data intersected with SGP components.

[1] Due to rounding, numbers presented in this table may not add up precisely to the totals provided.

[2] RCA acres come from Forest Service RCA data intersected with SGP components (AECOM 2020). Because the RCA data comes from different data than the stream data and is only applicable to NFS land, RCA acres do not match directly with the stream acres listed.

[3] Disturbance includes both temporary and permanent effects associated with transmission line construction.

[4] Tall tree clearing was only considered a possible impact to areas where tree species may grow (PFO and PSS wetlands). Information on tree presence in RCAs was not available at the time of analysis and therefore tree clearing in RCAs could not be quantified.

PEM = Palustrine emergent

PFO = Palustrine forested

PSS = Palustrine scrub-shrub

RCA = Riparian Conservation Area

ROW = Right-of-Way

**Table 7-9 Losses of Wetlands, Streams, and RCAs within the Off-site Focus Area by Watershed under the Johnson Creek Route Alternative**

| Drainage Basin (HUC 10) | PEM Wetlands (acres) | PFO Wetlands (acres) | PSS Wetlands (acres) | Open Water (acres) | Total Wetlands (acres)[1] | Perennial Streams (feet) | Non-Perennial Streams (feet) | RCA (acres)[2] |
|---|---|---|---|---|---|---|---|---|
| Big Creek-North Fork Payette River | 8.8 | 0.7 | 6.6 | <0.1 | 14.3 | 4,028.6 | 2,927.3 | 33.2 |
| Cascade Reservoir | 15.9 | | <0.1 | | 16.0 | 218.1 | 477.6 | |
| Gold Fork River | 0.9 | | 0.8 | 0.2 | 1.7 | | | |
| Johnson Creek | 5.7 | 2.1 | 13.0 | <0.1 | 17.2 | 9,902.7 | 4,264.5 | 198.3 |
| Lake Fork-North Fork Payette River | 2.2 | | 0.9 | | 2.7 | 283.1 | 365.3 | |
| Headwaters East Fork SFSR | 1.4 | 2.2 | 0.9 | | 3.9 | 1,711.0 | 731.9 | 41.3 |
| Upper South Fork Salmon River | 1.2 | <0.1 | 7.4 | | 6.5 | 5,715.0 | 3,028.5 | 79.8 |
| **Totals[1,3]** | **36.1** | **5.1** | **29.8** | **0.3** | **71.2** | **21,858.5** | **11,795.1** | **352.6** |

Source: AECOM 2020; Table prepared using wetland delineation data (HDR 2013, 2014a, 2014b, 2015, 2016a, 2017a, 2017b, Tetra Tech 2021b) and RCA spatial data intersected with SGP components.

[1] Due to rounding, numbers presented in this table may not add up precisely to the totals provided.

[2] RCA acres come from Forest Service RCA data intersected with SGP components (AECOM 2020). Because the RCA data comes from different data than the stream data and is only applicable to NFS land, RCA acres do not match directly with the stream acres listed.

[3] Disturbance includes both temporary and permanent effects associated with transmission line construction.

HUC = Hydrologic Unit Code

PEM = Palustrine emergent

PFO = Palustrine forested

PSS = Palustrine scrub-shrub

RCA = Riparian Conservation Area

### 7.2.4.2 Issue: Impacts on Wetland and Riparian Functions

An estimated total of 1,028.3 wetland functional units would be lost as a result of SGP construction under the Johnson Creek Route Alternative, approximately 370.6 of which would be due to impacts to high-value wetlands (**Table 7-10**). Wetland functional units would be lost due to direct impacts and indirect impacts due to wetland conversion. Impacts described generally in **Section 7.2.1.1** would occur as a result of these losses. Refer to **Appendix A** (**Table A-3**) for impacts to acres and functions in each specific AA and what specific SGP components would be associated with these impacts under the Johnson Creek Route Alternative. Because some of the functional units that would be lost would be due to temporary impacts associated with transmission line construction, the estimated total of functional units that would be lost is greater than reported in the CMP (which only considers permanent effects, see **Section 7.3.1**). Approximately 414.1 of the functional units lost would be temporary. As project design progresses, temporary loss would be better defined. **Figures 5-4a-f** and **5-5a-o** show the AAs impacted under the Johnson Creek Route Alternative within the off-site focus area (mine site focus impacts are the same as described for the 2021 MMP. The loss of functional units would constitute a major permanent effect and impacts described generally in **Section 7.2.1.1** would occur as a result of these losses. Functional loss due to other indirect effects, including changes in hydrology, water quality, and increase dust and/or mercury deposition has not been quantified. As a result, functional units that would be lost if these indirect effects do occur may be underestimated.

The type of effects that could occur due to dust and/or mercury deposition are described in **Section 7.2.1.1**. As described for the 2021 MMP, the magnitude of these type of effects 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 would be less than for the Burntlog Route, 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, effect magnitude would most likely be minor (small but measurable change) and long-term, limited to the life of the SGP. Effects from changes to hydrology and water quality could range from negligible to moderate and could be long-term or permanent depending on the actual impact.

**Table 7-10 Losses of Wetland Acreages and Functional Units under the Johnson Creek Route Alternative**

| Assessment Area (AA) | AA Number | AA Category[1] | Impacted Wetland Area (acres) | Baseline Function | Impacted Habitat Value (FUs)[2] |
|---|---|---|---|---|---|
| Upper Meadow Creek | 1 | II | 52.2 | 6.7 | 349.7 |
| Upper Meadow Creek Seeps | 2 | II | 3.3 | 5.5 | 18.2 |
| Lower Meadow Creek | 3 | III | 33.9 | 4.5 | 152.6 |
| Lower Meadow Creek Seeps | 4 | III | 4.3 | 5.6 | 24.1 |
| East Fork Meadow Creek | 5 | III | 0.1 | 4.3 | 0.4 |
| EFSF Valley | 6 | III | 17.1 | 5.6 | 95.8 |
| Fiddle Creek | 7 | III | 0.9 | 5.4 | 4.9 |
| Hennessy Creek | 8 | III | 0.4 | 4.2 | 1.7 |
| Midnight Creek | 9 | III | 1.3 | 2.9 | 3.8 |
| West End Creek | 10 | III | 0.7 | 2.7 | 1.9 |
| Burntlog Route | 11 | III | | 3.9 | |

| Assessment Area (AA) | AA Number | AA Category[1] | Impacted Wetland Area (acres) | Baseline Function | Impacted Habitat Value (FUs)[2] |
|---|---|---|---|---|---|
| Riordan Road and Powerline Corridor[3] | 12 | III | 6.1 | 4.2 | 25.6 |
| Johnson Creek Route Alternative[3] | 13 | III | 8.4 | 4.7 | 39.4 |
| Cabin Trout[3] | 14 | III | 14.7 | 5.5 | 80.9 |
| Upper East Fork SFSR | 15 | II | 0.4 | 6.7 | 2.7 |
| Stibnite Road Wetlands | 16 | III | 0.9 | 3.8 | 3.4 |
| Transmission Line and Warm Lake[3] | 17 | III | 11.4 | 5.7 | 65.0 |
| Transmission Line – Valley[3] | 18 | III | 29.6 | 5.0 | 146.5 |
| Yellow Pine Pit | 19 | IV | 4.5 | 2.6 | 11.7 |
| Rabbit Creek Slope Wetlands | 20 | III | | 4.0 | |
| Thunder Mountain Road | 21 | III | <0.1 | 5.4 | |
| Totals[4] | | | 190.2 | n/a | 1,028.3 |

Source: Tetra Tech (2021c). Refer to **Appendix A** (**Table A-3**) for AA-specific information.

[1] Wetland categories range from I (highest functional value) to IV (lowest functional value). No Category I wetlands were documented in the analysis area. Category II wetlands are considered high value for the purposes of this analysis.

[2] Functional unit impacts were calculated based on percentage of AA impacted; this calculation assumes equal distribution of functions over the area of a wetland.

[3] Disturbance and function units impacted in these AAs includes both temporary and permanent effects associated with transmission line construction.

[4] Due to rounding, numbers presented in this table may not add up precisely to the totals provided.

AA = Assessment Area

#### 7.2.4.3 Issue: Wetland and Riparian Area Fragmentation

Under the Johnson Creek Route Alternative, the total extent of wetland losses would be approximately 119.8 acres at the mine site and 71.2 acres outside the mine site. Losses of RCAs would occur on approximately 618.9 acres at the mine site and 353 acres outside the mine site. New roads would bisect six total individual wetlands. Fragmentation effects, as described in **Section 7.2.1.1**, could occur as a result of these impacts.

#### 7.2.4.4 Issue: Alteration of Wetland and Riparian Areas due to changes in Water Balance

Impacts of altered hydrology, including groundwater drawdown, would be the same as described under the 2021 MMP.

## 7.3 Mitigation and Monitoring

Mitigation measures required by the Forest Service would represent reasonable and effective means to reduce the impacts identified in the previous section or to reduce uncertainty regarding the forecasting of impacts into the future. These mitigation measures are in addition to the regulatory and Forest Plan requirements and project design features (**Section 2.4**) accounted for in the preceding impact analysis.

Mitigation measures may be added, revised, or refined based on public comment, agency comment or continued discussions with Perpetua regarding this specialist report or subsequent analysis under the National Environmental Policy Act (NEPA). The adopted mitigation measures will be finalized in the Final Environmental Impact Statement (EIS).

### 7.3.1 Compensatory Mitigation Plan

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. The final rule for Compensatory Mitigation for Losses of Aquatic Resources (U.S. Environmental Protection Agency and USACE 2008) states a preference for achieving mitigation by first trying to find available wetland mitigation credits from an agency-approved wetland mitigation bank. When mitigation bank credits are not available, the final rule directs 404 permit applicants to seek out opportunities to use in-lieu fee programs to satisfy mitigation needs. In-lieu fee programs are generally operated by public resource agencies that accept money for wetland impacts within a specific geography and periodically use that money to fund wetland restoration, creation, or enhancement projects within that same geography. Perpetua proposes to accomplish compensatory mitigation for impacts to wetlands through a combination of mitigation bank credits in the North Fork Payette subbasin and permittee-responsible on-site mitigation within the SFSR subbasin (Tetra Tech 2021a).

#### 7.3.1.1 Compensatory Mitigation Plan under the No Action Alternative

No compensatory wetland mitigation would need to occur under the No Action Alternative as ongoing activities within the analysis area are not associated with the SGP.

#### 7.3.1.2 Compensatory Mitigation Plan under the Action Alternatives

The two action alternatives include activities that would result in permanent impacts to WOTUS including wetlands. Therefore, Perpetua would need to submit and gain approval for a final compensatory wetland mitigation plan, and then implement and maintain the planned wetlands in coordination with the USACE, as part of their CWA 404 permit. Without this permit, work in WOTUS cannot legally commence. A CMP (Tetra Tech 2021a) that addresses compensation for lost wetland areas and functions has been provided by Perpetua. The CMP addresses compensatory mitigation for the permanent impacts described in this document, which would be accomplished through a combination of mitigation bank credits and the creation of new wetlands and enhancing and reclaiming existing wetlands in the general vicinity of the impact areas. The CMP also addresses compensatory mitigation to reduce the temporal loss of aquatic functions and potential risks associated with actions described in the CMP. Temporal loss of functions and values is discussed further below.

The current CMP describes an accounting process for tracking the various wetland impacts (losses) and associated wetland mitigation (gains). The CMP uses the MWAM functional assessment tool to determine functional units for each affected wetland assessment area. These units are based on a combination of MWAM scores and acres of wetlands. When these functional units would be lost due to development in the associated wetland those losses are considered “debits.” Conversely, the creation of new wetlands can result in “credits” by assessing and estimating the predicted functional scores (after 5 years) and area of proposed wetlands that would be created, restored, or enhanced. Using this system of accounting for wetland credits and debits, the CMP provides a ledger that itemizes debits throughout the construction and operating phases and proposed credits for conceptual wetland creation actions. This system of accounting for losses and compensatory gains is intended to demonstrate a means of ensuring that adequate mitigation would be provided regardless of the final impact area/selected action alternative. The

ledger can be scaled up or down to identify the appropriate wetland credits needed to compensate for the final determination of wetland debits, which would be documented in the CWA 404 permit. The ledger system also provides a way to track and assess temporal effects, which as described in **Section 7.2.1.1** are the effects that come from the loss of wetland functions during the period between impacts and compensatory mitigation.

Based on the CMP ledger of debits and credits, the amount of time associated with the temporal impacts related to wetlands is approximately 20 years, during which time as many as 576 functional units are outstanding (Tetra Tech 2021a). These temporal effects would only occur within the Salmon River Drainage because effects within the Payette River Drainage would be mitigated via mitigation bank credits. An accounting of the temporal effects is presented in Table 8-2a of the CMP (Tetra Tech 2021a) and a summary is shown below in **Figure 7-1**. To compensate for temporal effects in the Salmon River Drainage, the mitigation is designed to produce a surplus of approximately 1,038 functional units. While this design provides a measure of compensation for the temporal loss, there still would be a temporal loss of wetland functions in the Salmon River drainage for approximately 20 years. Coordination with the USACE for approval of existing and predicted wetland functional assessment scores is ongoing and may also result in changes relative to the totals listed in this section. Wetland baseline functions may be revised in a way that results in a change to baseline functional scores. Final impact acreages would be determined as part of the CWA Section 404 permit application and would be agreed upon by the USACE.

Note that the functional units discussed here and shown in **Figure 7-1** are lower than those discussed in **Sections 7.2.3.2** and **7.2.4.2**. As discussed in **Section 7.2.1.1**, much of the transmission line disturbance would be temporary and would not require mitigation. As a result, functional units discussed in this section includes only those that are permanent and require mitigation. As noted in the previous paragraph the CMP ledger creates a system to ensure adequate mitigation regardless of final impacts. Coordination with the USACE for approval of existing and predicted wetland functional assessment scores is ongoing and may also result in changes relative to the totals listed in this section. Wetland baseline functions may be revised in a way that results in a change to baseline functional scores. Final impact acreages will be determined as part of the CWA Section 404 permit application and would be agreed upon by the USACE.

For wetland and riparian mitigation to be effective in the long term, it must be self-sustainable and resilient. Demonstration of mitigation effectiveness would be achieved through performance monitoring and adaptive management, as is required for any mitigation proposal under the final mitigation rule. While the liners and dams may not be sustainable in the long-term (e.g., not seismically resilient and potentially susceptible to freeze-thaw damage and root penetration over time), it would be required to rectify any failures such that compensatory mitigation goals (e.g., acreage replacement and functional improvements) are achieved and maintained. Financial assurances also would be required to ensure that financing is available to achieve mitigation goals.

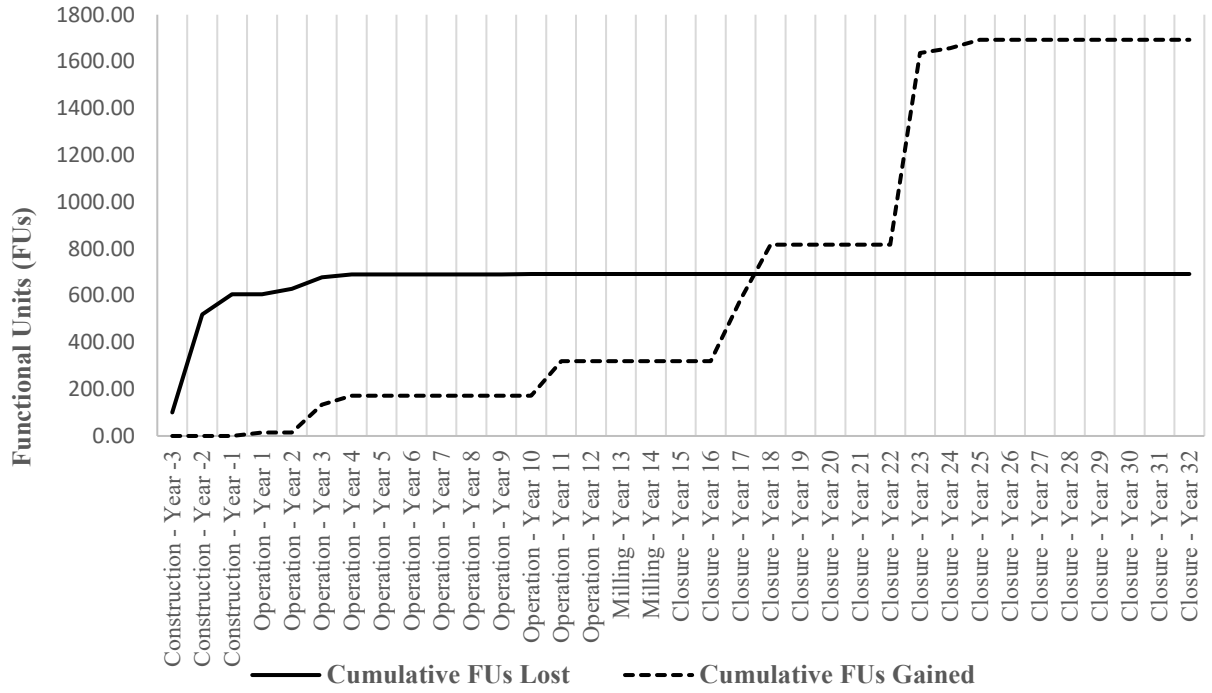



**Figure 7-1 Temporal Effects Summary – Salmon River Drainage**

The current CMP describes a plan to locate the compensatory wetland mitigation sites within the same subbasins as the associated wetland impact sites. However, although the proposed compensatory wetland mitigation sites would be within the subbasins where impacts occur, they would all be located around the mine site where the majority of wetland impacts would occur, with no mitigation sites proposed outside the mine site area (i.e., along the access roads, the transmission line, etc.). The current location and configuration of mitigation sites identified in the CMP were selected based on suitable hydrology and compatibility with watershed-scale features and on the likelihood that compensatory mitigation wetlands would be sustainable within five years (Tetra Tech 2021a). The anticipated need for wetland credits was based on the wetland debits that would occur under 2021 MMP. Once the Forest Service identifies a preferred alternative, final wetland impacts would be assessed, any agreed upon off-site compensatory mitigation projects would be finalized, and a final mitigation plan would be prepared, including a final assessment of functional units lost and created, and then the final credits/debits would be documented in an application for CWA Section 404 permit.

**Table 7-11** describes the general location and size of various wetland types proposed for on-site mitigation. Greater detail of the location of these wetland mitigation areas is presented in Table 9-4 of the CMP (Tetra Tech 2021a).

**Table 7-11 Extent of Various Wetland Types Proposed for Mitigation (in Acres)**

| Type | General Location | PAB (acres) | PEM (acres) | PFO (acres) | PSS (acres) | Totals |
|---|---|---|---|---|---|---|
| Valley Margin Wetlands | At the margins of the TSF and TSF Buttress | | 1.6 | 1.4 | 1.2 | **4.2** |
| Riparian Fringe and Floodplain Wetlands | At the margins of the TSF and TSF Buttress, Adjacent to Meadow Creek, East Fork SFSR, Fiddle Creek, and Yellow Pine Pit | 5.0 | 24.4 | 99.6 | 22.8 | **151.8** |
| Other Wetlands | At the toe of the TSF/ TSF Buttress, Hanger Flats Pit Backfill, East Fork SFSR. | | 43.7 | 22.4 | 6.4 | **72.5** |
| Blowout Creek Wetland Restoration | Blowout Creek | 4.3 | 1.0 | | 3.3 | **8.6** |
| **Totals**[1] | | **9.3** | **70.7** | **123.3** | **33.7** | **237.0** |

Source: Tetra Tech 2021a

[1] Due to rounding, numbers presented in this table may not add up precisely to the totals provided

PAB = Palustrine aquatic bed

PEM = Palustrine emergent

PFO = Palustrine forested

PSS = Palustrine scrub-shrub

# 7.4 Cumulative Effects

Effects of other past, present, and reasonably foreseeable future actions (RFFA) may cumulatively impact a resource if these actions overlap spatially with the potential direct and indirect effects of a proposed project. As such, the cumulative effects analysis area for wetlands and riparian resources is the same extent as the analysis area for direct and indirect impacts to these resources, which is the watersheds containing the SGP, access roads, transmission lines, and off-site facilities (**Figure 5-1**).

## 7.4.1 Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis

Past and present actions in the cumulative effects analysis area that have affected or are currently affecting wetlands and riparian areas are described below. RFFAs are described in **Section 7.4.2**. Past actions include activities that may have been initiated in the past but also could involve present operations such as mineral exploration, infrastructure development, and non-mining related actions. They may have lingering effects in degrading the environment or may influence trends in the physical, biological, or social environment.

Present actions include mining projects and their related activities (i.e., exploration, reclamation) that may have just commenced or are currently underway and are causing impacts. They also may include other non-mining related projects currently in progress, such as timber sales or vegetation treatment; recreation; other utility lines (e.g., powerlines) and roads; maintenance and use of the existing transportation network; urban development in Valley County; private land development and uses; and sand and gravel extraction.

Past and present actions that have an interactive, synergistic, and/or additive effect (per 40 CFR 1508.7) with a specific resource (such as lingering effects or influencing trends) in the SGP area are described below:

Mineral Exploration and Mining Activities – Past and present mineral exploration and mining have occurred in the vicinity of the mine site, including prospecting, exploration, underground mining, and open pit mining. To support past mining, other related activities occurred in the vicinity, including ore milling and processing, tailings disposal, smelting, heap leaching of ore, spent heap leach ore disposal, development rock disposal, hydropower generation, water retention dam construction, saw mill operations, electric power transmission line construction, and occupancy by thousands of people in housing camps and later in the town of Stibnite.

Two major periods of mineral exploration, development, and operations have occurred in the past century, and have left behind substantial environmental impacts. Between the mid-1920s and the 1950s, the area was mined for gold, silver, antimony, and tungsten mineralized materials by both underground and, later, open pit mining methods. The second period of major activity started with exploration activities in 1974 and was followed by open pit mining and seasonal on-off heap leaching and one-time heap leaching from 1982 to 1997, with ore provided by multiple operators from several locations, and processed in adjacent heap leaching facilities (Forest Service 2015).

The mining, milling, and processing activities 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), haul roads, an abandoned water diversion tunnel, and an airstrip.

Other past and/or present mining projects considered in the cumulative effects analysis include:

- **Fourth of July Mine** – Located in Government Creek on NFS land, Fourth of July Mine has been inactive (Forest Service 2012).
- **Camp Bird Mine** – Located in Logan Creek on private land, Camp Bird Mine has been inactive for more than 30 years (Forest Service 2012).
- **Valley County Quarry Development** – Development and operation of an aggregate source to support the road maintenance activities on McCall-Stibnite Road (County Road [CR] 50-412), Johnson Creek Road (CR 10-413), and other backcountry roads as determined by Valley County (Forest Service 2017).
- **Walker Millsite** – Located in Logan Creek on private land, the plan of operations approved in 1990 included a 50 ton per day ball mill and gravity milling process with the following components: a 50-foot by 100-foot by 8-foot-deep tailings impoundment, 1,000 feet of access road, a water transmission line, and explosives magazine. The millsite on NFS land has been reclaimed (Forest Service 2012).
- **Golden Hand No. 1 and No. 2 Lode Mining Claims** – Located in the Big Creek drainage on 1,309 acres of NFS land, approximately 19 miles north of Yellow Pine, the plan of operations included drilling operations, trenching and sampling, and reopening the caved Ella Mine adit. The project also would include the collection of subsurface geological information to prepare for a new mineral examination. The claims encompass approximately 20 acres each and are adjacent to Coin Creek (Forest Service 2012).

- **Cinnabar Mine** – Located 15 miles east of Yellow Pine and approximately 50 acres in extent, most of the mining occurred during the 1950s. Reclamation/cleanup work at the site consists of the following historical activities:
  - **1992 –** USFS completed a Time-Critical Removal Action on Tailings to construct a diversion ditch to carry Cinnabar Creek around the tailings impoundment and construct a spillway so that water would not be contained behind the impoundment structure
  - **1992 –** EPA completed a Time-Critical Removal Action to address various sources on site including demolishing large fuel tanks, removal and disposal of the smelter roaster and reconstructing the old diversion to move Cinnabar Creek away from the south tailings.
  - **1998 –** EPA completed a Time-Critical Removal Action to address erosion of the red waste piles by adding rip-rap reinforcement at locations where Cinnabar Creek was eroding into the piles and regrading to reduce the amount of surface water on the piles entering Cinnabar Creek.
  - **2003** - USFS completed a Time-Critical Removal Action which included removing tan tailings along Cinnabar Creek, placing riprap in the creek to prevent erosion, regrading tailings and capping the remaining tailings in place.

Exploration activities for potential future mining development have been occurring for the last decade and are ongoing at or within the vicinity of the SGP. Affiliates of Midas Gold initiated mineral exploration activities in 2009 as part of the Golden Meadows Exploration Project to better define the mineral deposit potential for the area. Activities associated with the Golden Meadows Exploration Project included the use of the existing road network, and construction of several temporary roads to access drill sites, drill pad construction, drilling on both NFS and private lands, and reclamation (Forest Service 2015). The following is a brief summary of the activities:

- **Midas Gold Exploratory Drilling (2009-2012)** –Exploratory drilling consisting of approximately 6 to 122 drill pads mostly occurred on private land. Crews were housed on private property in Yellow Pine. All equipment was staged on private property and drilling activities generally occurred 24 hours per day. Water withdrawal sites included existing sediment retention ponds and streams. Private and Forest Service temporary roads were used and/or authorized to access drill pads located on NFS lands. Road maintenance was needed to open the existing roads. For winter activities, chained rubber-tired vehicle, helicopter, snowcat, or snowmobile provided access. Where drill pads were located next to roads, some snow plowing occurred at select locations. During snow-free periods, access occurred by helicopter, and where there was authorized access on NFS land or on private land, rubber-tired vehicles also were used for access. Midas Gold also drilled 16 new groundwater alluvial and bedrock monitoring wells on 8 pads in 2012 (Forest Service 2015).
- **Monitoring Wells for the Golden Meadows Project (2013)** – Midas Gold drilled four new groundwater alluvial and bedrock monitoring wells on two pads in 2013. Exploration drilling was conducted in 26 drill areas within NFS land. Twenty-four of the drill areas were accessed by helicopter (i.e., for transport of equipment and crew) and contained temporary helicopter-supported drill pads. No temporary roads were needed for these 24 drill areas (Forest Service 2015).

- **Midas Gold Baseline Studies (2013-2017)** – Baseline data collection studies including water quality, fishery surveys, wildlife surveys, and vegetation mapping were conducted (Forest Service 2015).

- **Winter Geotechnical Study (2017)** – Exploration drilling was conducted in 26 drill areas within NFS land. Twenty-four of the drill areas were accessed by helicopter (i.e., for transport of equipment and crew) and contain temporary helicopter-supported drill pads. No temporary roads were needed for these 24 drill areas (Forest Service 2015).

- **Geotechnical Studies along Meadow Creek (2017)** – Geotechnical study field work program was conducted in support of feasibility level engineering work on the proposed tailings impoundment and impoundment dam foundation conditions. Midas Gold utilized a track mounted Cone-Penetrometer Test rig to access eight locations along Meadow Creek in September/October 2017 (Forest Service 2015).

- **Operations Exploratory Drilling (2016-2019)** – In addition to exploratory drilling for the winter geotechnical study in 2017, expansion of an existing borrow source on NFS land just east of the camp and shop area also occurred. The borrow material supplied approximately 7,000 cubic yards of crushed rock to support the exploration program, including road maintenance and site reclamation activities and also was used by previous operators and the Forest Service. Approximately 141,000 gallons of fuel (diesel, gasoline, and jet fuel) per calendar year was transported on existing Valley County roads to the fuel storage facility (located on private land) (Forest Service 2015).

- **Exploration and Geotechnical Drilling (2018)** – Midas Gold drilled 62 exploration and geotechnical drilling pads within the project area. Fifty-six of the pads are track-supported and the remaining six are helicopter-supported. None of the pads are steep slope drill pads. The 62 proposed pads are located in the vicinities of the following water bodies: Upper East Fork South Fork Salmon River, Meadow Creek, Middle East Fork South Fork Salmon River, Lower East Fork South Fork Salmon River, Upper Meadow Creek, and West End Creek (HDR 2017d).

- **On-going Monitoring for Golden Meadows Project** – Monitoring for weeds, water quality, minerals and geology, access and haul route water quality monitoring, monitoring of water quality best management practices and project standard operating procedures associated with haul and access road use, wildlife and rare plants continue to be conducted (Forest Service 2015).

- **Burntlog Route Geophysical Investigation Field Work (2020-2021)** – Midas Gold collected geophysical data at proposed rock quarries, bridge abutments, cut slopes, and soil nail/mechanically stabilized earth wall locations using four methods including a Dynamic Cone Penetrometer Test, a track mounted excavator, a truck/track mounted hollow stem auger/core rig, and a helicopter assisted casing advancer/core drill rig. Midas Gold is investigating 24 locations by drilling or excavating 40 borings/test pits along the proposed Burntlog Route. The geophysical investigation field work will last approximately 40 days. Nearly half of the locations are situated along the existing Burnt Log Road and the remaining sites are located along the proposed new alignment of the Burntlog Route between Trapper Creek and Stibnite (Midas Gold 2019).

Future Exploration Projects - One potential future project in the cumulative effects analysis area includes the Stallion Gold Horse Heaven exploration project located east of and directly adjacent to the Stibnite Gold Project claim block. This project consists of 695 unpatented mining claims that stretch from the Stibnite Gold claim block on the east to Johnson Creek on the west. This project is in the early stages. A

Plan of Operations was submitted on January 18, 2022. The only current work is geophysical which used hand-tools and instrumentation only.

Transportation Projects – Road maintenance, improvement projects, airstrip operations and maintenance, and culvert and bridge replacements have occurred in the past and are expected to continue in the future. Installation or improvement of culverts and bridges may impact aquatic habitat due to construction-related effects and erosion. Maintenance of existing roadways, culverts, and bridges will likely be short-term, while new roadways, culverts, and bridges would have a larger effect. More information regarding current and future road maintenance and airstrip operations are provided below:

- **Road Maintenance of NFS Roads** – Thunder Mountain Road (National Forest System Road 50375) and Meadow Creek Lookout Road (National Forest System Road 51290) are both NFS maintenance level 2 roads that received maintenance in 2014 and are on a regular maintenance schedule. Road maintenance activities include blading, slough removal, and culvert cleaning. It is assumed that private landowners on private lands keep roads open and maintained to meet their needs.

- **Road Maintenance of County Roads** –Warren Profile Gap Road (CR 50-340) and the road to the Big Creek Trailhead are currently maintained by Valley County under a cooperative agreement; both roads are on an annual or biannual maintenance schedule. Road maintenance activities include blading, slough removal, and culvert cleaning. Smith Creek and Pueblo Summit Roads have not received any maintenance for years (Forest Service 2016).

    - McCall-Stibnite Road (CR 50-412) is currently maintained by Valley County under a cooperative agreement, on a regular maintenance schedule. There is an agreement between Valley County and Midas Gold to allow Perpetua to provide maintenance along the road from Yellow Pine to Perpetua 's property, “the road will be continuously maintained during the open period. Maintenance will, in all respect, be subject to review and approval by the Valley County Road Superintendent. The Owner/Contractor will abide by the Schedule 8: Payette National Forest; Road Maintenance Best Management Practices. During winter operations the Owner/Contractor will maintain a vehicle and trailer parking and turn around area at Profile Creek and Stibnite. The Owner/Contractor will place a temporary Valley County owned and signed gate above the Profile Creek Road during the Spring Breakup to prohibit any full-size vehicles from entering the Yellow Pine-Stibnite Road, unless otherwise authorized. All-terrain vehicles (ATV), utility-terrain vehicles, and snow mobile access on the Yellow Pine-Stibnite Road will still be permitted for the public at large during this temporary travel restriction.”

- The Idaho Transportation Department (ITD), Division of Aeronautics maintains and operates the Johnson Creek, Warm Springs, and Bruce Meadows airstrips which are located on NFS land.

Mine Closure and Reclamation – Closure and reclamation of Hecla and SMI mining and processing facilities located in the headwaters of East Fork SFSR and Sugar Creek occurred between 1993 and 2000. Several Comprehensive Environmental Response, Compensation, and Liability Act Removal Actions also were conducted in the same area by the Forest Service, Environmental Protection Agency, and Exxon-Mobil Corporation to minimize risks to human health and the environment from legacy mining and processing activities during the 1930s, 40s, and 50s.

Recreation and Tourism – Past and present recreation and tourism activities include sport hunting, fishing, trapping, boating and river recreation, camping, hiking, backpacking, outfitter/guide operations, tourist

services – Big Creek Lodge, Elk Springs Outfitters, and Juniper Mountain Outfitters. These activities take place primarily from late spring to late fall, and there may be small plane, helicopter, and vehicle traffic associated with access.

Infrastructure Development – Past and present community infrastructure projects include the transmission line upgrades in the West Central Mountain Electric Plan 2014, which follows the general location of the SGP upgraded transmission line route (Idaho Power Company [IPCo] 2014). In 2020, IPCo rerouted approximately 2.5 miles of the existing Warm Lake Feeder overhead 7.2kV distribution line with approximately 2.75 miles of single-phase underground line in the Yellow Pine area (Forest Service 2020c).

Water Diversions and Hydro Power Projects – There are eight water diversions on federal and private lands in vicinity of the SGP area. There also are three residential, small-scale hydroelectric operations (0.4 to 0.9 cubic feet per second permitted), and one hydroelectric operation at Big Creek Lodge.

Wildland Fire, Noxious Weed Control, and Firewood Harvest – There have been numerous wildland fires in vicinity of the SGP area and it is likely more will occur in the future. Past fires within the headwaters of the East Fork SFSR and Sugar Creek include: Indian Creek Point (12,204 acres; 2000); Tamarack (2,348 acres; 2006); Bishop Creek (2,610 acres; 2006); Cascade Complex (299,930 acres; 2007); Thunder City (13,263 acres; 2013), and Buck Fire (19,474 acres; 2020). In fall of 2021, the Krassel Ranger District conducted prescribed burns to areas east of Yellow Pine (Bald Hill project area) and along the SFSR (Four Mile project areas). Removal of firewood for non-commercial use has occurred in the past and is expected to continue in the future on NFS land, in compliance with general permit requirements for the Boise National Forest and Payette National Forest. Several noxious weed species have been identified in the vicinity of the SGP including spotted knapweed, Canada thistle, yellow toadflax, and rush skeletonweed. Treatment of noxious weeds occurs regularly throughout the area. Treatments include chemical spraying and pulling. Main areas of treatment for noxious weeds include Chamberlain area, Beaver Creek, and Big Creek trails, and along road access areas. The Lost Horse vegetation management project was completed within the Clear Creek drainage along FRs 405, 406, 407, 409, and 433; the objective of this project was to restore species composition and stand structure while reducing undesirable tree densities and favoring retention of larger diameter, more fire-resistant trees (Forest Service 2020b).

Authorized in May 2021, the Big Creek Hazardous Fuel Reduction was a community protection project for Edwardsburg/Big Creek area using commercial and noncommercial treatments and prescription fire to reduce hazardous fuels. Treatments were on Forest Service lands along public roads and adjacent to private property, outside of wilderness. The project implementation reduced wildfire risk and fire severity/intensity on NFS lands around Big Creek and Edwardsburg and private property using commercial timber harvest, understory treatment, and prescribed burning. Approximately 10,290 acres were treated including, approximately 631 acres of mastication and/or hand thin, no removal; 847 acres of commercial and pre-commercial thinning; 1,047 acres of hand-thinning, no removal; 7,765 acres of natural fuel prescribed fire burn blocks; and less than 1 mile of temporary road constructed to facilitate equipment access and product removal reclaimed after vegetation management treatments were completed.

Forest Management - These activities include easements and other management actions. There are several easements in the SGP area and vicinity that are granted and maintained by the Forest Service including: Road Right-of-Way, Forest Road and Trail Act (FRTA) on McCall-Stibnite Road (CR 50-412), Road Right-of-Way and Linear Utility easement to the IPCo. The Yellow Pine Blowdown Project near Yellow Pine was conducted to remove down material from camping and recreating areas, reduce the risk of insect outbreak, and to reduce the fuel loading to help to ensure the safety of the Yellow Pine community. In

2020, the BNF decommissioned approximately 18 miles of non-system routes in the Six-bit Creek and Curtis Creek subwatersheds, part of the SFSR subbasin (Forest Service 2020b).

The South Fork Restoration and Access Management Plan (RAMP) is in the implementation phase with the decision dated July 13, 2021. The project's objective is to determine the minimum road system, improve watershed condition, provide ATV and motorcycle trail opportunities, and provide dispersed camping and parking opportunities. The project includes numerous actions relating to watershed restoration, motorized and non-motorized access, and improvements of recreation facilities within the SFSR watershed within a 329,000-acre project area (http://www.fs.usda.gov/project/?project=51257). Target dates for implementation are 2022-2027 (Forest Service 2021).

Commercial and Subsistence Harvest of Fish and Wildlife – Past and present harvest of fish and wildlife for recreational and subsistence purposes puts some degree of pressure on those resources. Legal hunting, fishing, and trapping has occurred and is currently occurring in the SGP area and vicinity. Fish and wildlife resources are managed by the Idaho Department of Fish and Game and federal agencies to maintain sustainable populations. Managers use management tools such as harvest limits and areas open and closed to sport and commercial harvest of fish and wildlife to maintain sustainable resources and allocate harvest.

### 7.4.2 Reasonably Foreseeable Future Actions

**Table 7-12 Reasonably Foreseeable Future Actions in the Vicinity of the SGP Area**

| Project or Activity Name | Forest Service Document/ District | Brief Description | Approximate Implementation/ Construction/ Operation Dates |
|---|---|---|---|
| East Fork Salmon River RAMP | (PNF) | Scoping for the East Fork Salmon River (EFSR) RAMP estimated to start late 2021. The spatial extent of the EFSR RAMP could include Yellow Pine, Big Creek, and Thunder Mountain within the PNF. The purpose of the EFSR RAMP is travel management. The Forest Service would conduct travel planning to identify a Minimum Road System (MRS) (36 CFR 212 Subpart A) and the routes open for public use (36 CFR 212 Subpart B), including motorized trail opportunities, dispersed camping, and parking opportunities and update the Forest Motor Vehicle Use Map. http://www.fs.usda.gov/project/?project=60889 | Expected Decision: 10/2022<br>Expected Implementation: 11/2022 |
| Burntlog Route Geophysical Investigation | CE<br>(BNF SOPA) | - Minerals and geology<br>The purpose of the investigation is to collect crucial geophysical data along the existing Burnt Log Road and proposed new alignment between Trapper Creek and Stibnite. | In Progress:<br>Scoping Start: 02/10/2020<br>Expected Decision: 03/2022<br>Expected Implementation: 09/2022 |
| SH 55 Banks Beach Parking Study | ITD and FHWA-WFLHD | Safety and operational improvement at the Banks Beach picnic area, located at milepost 77.9 on the west side of SH 55 (approximately 1 mile south of the intersection of SH 55 and Banks-Lowman Road). | Alternatives Analysis, Public Notification, and Design: 2020 |

| Project or Activity Name | Forest Service Document/ District | Brief Description | Approximate Implementation/ Construction/ Operation Dates |
|---|---|---|---|
| SH 55 Smiths Ferry Improvements | ITD | Safety improvement on SH 55 from Smiths Ferry to Round Valley. The project is expected to take 2 to 2.5 years to construct (four or five spring and fall blasting periods). | Construction to begin: Fall 2020 |
| Wildlife Conservation Strategy | EIS (Forest Plan Amendment) 101 (PNF SOPA) | - Land management planning<br>- Wildlife, Fish, Rare plants<br>Short- and long-term management strategies and priorities for maintaining and restoring habitats associated with terrestrial wildlife species.<br>http://www.fs.usda.gov/project/?project=28633 | On hold |
| Nez Perce Tribe Research Equipment | CE (PNF SOPA) | Replacement of an existing propane tank servicing a fish detection system (PIT array) with a 1,000-gallon tank in an existing hardened area to ensure fuel supply through winter months. | Scoping initiation: 11/2021<br>Expected Decision: 04/2022<br>Expected Implementation: 07/2022 |
| Stallion Gold – Horse Heaven Project | | Surface exploration of gold and antimony deposits. The project consists of 695 unpatented federal mining claims and mineral rights on 13,950 acres. This project would share its eastern boundary with the SGP. | |

Source: FHWA 2020;Forest Service 2018, 2020a, 2020b, 2020c, 2021h, and 2021i; ITD 2020
CE = Categorical Exemption; EA = Environmental Assessment; EIS = Environmental Impact Statement; FHWA-WFLHD = Federal Highway Administration, Western Federal Lands Highway Division; NOA = Notice of Availability; SOPA = Schedule of Proposed Actions

### 7.4.3 No Action Alternative

No new impacts to wetlands would occur under the No Action Alternative from the SGP. The SGP would not contribute to cumulative effects on wetlands or riparian areas in the cumulative effects analysis area. Although no new impacts would occur, existing elevated arsenic, antimony, and mercury concentrations would continue to contribute to contaminant loading to surface water, affecting adjacent and downstream wetlands.

Under the No Action Alternative, Perpetua would continue to comply with reclamation and monitoring commitments included in the applicable Golden Meadows Exploration Project Plan of Operations and Environmental Assessment, 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, 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. Therefore, the No Action Alternative would not present a contribution to cumulative impacts on wetland and riparian resources.

### 7.4.4 2021 MMP

The 2021 MMP would result in temporary and permanent losses of approximately 119.8 acres of wetlands in the mine site focus area (**Table 7-3**), 76.3 acres outside the mine site (**Table 7-4**), and 1,054.4 wetland functional units (375.9 of which would be high-value functional units) (**Table 7-6**). 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 cumulative effects analysis area.

The 2021 MMP would contribute new sources of mine waste material to the East Fork SFSR drainage through construction and use of mine site facilities. During mine operations, cumulative temperature effects in Meadow Creek and adjacent wetlands would be minimized due to routing the creek around the Hangar Flats pit. This feature also would reduce some impacts of dewatering on downstream wetlands and riparian areas. Overall, this alternative when added to the other RFFAs would increase the negative cumulative effects to wetlands and riparian areas due to new sources of mine waste material to the East Fork SFSR drainage.

### 7.4.5 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 (**Table 7-3**), 71.2 acres outside the mine site (**Table 7-9**), and 1,028.3 wetland functional units (370.6 of which would be high-value functional units) (**Table 7-11**). 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 cumulative effects analysis area.

The Johnson Creek Route Alternative would require all mine-related traffic during construction, operations, and reclamation to use the Johnson Creek Route, which would increase traffic on the Johnson Creek Route during the mine operational and reclamation period, leading to greater rutting and degradation, greater road maintenance needs, and potentially higher erosion rates from the road surface. 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 compared to the 2021 MMP. This consideration is especially important given that Johnson Creek Road (CR 10-413), the longest segment of the Johnson Creek Route, primarily follows the course of Johnson Creek. Thus, any additional sediment or dust generated from increased traffic on the Johnson Creek Route would have a direct pathway to be deposited into Johnson Creek, thereby potentially impacting nearby wetlands and riparian areas.

## 7.5 Short-term Uses and Long-term Productivity

### 7.5.1 No Action Alternative

The No Action Alternative would not affect the short-term use or long-term productivity of wetlands or riparian areas in the analysis area.

### 7.5.2 2021 MMP

Short-term uses of wetland and riparian resources for construction and operation of the SGP would impact the long-term productivity of these resources. Construction and operation of the mine site would permanently fill more than 119 acres of wetlands under 2021 MMP, resulting in a permanent loss of wetland functions and loss of long-term productivity of this resource. Compensatory mitigation would be implemented to ensure no net loss of wetland functions; however, some long-term wetland productivity loss would still occur. The time required for revegetated wetlands to return to their pre-impact functionality, or for compensatory wetlands to achieve functionality, would depend on the current condition and physical characteristics of each wetland. In general, organic soils would take much longer to return relative to mineral soils (particularly alluvial soils); forested wetland vegetation would take

much longer to return relative to herbaceous vegetation; and vegetation in higher elevations would take longer to return relative to lower elevations where growing seasons are longer.

Long-term impacts on wetland productivity also 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.

Construction and operation of the mine could affect long-term wetland and riparian productivity by 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 Forest Service and the USACE are expected to reduce the amount of sedimentation-caused wetland impacts. The USACE is working with Perpetua to address wetland impacts through compensatory mitigation, as described in **Section 7.3**, Mitigation Measures.

### 7.5.3 Johnson Creek Route Alternative

Under the Johnson Creek Route Alternative, the types of effects of short-term use on long-term productivity would be the same as that described for the 2021 MMP, although the extent of direct and indirect impacts would vary as presented in **Section 7.2.4**.

## 7.6 Irreversible and Irretrievable Commitments of Resources

### 7.6.1 No Action Alternative

Under the No Action alternative there would be no irreversible or irretrievable commitment of wetlands or riparian areas associated with the SGP.

### 7.6.2 2021 MMP

#### 7.6.2.1 Irreversible Commitments

The loss of the wetland acres and their functions as a result of the SGP (**Section 7.2.3**) would be irreversible in their original locations. However, compensatory wetland mitigation would allow for the extent and functions of lost wetlands to be reestablished in other locations.

#### 7.6.2.2 Irretrievable Commitments

The loss of riparian acreages, wetland acreages, and wetland functions as a result of the SGP (**Section 7.2.3**) would be irretrievable. However, compensatory wetland mitigation would allow for the acres and functions of wetlands to be reestablished in other locations.

### 7.6.3 Johnson Creek Route Alternative

The irreversible and irretrievable commitment of wetlands and riparian areas under the Johnson Creek Route Alternative would be less than under the 2021 MMP due to the Burntlog Route not being built under this alternative.

# 7.7 Summary

This section summarizes the impacts of the action alternatives and is organized by the issues identified for wetland and riparian areas in **Section 4.0**, Effects Analysis Issues and Indicators.

## 7.7.1 Issue: Loss of Wetland and Riparian Areas

### 7.7.1.1 Mine Site Focus Area

The 2021 MMP and the Johnson Creek Route Alternative would result in the same extent of loss of wetland acres within the mine site focus area (both would impact approximately 28 percent of the 429 acres of wetlands within the SGP analysis area).

### 7.7.1.2 Off-Site Focus Area

**Table 7-13** shows acres of wetlands and riparian areas that would be temporarily and permanently lost within the off-site focus area under each action alternative by SGP component. Stream lengths are also shown for reference. Losses of wetland and riparian acreages outside the mine site focus area would be lowest under the Johnson Creek Route Alternative predominantly due to the absence of the Burntlog Route under this alternative. **Table 7-14** shows acres of wetlands and riparian areas that would be temporarily and permanently lost within the off-site focus area under each of the action alternatives by watershed (stream lengths are again shown for reference). The same extent of impacts to wetlands would occur under both action alternatives in the Cascade Reservoir, Gold Fork River, and Lake Fork-North Fork Payette River. In the Headwaters East Fork SFSR, the Johnson Creek Route Alternative would have the greater wetland impacts, and in all other watersheds, the 2021 MMP would result in the largest extent of wetland impacts due to construction of the Burntlog Route.

**Table 7-13 Losses (in Acres) of Wetland Area by Major SGP Component within the Off-site Focus Area**

| SGP Component | Total Wetlands (acres) | | Perennial Streams (feet) | | Non-Perennial Streams (feet) | | RCAs (acres)[1] | |
|---|---|---|---|---|---|---|---|---|
| | 2021 MMP | Johnson Creek Route Alternative | 2021 MMP | Johnson Creek Route Alternative | 2021 MMP | Johnson Creek Route Alternative | 2021 MMP | Johnson Creek Route Alternative |
| Access Roads | 0.6 | 0.0 | 188.4 | 32.0 | <0.1 | <0.1 | 11.4 | <0.1 |
| Access Road Cut/Fill | 6.2 | 2.4 | 2,004.5 | 567.1 | 2,732.0 | 579.7 | 36.8 | 104.8 |
| Access Road Work Areas | 0.8 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 4.8 | <0.1 |
| Off-Site Facilities | 0.8 | 0.8 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 2.2 |
| OSV Routes | 0.2 | 0.3 | 47.7 | 34.0 | 121.7 | 163.5 | 4.3 | 4.1 |
| Transmission Line Access Roads | 3.2 | 3.2 | 3663.6 | 3663.6 | 1,913.1 | 1.913.1 | 57.8 | 57.1 |
| Transmission Line ROW | 43.3 | 43.3 | 16,115.1 | 16,098.9 | 7,185.4 | 7,185.4 | 147.2 | 146.1 |
| Transmission Line Work Areas | 12.3 | 12.3 | 1,445.3 | 1,445.3 | 1,947.5 | 1,946.8 | 36.9 | 36.7 |
| Wetland Conversion Losses from Tall Tree Clearing[2] | 8.9 | 8.9 | | | | | | |
| Totals[3,4] | 76.3 | 71.2 | 23,464.2 | 21,841.0 | 14,665.8 | 11,788.5 | 299.5 | 352.6 |

Source: AECOM 2020; Table prepared using wetland delineation data (HDR 2013, 2014a, b, 2015, 2016a, 2017a, b, Tetra Tech 2021b) and RCA spatial data intersected with SGP components.

[1] RCA acres come from Forest Service RCA data intersected with SGP components (AECOM 2020). Because the RCA data comes from different data than the stream data and is only applicable to NFS land, RCA acres do not match directly with the stream acres listed.

[2] Tall tree clearing was only considered a possible impact to areas where tree species may grow (PFO and PSS wetlands). Information on tree presence in RCAs was not available at the time of analysis and therefore tree clearing in RCAs could not be quantified.

[3] Disturbance includes both temporary and permanent effects associated with transmission line construction.

[4] Due to rounding, numbers presented in this table may not add up precisely to the totals provided.

**Table 7-14 Losses (in Acres) of Wetland Area by Watershed within the Off-site Focus Area**

| Drainage Basin (HUC 10) | Total Wetlands (acres) | | Perennial Streams (feet) | | Non-Perennial Streams (feet) | | RCAs (acres)[1] | |
|---|---|---|---|---|---|---|---|---|
| | 2021 MMP | Johnson Creek Route Alternative | 2021 MMP | Johnson Creek Route Alternative | 2021 MMP | Johnson Creek Route Alternative | 2021 MMP | Johnson Creek Route Alternative |
| Big Creek-North Fork Payette River | 16.1 | 14.3 | 4,028.6 | 4,028.6 | 2,927.3 | 2,927.3 | 33.2 | 33.2 |
| Cascade Reservoir | 16.0 | 16.0 | 218.1 | 218.1 | 477.5 | 477.6 | | |
| Gold Fork River | 1.9 | 1.7 | | | | 0 | | |
| Johnson Creek | 26.9 | 17.2 | 11,736.3 | 9,902.7 | 7,240.3 | 4,264.5 | 182.3 | 198.3 |
| Lake Fork-North Fork Payette River | 3.1 | 2.7 | 283.10 | 283.1 | 365.3 | 365.3 | | |
| Headwaters East Fork SFSR | 3.5 | 3.9 | 1,500.7 | 1,711.0 | 626.8 | 731.9 | 4.2 | 41.3 |
| Upper South Fork Salmon River | 8.7 | 6.5 | 5,715.0 | 5,715.0 | 3,028.5 | 3,028.5 | 79.8 | 79.8 |
| Totals[2,3] | 76.3 | 71.2 | 23,481.7 | 21,858.5 | 14,665.8 | 11,795.1 | 299.5 | 352.6 |

Source: AECOM 2020; Table prepared using wetland delineation data (HDR 2013, 2014a, 2014b, 2015, 2016a, 2017a, 2017b, Tetra Tech 2021b) and RCA spatial data intersected with SGP components.

[1] RCA acres come from Forest Service RCA data intersected with SGP components (AECOM 2020). Because the RCA data comes from different data than the stream data and is only applicable to NFS land, RCA acres do not match directly with the stream acres listed.

[2] Disturbance includes both temporary and permanent effects associated with transmission line construction.

[3] Due to rounding, numbers presented in this table may not add up precisely to the totals provided.

### 7.7.2 Issue: Impacts on Wetland and Riparian Functions

The analysis of losses of wetland functional units by action alternative is summarized in **Table 7-15**. Overall, because most losses of wetland functional units would be within the mine site focus area where impacts are the same between alternatives, losses are fairly consistent across all action alternatives. Causes for variations in wetland functional unit losses between action alternatives would be the same as described for losses of wetland acreages (predominantly, rerouting of a portion of the Burntlog Route under 2021 MMP and lack of the Burntlog Route under Johnson Creek Route Alternative).

**Table 7-15 Losses of Wetland Functional Units under both Action Alternatives**

| Wetland Category[1] | 2021 MMP | Johnson Creek Route Alternative |
|---|---|---|
| II (High-value) | 375.9 | 370.6 |
| III and IV | 678.5 | 657.7 |
| **Totals[2]** | **1,054.4** | **1,028.3** |

Source: Tetra Tech (2021c). Refer to **Appendix A** (**Table A-2** and **A-3**) for AA-specific information.
[1] Wetland categories range from I (highest functional value) to IV (lowest functional value). No Category I wetlands were documented in the analysis area. Category II wetlands are considered high-value for the purposes of this analysis.
[2] Disturbance and function units impacted in these AAs includes both temporary and permanent effects associated with transmission line construction.
[3] Due to rounding, numbers presented in this table may not add up precisely to the totals provided.

### 7.7.3 Issue: Wetland and Riparian Area Fragmentation

The results of the analysis of habitat fragmentation potential by alternative are summarized in **Table 7-16**.

**Table 7-16 Habitat Fragmentation Metrics in the Analysis Area**

| SGP Component | 2021 MMP | Johnson Creek Route Alternative |
|---|---|---|
| Number of Individual Wetlands Bisected by New Roads | 39 | 6 |
| Total Wetland Losses in the Mine Site Focus Area | 119.8 | 119.8 |
| Total Wetland Losses in the Off-Site Focus Area[1] | 76.3 | 71.2 |
| Total Acres of Riparian Area Losses in the Mine Site Focus Area | 618.9 | 618.9 |
| **Total Acres of Riparian Area Losses in the Off-Site Focus Area** | **299.5** | **352.6** |

Source: AECOM 2020; Table prepared using wetland delineation data (HDR 2013, 2014a, 2014b, 2015, 2016a, 2017a, 2017b, Tetra Tech 2021b) and RCA spatial data intersected with SGP components.
[1] Disturbance includes both temporary and permanent effects associated with transmission line construction.

### 7.7.4 Issue: Alteration of Wetland and Riparian Areas due to changes in Water Balance

Impacts due to groundwater drawdown would be the same for both alternatives since construction, operation, and reclamation activities would be the same within the mine site focus area. The action alternatives may vary in indirect effects due to roads, but those indirect effects have not been quantified. However, given the small amount of wetlands affected in the off-site focus area relative to the mine site focus area, the differences between the two action alternatives would be minimal.

### 7.7.5 Issue: Alternation of Wetland and Riparian Areas due to Changes in Water Quality

Both action alternatives would have direct permanent impacts on water quality due to contributions of new sources of mine waste material to the East Fork SFSR drainage. Indirect effects to wetlands and riparian areas could occur if the quantity and or quality of surface and groundwater flows, including the chemical characteristics of the waters, change downstream of disturbance areas, and if those changes disrupt water quality or habitat conditions during active mining and after SGP closure. These would include the effects of placing the TSF, TSF buttress, Hangar Flats pit backfill, and Yellow Pine Pit backfill in stream valleys, which could cause introduction of contaminants or temporary changes to pH and dissolved oxygen levels. Removal and repurposing of legacy mine wastes would occur under both action alternatives, thereby improving some existing water quality conditions observed in Meadow Creek and the East Fork SFSR.

Under the Johnson Creek Route Alternative, water quality effects on wetlands and riparian areas would be similar as described under the 2021 MMP, although the absence of construction or use of the Burntlog Route would eliminate water quality impacts in this area as compared to 2021 MMP. However, the Johnson Creek Route Alternative would require all mine-related traffic during construction, operations, and reclamation to use the Johnson Creek Route, which would increase traffic on the Johnson Creek Route during the mine operational and reclamation period, leading to the potential of greater rutting and degradation, greater road maintenance needs, and potentially higher erosion rates from the road surface into surface waters. As the Johnson Creek Route is parallel and near the East Fork SFSR along much of its route, these effects would be concentrated in this river, whereas the Burntlog Route would cross several drainages resulting in less impact on any one drainage. Higher erosion rates in this area under the Johnson Creek Route Alternative would impact wetlands and riparian areas adjacent to and downstream of the Johnson Creek Route to a greater degree than under the 2021 MMP.

**Table 7-17** provides a summary comparison of wetlands and riparian resources impacts by issue and indicators for each alternative.

**Table 7-17 Comparison of Wetlands and Riparian Resources Impacts by Alternative**

| Issue | Indicator | Baseline Conditions | No Action | 2021 MMP | Johnson Creek Route Alternative |
|---|---|---|---|---|---|
| Loss of wetland and riparian areas. | *Within the mine site focus area* - Acres of wetland and riparian habitat lost due to SGP construction. | There are 429 acres of wetlands delineated in the mine site focus area.<br>There are 2,655 acres of RCAs mapped in the mine site focus area. | None. | 119.8 acres of wetlands would be lost at the mine site (28% of wetlands at the mine site).<br>618.9 acres of riparian areas would be lost at the mine site. | Same as 2021 MMP. |
| | *Within the off-site focus area* - Acres of wetland and riparian habitat lost through SGP construction. | There are 2,138.6 acres of wetland delineated in the off-site focus area.<br>There are 127,389 acres of RCAs mapped in the off-site focus area. | None. | 76.3 acres of wetlands would be lost within the off-site focus area.<br>299.5 acres of riparian areas would be lost within the off-site focus area. | 71.2 acres of wetlands would be lost within the off-site focus area.<br><br>352.6 acres of riparian areas would be lost within the off-site focus area. |
| Impacts on wetland and riparian functions[1]. | Functional units of wetlands, including high-value wetlands (i.e., Category I and II per MWAM), lost due to SGP construction. | Existing Wetland Functions and Values of AAs assessed for the SGP are presented in **Appendix A**. | None. | 1,054.4 functional units would be lost, including 375.9 high-value functional units. | 1,028.3 functional units would be lost, including 370.6 high-value functional units. |
| Wetland and riparian area fragmentation. | Number of wetlands crossed by new roads. | See baseline reports and associated figures. | None. | 39 wetlands would be crossed by new roads. | Six wetlands would be crossed by new roads. |
| | Total area (in acres) of wetlands that would be lost. | See first row in this table for acreages on wetlands and RCAs | None. | 196.1 wetland acres lost. | 191.0 wetland acres lost. |
| Alteration of wetland and riparian areas due to changes in water balance. | Wetland acres within indirect impact area that would be affected by groundwater drawdown (maximum extent of drawdown under all years). | Wetlands within the groundwater analysis area are discussed in the Water Quantity Specialist Report (Forest Service 2022c). | None. | 46.7 acres of wetlands would be affected by drawdown. The entirety of these wetlands also would be subject to direct impacts from component construction. | Same as 2021 MMP. |

| Issue | Indicator | Baseline Conditions | No Action | 2021 MMP | Johnson Creek Route Alternative |
|---|---|---|---|---|---|
| Alteration of wetland and riparian areas due to changes in water quality. | Quantitative analysis of estimated changes in water quality parameters based on predictive water modelling in areas coincident with wetlands within the indirect impact area. | Surface water and groundwater quality are discussed in the Water Quality Specialist Report (Forest Service 2022b). | None. | The SGP would have the potential to impact wetland and riparian area water quality, primarily associated with sedimentation and traffic-related incidents. These impacts are discussed further in the Water Quality Specialist Report (Forest Service 2022b). These effects would be minimized through best management practices, spill prevention, and spill response measures. Effects if sedimentation and fugitive dust would be within normal range of properly maintained Forest Service roads. | Water quality effects on wetlands and riparian areas would be the same as the 2021 MMP, though 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. |

[1] Disturbance includes both temporary and permanent effects associated with transmission line construction.

# 8.0 References

AECOM Technical Services, Inc. (AECOM). 2020. Stibnite Gold Project. AECOM Geodatabase and Geodatabase Associated Calculations, Affected Acreage GIS data. [GIS Data].

Berglund, J., and R. McEldowney. 2008. MDT Montana Wetland Assessment Method. Prepared for Montana Department of Transportation. Helena, MT: Post, Buckley, Schuh & Jernigan.

Brown and Caldwell. 2018. Revised Final Stibnite Gold Project Hydrologic Model Proposed Action Report. Prepared for Midas Gold Idaho, Inc. October 2018.

Brown and Caldwell. 2019. Final Stibnite Gold Project Modified PRO Alternative Modeling Report. Prepared for Midas Gold Idaho, Inc. September 2019.

Brown and Caldwell. 2020. Stibnite Gold Project Water Quality Management Plan, Final. Prepared for Midas Gold Idaho, Inc., Valley County, Idaho. March 27, 2020.

Brown and Caldwell. 2021. Stibnite Gold Project Stibnite Hydrologic Site Model Refined Modified Proposed Action (ModPRO2) Report. Prepared for Perpetua Resources Idaho, Inc. August 2021.

Brown and Caldwell, McMillen Jacobs, and BioAnalysts. 2021a. Fisheries and Aquatic Resources Mitigation Plan. Prepared for Perpetua Resources Idaho, Inc. October 2021.

Brown and Caldwell, McMillen Jacobs, and BioAnalysts. 2021b. Fishway Operations and Management Plan. Prepared for Perpetua Resources Idaho, Inc. October 2021.

Code of Federal Regulations (CFR). 1978a. Title 40: Protection of Environment. Part 1502 – Environmental Impact Statement. Office of the Federal Register and the Government Publishing Office. Available at: https://www.ecfr.gov/cgi-bin/text-idx?SID=90c285a87f899af2d4d36cf2a293a626&mc=true&tpl=/ecfrbrowse/Title40/40cfr1502_main_02.tpl. Accessed July 2020.

Code of Federal Regulations (CFR). 1978b. Title 40: Protection of Environment. Part 1508 – Terminology and Index. Office of the Federal Register and the Government Publishing Office. Available at: https://www.ecfr.gov/cgi-bin/text-idx?SID=2cb7422067e5d0da5e7c4467e6ddcaaa&mc=true&node=pt40.37.1508&rgn=div5#_top. Accessed July 2020.

Code of Federal Regulations (CFR). 1979. Title 40 Protection of Environment. Part 1500 – Purpose, Policy, and Mandate. Office of the Federal Register and the Government Publishing Office. Available at: https://www.ecfr.gov/cgi-bin/text-idx?SID=92f6db8b1abf7bd64c254509dd049cda&mc=true&node=pt40.37.1500&rgn=div5. Accessed July 2020.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. Office of Biological Services, U.S. Department of the Interior, FWS/OBS-79/31.

Environmental Laboratory. 1987. U.S. Army Corps of Engineers Wetlands Delineation Manual (online edition). Washington, D.C.

Environmental Laboratory. 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys and Coast Region (Version 2.0). May 2010. Available online at: https://usace.contentdm.oclc.org/utils/getfile/collection/p266001coll1/id/7646.

Etyemezian, V., S. Ahonen, D. Nikolic a, J. Gillies, H. Kuhns, D. Gillette, and J. Veranth. 2004. Deposition and Removal of Fugitive Dust in the Arid Southwestern United States: Measurements and Model Results. Journal of the Air and Waste Management Association 54:1099-1111.

Everett, K.R. 1980. Distribution and properties of road dust along the northern portion of the haul road. Pages 101-128 in J. Brown and R. Berg, editors. Environmental engineering and ecological baseline investigations along the Yukon River-Prudhoe Bay Haul Road. CRREL Report 80-19. U.S. Army Cold Regions Research and Engineering Laboratory, Hanover, New Hampshire, USA.

Farmer, A.M. 1993. The effects of dust on vegetation- A review. Environmental Pollution 79: 63-75.

Halofsky, J.E., D.L. Peterson, J.J. Ho, N.J. Little, and L.A. Joyce, editors. 2018. Climate change vulnerability and adaptation in the Intermountain Region. Gen. Tech. Rep. RMRS-GTR-375. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. Part 1. pp. 1–197.

HDR, Inc. (HDR). 2013. Wetland Resources Baseline Study, Stibnite Gold Project. Prepared for Midas Gold Idaho, Inc. July.

HDR, Inc. (HDR). 2014a. Wetland Resources Baseline Study Addendum #1, Stibnite Gold Project. Prepared for Midas Gold Idaho, Inc. January.

HDR, Inc. (HDR). 2014b. Wetland Resources Baseline Study Addendum #2, Stibnite Gold Project. Prepared for Midas Gold Idaho, Inc. December.

HDR, Inc. (HDR). 2015. Wetland Resources Baseline Study Addendum #3, Stibnite Gold Project. Prepared for Midas Gold Idaho, Inc. August.

HDR, Inc. (HDR). 2016a. Wetland Functional Assessment Report, Stibnite Gold Project. Prepared for Midas Gold Idaho, Inc.

HDR, Inc. (HDR). 2016b. Wetland Resources Baseline Study Addendum #4, Stibnite Gold Project. Prepared for Midas Gold Idaho, Inc. August.

HDR, Inc. (HDR). 2016c. Wetland Resources Baseline Study for Logistics Center Site, Stibnite Gold Project. December.

HDR, Inc. (HDR). 2017a. Technical Memorandum: Summary of Project Wetland Baseline Studies 2011-2016.

HDR, Inc. (HDR). 2017b. Midas Gold, Inc. Golden Meadows Project, Wetland Resources Baseline Study for Logistics Center Site.

HDR, Inc. (HDR). 2017c. Surface Water Quality Baseline Study, Stibnite Gold Project. Prepared for Midas Gold Idaho, Inc. December 2016, revised May 2017.

HDR, Inc. (HDR). 2017d. Plan of Operations, Geophysical Investigation. Prepared for Midas Gold Idaho, Inc. Stibnite Gold Project. Stibnite, Idaho. Revised June 2017.HydroGeo, Inc. (HydroGeo). 2012. Hydrology Field Survey for Golden Meadows Project. Midas Gold Idaho, Inc. November 2012.

Idaho Department of Fish and Game (IDFG). 2004a. Wetland Conservation Strategy for the High Valleys of the Salmon River, Idaho. Prepared by Bottum, E. for Idaho Department of Fish and Game, Natural Policy Bureau, Boise, Idaho.

Idaho Department of Fish and Game (IDFG). 2004b. Between Land and Water: The Wetlands of Idaho. Nongame Wildlife Leaflet #9. Second Edition. Available online at: https://idfg.idaho.gov/old-web/docs/wildlife/nongame/leafletWetlands.PDF.

Idaho Department of Fish and Game (IDFG). 2005. Idaho Wetland Conservation Prioritization Plan. Idaho Conservation Data Center. December 2005. https://fishandgame.idaho.gov/ifwis/idnhp/cdc_pdf/u05hah01idus.pdf.

Idaho Department of Fish and Game (IDFG). 2012. Idaho Wetland Conservation Prioritization Plan 2012. Wetland Data Viewer available online at: https://idfggis.maps.arcgis.com/apps/webappviewer/index.html?id=66005d5847504af08ac5a73b540ac86b.

Idaho Department of Lands. 1992. Best Management Practices for Mining in Idaho.

Idaho Power Company (IPCo). 2014. West Central Mountains Electrical Plan Final Report. December 2014.

Idaho Transportation Department (ITD). 2020. ID-55, Smiths Ferry Improvements. Available at: https://itdprojects.org/projects/id55smithsferry/. Accessed July 2020.

Jiao, J., Z. Houyuan, J. Yanfeng, and W. Ning. 2009. Research Progress on the effects of soil erosion on vegetation. Acta Ecologica Sinica 29 (2009) 85-91.

Jones, W.M. 2003. Kootenai National Forest Peatlands: Description and Effects of Forest Management. Prepared for The Kootenai National Forest, U.S. Forest Service. Montana Natural Heritage Program Natural Resource Information System. 72 pp.

Keddy, Paul A. 2010. Wetland Ecology: Principles and Conservation. Second Edition. Chapter 1: Wetlands: An Overview. Pages 1-38. Cambridge University Press, Cambridge United Kingdom. [Copyright; PDF not available].

Knutson, K.L., and V.L. Naef. 1997. Management Recommendations for Washington's Priority Habitats: Riparian. Olympia: Washington Department of Fish and Wildlife.

Midas Gold Idaho, Inc. (Midas Gold). 2016. Stibnite Gold Project, Valley County, Idaho. Plan of Restoration and Operations. September 2016.

Midas Gold Idaho, Inc. (Midas Gold). 2017. Response to USFS/AECOM RFAI #10 – Wetlands. September 02, 2017.

Midas Gold Idaho, Inc. (Midas Gold). 2019. Notice of Intent: Stibnite Gold Project – Burntlog Route Geophysical Investigation Field Work. May 28, 2019.

Murphy, C. 2012. Riparian and Wetland Restoration Planting Guide for the Boise and Payette River Basins, Idaho. Prepared for Idaho Department of Lands and U. S. Forest Service. Idaho Department of Fish and Game, Boise, ID. 61 pp.

MWH Americas, Inc. (MWH). 2017. Aquatic Resources 2016 Baseline Study, Stibnite Gold Project. Prepared for Midas Gold Idaho, Inc. April 2017.

Perpetua Resources Idaho Inc. (Perpetua). 2021a. Stibnite Gold Project: Refined Proposed action ModPRO2. October.

Perpetua Resources Idaho Inc. (Perpetua). 2021b. Stibnite Gold Mitigation Plan.

Rio Applied Science and Engineering (Rio ASE). 2019. Stream Functional Assessment Report and Ledger - Stibnite Gold Project. February 2019. Ledger updated 6/12/2019.

SRK. 2012. Golden Meadows Project, Overburden Geotechnical Investigation. Prepared for Midas Gold. June 2012.

STRATA Inc. (STRATA). 2014. Geologic Hazard Assessment, Golden Meadows Project. Stibnite, Idaho. January 31, 2014.

STRATA Inc. (STRATA). 2016. Geologic Hazard Assessment. Proposed Burntlog Access Road Alignment Valley County, Idaho. [Confidential; Not available to the public].

STRATA, Inc. (STRATA) and Tierra Group. 2017. Geotechnical Baseline Summary, Stibnite Gold Project. Prepared for Midas Gold Idaho, Inc. May 2017.

Tetra Tech, Inc. (Tetra Tech). 2018. Additional Information to Amend the 2016 HDR Wetlands Functions and Values Assessment, Stibnite Gold Project, 194-6296. Final Technical Memorandum Prepared for Midas Gold Idaho, Inc. March 27, 2018.

Tetra Tech, Inc. (Tetra Tech). 2019. Evaluation of potential fen wetland occurrence in the SGP study area. Technical Memorandum prepared for Midas Gold. November 2019.

Tetra Tech, Inc. (Tetra Tech). 2021a. Conceptual Stream and Wetland Mitigation Plan. Stibnite Gold Project, Valley County, Idaho. U.S. Army Corps of Engineers File Number: NWW-2013-0321.

Tetra Tech, Inc. (Tetra Tech). 2021b. 2018 and 2019 Wetland Resources Baseline Study Addendum #5. Prepared for Perpetua Resources Idaho, Inc. February 25, 2021.

Tetra Tech, Inc. (Tetra Tech). 2021c. 2021 Wetlands Functions and Values Report. Draft report prepared for Perpetua Resources Idaho, Inc. May 12, 2021.

Tierra Group International (Tierra Group). 2018. Stibnite Gold Project Geotechnical Investigations Summary Report and Appendices. Prepared for Midas Gold, Boise, Idaho. Prepared by Tierra Group International, Ltd., Salt Lake City, Utah. [Confidential; Not available to the public].

U.S. Department of Transportation Federal Highway Administration (FHWA). 2020. SH-55 Banks Beach Parking Study. Available at: https://highways.dot.gov/federal-lands/projects/id/dot-55-2. Accessed July 2020.

U.S. Environmental Protection Agency (EPA). 2020. Cinnabar Mine Integrated Assessment. Yellow Pine, ID – Region X. Available at: https://response.epa.gov/site/site_profile.aspx?site_id=9801. Accessed July 2020.

U.S. Forest Service (Forest Service). 1994. Stibnite Mine Expansion Project Draft Environmental Impact Statement. November 1994.

U.S. Forest Service (Forest Service). 2003. Record of Decision for the Final Environmental Impact Statement and Revised Payette National Forest Land and Resource Management Plan. Revised July 2003.

U.S. Forest Service (Forest Service). 2010. Boise National Forest Land and Resource Management Plan. 2003-2010 Integration.

U.S. Forest Service (Forest Service). 2012. Draft Environmental Impact Statement, Golden Hand No. 1 and No. Lode Mining Claims Project. Krassel Ranger District, Payette National Forest, Valley and Idaho County, Idaho. June 2012.

U.S. Forest Service (Forest Service). 2015. Final Environmental Assessment, Golden Meadows Exploration Project. Krassel Ranger District, Payette National Forest, Valley County, Idaho. September 2015.

U.S. Forest Service (Forest Service). 2016. Environmental Assessment, Big Creek Roads Plan of Operations. Krassel Ranger District, Payette National Forest, Valley County, Idaho. November 2016.

U.S. Forest Service (Forest Service). 2017. Valley County Quarry Development Project Proposed Action Report. Yellow Pine, Valley County, Idaho. August 2017.

U.S. Forest Service (Forest Service). 2018. Payette National Forest; Idaho; Granite Meadows Project: Notice of Intent to prepare and environmental impact statement. Federal Register. Vol. 83, No. 211. FR Docket. 2018-23826. October 31, 2018.

U.S. Forest Service (Forest Service). 2020a. Schedule of Proposed Action (SOPA) 7/01/2020 to 9/30/2020 Payette National Forest. July 1.

U.S. Forest Service (Forest Service). 2020b. Schedule of Proposed Action (SOPA) 7/01/2020 to 9/30/2020 Boise National Forest. July 1.

U.S. Forest Service (Forest Service). 2020c. Schedule of Proposed Action (SOPA) 4/01/2020 to 6/30/2020 Boise National Forest. April 1.

U.S. Forest Service (Forest Service). 2021. Schedule of Proposed Action (SOPA) 10/01/2020 to 12/31/2020. Payette National Forest. October 1.

U.S. Forest Service (Forest Service). 2022a. Stibnite Gold Project Fisheries and Aquatic Habitat Specialist Report. Payette National Forest.

U.S. Forest Service (Forest Service). 2022b. Stibnite Gold Project Water Quality Specialist Report. Payette National Forest.

U.S. Forest Service (Forest Service). 2022c. Stibnite Gold Project Water Quantity Specialist Report. Payette National Forest.

U.S. Forest Service (Forest Service). 2022d. Stibnite Gold Project Soils and Reclamation Cover Materials Specialist Report. Payette National Forest.

U.S. Forest Service (Forest Service). 2022e. Stibnite Gold Project Vegetation Communities Specialist Report. Payette National Forest.

U.S. Forest Service (Forest Service). 2022f. SGP 2021 MMP and Alternatives Report. Payette National Forest.

U.S. Forest Service (Forest Service). 2022g. Stibnite Gold Project Air Quality Specialist Report. Payette National Forest.

U.S. Geological Survey (USGS). 2016. National Hydrography Dataset (NHD), data date 8/1/2016. Accessed at: https://viewer.nationalmap.gov/basic/?basemap=b1&category=nhd&title=NHD%20View. Accessed June 6, 2018. [GIS data].

Waser, N.M., M.V. Price, G. Casco, M. Diaz, A.L. Morales, and J. Solverson. 2017. Effects of road dust on the pollination and reproduction of wildflowers. International Journal of Plant Sciences 178:85-93.

# Appendix A
# Wetlands Functions and Values Tables

**Table A-1 Wetland Functional Point Summary for all Assessment Areas**

| AA Number | AA Name | Portion of the Analysis Area | Wetland Category[1] | Primary Functions[2] | Habitat for S1, S2, or S3 Species | Listed/Proposed T&E Species Habitat | General Wildlife Habitat | General Fish Habitat | Flood Attenuation | Long- and Short-term Surface Water Storage | Sediment/Nutrient/Toxicant Retention and/or Removal | Sediment/Shoreline Stabilization | Production Export/ Terrestrial and Aquatic Food Chain | Groundwater Discharge/Recharge | Uniqueness | Recreation/ Education Potential | Total Baseline Function | Wetlands Area (acres) | Total Functional Units |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Upper Meadow Creek | Mine Site | II | General Wildlife Habitat<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Short- and Long-Term Surface Water Storage | 0.70 | 0.00 | 0.90 | N/A | 0.70 | 1.00 | 0.90 | 0.70 | 1.00 | N/A | 0.60 | 0.20 | 6.70 | **71.6** | **479.65** |
| 2 | Meadow Creek Hillside Seeps | Mine Site | II | Groundwater Discharge/ Recharge<br>Natural Heritage Program Species Habitat<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal | 0.70 | 0.00 | 0.70 | N/A | N/A | N/A | 0.90 | 0.70 | 0.80 | 1.00 | 0.50 | 0.15 | 5.45 | **32.8** | **178.98** |
| 3 | Lower Meadow Creek | Mine Site | III | Flood Attenuation<br>Sediment/ Nutrient/ Toxicant Removal<br>Sediment/ Shoreline Stabilization<br>Short- and Long-Term Surface Water Storage | 0.10 | 0.00 | 0.20 | N/A | 0.60 | 1.00 | 0.90 | 0.70 | 0.60 | N/A | 0.40 | N/A | 4.50 | **71.2** | **320.54** |
| 4 | Meadow Creek Hillside Seeps | Mine Site | III | Groundwater Discharge/ Recharge<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Sediment/ Shoreline Stabilization | 0.70 | 0.00 | N/A | N/A | N/A | 0.30 | 0.70 | 1.00 | 0.80 | 1.00 | 0.30 | 0.10 | 5.60 | **7.3** | **40.82** |
| 5 | East Fork Meadow Creek | Mine Site | III | General Wildlife Habitat<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Sediment/ Shoreline Stabilization | 0.10 | 0.00 | 0.70 | N/A | 0.10 | 0.40 | 0.90 | 1.00 | 0.70 | N/A | 0.20 | 0.20 | 4.30 | **60.4** | **259.85** |
| 6 | East Fork SFSR Valley | Mine Site | III | Groundwater Discharge/ Recharge<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Sediment/ Shoreline Stabilization | 0.70 | 0.00 | 0.50 | N/A | 0.60 | 0.60 | 1.00 | 0.90 | 0.70 | 0.90 | N/A | 0.30 | 5.60 | **35.9** | **201.15** |
| 7 | Fiddle Creek | Mine Site | III | General Wildlife Habitat<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Sediment/ Shoreline Stabilization | 0.80 | 0.00 | 0.70 | N/A | 0.70 | 0.40 | 0.90 | 0.70 | 0.70 | N/A | 0.30 | 0.15 | 5.35 | **17.7** | **94.86** |
| 8 | Hennessy Creek | Mine Site | III | General Wildlife Habitat<br>Groundwater Discharge/ Recharge<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal | 0.00 | 0.00 | 0.70 | N/A | N/A | N/A | 0.90 | N/A | 0.90 | 1.00 | 0.50 | 0.20 | 4.20 | **8.8** | **37.04** |

| AA Number | AA Name | Portion of the Analysis Area | Wetland Category[1] | Primary Functions[2] | Habitat for S1, S2, or S3 Species | Listed/Proposed T&E Species Habitat | General Wildlife Habitat | General Fish Habitat | Flood Attenuation | Long- and Short-term Surface Water Storage | Sediment/Nutrient/Toxicant Retention and/or Removal | Sediment/Shoreline Stabilization | Production Export/ Terrestrial and Aquatic Food Chain | Groundwater Discharge/Recharge | Uniqueness | Recreation/ Education Potential | Total Baseline Function | Wetlands Area (acres) | Total Functional Units |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | Midnight Creek | Mine Site | III | Groundwater Discharge/ Recharge<br>Natural Heritage Program Species Habitat<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal | 0.60 | 0.00 | 0.20 | N/A | N/A | N/A | 0.60 | N/A | 0.30 | 1.00 | 0.20 | N/A | 2.90 | **2.9** | **8.27** |
| 10 | West End Creek | Mine Site | III | Groundwater Discharge/ Recharge<br>Natural Heritage Program Species Habitat<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal | 0.60 | 0.00 | 0.20 | N/A | N/A | N/A | 0.40 | N/A | 0.30 | 1.00 | 0.20 | N/A | 2.70 | **4.4** | **11.75** |
| 11 | Burntlog | Off-Site | III | General Wildlife Habitat<br>Natural Heritage Program Species Habitat<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal | 0.70 | 0.00 | 0.70 | N/A | N/A | N/A | 0.90 | N/A | 0.90 | N/A | 0.50 | 0.20 | 3.90 | **82.9** | **323.43** |
| 12 | Riordan Road Alternative and Powerline Corridor | Off-Site | III | General Wildlife Habitat<br>Groundwater Discharge/ Recharge<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal | 0.00 | 0.00 | 0.70 | N/A | N/A | 0.40 | 0.60 | N/A | 0.90 | 1.00 | 0.40 | 0.20 | 4.20 | **35.6** | **149.69** |
| 13 | Johnson Creek Road Alternative | Off-Site | III | Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Sediment/ Shoreline Stabilization<br>Short- and Long-Term Surface Water Storage | 0.00 | 0.00 | 0.50 | N/A | 0.30 | 0.80 | 0.90 | 0.70 | 0.90 | N/A | 0.40 | 0.20 | 4.70 | **50.1** | **235.33** |
| 14 | Cabin/Trout and Powerline | Off-Site | III | General Wildlife Habitat<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Short- and Long-Term Surface Water Storage | 0.00 | 0.00 | 0.70 | N/A | 0.60 | 1.00 | 0.90 | 0.70 | 0.90 | N/A | 0.50 | 0.20 | 5.50 | **47.0** | **258.67** |
| 15 | Upper East Fork SFSR | Mine Site | II | Groundwater Discharge/ Recharge<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Short- and Long-Term Surface Water Storage | 0.70 | 0.00 | 0.70 | N/A | 0.30 | 0.80 | 0.90 | 0.70 | 0.90 | 1.00 | 0.50 | 0.20 | 6.70 | **40.4** | **270.68** |
| 16 | Stibnite Road Wetlands | Off-Site | III | Flood Attenuation<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Sediment/ Shoreline Stabilization | 0.00 | 0.00 | 0.50 | N/A | 0.80 | 0.40 | 0.40 | 0.70 | 0.70 | N/A | 0.10 | 0.20 | 3.80 | **26.0** | **98.61** |

| AA Number | AA Name | Portion of the Analysis Area | Wetland Category[1] | Primary Functions[2] | Habitat for S1, S2, or S3 Species | Listed/Proposed T&E Species Habitat | General Wildlife Habitat | General Fish Habitat | Flood Attenuation | Long- and Short-term Surface Water Storage | Sediment/Nutrient/Toxicant Retention and/or Removal | Sediment/Shoreline Stabilization | Production Export/ Terrestrial and Aquatic Food Chain | Groundwater Discharge/Recharge | Uniqueness | Recreation/ Education Potential | Total Baseline Function | Wetlands Area (acres) | Total Functional Units |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 17 | Transmission Line and Warm Lake Wetlands | Off-Site | III | Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Sediment/ Shoreline Stabilization<br>Short- and Long-Term Surface Water Storage | 0.60 | 0.00 | 0.70 | N/A | 0.60 | 0.80 | 0.90 | 0.70 | 0.90 | N/A | 0.30 | 0.20 | 5.70 | **25.2** | **143.64** |
| 18 | Transmission Line – Valley | Off-Site | III | Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Sediment/ Shoreline Stabilization<br>Short- and Long-Term Surface Water Storage | 0.00 | 0.00 | 0.50 | N/A | 0.50 | 1.00 | 0.90 | 0.70 | 0.90 | N/A | 0.40 | 0.05 | 4.95 | **98.6** | **488.07** |
| 19 | Yellow Pine Pit | Mine Site | IV | Groundwater Discharge/ Recharge<br>Natural Heritage Program Species Habitat<br>Sediment/ Shoreline Stabilization<br>Short- and Long-Term Surface Water Storage | 0.00 | 0.00 | 0.10 | N/A | N/A | 0.80 | 0.60 | 0.30 | 0.30 | N/A | 0.30 | 0.15 | 2.55 | **4.5** | **11.48** |
| 20 | Rabbit Creek Slope Wetlands | Mine Site | III | General Wildlife Habitat<br>Groundwater Discharge/ Recharge<br>Natural Heritage Program Species Habitat<br>Production Export/ Food Chain Support | 0.70 | 0.00 | 0.70 | N/A | N/A | N/A | 0.40 | N/A | 0.80 | 1.00 | 0.40 | N/A | 4.00 | **5.0** | **19.92** |
| 21 | Thunder Mountain Road | Off-Site | III | Flood Attenuation<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Short- and Long-Term Surface Water Storage | 0.10 | 0.00 | 0.70 | N/A | 0.70 | 0.80 | 0.90 | 0.70 | 0.80 | an | 0.50 | 0.20 | 5.40 | **45.8** | **247.16** |

Source: HDR 2016; Tetra Tech 2018, 2021a

[1] Wetland categories range from I (highest functional value) to IV (lowest functional value) (Berglund and McEldowney 2008). No Category I wetlands were documented in the analysis area.

[2] Primary functions listed are the four highest rated functions identified for each AA on Wetland Assessment Forms (Tetra Tech 2021a). In some cases, more than four functions may be included primary due to equal scores between multiple functions. See the individual ratings for more information.

AA = Assessment Area.

N/A = The function is not relevant to the AA being assessed (refer to MWAM guidelines, Berglund and McEldowney 2008).

**Table A-2 Wetland Functional Impacts under the 2021 MMP by AA**

| AA Number | AA Name | Wetland Category[1] | Primary Functions[2] | Major Associated Component | Total Wetland Acreage (acres)[3] | Proposed Wetland Removal (acres)[4] | Proposed Tall Tree Clearing (acres) | Proposed Percentage of AA Impact | Total Functional Units[5] | Number of Functional Units Affected[6] |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Upper Meadow Creek | II | General Wildlife Habitat<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Short- and Long-Term Surface Water Storage | Mine Site | 71.6 | 52.2 | - | 73% | 479.65 | **349.7** |
| 2 | Meadow Creek Hillside Seeps | II | Groundwater Discharge/ Recharge<br>Natural Heritage Program Species Habitat<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal | Mine Site | 32.8 | 3.3 | - | 10% | 178.98 | **18.2** |
| 3 | Lower Meadow Creek | III | Flood Attenuation<br>Sediment/ Nutrient/ Toxicant Removal<br>Sediment/ Shoreline Stabilization<br>Short- and Long-Term Surface Water Storage | Mine Site | 71.2 | 33.9 | - | 48% | 320.54 | **152.6** |
| 4 | Meadow Creek Hillside Seeps | III | Groundwater Discharge/ Recharge<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Sediment/ Shoreline Stabilization | Mine Site | 7.3 | 4.3 | - | 59% | 40.82 | **24.1** |
| 5 | East Fork Meadow Creek | III | General Wildlife Habitat<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Sediment/ Shoreline Stabilization | Mine Site | 60.4 | 0.1 | - | <1% | 259.85 | **0.4** |
| 6 | East Fork SFSR Valley | III | Groundwater Discharge/ Recharge<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Sediment/ Shoreline Stabilization | Mine Site | 35.9 | 16.9 | 0.2 | 48% | 201.15 | **95.8** |
| 7 | Fiddle Creek | III | General Wildlife Habitat<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Sediment/ Shoreline Stabilization | Mine Site | 17.7 | 0.9 | - | 5% | 94.86 | **4.9** |
| 8 | Hennessy Creek | III | General Wildlife Habitat<br>Groundwater Discharge/ Recharge<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal | Mine Site | 8.8 | 0.4 | - | 5% | 37.04 | **1.7** |
| 9 | Midnight Creek | III | Groundwater Discharge/ Recharge<br>Natural Heritage Program Species Habitat<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal | Mine Site | 2.9 | 1.3 | - | 45% | 8.27 | **3.8** |
| 10 | West End Creek | III | Groundwater Discharge/ Recharge<br>Natural Heritage Program Species Habitat<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal | Mine Site<br>Access Roads at Mine Site | 4.4 | 0.7 | - | 16% | 11.75 | **1.9** |

| AA Number | AA Name | Wetland Category[1] | Primary Functions[2] | Major Associated Component | Total Wetland Acreage (acres)[3] | Proposed Wetland Removal (acres)[4] | Proposed Tall Tree Clearing (acres) | Proposed Percentage of AA Impact | Total Functional Units[5] | Number of Functional Units Affected[6] |
|---|---|---|---|---|---|---|---|---|---|---|
| 11 | Burntlog | III | General Wildlife Habitat<br>Natural Heritage Program Species Habitat<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal | Access Roads | 82.9 | 7.7 | - | 9% | 323.43 | **30.0** |
| 12 | Riordan Road Alternative and Powerline Corridor | III | General Wildlife Habitat<br>Groundwater Discharge/ Recharge<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal | Utilities | 35.6 | 5.2 | 0.9 | 17% | 149.69 | **25.6** |
| 13 | Johnson Creek Road Alternative | III | Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Sediment/ Shoreline Stabilization<br>Short- and Long-Term Surface Water Storage | Utilities | 50.1 | 6.8 | 1.6 | 17% | 235.33 | **39.4** |
| 14 | Cabin/Trout and Powerline | III | General Wildlife Habitat<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Short- and Long-Term Surface Water Storage | Access Roads<br>Utilities | 47.0 | 11.8 | 2.9 | 31% | 258.67 | **80.9** |
| 15 | Upper East Fork SFSR | II | Groundwater Discharge/ Recharge<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Short- and Long-Term Surface Water Storage | Access Roads at Mine Site | 40.4 | 0.4 | - | 1% | 270.68 | **2.7** |
| 16 | Stibnite Road Wetlands | III | Flood Attenuation<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Sediment/ Shoreline Stabilization | Access Roads | 26.0 | 0.0 | - | - | 98.61 | - |
| 17 | Transmission Line and Warm Lake Wetlands | III | Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Sediment/ Shoreline Stabilization<br>Short- and Long-Term Surface Water Storage | Off-site Facilities<br>Utilities<br>Transmission Line | 25.2 | 9.4 | 2.0 | 45% | 143.64 | **65.0** |
| 18 | Transmission Line – Valley | III | Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Sediment/ Shoreline Stabilization<br>Short- and Long-Term Surface Water Storage | Off-site Facilities<br>Utilities<br>Transmission Line | 98.6 | 28.1 | 1.4 | 30% | 488.07 | **146.0** |
| 19 | Yellow Pine Pit | IV | Groundwater Discharge/ Recharge<br>Natural Heritage Program Species Habitat<br>Sediment/ Shoreline Stabilization<br>Short- and Long-Term Surface Water Storage | Mine Site | 4.5 | 4.5 | - | 100% | 11.48 | **11.7** |
| 20 | Rabbit Creek Slope Wetlands | III | General Wildlife Habitat<br>Groundwater Discharge/ Recharge<br>Natural Heritage Program Species Habitat<br>Production Export/ Food Chain Support | Mine Site | 5.0 | 0.0 | - | - | 19.92 | - |

| AA Number | AA Name | Wetland Category[1] | Primary Functions[2] | Major Associated Component | Total Wetland Acreage (acres)[3] | Proposed Wetland Removal (acres)[4] | Proposed Tall Tree Clearing (acres) | Proposed Percentage of AA Impact | Total Functional Units[5] | Number of Functional Units Affected[6] |
|---|---|---|---|---|---|---|---|---|---|---|
| 21 | Thunder Mountain Road | III | Flood Attenuation<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Short- and Long-Term Surface Water Storage | Access Roads | 45.8 | <0.1 | - | - | 247.16 | **0.0** |
| **Total** | **--** | **--** | **--** | **--** | **774.1** | **188.0** | **8.9** | **25%** | **3,879.59** | **1,054.4** |

Sources: HDR 2016; Tetra Tech 2018

[1] Wetland categories range from I (highest functional value) to IV (lowest functional value) (Berglund and McEldowney 2008). No Category I wetlands were documented in the analysis area.

[2] Primary functions listed are the four highest rated functions identified for each AA on Wetland Assessment Forms (Tetra Tech 2021a). In some cases, more than four functions may be included primary due to equal scores between multiple functions. See the individual ratings for more information.

[3] Total wetland acreages include only areas delineated and assessed for the Project; it does not include National Wetlands Inventory data used to extrapolate wetland impacts across the entire analysis area.

[4] Proposed wetland impact acreage includes only areas delineated and assessed for the Project; it does not include National Wetlands Inventory data used to extrapolate wetland impacts across the entire analysis area.

[5] Efforts to gain approval of existing wetland functional assessment scores are ongoing and may result in changes relative to the totals listed in this table. Total Functional Units reported are consistent with functional unit scores presented in Table A-1.

[6] Functional unit impacts were calculated by multiplying the percentage of AA impact by the total functional units associated with each AA. Disturbance and function units impacted in AAs 12, 13, 14, 17, and 18 includes both temporary and permanent effects associated with transmission line construction.

AA = Assessment Area

NA = not applicable

**Table A-3 Wetland Functional Impacts under the Johnson Creek Route Alternative by AA**

| AA Number | AA Name | Wetland Category[1] | Primary Functions[2] | Major Associated Component | Total Wetland Acreage (acres)[3] | Proposed Wetland Removal (acres)[4] | Proposed Tall Tree Clearing (acres) | Proposed Percentage of AA Impact | Total Functional Units[5] | Number of Functional Units Affected[6] |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Upper Meadow Creek | II | General Wildlife Habitat<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Short- and Long-Term Surface Water Storage | Mine Site | 71.6 | 52.2 | - | 73% | 479.65 | **349.7** |
| 2 | Meadow Creek Hillside Seeps | II | Groundwater Discharge/ Recharge<br>Natural Heritage Program Species Habitat<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal | Mine Site | 32.8 | 3.3 | - | 10% | 178.98 | **18.2** |
| 3 | Lower Meadow Creek | III | Flood Attenuation<br>Sediment/ Nutrient/ Toxicant Removal<br>Sediment/ Shoreline Stabilization<br>Short- and Long-Term Surface Water Storage | Mine Site | 71.2 | 33.9 | - | 48% | 320.54 | **152.6** |
| 4 | Meadow Creek Hillside Seeps | III | Groundwater Discharge/ Recharge<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Sediment/ Shoreline Stabilization | Mine Site | 7.3 | 4.3 | - | 59% | 40.82 | **24.1** |
| 5 | East Fork Meadow Creek | III | General Wildlife Habitat<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Sediment/ Shoreline Stabilization | Mine Site | 60.4 | 0.1 | - | <1% | 259.85 | **0.4** |

| AA Number | AA Name | Wetland Category[1] | Primary Functions[2] | Major Associated Component | Total Wetland Acreage (acres)[3] | Proposed Wetland Removal (acres)[4] | Proposed Tall Tree Clearing (acres) | Proposed Percentage of AA Impact | Total Functional Units[5] | Number of Functional Units Affected[6] |
|---|---|---|---|---|---|---|---|---|---|---|
| 6 | East Fork SFSR Valley | III | Groundwater Discharge/ Recharge<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Sediment/ Shoreline Stabilization | Mine Site | 35.9 | 16.9 | 0.2 | 48% | 201.15 | **95.8** |
| 7 | Fiddle Creek | III | General Wildlife Habitat<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Sediment/ Shoreline Stabilization | Mine Site | 17.7 | 0.9 | - | 5% | 94.86 | **4.9** |
| 8 | Hennessy Creek | III | General Wildlife Habitat<br>Groundwater Discharge/ Recharge<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal | Mine Site | 8.8 | 0.4 | - | 5% | 37.04 | **1.7** |
| 9 | Midnight Creek | III | Groundwater Discharge/ Recharge<br>Natural Heritage Program Species Habitat<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal | Mine Site | 2.9 | 1.3 | - | 45% | 8.27 | **3.8** |
| 10 | West End Creek | III | Groundwater Discharge/ Recharge<br>Natural Heritage Program Species Habitat<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal | Mine Site<br>Access Roads at Mine Site | 4.4 | 0.7 | - | 16% | 11.75 | **1.9** |
| 11 | Burntlog | III | General Wildlife Habitat<br>Natural Heritage Program Species Habitat<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal | Access Roads | 82.9 | | - | 0% | 323.43 | |
| 12 | Riordan Road Alternative and Powerline Corridor | III | General Wildlife Habitat<br>Groundwater Discharge/ Recharge<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal | Utilities | 35.6 | 5.2 | 0.9 | 17% | 149.69 | **25.6** |
| 13 | Johnson Creek Road Alternative | III | Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Sediment/ Shoreline Stabilization<br>Short- and Long-Term Surface Water Storage | Utilities | 50.1 | 6.8 | 1.6 | 17% | 235.33 | **39.4** |
| 14 | Cabin/Trout and Powerline | III | General Wildlife Habitat<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Short- and Long-Term Surface Water Storage | Access Roads<br>Utilities | 47.0 | 11.8 | 2.9 | 31% | 258.67 | **80.9** |
| 15 | Upper East Fork SFSR | II | Groundwater Discharge/ Recharge<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Short- and Long-Term Surface Water Storage | Access Roads at Mine Site | 40.4 | 0.4 | - | 1% | 270.68 | **2.7** |

| AA Number | AA Name | Wetland Category[1] | Primary Functions[2] | Major Associated Component | Total Wetland Acreage (acres)[3] | Proposed Wetland Removal (acres)[4] | Proposed Tall Tree Clearing (acres) | Proposed Percentage of AA Impact | Total Functional Units[5] | Number of Functional Units Affected[6] |
|---|---|---|---|---|---|---|---|---|---|---|
| 16 | Stibnite Road Wetlands | III | Flood Attenuation<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Sediment/ Shoreline Stabilization | Access Roads | 26.0 | 0.9 | - | 3% | 98.61 | **3.4** |
| 17 | Transmission Line and Warm Lake Wetlands | III | Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Sediment/ Shoreline Stabilization<br>Short- and Long-Term Surface Water Storage | Off-site Facilities<br>Utilities<br>Transmission Line | 25.2 | 9.4 | 2.0 | 45% | 143.64 | **65.0** |
| 18 | Transmission Line – Valley | III | Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Sediment/ Shoreline Stabilization<br>Short- and Long-Term Surface Water Storage | Off-site Facilities<br>Utilities<br>Transmission Line | 98.6 | 28.1 | 1.5 | 30% | 488.07 | **146.5** |
| 19 | Yellow Pine Pit | IV | Groundwater Discharge/ Recharge<br>Natural Heritage Program Species Habitat<br>Sediment/ Shoreline Stabilization<br>Short- and Long-Term Surface Water Storage | Mine Site | 4.5 | 4.5 | - | 100% | 11.48 | **11.7** |
| 20 | Rabbit Creek Slope Wetlands | III | General Wildlife Habitat<br>Groundwater Discharge/ Recharge<br>Natural Heritage Program Species Habitat<br>Production Export/ Food Chain Support | Mine Site | 5.0 | 0.0 | - | - | 19.92 | - |
| 21 | Thunder Mountain Road | III | Flood Attenuation<br>Production Export/ Food Chain Support<br>Sediment/ Nutrient/ Toxicant Removal<br>Short- and Long-Term Surface Water Storage | Access Roads | 45.8 | 0.0 | <0.1 | 0% | 247.16 | - |
| **Total** | **--** | **--** | **--** | **--** | **774.1** | **181.2** | **9.1** | **26%** | **3,879.59** | **1,028.3** |

Sources: HDR 2016; Tetra Tech 2018

[1] Wetland categories range from I (highest functional value) to IV (lowest functional value) (Berglund and McEldowney 2008). No Category I wetlands were documented in the analysis area.

[2] Primary functions listed are the four highest rated functions identified for each AA on Wetland Assessment Forms (Tetra Tech 2021a). In some cases, more than four functions may be included primary due to equal scores between multiple functions. See the individual ratings for more information.

[3] Total wetland acreages include only areas delineated and assessed for the Project; it does not include National Wetlands Inventory data used to extrapolate wetland impacts across the entire analysis area.

[4] Proposed wetland impact acreage includes only areas delineated and assessed for the Project; it does not include National Wetlands Inventory data used to extrapolate wetland impacts across the entire analysis area.

[5] Efforts to gain approval of existing wetland functional assessment scores are ongoing and may result in changes relative to the totals listed in this table. Total Functional Units reported are consistent with functional unit scores presented in Table A-1

[6] Functional unit impacts were calculated by multiplying the percentage of AA impact by the total functional units associated with each AA. Disturbance and function units impacted in AAs 12, 13, 14, 17, and 18 includes both temporary and permanent effects associated with transmission line construction.

AA = Assessment Area

NA = not applicable