Granite Mining Environmental Impact Statement

Fish and Aquatic Habitat

Biological Assessment for Umatilla and Wallowa-Whitman National Forests

Photo Above: A historic non-operational mill site located on the Lucky Strike mine claim. This is a lode and placer claim located in the Upper Clear Creek watershed along the headwaters of Lightning Creek.

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Introduction

This Biological Assessment (BA) documents the potential effects of the Granite Mining Project on Middle Columbia River steelhead *Oncorhynchus mykiss*, bull trout (*Salvelinus confluentus*) and their designated critical habitat (CH). These species are listed as Threatened under the Endangered Species Act (Table 1).

The Granite Mining BA was prepared in accordance with the following guidance and direction:

- Section 7(a)(2) of the Endangered Species Act of 1973 (as amended),
- 50 CFR § 402.12 (Interagency Cooperation, Biological Assessments),
- Endangered Species Consultation Handbook (USFWS and NMFS, March 1998),
- Streamlined Consultation Procedures for Section 7 of the Endangered Species Act (FS, NMFS, BLM & USFWS 1999).

### Table 1. ESA listed species included in the Granite Mining BA.

<table>
<thead>
<tr>
<th>Species</th>
<th>Listing Status, Date and Reference</th>
<th>Critical Habitat Listing Date and Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Middle Columbia River Steelhead</td>
<td>Threatened 3/25/1999 (71FR834) 1/5/06 (71FR834) 8/5/11 (76FR50448)</td>
<td>Designated 9/2/2005 (70FR52630)</td>
</tr>
<tr>
<td>Middle Columbia River Bull Trout</td>
<td>Threatened 6/10/1998 (63 FR 31647)</td>
<td>Designated 10/18/2010 (75FR 63698)</td>
</tr>
</tbody>
</table>

Terminology

Some key terms are listed below as they apply to the Granite Mining project. A more extensive list of mining definitions is found in Appendix C of the September 15, 2015 document.

**Lode mining** – Removing a mineral deposit in consolidated rock. The minerals are contained in the original bedrock, and must be removed from the surrounding rock by mechanical means. In the Granite Mining project only existing adits (horizontal mine entrances) will be re-opened for lode mining.

**Placer mining** - the mining of stream sand, rock and gravel deposits for minerals, or discrete grains called “placers”. The placers usually were moved by stream flow from an original source such as a vein.

**Suction dredge mining** – use of a machine to remove material from the bottom of a body of water via suction. Materials are subsequently processed to find precious minerals.
Project Area and Action Area

The analysis area within the North Fork John Day (NFJD) basin in the Granite Creek Watershed (1707020202) encompasses 94,526 acres in North Eastern Oregon of lands managed by the US Forest Service, the Wallowa-Whitman National Forest (40,878 acres) (WWNF) and Umatilla National Forest (49,262) (UNF) and includes 3,239 acres of private land (Figure 1 and Table 2). There is approximately 25,000 acres of NFJD Wilderness, mostly on the Umatilla National Forest in the Granite Watershed. The Project area sub-watersheds include Bull Run Creek, Lower Granite Creek, Upper Granite Creek, Beaver Creek, and Clear Creek. There is no proposed activity in the Lake Creek subwatershed and Lake Creek watershed will not be further discussed in the analysis.

The Endangered Species Act (ESA) requires that potential effects to listed and proposed threatened and endangered species and Designated Critical Habitat (DCH) be evaluated in relation to the extent in which an area is influenced by the proposed action and project area. The action area is defined as all areas to be affected directly or indirectly by the federal action, including areas outside the immediate area involved in the action (50 Code of Federal Regulations 402-02). For purposes of this consultation, as described in the effects section, the project area and action area are the same.

Table 2. Subwatersheds within the Granite Mining Project Area

<table>
<thead>
<tr>
<th>Subwatershed</th>
<th>HUC 6</th>
<th>Ownership In Acres</th>
<th>Total Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>UNF</td>
<td>WWNF</td>
</tr>
<tr>
<td>Beaver Cr.</td>
<td>170702020203</td>
<td>15</td>
<td>12,104</td>
</tr>
<tr>
<td>Bull Run Cr.</td>
<td>170702020202</td>
<td>0</td>
<td>18,765</td>
</tr>
<tr>
<td>Clear Cr.</td>
<td>170702020204</td>
<td>17,682</td>
<td>1,561</td>
</tr>
<tr>
<td>Lake Cr.</td>
<td>170702020205</td>
<td>11,884</td>
<td>0</td>
</tr>
<tr>
<td>Lower Granite Cr.</td>
<td>170702020206</td>
<td>17,954</td>
<td>1,055</td>
</tr>
<tr>
<td>Upper Granite Cr.</td>
<td>170702020201</td>
<td>2,003</td>
<td>7,138</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>49,538</strong></td>
<td>40,623</td>
<td>4,315</td>
</tr>
</tbody>
</table>

Prior to Forest Service authorization, all activities proposed in the Granite Mining EIS must have any required State of Oregon permits and must be in compliance with the Clean Water Act.

**Oregon DEQ and DSL may require one or more of the following:**
- **General Permit (600 permit)** – to operate off-stream placer mining that may generate wastewater
- **Individual Permit** – required if operation does not fit General Permit
- **401 certification** – if operation “may result in any discharge into the navigable waters”…. “the mining operator must give a copy of this 401 certification to the Forest Service prior to the Agency approving the Plan of Operations” (FSM 2817.23a - Compliance With the Clean Water Act)

**Forest Service Manual 2817.23a - Compliance with the Clean Water Act**
All newly approved Plans of Operations for mining operations on National Forest System lands must comply with the Federal Water Pollution Control Act of 1972, 33 U.S.C §§ 1251-1387 (Clean Water Act or CWA). Proposed mining activities, which can reasonably be expected to result in any discharges into waters of the United States are subject to compliance with CWA Sections 401, 402, and/or 404 as applicable.
Figure 1. Project Area.
Figure 1a. ("Map 4") Granite Mining Project major streams, ESA critical habitat, 303d listed streams and location of proposed Plans of Operations
Proposed Action

Plans of Operations (Plans) are submitted by private citizens proposing mining activities on federal lands. The Proposed Action is to authorize all of the Plans listed in this document. Each Plan is summarized and highlights the following key steps in the mining process:

- How the operator will access their Plan/claim (i.e. existing road, and if needed how would a operator cross a stream)
- How the operator will remove material (i.e. with an excavator, by hand)
- How and where the operator will process material (i.e. on site with a trammel or sluice box)
- How water will be used in processing material (i.e. existing pond using recycled pond water)

Following each summary, the Site-Specific Forest Service Requirements highlight the site-specific protection measures and General Requirements developed for water and fish protection. Plan summaries include a no activity Plan-specific stream buffer for mining-related activities (G15). These buffers were proposed by the miners, and the project hydrologist mapped the buffer based on establishing the ordinary high water mark. Additional General and site-specific measures may apply to each Plan depending on other resource needs for soil, roads, etc. For the complete wording and listing of all General Requirements and Site-Specific Protection measures which may be applicable to all Plans see page 42.

Detailed site maps of the Plans are located in Appendix A of this Biological Assessment. Official copies of Plans are filed on the appropriate Ranger District and electronic and paper copies are available. Proposed operating period for all operations is June 1st to October 31st. Definitions of mining activities, equipment and terminology are found in Appendix C of this Biological Assessment.

The Granite Mining EIS will be valid for ten years.

Oregon Senate Bill 838

In 2013 the Oregon Legislature passed Senate Bill 838, which implemented a moratorium in Essential Salmon Habitat in January 2016 in the following situations:

- motorized mining in streams (such as suction dredging), and
- in upland areas within 100 yards of these streams if the mining results in the removal or disturbance of vegetation in a manner that may affect water quality.

The State moratorium is in effect until 2021, or until the Oregon State legislature changes the law. The Granite Mining FEIS will extend beyond the 2021 moratorium. The Forest Service, in order to ensure consistency with Section 402 of the Clean Water Act, has determined Plans proposing suction dredging in Essential Salmon Habitat streams and 303d streams listed for sediment will not be approved until the moratorium on suction dredging is lifted, or until an amended Plan is submitted to the Forest Service that excludes the proposed suction dredging. Should the moratorium on suction dredging in the State of
Oregon be lifted the Forest Service would re-initiate ESA Section 7 consultation for that activity as appropriate.

**Fisheries Protection Measures**

Protection of fish habitat and fish is embedded in PACFISH/INFISH (1995) (goals, MM1-MM6 and Riparian Management Objectives) WWNF and UNF Forest Plans, Oregon Department of State Lands (DSL) permit, Forest Service site-specific Water Resource Protection Measures (WRPMs), General Requirements (as applicable), and site-specific Fish Protection Measures as described below. Each Plan is consistent with, and incorporates the above described regulations and policy. Water quality and fish protection measures are designed together to protect aquatic resources.

All actions described below re-work areas previously disturbed over the past 100 years or so by placer and lode mining activities (see Environmental Baseline). Mining is proposed in many areas where hydraulic hoses blasted hillsides to loosen material for processing, or large dredges excavated streambeds.

To assist the reader, each Plan Title includes the closest stream name and the general proximity of each Plan to ESA listed fish or designated critical habitat. Plan specific stream buffers (see General Requirement 15) are included in the description, as are stream crossings limits as identified by miners.

**ALTONA (Placer) – Quartz Gulch, steelhead DCH 1 mile, Bull Trout DCH > 5 miles**

This is a proposed placer operation that plans to extend an old skid trail to access the old dredge tailings and potential adit along the creek. Quartz Gulch was mined previously and high mounds of tailings are present. Gravel will be tested along the high banks in the riparian area, but work will not be conducted within a 20 ft. stream buffer. Only one test hole (20’x20’x10’ ft.) will be open at any time over the plan area of an estimated 5 acres. Two small processing ponds (10’x20’x10’ft.) will be constructed near the portal of the collapsed adit. Adit water will be gravity fed through a pipe into the ponds, and recycled. Equipment used: Backhoe will be used in testing and a wash plant will recycle water at the rate of approximately 150 GPM and a pick-up will haul material.

**Site-Specific Forest Service Requirements**

**Site-specific Water Resources Protection Measures**

1. Measurement of the buffer would start at the top of the valley floor terrace-channel bank break in slope of the side channel.
2. Put straw bales/coils on the valley floor between the activity site and the creek (side channel).

**Site-specific Fish Protection Measures**

None

**General Requirements Identified for Protection of Water and/or Fish Resources**

G4: Surface runoff and water quality related
G5: Disturbed areas kept in stable conditions
G6: Tree removal related
G12: Effective buffer strips to protect water quality during seasonal runoff events
G14: Beaver dams protected
BELVADEAR (Placer) - steelhead DCH 20 feet, Bull Trout DCH > 5 miles

This is a proposed placer operation that plans to use an existing (open) road to access the old tailings along Olive Creek. There will be a 20 ft stream buffer between Olive Creek and area of activity. Test areas will be in ¼ acre size and will be worked and reclaimed in an ongoing manner. Total area of disturbance will be 3 acres in size. Small diameter lodgepole and other riparian vegetation will be removed from the activity area, outside the 20 foot stream buffer, within the riparian habitat conservation area (RHCA). Water from a spring and Olive Creek will be used under an existing water right to process the material in a small 2-4 yard per hour trommel. All processing water will be recycled on site. One existing pond (20’x30’x5’) has been constructed. The operator claims a shared water right of 4 cfs for Olive Creek. Equipment used: Cat backhoe, John Deere Crawler, trackhoe, 2-4 yd trommel, water pump (10 hp-3”), air compressor, gold spinners, highbankers, pick-up truck, 3-5 yd dump trucks.

Springs are the primary water source for the pond. Water is recycled in the ponds during mining operations. As proposed in the Plan, pond water may be supplemented with water withdrawn from Olive Creek to account for losses from evaporation and seepage. Based on the size of the pond and type of mining proposed, it is expected water withdrawals will occur once every one to two weeks during the operating season (Chris Helberg personal communication).

Conclusions: Proposed mine activity will not be approved by the FS until the miner has received a 401 certification from ODEQ and DSL because no protection measures could be determined to prevent a discharge.

Site-Specific Forest Service Requirements

Site-specific Water Resources Protection Measures
No Water Resources Protection Measures could be identified that would prevent a discharge of sediment into Olive Creek given the location of the proposed mining in the riparian area.

General Requirements Identified for Protection of Water and /or Fish Resources

G4: Surface runoff and water quality related
G5: Disturbed areas kept in stable conditions
G6: Tree removal related
G12: Effective buffer strips to protect water quality during seasonal runoff events
G14: Beaver dams protected
G15: Stream buffers undisturbed
G23: Identifies characteristics of pumps that can be use when drafting water from a creek to minimize potential for impacts to fish.

H3: Have lined containment vault under hazardous material storage barrels
H5: Spill kit on site
H6: Hazardous substances not to be released on land, rivers etc. Have oil absorbing mats
H8: Check equipment for leaks

M1: Specific requirements for visual monitoring of Olive Creek

W1 – 3: Requirements for working in wetlands and floodplains

**BLUE SKY/ BULL RUN (Placer)** – Bull Run Creek steelhead DCH 30 feet, Bull Trout DCH 30 feet

Blue Sky is a proposed placer operation with test sites at four different locations and Bull Run contains two identified test sites. Each activity site is no larger than 1/5 acre and will be mined by digging and filling a trench 20 feet wide and 11 feet deep. A 30 foot stream buffer will be maintained throughout the claim and each test hole will be reclaimed before moving to the next test site. Operator will use three existing ponds (5’x10’x5’) to control overflow from the main processing pond (pond #6). Up to 5 cubic yds of material will be hauled daily from excavations sites to the processing site. Use of the existing ford on Bull Run Creek on a non-system Forest Service road off Forest Road 7300 by heavy machinery would not exceed 4 trips per season for access and repairs. There is daily use of pickups for hauling material. Gravel will be placed and packed on streambanks at fords to protect streambanks. This non-system road is used by the public to access dispersed campsites (a WWNF access and travel management plan has not been completed) (see map of Blue Sky – Bull Run 1 of 3 road E4A). Some small diameter lodgepole and other riparian vegetation may be removed from the worksite. Equipment used: Washing plant, trommel, highbankers, water pump, auger, backhoe, ATV and pickup trucks.

**Conclusions:** A 401 certification from ODEQ and DSL must be obtained before receiving FS approval before commencing with site activity at Blue Sky site #3 because there is the potential for a discharge.

**Site-Specific Forest Service Requirements**

**Site-specific Water Resources Protection Measures**

*Processing site*

None needed

**Blue Sky Bull Run (Blue Sky site #1)**  
None needed.

**Blue Sky Bull Run (Blue Sky site #2)**  
Place straw bales/coils along the low berm that separates the activity site from Swamp Creek to increase the effectiveness of the low berm.

**Blue Sky Bull Run (Blue Sky site #3)**  
1. Measurement of the buffer would start at the top of the valley floor terrace-channel bank break in slope of the side channel.
2. Put straw bales/coils on the valley floor between the activity site and the creek [side channel]
3. The test hole must be filled in at the end of each season and the disturbed area seeded and covered with straw.
4. Straw bales will be staked on the valley floor where the mining occurred in a pattern to disperse stream flows during spring high flows and prevent concentrated flows that could erode the disturbed area.

Blue Sky Bull Run (Blue Sky site #4)
1. Measurement of the buffer would start at the top of the valley floor terrace-channel bank break in slope.
2. Use straw bales to prevent sediment transport to Bull Run Creek.

Blue Sky Bull Run (Bull Run site #1)
1. Measurement of the 30 foot buffer would start at the top of the valley floor terrace-channel bank break in slope.
2. Miner’s protection measure related to straw bales applies to this site because site is adjacent to Bull Run Creek.

Blue Sky Bull Run (Bull Run site #2)
1. Measurement of the buffer would start at the top of the valley floor terrace-channel bank break in slope.
2. Miner’s protection measure related to straw bales applies to this site because site is adjacent to Bull Run Creek (G4 and G12).
3. Location of a proposed 7375-M1b two-track road through the forest would be determined with input from the Forest Service (see map in Appendix A and temporary road discussion above for more information).

Ford
There is a ford on the intermittent, non-fish bearing portion of Swamp Creek, rock and slope ford approaches.

Site-specific Fish Protection Measures
None

General Requirements Identified for Protection of Water and/or Fish Resources

G4: Surface runoff and water quality related
G5: Disturbed areas kept in stable conditions
G6: Tree removal related
G7: Fords
G12: Effective buffer strips to protect water quality during seasonal runoff events
G14: Beaver dams protected
G15: Stream buffers undisturbed

H3: Have lined containment vault under hazardous material storage barrels
H5: Spill kit on site
H6: Hazardous substances not to be released on land, rivers etc. Have oil absorbing mats
H8: Check equipment for leaks

M1: Specific requirements for visual monitoring of Bull Run Creek
W1 – 3: Requirements for working in wetlands and floodplains

BLUE SMOKE (Placer) Granite Creek - steelhead DCH > 300 feet, Bull Trout DCH > 300 feet

This is a proposed placer operation with access to the activity area via County Road (CR) 24 and an existing powerline road. There are three proposed excavation sites and one processing site (approximately 1.75 acres). Test holes will be 20’x25’x10’ with each test hole being reclaimed before moving on to the next. Excavation will be in the high bank north of the powerline road with CR 24 separating activity area from Granite Creek. There are three existing ponds; Pond #2 will be used to supply water to the processing site. A dry pond will be deepened and widened to create a settling pond, and if needed a third pond will be used as overflow to ensure no sediment is mobilized via surface or
subsurface flow. Equipment used: Highbanker, small trommel, water pump, backhoe, dozer, ATV and 5 yard dump truck.

**Site-Specific Forest Service Requirements**

**Site-specific Water Resources Protection Measure**
**Processing site**
Miner will maintain the existing difference in water surface elevations between processing pond and the overflow settling pond (Pond #3) to prevent a change in the gradient of the subsurface water as it moves through the fill.

**Blue Smoke sites 1, 2, and 3**
None needed

**Site-specific Fish Protection Measures**
None

**General Requirements Identified for Protection of Water and/or Fish Resources**

G4: Surface runoff and water quality related
G5: Disturbed areas kept in stable conditions
G6: Tree removal related
G12: Effective buffer strips to protect water quality during seasonal runoff events
G14: Beaver dams protected
G15: Stream buffers undisturbed

H3: Have lined containment vault under hazardous material storage barrels
H5: Spill kit on site
H6: Hazardous substances not to be released on land, rivers etc. Have oil absorbing mats
H8: Check equipment for leaks

M1: Specific requirements for visual monitoring of Granite Creek

**BUNCH BUCKET (Placer) Granite Creek - steelhead DCH 150 feet, Bull Trout DCH 150 feet**

This proposed placer operation will use existing roads and a pond. Two sites will be mined with a series of 4 trenches at each site (~ 10 acres). The trenches will be 2’ wide, and dug to impermeable substrate (~8’ deep) and reclaimed as each season. Material will be stockpiled along the trenches and hauled to a stationary processing site next to the processing pond. Up to 600 yards of material is proposed to be processed each year. The existing pond (30’x60’x10’) will be expanded to secure a dependable water source and all water will be recycled. No more than one excavation site will be open at a time and reclamation will be ongoing each year. FS 1310 Rd and existing skid trails separate work activity from Clear Creek. Equipment used: Crawler loader with a backhoe, pickup trucks, ATV, pump and trommel.

**Site-Specific Forest Service Requirements**

**Site-specific Water Resources Protection Measures**
No activity in the very small creek mentioned in the Plan (site 1) would occur without first input from the minerals administrator and district hydrologist and appropriate WRPMs identified and implemented.

**Site-specific Fish Protection Measures**
None
**General Requirements Identified for Protection of Water and /or Fish Resources**

G4: Surface runoff and water quality related  
G5: Disturbed areas kept in stable conditions  
G6: Tree removal related  
G12: Effective buffer strips to protect water quality during seasonal runoff events  
G14: Beaver dams protected  
G15: Stream buffers undisturbed  

H3: Have lined containment vault under hazardous material storage barrels  
H5: Spill kit on site  
H6: Hazardous substances not to be released on land, rivers etc. Have oil absorbing mats  
H8: Check equipment for leaks  

M1: Specific requirements for visual monitoring of small, unnamed creek  

**CITY LIMITS (Placer) Granite Creek - steelhead DCH 200 feet, Bull Trout DCH 200 feet**  

This is a proposed placer operation that is working the high bank in a previously disturbed site along on the east side of Forest Service (FS) 73 road. Processing water will come from and be recycled in the four existing off-channel ponds. All mining activity is separated from Granite Creek by the paved FS 73 Rd. Placer gravels will be hauled to the processing site and stockpiled at this location; approximately 3-5 cubic yds of material will be processed daily. The activity area is 1 acre in size and the test holes are 20’x30’x8’ in size. Equipment used: Bobcat, backhoe, pick-up trucks, 5 yd dump trucks, washing plant, sluice, pumps and highbankers.  

**Site-Specific Forest Service Requirements**  

**Site-specific Water Resources Protection Measures**  
None  

**Site-specific Fish Protection Measures**  
None  

**General Requirements Identified for Protection of Water and /or Fish Resources**

G4: Surface runoff and water quality related  
G5: Disturbed areas kept in stable conditions  
G6: Tree removal related  
G12: Effective buffer strips to protect water quality during seasonal runoff events  
G14: Beaver dams protected  
G15: Stream buffers undisturbed  

H3: Have lined containment vault under hazardous material storage barrels  
H5: Spill kit on site  
H6: Hazardous substances not to be released on land, rivers etc. Have oil absorbing mats  
H8: Check equipment for leaks  

M1: Visual monitoring of Granite Creek is not needed based on site location
EAST TEN CENT (Placer)  East Ten Cent Creek - steelhead DCH 10 feet, Bull Trout DCH two miles

This placer operation is on the west side of East Ten Cent Creek. The operator is proposing test digs in old tailings between the creek and the access road the adjacent claim. The activity area will be approximately 2 acres. Only one test hole (12 ft diameter) will be open at a time and reclaimed before moving onto the next site. An existing processing/settling pond (12’x12’x6’) will be used and all water will be recycled. Existing rock tailings and a small bench (~15 ft wide) is located between mining activity 5 ft above the creek. Waste rock will be used to improve the existing rock berm between the outer edge of the bench area and the creek. Equipment used: pick-up trucks, trommel, backhoe, highbanker, ATVs, pumps, and two generators.

Site-Specific Forest Service Requirements

Site-specific Water Resources Protection Measures
1. Equipment access to the mining site will be limited to use of the FS 7350-070 road, 7350-E1a and designated, miner-created two tracks.
2. A berm of straw bales (1-2’ high) will be placed between the mining activity and the edge of the bench along the creek.
3. Waste rock will not be placed on the berm but temporarily on the south side of the two-track shown on the site map, in the grassy meadow.
4. The area to be mined will be worked from the south end to the north end. This allows the bench to be enlarged at the north end prior to any activity in this portion of the cutbank

Site-specific Fish Protection Measures
None

General Requirements Identified for Protection of Water and/or Fish Resources

G4: Surface runoff and water quality related
G5: Disturbed areas kept in stable conditions
G6: Tree removal related
G12: Effective buffer strips to protect water quality during seasonal runoff events
G14: Beaver dams protected
G15: Stream buffers undisturbed
H3: Have lined containment vault under hazardous material storage barrels
H5: Spill kit on site
H6: Hazardous substances not to be released on land, rivers etc. Have oil absorbing mats
H8: Check equipment for leaks
M1: Specific requirements for visual monitoring of East Three Cent Creek

EDDY SHIPMAN (Lode and Placer)  Granite Creek - steelhead DCH 10 feet, Bull Trout DCH 10 feet

Eddy Shipman is both a proposed claim lode and a proposed placer operation. There is a total of 2 ½ acres of disturbance.

Lode Claim: Lodgepole, western larch and red fir will be used to reinforce the adit; removal of vegetation will occur within the RHCA but no shade bearing trees will be removed. Explosives will be used but, there will be no surface blasting. Up to 5 tons per day will be crushed and milled. Water from Chipman Gulch will be used during the milling process. No more than 150 GPM will be used in the milling process. The operator has proposed to construct a processing pond and one off channel settling ponds
(estimated 10’ x 20’ x 6’). Waste rock will be placed to build up the existing berm between Upper Granite Creek and the Mill site. Equipment used: skid mounted jaw crusher, horse, portable arrastra for milling, ball mill, bobcat.

Proposed placer operation: Placer mining activity will take place along ¼ acre of Chipman Gulch. A 20 ft. stream buffer between mining activity and Chipman Gulch will be maintained. Equipment used: Washing plant, mill, pick-up trucks, horse, ATV’s and water pump, backhoe loader, small cat and dump truck.

Processing Site: Processing water is proposed to be pumped from Chipman Gulch to three off-channel ponds and will be used in both the milling and placer operation. Water will be recycled between the newly constructed processing and settling ponds.

Use of the existing ford on the closed FS road 7300-680 (above the fish barrier culvert) would not exceed 2 weekly trips by heavy machinery to haul material to the processing site. Gravel will be placed and packed on streambanks at fords to protect streambanks. 2-4 round trips per month by pick-up trucks for maintenance needs and fuel delivery would be allowed.

**Site-Specific Forest Service Requirements**

**Site-specific Water Resources Protection Measures**

1. Prior to crossing the ford with a vehicle the channel bed must be determined to be stable and the water depths must be below the frame on the vehicle in order to ensure that equipment can safely cross.
2. Rock both approaches to the ford used to access Adit A (FS road 7300-680 and TA road 7300-E1d)

**Processing Site**

1. Build a berm on the lower portion of each pond to prevent surface water and sediment from entering the wet meadow.
2. Place a straw bale berm during construction and during use of the source water and settling ponds and the edge of the bench to trap any sediment generated by the operation from entering into the wet meadow and Chipman Gulch, and thus Granite Creek.

**Placer Mining**

1. If any placer mining occurs in old lode tailings or results in disturbing the old lode tailings than L3 and L5 apply.
2. Settling pond will be lined with sediment trapping cloth on the stream side of the pond with some drape on the bottom (3 feet) and on the sides (3 feet on either side) (See Olive Tone for a schematic).
3. Place a straw bale berm between the existing horse corral and creek to prevent runoff of nutrients.
4. No removal of trees providing stream shade.

**Lode Mining (adits A and B)**

See General Requirements related to Lode mining below (L1 – L12).

**Site-specific Fish Protection Measures**

None

**General Requirements Identified for Protection of Water and/or Fish Resources**

G4: Surface runoff and water quality related
G5: Disturbed areas kept in stable conditions
G6: Tree removal related
G7: Fords
G12: Effective buffer strips to protect water quality during seasonal runoff events
G14: Beaver dams protected  
G15: Stream buffers undisturbed

H3: Have lined containment vault under hazardous material storage barrels  
H5: Spill kit on site  
H6: Hazardous substances not to be released on land, rivers etc. Have oil absorbing mats  
H8: Check equipment for leaks  
M1: Specific requirements for visual monitoring of Granite Creek and Chipman Gulch

W1 – 3: Requirements for working in wetlands and floodplains  
L3, 8, 11: These require water exiting lode mines to be tested for heavy metals.  
L4: This requires that the first run of the adit material be tested to determine if potential for release of heavy metals as well as additional testing throughout the life of the operation.  
L5: This requirement states that test results will be provided to the Forest Service directly from the testing facility. Should the results exceed EPA and ODEQ’s standards, the miner must address this issue prior to continuing this portion of the operation (36CFR 261.11 (c)).  
L1, 2, L 6, L7, L 9, L 10, and L12 General Lode requirements that address water use and protection.

GRUBSTEAK (Placer) Granite Creek- steelhead DCH 20 feet, Bull Trout DCH 20 feet

This proposed placer operation is working an existing pit (20’x30’x20’deep) and proposes a second test site (20’x30 ’x 12’deep) in the activity area (approximately 2 acres). Excavations are in historic dredge tailings. A 20 ft. stream buffer will be maintained with a gravel berm and straw bales/coils that will be placed between the work site and Clear Creek. Space limits at the site and the preferred approach of keeping equipment furthest from the stream allows temporary stockpiling upslope from the berm and straw bales. If there is space the stockpile will be moved further from the stream. Processing water will be used from an existing processing pond (Site A on map), which is over 150 feet away from Clear Creek. All water will be recycled. The operator is using an existing road and an existing miner constructed bridge to access both test sites. Heavy equipment will access the site via the existing ford on Clear Creek from July 15 – Aug 15 four trips per season. If the miner proposes to ford outside the instream work window then a fish biologist must inspect the crossing and approve beforehand. Gravel will be placed and packed on streambanks at fords to protect streambanks. Equipment used: backhoe, trommel, shaker, water pumps, generator, pick-up trucks, ATV, utility trailer, and motorcycles.

Site-Specific Forest Service Requirements

Site-specific Water Resources Protection Measures

Ford  
Rock southwest approach to the ford.

Site A  
None needed

Site B
1. Place straw bales/coils as a berm between the creek and the mining activity. Gravels and filter cloth are not be used.  
2. Measurement of the 20 foot buffer would start at the top of the valley floor terrace-channel bank break in slope of the side channel.  
3. Miner must fill the existing hole at Site B at the end of each season.  
4. Flow Alteration potential: If the hole starts to fill with water, then the miner is to stop and contact the Forest Service. Site conditions will be reevaluated at that time and additional mitigation measures added if necessary.
Site-specific Fish Protection Measures
None

General Requirements Identified for Protection of Water and/or Fish Resources

G4: Surface runoff and water quality related
G5: Disturbed areas kept in stable conditions
G6: Tree removal related
G7: Fords
G12: Effective buffer strips to protect water quality during seasonal runoff events
G14: Beaver dams protected
G15: Stream buffers undisturbed

H3: Have lined containment vault under hazardous material storage barrels
H5: Spill kit on site
H6: Hazardous substances not to be released on land, rivers etc. Have oil absorbing mats
H8: Check equipment for leaks

M1: Specific requirements for visual monitoring of Clear Creek

HOPEFUL 1 (Placer) – Granite Creek steelhead DCH 150 feet, Bull Trout DCH 150 feet

Operators will primarily work the prospecting area (~100 feet away from Granite Creek) with hand tools, and a backhoe will be used twice during the operating season to loosen or remove material. This area is a high bank located between historic dredge tailings and an old cabin. Only 1-5 yards of material are worked each summer (1 acre). All tailings will be placed adjacent to the dredge hole. The operator will be using existing open, closed and temporary access roads. Water from an existing dredge hole will be used as the source water. Additional water may be withdrawn later in the season from Granite Creek. Waste water will be put into a depression in the dredge tailings. Equipment used: Sluice box, trommel, pick-up truck, backhoe, water pumps and generator and RV.

Site-Specific Forest Service Requirements

Site-specific Water Resources Protection Measures
None

Site-specific Fish Protection Measures
Water pump intakes should be screened with 3/32” plate screen (or equivalent) to avoid entrainment and/or intake of juvenile fish when withdrawing water from Granite Creek.

General Requirements Identified for Protection of Water and/or Fish Resources

G4: Surface runoff and water quality related
G5: Disturbed areas kept in stable conditions
G6: Tree removal related
G12: Effective buffer strips to protect water quality during seasonal runoff events
G14: Beaver dams protected
G15: Stream buffers undisturbed
G23: Identifies characteristics of pumps that can be use when drafting water from a creek to minimize potential for impacts to fish.
H3: Have lined containment vault under hazardous material storage barrels
H5: Spill kit on site
H6: Hazardous substances not to be released on land, rivers etc. Have oil absorbing mats
H8: Check equipment for leaks

M1: Specific requirements for visual monitoring of Granite Creek

**HOPEFUL # 2 & # 3 (Placer)** – Granite Creek - steelhead DCH 50 feet, Bull Trout DCH 50 feet

This is a proposed placer operation with mining proposed on both sides of Granite creek (3.5 acres). The operator will be working old dredge tailings and approximately 15 cubic yards of material will be processed each year. Test holes will be 6’x3’x10’ in size. If valuables are found, the area will be worked in ¼ acre parcels. The processing water will be recycled within the ponds. Pond 1 (20’x30’x4’) is existing and lies on the south side of the claim. Pond 2 (4’x4’x4’) is proposed and would lie on the North side of the claim. As an applicant, the miner reviewed the original description of activities, and in July 2014 proposed moving the north size processing pond to a location where there would not be a discharge call. The miner will be using existing skid trail/roads. Miner would limit the number of crossings of Granite Creek with heavy machinery and trucks to no more than 4 crossings per season only for fuel or maintenance needs, and the miner would use only 1 ford on Granite Creek. Miner would limit use of the ford with a pickup to no more than two times per week for fuel or other maintenance items. Gravel will be placed and packed on streambanks at fords to protect streambanks. Equipment used: Backhoe, dump truck, cat, pick-up trucks, ATVs, high banker, and trommel, washing plant and water pumps.

**Site-Specific Forest Service Requirements**

**Site-specific Water Resources Protection Measures**

South Processing Site Pond 1 and North Processing Site 3 Pond 3
None

North Processing site Pond 2 Processing and Pond 2 Settling
Ensure that two proposed ponds are deep enough and sufficiently bermed to prevent water from overflowing the top of the ponds. Miner will work with the Forest Service Minerals Administrator to ensure proper location of ponds and placement of berms. Source water pond will be the west pond and at least 7 feet from the terrace break in slope. Settling pond will be the east pond, and will be at least 7 feet from the terrace break in slope.

a. A sediment berm will be created along the stream-side edge of the settling pond to eliminate a small swale.

b. Straw bales will be put on the stream-side edge of the sediment berm.

Mining sites 1, 3, and 4
None needed

**Site-specific Fish Protection Measures**

**Fords**

1. Channel bed must be stable and water depths must be below the frame on the vehicle before the ford can be used in order to ensure that equipment can safely cross.

2. East Ford north approach: Rock the north approach to the slope break plus 25 feet of additional road. East Ford south approach and ford (map of road segments in Hydrology report):

   Segment A: rock the road
Segment B: The road steepens for about 35 feet to reach the top of the hill. Place a water bar at the base of the steep section of road where there is a 2.5 foot wide flat area on the stream side of the road. Forest Service Minerals Administrator will be on site and verify water bar location prior to construction. Design the water bar so that it diverts towards the flat area (only option as the other side is a hillslope). Place straw bales at the stream side edge of the flat area to trap all sediment leaving the road and prevent it from entering the creek.

Do not rock this section because rock will only fill the water bar.

Segment C: A water bar will be placed where the road flattens out. Forest Service Minerals Administrator will be on site and verify water bar location prior to construction. This portion of road will be rocked.

3. Ford Unnamed tributary on the south side
   1. Rock both approaches to where 1) the road flattens out (east side) or there is a change in slope (west side).
   2. Leave existing corduroy bridge in the channel

**General Requirements Identified for Protection of Water and/or Fish Resources**

G4: Surface runoff and water quality related
G5: Disturbed areas kept in stable conditions
G6: Tree removal related
G7: Fords
G12: Effective buffer strips to protect water quality during seasonal runoff events
G14: Beaver dams protected
G15: Stream buffers undisturbed

H1: No use of processing chemicals to extract ore unless authorized
H2: No chemical flocculent or surfactant used in ponds unless EPA approved
H3: Have lined containment vault under hazardous material storage barrels
H5: Spill kit on site
H6: Hazardous substances not to be released on land, rivers etc. Have oil absorbing mats
H8: Check equipment for leaks

M1: Specific requirements for visual monitoring of Granite Creek

W1 – 3: Requirements for working in wetlands and floodplains

**L & H (Placer and Lode)** – Olive Creek - steelhead DCH 0.5 miles, Bull Trout DCH > 7 miles

Lode: There are three adits of interest; exploration underground will occur with no surface or underground blasting and no chemicals will be used. A backhoe will be used to remove material from the existing adits and rock material will be piled adjacent to the adit. For the initial testing only a small amount of material will be tested (FS estimates ~ 5 yards total from all adits).

Placer: Testing and mining will occur over 5 acres along the stream and 3 acres upslope of road 1042. Test holes will average in size 20’x30’x10’. Reclamation will be ongoing and only one test hole will be open at a time. Placer exploration below the adits will leave a 10 foot minimum stream buffer from the high water mark and old dredge tailings will separate the new mining activity from Olive Creek. The processing site is on an existing landing at the junction of FS 1042-900 and 1042-950 roads. There are three existing ponds located here; water will be recycled between ponds. This site is located directly below Pete Mann Ditch. Equipment used: pick-up trucks, washing plant, water pumps, and backhoe.

Stream Fording: This is an existing ford on the open FS road 1305-200 (.5 miles above DCH). Fording by heavy equipment will occur 1 -4 times at the beginning and the end of the season. Daily fording by pickup. Gravel will be placed and packed on streambanks at fords to protect streambanks.
Site-Specific Forest Service Requirements

Site-specific Water Resources Protection Measures
Adit 3: Waste rock/tailings will not be returned to the adit but placed at a site selected with input from the minerals administrator and the district hydrologist. Once in place, the waste rock and tailings will be graded to ensure runoff and capped with a minimum of six inches of soil. The soil cap is to be seeded with an approved Forest Service mix to create a vegetative cover.

Site-specific Fish Protection Measures
None

General Requirements Identified for Protection of Water and /or Fish Resources

G4: Surface runoff and water quality related
G5: Disturbed areas kept in stable conditions
G6: Tree removal related
G12: Effective buffer strips to protect water quality during seasonal runoff events
G14: Beaver dams protected
G15: Stream buffers undisturbed

H3: Have lined containment vault under hazardous material storage barrels
H5: Spill kit on site
H6: Hazardous substances not to be released on land, rivers etc. Have oil absorbing mats
H8: Check equipment for leaks

M1: Specific requirements for visual monitoring of Olive Creek

L3, 8, 11: These require water exiting lode mines to be tested for heavy metals.
L4: This requires that the first run of the adit material be tested to determine if potential for release of heavy metals as well as additional testing throughout the life of the operation.
L5: This requirement states that test results will be provided to the Forest Service directly from the testing facility. Should the results exceed EPA and ODEQ’s standards, the miner must address this issue prior to continuing this portion of the operation (36CFR 261.11 (c)).
L1, 2, L 6, L7, L9, L 10, and L12. General Lode requirements that address water use and protection

LIGHTNING CREEK (Placer) – Lightning Creek - steelhead DCH 150 feet, Bull Trout DCH 150 feet

This is a proposed placer operation working old dredge tailings on the south side of Lightning Creek. Mining will take place over 3 sites along the hillside 50’x100’x15’ each in size (approximately 5 acres). The mining operation is over 150 feet from Lightning Creek and FS 1305-100 Rd and old settling ponds separate mining activity from Lightning Creek. There will be reclamation of each parcel before moving to the next activity area. Existing processing ponds and settling ponds will be used; water from Lightning Creek is used under an existing water right to process the material. The operator will use existing roads and a miner built bridge that crosses Lightning Creek. A hardened ford will be used twice during the year to walk heavy equipment across the creek during the instream work window. Gravel will be placed and packed on streambanks at fords to protect streambanks. Equipment used: Backhoe, excavator, two 5 yard dump trucks, pick-up trucks, washing plant, water pumps, generator, and ATVs.
Site-Specific Forest Service Requirements

Site-specific Water Resources Protection Measures
None

Site-specific Fish Protection Measures
1. No water withdrawals are permitted in Lightning Creek after August 15 to protect fish migrating to spawn.
2. If a stream is dry below where the miner is working prior to August 15, then the miner must cease withdrawing water from the creek until flow exceeds the amount withdrawn. The Forest Service Minerals Administrator monitors flow levels. If water withdrawals are stopped, the Minerals Administrator would consult with the Forest Service fish biologist before allowing water withdrawals to resume.
3. On Lightning Creek water pump intakes should be screened with 3/32” plate screen (or equivalent) to avoid entrainment and/or intake of juvenile fish.

General Requirements Identified for Protection of Water and/or Fish Resources

G4: Surface runoff and water quality related
G5: Disturbed areas kept in stable conditions
G6: Tree removal related
G12: Effective buffer strips to protect water quality during seasonal runoff events
G14: Beaver dams protected
G15: Stream buffers undisturbed
G23: Identifies characteristics of pumps that can be use when drafting water from a creek to minimize potential for impacts to fish.

H3: Have lined containment vault under hazardous material storage barrels
H5: Spill kit on site
H6: Hazardous substances not to be released on land, rivers etc. Have oil absorbing mats
H8: Check equipment for leaks

M1: Specific requirements for visual monitoring of Lightning Creek

LITTLE CROSS 1 (Placer) — Granite Creek - steelhead DCH 50 feet, Bull Trout DCH 50 feet

This operation is a small proposed placer operation, working less than ¼ acre approximately 15 feet from Granite Creek on a road that slopes towards Granite Creek. Tailings will be processed at the dispersed campsite using existing groundwater from the dig site. Water will be recycled and no water will be discharged into Granite Creek. Equipment used: ATV, backhoe, and highbanker.

Site-Specific Forest Service Requirements

Site-specific Water Resources Protection Measures
Place mining activity
1. Place straw bales along creek edge,
2. Place a second set of straw bales 6 ft. to 8 ft. upslope from the edge of the creek.
3. Site will be reclaimed at the end of the season.
4. Any sediment that collected behind the straw bale berm located 6 to 8 feet from the edge of the creek will be removed prior to removing the stream side berm.

Site-specific Fish Protection Measures
None
**General Requirements Identified for Protection of Water and/or Fish Resources**

G4: Surface runoff and water quality related  
G5: Disturbed areas kept in stable conditions  
G6: Tree removal related  
G12: Effective buffer strips to protect water quality during seasonal runoff events  
G14: Beaver dams protected  
G15: Stream buffers undisturbed  

H3: Have lined containment vault under hazardous material storage barrels  
H5: Spill kit on site  
H6: Hazardous substances not to be released on land, rivers etc. Have oil absorbing mats  
H8: Check equipment for leaks  

M1: Specific requirements for visual monitoring of Granite Creek  

**LUCKY STRIKE (Lode and Placer) – Quartz Gulch - steelhead DCH > 300 feet, Bull Trout DCH > 300 feet**

This is a lode with historic mill located above Pete Mann Ditch (2 acres). Operator proposes reclamation of the old adit and its existing tunnel system and extension along the vein. This involves the backfill of all exploratory holes from past mining operations. There will also be further exploration and assay of the existing vein through the use of test pits (20’ x 10’ x 10’ deep) near the adit, and removal for commercial processing if viable material is found. There will be ongoing maintenance of the existing mill building and structures on the claim. There is a small spring that provides water for the processing material and there is no hydrologic connection to any streams or waterways. The miner will use existing roads to access the claim. Equipment used: backhoe, pick-up trucks, ore cart, portable generator, electric roto-hammer and hand tools.

**Site-Specific Forest Service Requirements**

**Site-specific Water Resources Protection Measures**

None

**Site-specific Fish Protection Measures**

None

**General Requirements Identified for Protection of Water and/or Fish Resources**

G4: Surface runoff and water quality related  
G5: Disturbed areas kept in stable conditions  
G6: Tree removal related  
H3: Have lined containment vault under hazardous material storage barrels  
H5: Spill kit on site  
H6: Hazardous substances not to be released on land, rivers etc. Have oil absorbing mats  
H8: Check equipment for leaks  

L3, 8, 11: These require that water exiting lode mines to be tested for heavy metals.  
L4: This requires that the first run of the adit material be tested to determine if potential for release of heavy metals as well as additional testing throughout the life of the operation.
MAKE IT (Placer) — Granite Creek - steelhead DCH 100 feet, Bull Trout DCH 100 feet

Make It is a proposed placer operation that will use a backhoe to test dig areas no larger than 15’x20’ down to bedrock (~10 ft). The operator will process approximately 15-20 cubic yards of material during the operating season. Activity site is approximately 2 acres. Each parcel will be reclaimed before moving to the next test dig. All mining activity is > 50 feet away from Granite Creek. Water will be used from the existing pond and recycled to existing off channel settling ponds. Equipment used: pick-up trucks, generators, trommel, high-banker, backhoe, water pumps and an RV.

Site-Specific Forest Service Requirements

Site-specific Water Resources Protection Measures
1. Water used for processing will only be put into the depressions that are being used as settling ponds. No water will be returned to the existing off channel pond which is connected to Granite Creek and is the source water pond.
2. The miner must avoid decreasing the source water pond level below the pond outlet elevation so that the pond and Granite Creek remain hydrologically connected via surface flow.

Site-specific Fish Protection Measures
Water pump intakes should be screened with 3/32” plate screen (or equivalent) to avoid entrainment and/or intake of juvenile fish when withdrawing water from the pond that is connected to Granite Creek

General Requirements Identified for Protection of Water and/or Fish Resources

G4: Surface runoff and water quality related
G5: Disturbed areas kept in stable conditions
G6: Tree removal related
G12: Effective buffer strips to protect water quality during seasonal runoff events
G14: Beaver dams protected
G15: Stream buffers undisturbed
G23: Identifies characteristics of pumps that can be use when drafting water from a creek to minimize potential for impacts to fish.

H3: Have lined containment vault under hazardous material storage barrels
H5: Spill kit on site
H6: Hazardous substances not to be released on land, rivers etc. Have oil absorbing mats
H8: Check equipment for leaks

M1: Specific requirements for visual monitoring of Granite Creek

MUFFIN (Placer) – Last Chance Creek - steelhead DCH > 300 feet, Bull Trout DCH > 300 feet

Muffin is a proposed placer operation along Last Chance Creek. There are four exploration sites included in which, test holes will be dug around 20’x25’x10’ in size, about 2.5 acres. A 20 foot buffer will be maintained between the dig site and Last Chance Gulch. Trees providing shade to the stream will be left. Each test hole and site will be reclaimed before moving on to the next. Approximately 4-10 yards of material will be removed for processing from each test site during the operating season. There is one
processing site; water comes from an existing reservoir and water is recycled into two existing settling ponds. Equipment used: sluice box, high banker, dredge, trommel, backhoe, 3-5 yd dump truck and ATVs and an RV.

**Site-Specific Forest Service Requirements**

**Site-specific Water Resources Protection Measures**

**Sites 1, 2, and 3**

Limit the size of the hole at any one time to 10 feet or less or start the hole 5 to 10 feet back from point where the hillslope has a break in slope just before it reaches the Gulch (wetland meadow related)

**Site 4**

None

**Site-specific Fish Protection Measures**

None

**General Requirements Identified for Protection of Water and/or Fish Resources**

G4: Surface runoff and water quality related
G5: Disturbed areas kept in stable conditions
G6: Tree removal related
G12: Effective buffer strips to protect water quality during seasonal runoff events
G14: Beaver dams protected
G15: Stream buffers undisturbed

H3: Have lined containment vault under hazardous material storage barrels
H5: Spill kit on site
H6: Hazardous substances not to be released on land, rivers etc. Have oil absorbing mats
H8: Check equipment for leaks

M1: Specific requirements for visual monitoring of Last Chance Creek where it exists in the project area.

**OLD ERIC 1 & 2 (Placer) – Granite Creek - steelhead DCH 150 feet, Bull Trout DCH 150 feet**

Old Eric is a proposed placer operation working an area on the west side of Granite Creek. The claim exists of one work site approximately 1 acre in size and will move no more than 5 yards of material during the operating season. The operator will recirculate the existing water from an old settling pond (drainage filter area), and when it becomes unusable, water will be discharged into an existing settling pond (100’x50’x 3’). Use of ponds is to assure infiltration, prevent ponding of water and minimize possible water temperature increases. The majority of this work will be by hand excavation with occasional backhoe use to loosen the dig site and upgrade the water source and recirculating settling pond. The operator will use existing roads to access the claim. Equipment used: pick-up truck, sluice box, water pumps and backhoe.

**Site-Specific Forest Service Requirements**

**Site-specific Water Resources Protection Measures**

**Settling Pond**

Water temperature related: No standing water is permissible in the settling pond beyond 1 day.
Site-specific Fish Protection Measures
None

General Requirements Identified for Protection of Water and /or Fish Resources

G4: Surface runoff and water quality related
G5: Disturbed areas kept in stable conditions
G6: Tree removal related
G12: Effective buffer strips to protect water quality during seasonal runoff events
G14: Beaver dams protected
G15: Stream buffers undisturbed

H3: Have lined containment vault under hazardous material storage barrels
H5: Spill kit on site
H6: Hazardous substances not to be released on land, rivers etc. Have oil absorbing mats
H8: Check equipment for leaks

M1: Specific requirements for visual monitoring of Granite Creek

OLIVE TONE (Placer) – Olive Creek - steelhead DCH 50 feet, Bull Trout DCH > 5 miles

Olive Tone is a 2 acre placer operation that proposes placer exploration on a previously disturbed landing on the west side of Olive Creek using a backhoe. Test holes will be approximately 30’x30’x10’ in size and each test hole will be reclaimed before moving to the next. An existing spring will be used as a water source along with two proposed off channel settling ponds (20’x10’x10’). Ponds will be approximately 40 ft. from Olive Creek. Water will be recycled in the settling ponds. Miner would limit crossing the existing ford with heavy machinery to access the site to no more than 4 times per season, and daily crossing with an ATV. Gravel will be placed and packed on streambanks at fords to protect streambanks.

Springs are the primary water source for the ponds. Water is recycled in the ponds during mining operations. As proposed in the Plan, pond water may be supplemented with water withdrawn from Olive Creek to account for losses from evaporation and seepage. Based on the size of the ponds and type of mining proposed, it is expected water withdrawals will occur once every one to two weeks during the operating season (Chris Helberg personal communication).

Equipment used: Backhoe, front loader truck, pick-up trucks, highbanker, sluices, washplant, trommel, gold spinners, water pumps and 2 self-contained RVs.

Site-Specific Forest Service Requirements

Site-specific Water Resources Protection Measures

Settling Ponds
A trench will be dug parallel to the settling ponds for the pond length plus five feet on either side. The trench will be on the stream side of the settling ponds and 5 to 20 feet away from the ponds and the location field verified with the Forest Service prior to installation. The trench will be lined with with material such as 1) a bentonite blanket, 2) filter cloth, or 3) plastic to eliminate the potential for subsurface flow to transport sediment into the creek (see below for schematic).

If a bentonite blanket is used then it can be left buried. If filter cloth or plastic is used it must be removed at completion of the project.
Site-specific Fish Protection Measures
1. If a stream is dry below where the miner is working prior to August 15, then the miner must cease withdrawing water from the creek until flow exceeds the amount withdrawn.
2. See General Requirement G23 below. This is a protection measure used when withdrawing water from Olive Creek or Quartz Gulch.

General Requirements Identified for Protection of Water and /or Fish Resources

- G4: Surface runoff and water quality related
- G5: Disturbed areas kept in stable conditions
- G6: Tree removal related
- G7: Fords
- G12: Effective buffer strips to protect water quality during seasonal runoff events
- G14: Beaver dams protected
- G15: Stream buffers undisturbed
- G23: Identifies characteristics of pumps that can be use when drafting water from a creek to minimize potential for impacts to fish.

- H3: Have lined containment vault under hazardous material storage barrels
- H5: Spill kit on site
- H6: Hazardous substances not to be released on land, rivers etc. Have oil absorbing mats
- H8: Check equipment for leaks
- M1: Specific requirements for visual monitoring of Olive Creek

ROSEBUD 1-4 – Granite Creek - steelhead DCH 200 feet, Bull Trout DCH 200 feet

Rose Bud is a 5 acre proposed placer operation that will be working old dredge tailings north of the County Road 24. Test holes will be dug with a backhoe and are located on an existing highbar. The operator has estimated approximately 2-10 yards of material will be processed each year. The operator is using existing roads and settling ponds. County Road 24 separates mining activity from Granite Creek. Equipment used: backhoe, trommel, water pump, gold spinner and 3 yard dump truck and pick-up trucks.
Site-Specific Forest Service Requirements

Site-specific Water Resources Protection Measures
All settling ponds must be sufficiently bermed to prevent water and sediment from overtopping to top of the ponds and flowing down the road and into the old dredge ponds. Berm material can be either sediment or straw bales but must be stable.

Site-specific Fish Protection Measures
Miner would limit loss of water in the processing pond to no more than 6 inches of water during daily operations. Miner is to establish a fixed measuring device such a a staff gage or measuring rod.

General Requirements Identified for Protection of Water and /or Fish Resources

G4: Surface runoff and water quality related
G5: Disturbed areas kept in stable conditions
G6: Tree removal related
G12: Effective buffer strips to protect water quality during seasonal runoff events

H3: Have lined containment vault under hazardous material storage barrels
H5: Spill kit on site
H6: Hazardous substances not to be released on land, rivers etc. Have oil absorbing mats
H8: Check equipment for leaks
M1: Specific requirements for visual monitoring of dredge ponds

ROYAL WHITE GROUP (Lode) — distant from any stream - steelhead DCH > .5 miles, Bull Trout DCH > .5 miles

Royal White is a proposed lode operation above Pete Mann Ditch. There are three adits in this mining operation, located on 3 acres. The operator estimated approximately five tons of material will be processed daily. Small diameter trees may be used to reinforce the old adits. Explosives may be used but, no surface blasting is proposed. Material will be hauled from adits to the processing site. Water from the portals will be used to process the excavated material and waste water is discharged into an existing settling pond (20’x30’x6’). No chemicals are used during mining or milling of material. Waste rock will be placed on current landings and tailings will be mixed with cement slurry and pumped back into the mine. The operator is using existing roads. Equipment used: underground mucker, air trammer and ore cart, surface air compressor, bobcat or backhoe, small cat, side mounted jaw crusher, 5Tpd ball mill, and recycling tank for milling, dump truck and pick-up trucks, water pumps and chainsaws.

Site-Specific Forest Service Requirements

Site-specific Water Resources Protection Measures
None

Site-specific Fish Protection Measures
None

General Requirements Identified for Protection of Water and /or Fish Resources

G4: Surface runoff and water quality related
G5: Disturbed areas kept in stable conditions
G6: Tree removal related

H3: Have lined containment vault under hazardous material storage barrels
H5: Spill kit on site
H6: Hazardous substances not to be released on land, rivers etc. Have oil absorbing mats
H8: Check equipment for leaks

L3, 8, 11: These require that water exiting lode mines be tested for heavy metals.
L4: This requires that the first run of the adit material be tested to determine if potential for release of heavy metals as well as additional testing throughout the life of the operation.
L5: This requirement states that test results will be provided to the Forest Service directly from the testing facility. Should the results exceed EPA and ODEQ’s standards, the miner must address this issue prior to continuing this portion of the operation (36CFR 261.11 (c)).
L1, 2, L 6, L7, L9, L 10, and L12. General Lode requirements that address water use and protection.

RUBY GROUP (Placer) – Granite Creek and Ruby Creek - steelhead DCH 20 feet, Bull Trout DCH 20 feet

Ruby is a proposed placer operation with 8 proposed mining sites (~3 acres) located on Ruby and Clear creeks. The operator proposes to dig 5-20 test holes at each site. Each test hole will be reclaimed before moving onto the next test hole. Test holes will remove 1-2 yards of material (8 feet deep). Yearly production is estimated at 2-5 yards of material a year. Operator will be using a self- contained and portable wash plant and using existing roads/skid trails. The operators are also proposing a portable ATV bridge over Clear Creek but they would have to walk heavy equipment and pick-up trucks across Clear Creek due to the limiting size of the bridge. Road 1310-E1a is used to ford Ruby Creek, and Ruby Creek seasonally floods the road. Clear Creek ford - Miner would mobilize heavy equipment to work sites #1, 2 and 3 and the miner would limit the number of crossings over Clear Creek to no more than 4 times per season. Miner would limit crossings with pickup truck to no more than 2 times per week for maintenance needs and fuel. An ATV bridge would be in place for daily use of an ATV crossing on Clear Creek. Ruby Creek ford - Miner would mobilize heavy equipment to work sites #1, 2 and 3 and the miner would limit the number of crossings over Ruby Creek to no more than 4 times per season. Miner would limit crossings with pickup truck to no more than 2 times per week for maintenance needs and fuel. Miner would limit crossings with an ATV to twice in June, and five trips per week in July and August, during low flows or the crossing is dry. Gravel will be placed and packed on streambanks at fords to protect streambanks.

Equipment used: Backhoe, trommel, water pumps, ATV’s, and pick-up trucks.

Site-Specific Forest Service Requirements

Site-specific Water Resources Protection Measures

Mining at Sites 1, 2, and 3
1. Measurement of the 10 foot buffer would start at the top of the valley floor-channel break in slope.
2. Use of the temporary road behind barricade that accesses work sites # 1, 2, and 3 is limited to after the road goes dry.
3. Straw bales or wattles must be placed between work sites #1, 2 and 3 and Ruby Creek.
4. Straw bales or wattles must be placed across the road used to access sites 1, 2, and 3 where the road could contribute sediment into the side channel of Clear Creek in order to trap any sediment generated by the activity.

Mining at Sites 4, 5, 6, and 8
1. Measurement of the 10 foot buffer would start at the top of the valley floor-channel break in slope.
2. Straw bales or wattles must be placed between test holes and Clear Creek and between the test holes and the side channel to Clear Creek.
Mining at Site 7
None

Access Roads
*Road 1310-E1a (access road to Sites 1, 2, and 3)* (see Appendix A for a map of the sites)

In identifying Forest Service WRPMs to prevent a discharge of sediment into Ruby Creek from the use of TA 1310-E1a and the Ruby Creek ford it was necessary to divide the road into segments:

- **Segment A**: The portion of TA 1310-E1a between the Clear Creek ford and the Ruby Creek ford
- **Segment B**: The north and south approaches to the ford.
- **Segment C**: The portion of the road between the Ruby Creek ford and Site 2
- **Segment D**: The portion of the road between Site 2 and Site 1

**Segment A**: No WRPMs are needed as this section of the road does not interact with Ruby Creek.

**Segment B**: The north and south approaches to the ford and 25 feet of the road on the south side of the ford, just before the approach begins will be rocked.

**Segment C**: Weed-free straw bales will be placed end to end starting at the north side of the ford to Site 2 along the west side of the road. Straw bales will be two bales deep to act as a dam to prevent water from Ruby Creek from flowing onto Segment C and moving sediment generated by road use into Ruby Creek.

**Segment D**: If water from Ruby Creek is observed flowing onto this segment of road, then the WRPMs stated for Segment C would be put into place.

**Temporary ATV Bridge**
1. Stream banks where the bridge will be placed will be rocked.
2. At the beginning of each season, this area will be checked and more rock added as necessary.
3. Bridge will be removed each fall.

**Site-specific Fish Protection Measures**
None

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**Ruby Group** Shows the location of the Valley floor terrace (historic floodplain) and how Channel break-in-slope geomorphic feature is defined. Note that this edge is NOT the streambank of the active channel but the streambank of the larger geomorphic channel. The active channel is inset into the geomorphic channel (from hydrology report).
General Requirements Identified for Protection of Water and/or Fish Resources

G4: Surface runoff and water quality related
G5: Disturbed areas kept in stable conditions
G6: Tree removal related
G7: Fords
G12: Effective buffer strips to protect water quality during seasonal runoff events
G14: Beaver dams protected
G15: Stream buffers undisturbed

H3: Have lined containment vault under hazardous material storage barrels
H5: Spill kit on site
H6: Hazardous substances not to be released on land, rivers etc. Have oil absorbing mats
H8: Check equipment for leaks

M1: Specific requirements for visual monitoring of Clear Creek and Ruby Creek

SUNSHINE/MCWILLIS (Placer) – McWillis Gulch - steelhead DCH 0.25 miles, Bull Trout DCH > 5 miles

There are two processing sites associated with this 2.5 acre proposed placer operation. The two work areas will be in ¼ acre parcels. Each site will be reclaimed before opening another and no more than ¼ acre parcels will be disturbed at a time. The operator estimated that 100 cubic yards of material will be processed annually. There will be a 30 foot buffer between the work site, processing site and McWillis Gulch. For the trommel, three existing off-channel ponds (20’x30’x10’) will be used during this operation with water being recycled in the settling ponds. The operator will use existing roads and a operator constructed bridge to access the processing site. The bridge is already in place and is made of logs, and is not open for public use. Equipment used: Backhoe, cat, 5 yard dump truck, pick-up trucks, ATVs, trommel, high banker, wash plant, and water pumps.

Site-Specific Forest Service Requirements

Site-specific Water Resources Protection Measures

1. Only processing site 1 will be used.
2. Berm the downstream end of the Pond 2 (settling pond) so that the only outlet point is the pipe.
3. Straw bales or wattles must be placed between the edge of the hillslope and the gulch at mining site #2.

Site-specific Fish Protection Measures

None

General Requirements Identified for Protection of Water and/or Fish Resources

G4: Surface runoff and water quality related
G5: Disturbed areas kept in stable conditions
G6: Tree removal related
G12: Effective buffer strips to protect water quality during seasonal runoff events
G14: Beaver dams protected
G15: Stream buffers undisturbed

H3: Have lined containment vault under hazardous material storage barrels
H5: Spill kit on site
H6: Hazardous substances not to be released on land, rivers etc. Have oil absorbing mats
H8: Check equipment for leaks
M1: Visual monitoring of McWillis Gulch creek will only apply while there is flowing water in the creek.

**TETRA ALPHA (Placer) – Boulder Creek - steelhead DCH 25 feet, Bull Trout 25 feet**

Placer mining is proposed on 8 acres on the south side of Boulder Creek. The operator proposes processing approximately one hundred cubic yards of material per day. The miner proposes a 25 foot stream buffer throughout the entire placer operation. Placer gravels will be excavated to bedrock and all material will be hauled to a pre-existing processing site on the north side of Boulder Creek at the Tetra Alpha Placer site where processing equipment is currently located. An existing pond provides water for processing and all water will be recycled on site. Miner has a valid water right. Water withdrawals would be monitored by the Minerals Administrator. Mining will take place in approximately 1/2 acres parcels with a total disturbance area of 1 acre each season and a maximum depth of 30 feet. Each ½ acre parcel will be reclaimed before moving to the next work site. After material is processed it will be returned to the excavation site for fill. The operator has proposed three ford crossings to access the proposed placer operations on the south side of Boulder Creek. Miner would limit crossing of fords to no more than 3 times per day for each crossing with heavy machinery for hauling material to the processing site. Miner would limit crossing the existing ford to no more than 2-4 times per week with a pickup truck or ATV for maintenance and repairs. Gravel will be placed and packed on streambanks at fords to protect streambanks. There are two fords for Tetra Alpha Placer. Equipment used: excavator, cat, generator, trommel, water pumps, dump trucks, and ATVs.

**Site-Specific Forest Service Requirements**

**Site-specific Water Resources Protection Measures**

1. The high water mark is defined as the back edge of the meadow because the lushness of the meadow vegetation indicates that this area is frequently flooding and has a high water table. Measurement of the 25 foot buffer would start at the back edge of the meadow.
2. For Stage 2 mining operations (the area accessed via 7355-m3c and 7355-mcd roads), a straw bale berm will be constructed at the base of the hillslope.

**Fords**

West Ford (existing); used to access Stage 1 area via 7355-m3b road (State 1 area is located along the western portion of the 7355m3a and m3b temporary road).

1. Ford approaches will be rocked.

East Fords (proposed); used to access Stage 2 mining area (Stage 2 area is on the south side of Boulder Creek along the eastern portion of 7355-mc3 temporary road).

1. Construction will take place during the instream work window
2. Material will be pulled away from the stream and deposited in a location where the sediment will not be able to reach the stream during high flow
3. Small straw wattles or bales or silt fences will be placed along the stream when pulling back the material during ford construction or maintenance
4. Ford approaches will be rocked and sloped
5. General requirement G7 applies (See below)

**Access Road**

1. Where temporary road 7355-M3d cross the meadow, it will be rocked to at least 20 feet back from the creek to ensure that no sediment will make it to the creek and at additional areas as needed to ensure that road would not erode and trigger gullying in the meadow.
2. Two-track location would be flagged by miner and approved by Forest Service personnel.
Site-specific Fish Protection Measures

1. A fisheries biologist would monitor stream crossings to ensure that constructed fords do not create a fish barrier during low flows.
2. No water withdrawals are permitted in Boulder Creek after August 15 to protect fish migrating to spawn.
3. If Boulder Creek is dry below where the miner is working prior to August 15, then the miner must cease withdrawing water from the creek until flow exceeds the amount withdrawn.

General Requirements Identified for Protection of Water and/or Fish Resources

G4: Surface runoff and water quality related
G5: Disturbed areas kept in stable conditions
G6: Tree removal related
G7: Fords
G12: Effective buffer strips to protect water quality during seasonal runoff events
G14: Beaver dams protected
G15: Stream buffers undisturbed

H3: Have lined containment vault under hazardous material storage barrels
H5: Spill kit on site
H6: Hazardous substances not to be released on land, rivers etc. Have oil absorbing mats
H8: Check equipment for leaks

M1: Visual monitoring for turbidity of Boulder Creek is not required given site conditions and distance from Boulder Creek.

W1 – 3: Requirements for working in wetlands and floodplains

TETRA ALPHA (Mill and Lode) - Boulder Creek - steelhead DCH 25 feet, Bull Trout 25 feet

Lode Claim: Operator would use existing roads to access the adit (1 acre). Material from the adits would be hauled to the mill site. No explosives are proposed for this operation. Approximately 10 tons of ore will be removed to the milling site which could result in an estimated 30 tons of waste rock. Equipment used: excavator, cat, dump trucks and pick-up trucks.

Mill Site: This is an existing mill site (1 acre) from a previously approved plan. The plan was resubmitted with amendments in order to continue operations. Water source for the mill comes from an existing reservoir on Last Chance Creek and the operator will use three existing settling ponds where water will be recycled. Miner has a valid water right. Water withdrawals would be monitored by the Minerals Administrator. Equipment used: Jaw crusher, vibrator mill, front end loader, dump truck, air compressor, water pumps, final gold recovery unit.

Site-Specific Forest Service Requirements

Site-specific Water Resources Protection Measures

None needed.

Site-specific Additional Fish Protection Measures

1. No water withdrawals are permitted in Boulder Creek after August 15 to protect fish migrating to spawn.
2. If Boulder Creek is dry below where the miner is working prior to August 15, then the miner must cease withdrawing water from the creek until flow exceeds the amount withdrawn.

General Requirements Identified for Protection of Water and/or Fish Resources

G4: Surface runoff and water quality related
G5: Disturbed areas kept in stable conditions  
G6: Tree removal related  
G12: Effective buffer strips to protect water quality during seasonal runoff events  
G14: Beaver dams protected  
G15: Stream buffers undisturbed  

H1: No use of processing chemicals to extract ore unless authorized  
H2: No chemical flocculent or surfactant used in ponds unless EPA approved  
H3: Have lined containment vault under hazardous material storage barrels  
H5: Spill kit on site  
H6: Hazardous substances not to be released on land, rivers etc. Have oil absorbing mats  
H8: Check equipment for leaks  

M1: Specific requirements for visual monitoring of Boulder Creek  

L3, 8, 11: These require that water exiting lode mines to be tested for heavy metals.  
L4: This requires that the first run of the adit material be tested to determine if potential for release of heavy metals as well as additional testing throughout the life of the operation.  
L5: This requirement states that test results will be provided to the Forest Service directly from the testing facility. Should the results exceed EPA and ODEQ’s standards, the miner must address this issue prior to continuing this portion of the operation (36CFR 261.11 (e)).  
L1, 2, L 6, L7, L9, L 10, and L12. General Lode requirements that address water use and protection.  

**TROY D (Placer) – Granite Creek - steelhead DCH 25 feet, Bull Trout 25 feet**  

This is a proposed placer operation that proposes excavation of old dredge tailings on 8 acres along the north side of Granite Creek. There will be a 25 foot stream buffer and a berm of old dredge tailings separates the claim from Granite Creek. Test holes will be 20’x20’ and down to bedrock (~ 12 ft. deep). Each test hole will be reclaimed before moving to the next test site. The operator estimated that 50 cubic yards of material will be processed daily. Material will be processed at two existing ponds >200 ft away from the old tailing berm; water will be recycled on site. Equipment used: backhoe, excavator, small cat, 5 yd dump truck, washing plant, trommel, sluices, generator, 1 filter trailer, water pumps, pick-up trucks, hand tools and a self-contained RV trailer. A powerline has been proposed adjacent to the operation off of County Road 21 to run the filter trailer. The powerline would consist of two 45 foot poles approximately 300 feet apart.  

**Site-Specific Forest Service Requirements**  

**Site-specific Water Resources Protection Measures**  
1. Pond A, as identified on the miner’s map, would be used only as the source water pond.  
2. Pond B, as identified on the miner’s map, would be used as a settling pond. A trench will be dug parallel to the settling ponds for the pond length plus five feet on either side. The trench will be on the stream side of the settling ponds and 5 to 20 feet away from the ponds and the location field verified with the Forest Service prior to installation. The trench can be lined with 1) a bentonite blanket, 2) filter cloth, 3) plastic to eliminate the potential for subsurface flow to transport sediment into the creek (see Olive Tone for schematic).  

If a bentonite blanket is used then it can be left buried. If filter cloth or plastic is used it must be removed at completion of the project.  

**Site-specific Fish Protection Measures**  
None
General Requirements Identified for Protection of Water and /or Fish Resources

G4: Surface runoff and water quality related
G5: Disturbed areas kept in stable conditions
G6: Tree removal related
G12: Effective buffer strips to protect water quality during seasonal runoff events
G14: Beaver dams protected
G15: Stream buffers undisturbed

H3: Have lined containment vault under hazardous material storage barrels
H5: Spill kit on site
H6: Hazardous substances not to be released on land, rivers etc. Have oil absorbing mats
H8: Check equipment for leaks

M1: Specific requirements for visual monitoring of Granite Creek

YELLOW GOLD (Placer) – Last Chance Creek - steelhead DCH > 2 miles, Bull Trout > 2 miles

This is a small scale proposed placer operation on Last Chance Gulch Creek. Placer gravels will be excavated using a backhoe with excavations being 50’x30’x12’ in size. Two holes will be open at a time and material will be processed using three proposed off-channel settling ponds (20’x15’x10’) and one existing pond. A 25 foot stream buffer will be observed and old dredge tailings separate mining activity from Last Chance Creek. The operator will be using existing roads and trails to access the claim. Equipment used: Backhoe, wash plant, trommel, sluices, highbankers, water pumps, pick-up trucks, and 5 yard dump trucks.

Site-Specific Forest Service Requirements

Site-specific Water Resources Protection Measures

1. Settling ponds would be located with input from the minerals administrator and district hydrologist and appropriate WRPMs identified and implemented
2. The foot bridge will be limited to planks of wood that can be moved at the end of each season by hand.

Site-specific Fish Protection Measures

None

General Requirements Identified for Protection of Water and /or Fish Resources

G4: Surface runoff and water quality related
G5: Disturbed areas kept in stable conditions
G6: Tree removal related
G12: Effective buffer strips to protect water quality during seasonal runoff events
G14: Beaver dams protected
G15: Stream buffers undisturbed

H3: Have lined containment vault under hazardous material storage barrels
H5: Spill kit on site
H6: Hazardous substances not to be released on land, rivers etc. Have oil absorbing mats
H8: Check equipment for leaks

M1: Not needed. Last Chance Creek in this area is just a large pond and wetland.
YELLOW JACKET (Placer) – Orofino Gulch - steelhead DCH > 300 feet, Bull Trout > 300 feet

Yellow Jacket will excavate placer material over a 7.5 acre area along the South Fork of Orofino Gulch. Excavations will be approximately 30’x50’x8’ in size. A 20 foot stream buffer will be observed between the mining operations and South Fork Orofino Gulch. An old berm of tailings exists between the proposed mining activity and Orofino Gulch. If valuables are identified the work site may expand to ¼ acre parcels. No more than one test hole will be open at a time and the ¼ acre parcels will be reclaimed before working the next area. The processing site is located on private property. Short segment of temporary road will be established between placer excavations and the existing roads to the processing site. Equipment used: backhoe, cat, trommel, water pumps, gold spinner, pick-up trucks, and 5 yard dump trucks.

Site-Specific Forest Service Requirements

Site-specific Water Resources Protection Measures
No lode material mined on private land, or water that discharges from the adit on private land is allowed on Forest Service lands.

Site-specific Fish Protection Measures
None

General Requirements Identified for Protection of Water and/or Fish Resources

G4: Surface runoff and water quality related
G5: Disturbed areas kept in stable conditions
G6: Tree removal related
G12: Effective buffer strips to protect water quality during seasonal runoff events
G15: Stream buffers undisturbed

H3: Have lined containment vault under hazardous material storage barrels
H5: Spill kit on site
H6: Hazardous substances not to be released on land, rivers etc. Have oil absorbing mats
H8: Check equipment for leaks

M1: Not needed. Highly disturbed area and no connection to any fish-bearing streams due to past hydraulic mining.

L3, 8, 11: These require water exiting lode mines to be tested for heavy metals.
L5: This requirement states that test results will be provided to the Forest Service directly from the testing facility. Should the results exceed EPA and ODEQ’s standards, the miner must address this issue prior to continuing this portion of the operation (36CFR 261.11 (c)).
L1, 2, L 6, L7, L9, L 10, and L12 General Lode requirements that address water use and protection.

Plans of Operations that are No Effect to ESA listed species and DCH

The following Plans of Operations have been determined to be no effect to ESA listed species and their Designated Critical Habitat because of their distance to listed species and DCH, or the lack of hydrologic connection and no causal mechanism to affect listed species and DCH. :

Muffin
Yellow Gold
Lucky Strike
Royal White
Table 4 summarizes many of the connected actions of the Plans of Operations included in the Granite mining EIS and this BA. Included is information on where water will accessed for mining activities, if there is road activity associated with a claim, identifying stream fording, and structures (such as cabins) to be used on the claim.
Table 4. Connected Activities of the proposed Plans of Operations*

<table>
<thead>
<tr>
<th>Operation Name</th>
<th>Forest¹</th>
<th>Lode</th>
<th>Placer</th>
<th>Water Source</th>
<th>Temporary² Road Activity</th>
<th>Bridge Use</th>
<th>Stream Fording</th>
<th>Structures within RHCA</th>
</tr>
</thead>
<tbody>
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<td>Altona</td>
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<td>Placer</td>
<td>Water Source</td>
<td>Temporary Road Activity</td>
<td>Bridge Use</td>
<td>Stream Fording</td>
<td>Structures within RHCA</td>
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<tr>
<td>Tetra Group (Mill and Lode)</td>
<td>WWNF</td>
<td>X</td>
<td></td>
<td>Reservoir on Last Chance Creek, processing pond and off-channel ponds</td>
<td>0.39 miles</td>
<td>4 (trailer, sheds and mill)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Troy D</td>
<td>UNF</td>
<td>X</td>
<td></td>
<td>Existing off channel pond</td>
<td></td>
<td></td>
<td></td>
<td>1 trailer</td>
</tr>
<tr>
<td>Yellow Gold</td>
<td>WWNF</td>
<td>X</td>
<td></td>
<td>Existing off channel pond</td>
<td></td>
<td></td>
<td></td>
<td>None</td>
</tr>
<tr>
<td>Yellow Jacket</td>
<td>WWNF</td>
<td>X</td>
<td></td>
<td>Adit on private land</td>
<td></td>
<td></td>
<td></td>
<td>None</td>
</tr>
</tbody>
</table>

*Muffin, Lucky Strike, Royal White and Yellow Gold have a “No Effect” determination for Mid C Steelhead, bulltrout and their DCH given distance to designated critical habitat and perennial fish bearing streams and no causal mechanism for an effect.

\(^1\) WWNF=Wallowa-Whitman NF, UNF= Umatilla NF.

\(^2\) Detailed temporary roads information can be found in Appendix D.
Water Quality Best Management Practices and Protection Measures

The Granite Mining management requirements and mitigation measures meet or exceed state requirements in accordance with the Clean Water Act of 1977 for protection of waters of the State of Oregon (OAR Chapters 340-341) through planning, application, and monitoring of Best Management Practices (USDA BMPs 2012) in conformance with the UNF Forest plan as amended by PACFISH (USDA 1995). These measures also meet the direction for management of wetlands and floodplains in accordance with EO 11990 and EO 11988.

The Whitman Ranger District and North Fork John Day Ranger District Minerals Administrators are responsible for completing the minerals inspections and review to determine if Forest Plan standards and guides, PACFISH/INFISH direction, as well as the site specific protection measures and requirements in the Plans of Operation are being met. If operations are found to be not in compliance, the Minerals Administrator is responsible for assuring corrective action is taken. Perennial streams in the operation shall be monitored by the Forest Service for water quality, sediment, and temperature through normal compliance inspections, and reclamation inspections. Appendix F describes the annual inspection items.

The Minerals Administrator is also responsible for reclamation reviews. These reviews assure that requirements in the reclamation plans are being properly implemented and completed in a timely manner. The annual monitoring program would be accomplished on a yearly basis following mining to determine vegetation response, soil stability, and the impact of roads on water quality. Reclaimed areas would be monitored to identify areas of instability and detrimental compaction. These areas would be restored to meet Forest Service standards.

Additional monitoring will occur using the 2012 BMP Sampling and Monitoring protocol (Appendix G) based on the number of active mines each year. A minimum of two mines or 25% of active operations, not to exceed four total each year, would be monitored under the current 2012 protocol. Mine operations that are LAA fisheries resources would be targeted and one to three random sites would be chosen for sampling each year.

PACFISH/INFISH Standards and Guidelines for Minerals Management:

MM-1.
If the Notice of Intent indicates a mineral operation would be located in a Riparian Habitat Conservation Area, or could affect attainment of Riparian Management Objectives, or adversely affect listed anadromous fish, require a reclamation plan, an approved Plan of Operations, and reclamation bond. Such plans and bonds must address costs of removing facilities, equipment and materials; recontouring disturbed areas; isolating and neutralizing toxic material; salvage and replacement of topsoil; and revegetation of RHCAs. Reclamation bonds must contain measurable attainment and bond release criteria for each reclamation activity.

MM-2
Where no alternative to sitting facilities in RHCAs exist, locate and construct the facilities in ways that avoid impact to RHCAs and adverse effects. Where no alternative to road construction exists, keep roads to the minimum necessary for the approved mineral activity. Close obliterate and revegetate roads no longer required for mineral or land management activities.

MM-3
If no alternative to locating mine waste facilities in RHCAs exists, and releases can be prevented and stability can be ensured, then:
- Analyze the waste material using current sampling methods
- Locate and ensure mass stability and prevent the release of acid or toxic materials.
- Reclaim and monitor waste facilities to assure chemical and physical stability and vegetation.
- Require adequate reclamation bonds to ensure long term chemical and physical stability
MM-6

Develop inspection, monitoring, and reporting requirements for mineral activities. Evaluate and apply the results of inspection and monitoring to modify mineral plans as needed to eliminate impacts that prevent attainment of RMOs and avoid adverse effects to listed fish.

General Requirements for Protection of Surface Resources

The general mitigations apply to all mine operations analyzed in the Granite Mining Project.

G1. In accordance with 36 CFR §228.4(d), the operator will submit a supplement to a Plan of Operations for any ground-disturbing operations not specifically covered within the initial Plan. Any supplemental plan shall be subject to approval by the authorized officer in the same manner as the initial plan (36CFR §228.5(c)).

G2. Prior to approval of the Plan of Operations, the operator will furnish a reclamation bond (36CFR §228.13(a)). The bond will be calculated based on site-specific conditions addressing the resource concerns listed in 36CFR §228.8(g), Reclamation. The bond shall also cover the removal of all equipment and improvements authorized in the plan, or any subsequent supplements or modifications to the plan. The bond amount may be adjusted during the term of this proposed plan of operations in response to changes in the operations or to changes in the economy.

G3. Operations shall be conducted to prevent damage to historic properties or objects of antiquity protected by American Antiquities Act (16 U.S.C. 433); Section 106 of the National Historic Preservation Act of 1966, as amended; National Environmental Policy Act of 1969; American Indian Religious Freedom Act of 1978; Archaeological Resource Protection Act of 1979, as applicable in 36 CFR 261 Regulations; applicable Sections 36 CFR 800 Regulations; and other laws and various executive orders that protect cultural resources. Operator shall stop all operations and notify the Forest Service of any discovery of cultural or natural history resources and work will not continue in the area of the discovery until the properties have been evaluated and all necessary consultations are complete. Removal or destruction of historic artifacts is a violation of Federal law and as such not allowed.

Historic building that are eligible for listing or are unevaluated will be maintained as eligible by following the Secretary of Interior’s guidelines for Historic Preservation and consulting with the Forest Service.

G4. Surface runoff water from off-site shall be diverted around the operating site to ensure that this runoff water does not have a negative impact on water quality. Wood, certified weed-free straw bales (See R3), silt fences, or other Forest Service approved barriers, may be used to establish a barrier along the banks to control sediment movement into the creek. If tree boles are used, the logs must be embedded so that the entire length of the bole is in contact with the ground, and the logs overlap in a parallel shingle arrangement so that sediment-laden runoff cannot escape the impounded area.

G5. During ongoing mining activities, all disturbed sites (roads, cut and fill slopes, campsites, ponds, dumps, and stockpiles) shall be maintained in a stable condition.

G6. No live trees greater than 7" diameter at breast height (4.5’ from uphill side of base of tree) shall be cut without prior written approval. All live trees approved for removal shall remain on-site. Forest Service personnel will determine which trees approved for removal are merchantable. These trees will be stockpiled by the operator for Forest Service disposal, or for use during final reclamation.

Forest Service shall approve removal of snags or trees with signs of mistletoe, prior to falling. If snags greater than 12” are removed, the Forest Service shall be notified and a new snag in the same area shall be created with the approval of the Forest Service wildlife biologist.

G7. Mining equipment shall cross creeks only at pre-approved sites, as authorized by the District Ranger with FS, NMFS and USFWS mitigations, and 2012 BMPs. All fords shall be sloped and armored with rock, based on a site-specific evaluation. Bridges shall be installed so as not to result in continued sediment delivery to the stream, and shall be removed upon final cessation of mining operations.

G8. All use and/or construction of any structures shall be listed and authorized in the Plan of Operations or supplement (36CFR 261.10 (a)). Only structures reasonably incident and necessary for the proposed level of mining operations will be authorized (FSM 2812, and 69 Stat. 367; 30 U.S.C. 601, 603, 611-615).

G9. Snow removal on roads is not approved unless addressed in an approved Plan of Operations or subsequent modifications or supplements to the Plan of Operations.
G10. Excavations left open for more than a week shall have the sides contoured to allow wildlife to escape should they fall in.

G11. Other than seasonally, where operations have ceased for a year or more, the operator shall annually submit a written statement of intent to the District Ranger which includes the operator’s intent to maintain the equipment and structures, the expected date operations will resume, and an estimate of extended duration of operations. The operator will maintain the site, equipment, and structures in a neat and safe condition during non-operating periods (36 CFR 228.10).

G12. Buffer strips and/or silt fencing (or other materials approved by the District Ranger) between the approved operation and the channel of intermittent or perennial streams shall be of sufficient width and filtering capacity (as determined by the District Ranger) to prevent the introduction of sediment into the stream system during normal seasonal runoff events such as snowmelt or high-intensity rainstorm events.

In addition, if straw bales or silt fences are used, they will be installed with adequate support (i.e. straw bales staked into the ground, silt fences dug into the ground and with seams on stakes facing away from sediment sources) and maintained during use (i.e. fences and bales regularly checked for failure or movement, sediment removed with it accumulates to 1/3 height of silt fence or bale).

G13. All explosive handling and storage will comply with Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) requirements and Mine Safety and Health Administration (MSHA). Copies of any permits that require any improvements (storage facilities, gates, etc.) on national forest system (NFS) lands must accompany the Plan of Operation or supplemental Plan, and the improvements shall be identified within the approved Plan.

G14. Beaver dams will not be breached by the operators. If pond levels behind the dams increase to the point that there is the potential to flood the mining operation, the operator shall work with the Forest Service to install pond-level control devices.

G15. Plan-specific stream buffers for mining-related activities (as specified in Appendix 1A of the EIS) are to be undisturbed. No mining activities, storage of equipment or overburden, or vegetation removal is permitted. Driving a vehicle off an existing road within a stream buffer is only permitted where necessary to access the stream for mining related activities such as installation of a pump or dredge put in, as long as there is no significant impact to surface resources, and is consistent with 2012 BMPs. For requirements specific to use of fords, see G7.

G16. If new active goshawk nests are discovered, a 30-acre nest area will be delineated by district wildlife personnel around active goshawk nest sites, and a seasonal restriction on the use of heavy equipment would be recommended in the immediate vicinity of the nests to reduce disturbance to goshawks during courtship and nesting. Nest areas will be deferred from tree removal with the exception of snags cut to address hazards around work areas. An active nest site is one that has been used for nesting within the previous five years. Failure to monitor a nest site does not equate to inactive status.

If a new active goshawk nest is discovered after a Plan of Operation is approved, the Forest would initiate a Plan modification process per (CFR 228.4e) to determine what reasonable additional restrictions could be added to the Plan to mitigate this unanticipated impact.

G17. If unexpected heritage resources are encountered during project implementation, these resources will be protected from disturbance and evaluated for eligibility for inclusion on the National Register of Historic Places. Significant resources will be avoided or mitigated as described below. In accordance with 36 CFR 800 and Section 106 of the National Historic Preservation Act (1966), all unevaluated sites will be avoided pending determination of eligibility for listing on the National Register of Historic Places by the Forest Service and consultation with the Oregon State Historic Preservation Office. All eligible and unevaluated sites will be protected throughout the life of the project if possible. Protection of these sites, in most cases, shall be accomplished through avoidance by ground-disturbing activities.

If protection or avoidance of significant heritage resources is not possible, mitigation measures will be developed in consultation with the Forest Service and the Oregon State Historic Preservation Office and in some cases, the Advisory Council on Historic Preservation.

G18. Approval of this plan does not relieve the operator from complying with all applicable Federal, State, or County laws or regulations. Any regulations/laws referenced herein are for emphases only and not intended to cover all regulations that may apply to this operation.

G19. Copies of any permits/certifications issued by other regulatory agencies related to mining operations on NFS lands shall be submitted to the authorized officer. In some cases this may be required prior to approval of the Plan. (CWA §401(a)(1). BMP Min-8)
G20. Extended occupancy (longer than allowed under the Forest Order) must be incidental to and necessary for the level of proposed mining operation and authorized in the Plan of Operations. No person not actively involved in the day to day operations will be authorized to stay longer than allowed under the Forest Order (ORDER NO. 2010-0616-WW-12 and Uma FO 2009-0614-UM-01) (36CFR 261.1(a) and 261.58(a)).

G21. The work site and camp area will be kept clean and orderly. Litter and other non-essential mining items brought in by the operator will be removed by the operator from NFS lands and disposed of properly. Burning or burying of trash is not authorized. (36CFR 261.11 (b)(c)(d))

G22. When the operator is contemplating a sale of the claim(s) associated with their approved Plan of Operations, the claimant/operator shall notify the District Ranger. The Plan of Operations will not automatically transfer to the new owner, and the new owner must file their own notice to the Forest Service (36CFR 288.4). If a new owner wishes to submit the same Plan, additional environmental analysis may not be needed.

G23. During water drafting, pumps should be screened with 3/32” plate screen (or equivalent). Screens should be kept in good and efficient state of repair, and water must not be withdrawn at any time that the screen is removed.

G24. At a pre-arranged meeting time and place, the Forest Service minerals administrator will inspect all equipment prior to its placement on NFS land in order to make sure that it is in working order, and there are no obvious leaks.

G25. Any existing Forest Service section corners and/or marker trees removed or damaged by the miner will be replaced at the miner’s expense

Hazardous Materials

H1. No processing chemicals shall be used in the process to extract ore unless authorized in a Plan of Operations. Authority will be in conjunction with Oregon DEQ permitting regulations.

H2. No chemical flocculent or surfactant shall be used in ponds unless it is EPA approved and shown to be safe for aquatic species (amphibians).

H3. Operators shall be required to have a lined containment vault under hazardous material storage barrels.

H4. Before commencing operations, operator shall provide a Hazardous Substances Plan. The Plan must include, but is not limited to, hazardous substances (as defined by 29 CFR 1910.120) to be used in the mining operation and identification of operators’ representatives responsible for supervising initial containment action for releases and, if required by Forest Service, subsequent cleanup. Material Safety Data Sheets (MSDSs) for all hazardous materials used will be available at the mining operation and all such materials shall be labeled in accordance with Federal and State regulations. The Plan should show operator's procedures for reporting and responding to a release. The current names and telephone numbers of those to be notified and their responsibilities should be listed. The Forest's Emergency Response Coordinator (name shall be supplied by the Forest service) should be included as a person to be notified early. The Plan should also list the appropriate hazardous substance response services to be employed for release assessment and cleanup actions.

H5. Spill kits shall be available on site in case of an accidental spill. Spill kits (minimum size 40 gallons) must be able to absorb and contain oils, coolants, solvents and other materials in the event of a spill.

H6. Petroleum products or other hazardous substances shall not be released into land, rivers, streams, impoundments, or natural or man-made channels leading thereto. Storage of fuel, fueling of equipment or routine maintenance shall require the use of oil-absorbing mats, and storage would occur outside the plan-specific stream buffers for mining-related activities (as specified in Appendix 1A of the EIS). Oil-absorbing mats are required under all stationary equipment to prevent leaking or spilled petroleum base products from contaminating soil and water resources. Such material will be furnished by operator and approved by the District Ranger before use.

H7. Burning of spilled substances shall not occur unless authorized by the District Ranger and Oregon DEQ.

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1. Be reasonably incident - Reasonably incident means the statutory standard "prospecting, mining, or processing operations and uses reasonably incident thereto" (30 U.S.C. 612). It is a shortened version of the statutory standard. It includes those actions or expenditures of labor and resources by a person of ordinary prudence to prospect, explore, define, develop, mine, or beneficiate a valuable mineral deposit using methods, structures, and equipment appropriate to the geological terrain, mineral deposit, and stage of development and reasonably related activities.
H8. All equipment shall be checked for fluid leaks on a daily basis. All equipment operating on mining operation will be in good repair and shall be free from leakage of lubricants, fuel, coolants, and hydraulic fluid. Servicing of all equipment shall be done only in the areas approved by the District Ranger as part of the Plan of Operations. Unless otherwise agreed, operator shall properly dispose of all contaminated soil, vegetation, debris, vehicle oil filters (drained of free-flowing oil), oily rags, and waste oil in accordance with local, State, and Federal regulations off NFS lands and shall transport such substances in accordance with State and Federal regulations.

H9. Operator shall immediately implement the Hazardous Substances Plan, notifying appropriate agencies, including the Forest Service, concerning all spills, leaks, or other releases of petroleum products or other hazardous substances (as defined in (29 CFR 1910.1200 and/or releases) on or in the vicinity of all NFS lands which are caused by operator's employees, directly or indirectly, as a result of mining operations. Plans of Operations must display storage locations for hazardous substances.

H10. In addition to taking initial action to contain all releases, operator shall be held liable for all damages and costs of additional labor, subsistence, equipment, supplies, and transportation deemed necessary by the government for the containment and cleanup of petroleum products or other hazardous substances.

H11. If the total oil or oil products storage exceeds 1,320 gallons or if any single container exceeds a capacity of 660 gallons, operator shall prepare and implement a Spill Prevention Control and Countermeasures (SPCC) Plan. Such plan shall meet applicable EPA requirements (40 CFR 112), including certification by a registered professional engineer. This plan shall include notification of appropriate State and local officials, the Forest Service, and other appropriate agencies.

H12. It is the intent that all releases shall be removed from NFS lands and disposed of according to above regulations. De minimus (trifling) releases are occasional drips that fall from operating equipment. Routine systematic releases are drips that become increasingly worse and/or operator takes no preventative action to curtail releases. The Forest Service is not expected to enforce this provision as to de minimus releases, but routine systematic releases warrant enforcement.

**Fire Protection and Suppression Requirements**

Specific fire prevention measures are listed below and shall be effective for the period of April 1 to October 31 of each year. The Forest Service may change the dates of said period by advance written notice if justified by unusual weather or other conditions. Required tools and equipment shall be kept currently in serviceable condition and immediately available for initial attack on fires.

Compliance with State Forest Laws - Listing of specific fire precautionary measures herein is not intended to relieve the operator in any way from compliance with the State Fire Laws covering fire prevention and suppression equipment, applicable to operations under this Plan of Operations. These requirements meet the intent of 36 CFR 228.11.

F1. Fire Plan – Before starting any operations, the mine operator shall prepare a fire plan, in cooperation with the district minerals administrator, providing for the prevention, notification and control of fires in the project area.

F2. Substitute Measures - The District Ranger may by written notice authorize substitute measures or equipment or may waive specific requirements during periods of low fire danger.

F3. Emergency Measures - The Forest Service may require emergency measures, including the necessary shutting down of equipment or portions of operations in the mining claim during periods of fire emergency created by hazardous climatic conditions.

F4. Fire Control - The mine operator shall, independently and in cooperation with the WWNF, take all reasonable action to prevent and suppress fires on the mining claim. Independent initial action shall be prompt and shall include the use of all personnel and equipment available in the mining claim.

F5. Fire Precautions

1) Smoking and Open Fires - Smoking and fires shall be permitted only at the option of the mine operator. Campfires shall be on mineral soil within a fire ring (either rock or metal) and shall not be left unattended. Unless restricted by State Law or Federal Regulation, smoking shall be permitted only in such portions of the mining claim that are free of flammable material. Smokers shall extinguish and press out all burning material in a closed container or in mineral soil before leaving the cleared area.

2) Fire Extinguishers and Equipment on Trucks, Tractors, etc. - All power-driven equipment operated on NFS lands, except portable fire pumps, shall be equipped with one fire extinguisher having a UL rating of at least 5 BC, and one "D" handled or long-handled, round-point shovel size "0" or larger. In addition, each motor patrol, truck, and passenger-carrying vehicle shall be equipped with a double-bit axe or Pulaski, 3½ pounds or larger. Equipment shall be kept in a serviceable condition and shall be readily available.
3) Power Saws - Each gasoline power saw operator shall be equipped with a pressurized chemical fire extinguisher of not less than 8-ounce capacity by weight and one long-handled, round-point shovel, size "0" or larger. The extinguisher shall be kept in possession of the saw operator at all times. The shovel shall be accessible to the operator within 1 minute.

4) Spark Arresters and Mufflers - Each internal combustion engine shall be equipped with a spark arrester meeting either (1) USDA Forest Service Standard 5100-1a, or (2) appropriate Society of Automotive Engineers (SAE) recommended practice J335(b) and J350(a) as now or hereafter amended unless it is:

(a) Equipped with a turbine-driven exhaust supercharger such as the turbocharger. There shall be no exhaust bypass.
(b) A passenger-carrying vehicle or light truck or medium truck up to 40,000 GVW used on roads and equipped with a factory-designed muffler complete with baffles and an exhaust system in good working condition.
(c) A heavy duty truck, such as a dump or log truck, or other vehicle used for commercial hauling, used only on roads and equipped with a factory designed muffler and with a vertical stack exhaust system extending above the cab.

Exhaust equipment described in this subsection, including spark arresters and mufflers, shall be properly installed and constantly maintained in serviceable condition.

F6. The operator shall observe all the requirements of the Industrial Fire Precaution Level. It is the responsibility of the operator to obtain the Industrial Fire Precaution Level daily. The Industrial Fire Precaution Level may be obtained daily from the Forest Service at approximately 4PM to 6PM, local time. (R6-FS-6300-51 Regional Forester Order No. 3).

F7. Fire Security - When the Industrial Fire Precautions Level is "I" or higher, unless a waiver is granted, the operator shall designate a person who shall perform fire security services listed below on the mining claim and vicinity. The designated person shall be capable of operating the operator's communications and firefighting equipment specified in F-6b, and of directing the activities of the operator's personnel on forest fires. In lieu of having the designated person perform the required supervisory duties, the operator may provide another person meeting the qualifications stated above to direct the activities of the operator's personnel and equipment during all firefighting activities.

Services described shall be for at least 1 hour from the time the operator's operations are shut down. For the purposes of this provision, personnel servicing equipment and their vehicles who are not engaged in cutting or welding metal are excluded.

Fire security services shall consist of moving throughout the operation area or areas constantly looking, reporting, and taking suppression action on any fires detected.

Whenever the Industrial Fire Precaution Level is "II" or greater, a fire security person equipped with a long-handled, round point, Number "0" or larger, shovel, and a five-gallon backpack pump can filled with water will stay at the location of a blast for 1 hour after blasting is done. Blasting may be suspended by Forest Service in writing, in an area of high rate of spread and resistance to control.

F8. Surface blasting - Fuses shall not be used for blasting. Explosive cords shall not be used without written Forest Service permission, which may specify conditions under which such explosives may be used and precautions to be taken.

Invasive Species and Noxious Weeds

IS1. The minerals administrator will provide the mine operator with a noxious weed identification book and a map of known noxious weed locations on or near the proposed activity area so that the operator is able to recognize the presence of noxious weeds.

IS2. Actions conducted or authorized by written permit by the Forest Service that will operate outside the limits of the road prism, require the cleaning of all equipment (e.g. heavy equipment, pumps, ATVs) prior to entering NFS lands, and will comply with regional and forest-specific invasive plant management plans, and the 2011 Region 6 Aquatics Invasive Species Management Plan.

The Forest Service minerals administrator will inspect all equipment prior to its placement on NFS land to make sure that it has been cleaned for invasive species. Mining equipment already on NFS land will be cleaned by the operator, to remove invasive species at the current work site before moving to another location.

IS3. Use only gravel, fill, sand, and rock that is judged to be weed free by Forest Service weed specialists.

IS4. The presence of any previously unknown invasive species infestations (aquatic or terrestrial) should be reported to the Forest Service Minerals Administrator as soon as possible. Upon notification, Forest Service employees shall initiate a weed inventory at the reported site.
IS5. All noxious weed infestations will be avoided during times of seed production. If avoidance is not feasible, then mechanical treatment (pulling, chopping, weed eating, etc.) will occur prior to any ground disturbing activities. Treatment of these areas will, at the minimum, remove all flower heads prior to seed set.

IS6. When invasive plants begin to grow on stockpiled soil, mechanical treatment will occur to prevent seed set. Mechanical treatment (like pulling, chopping, etc.) will occur as flowers begin to form. The resulting organic matter may be left on site if removed prior to seed set.

Lode Mines

L1. When water from an adit is used in the mining process, it shall be piped or trenched around the mine dump to a settling pond for use. Certified weed-free straw bales and filter cloth will also be used to minimize sediment if determined necessary by the District Ranger.

L2. Settling ponds shall not be built on mine dumps.

L3. Prior to the beginning of operations, the operator(s) will test any adit discharge for compliance with the CWA and Safe Drinking Water Act, Oregon State and the EPA, at an approved testing facility. As conditions change during operations, the operator(s) will periodically test the discharge to see if water chemistry has changed (e.g. heavy metals or sulfides). Upon completion of the operations, a final water quality test of the adit discharge will be completed.

L4. When processing is conducted on Forest Service land, tailings from the first run will need to be tested at an approved testing facility to see if they have the potential to release acidity or other contaminants. (See EPA standards and CWA for guidelines). Testing of the waste rock may be required based on the type of rock present. Additional testing will be required throughout the life of the operation as conditions change. Upon completion of the operations, a final test of the tailings and waste rock will be required before the Plan can be closed out. Reclamation procedures may be modified, depending on the results of the testing.

L5. When testing of adit discharge, tailings or waste rock, a copy of the test results will be sent directly from the testing facility to the District Ranger. Should the results exceed EPA and ODEQ’s standards, the operator must address this issue prior to continuing this portion of the operation (36CFR 261.11 (c)). A modification to the Plan may be required as per direction found in 36CFR 228.4 (e).

L6. Water and winter run off will be diverted around tailings and waste rock piles.

L7. When opening a collapsed adit portal, the surface soils will be set aside for later closure of the adit or use as top soil for reclamation.

L8. Should water begin to discharge from previously dry adits, the District Ranger will be notified immediately and L3 and L5 would apply.

L9. Tailings, waste rock, and soil piles will be placed in separate /locations. Tailings and waste rock piles will be placed a sufficient distance from any nearby surface waters such that no surface discharge from the waste rock or tailings will reach the waters.

L10. The operator will be held financially responsible for containing/controlling tailings or waste rock that exceeds EPA standards for human health and safety. The operator(s)/owners(s) will be held responsible until the tailings and waste rock are in a stable, non-leaching condition.

L11. Portal discharges resulting from underground development conducted during the life of the approved Plan of Operations must meet State standards for water quality for the receiving stream. The point of compliance shall be at the point of entry into Waters of the State. If water quality standards are exceeded, then the operator(s) shall comply with OAR 340-041-0004. If treatment systems are needed to meet State Water Quality standards, a supplemental plan must be submitted to the District Ranger for approval prior to implementation.

L12. Decontamination procedures for White Nose Syndrome “Geomyces destructans” will be required for all equipment leaving or coming into an adit site. See EIS for procedures as of Jan 25, 2013. The most current procedures can be found at the following web site or through local State or Federal Fish and Wildlife office.

http://www.whitenosesyndrome.org/topics/decontamination

Placer Mining

P1. When mining or processing old lode tailings or waste rock, then the following Lode requirements apply: L1-6, L8-10, L11.
Reclamation Requirements

Ongoing Reclamation

R1. Prior to reclamation, the operator will coordinate with the Forest Service on reclamation activities for things such as, but not limited to, placement of topsoil, use of slash (e.g. scattering on the surface, burying to create an organic layer), seed mixes and seeding rates, and means of accelerating vegetative recovery and soil development.

R2. Reclamation shall be ongoing to ensure stabilization of the area and so that a minimum amount of ground will be open at any time.

R3. Use certified weed-free straw for all projects, conducted or authorized by the Forest Service, on NFS lands. If State certified straw is not available, use sources certified to be weed free using the North American Weed Free Forage Program Standards or a similar certification process.

R4. All mining excavations, not approved for winter hold over, will be refilled and reclaimed to normal contours before seasonal shutdown of each year. This shall include refilling of the excavations, re-vegetating to avoid active erosion, and mulching with certified weed-free straw.

R5. All mining excavations, approved for winter hold over, shall be stabilized prior to seasonal shutdowns or extended periods of inactivity. This shall be accomplished before any equipment is removed. Stabilization includes, but is not limited to, the following: covering the stockpiled top soil and other areas of bare soil with certified weed-free straw, sloping pond sides and trenches, and installing sediment barriers in disturbed areas such as roads or mined area to prevent soil from reaching stream channels.

R6. Topsoil, where it exists, shall be scraped off the areas to be excavated and stockpiled for later reclamation. All material shall be stockpiled in the order that it was excavated and used to refill the excavation in that order.

R7. At the end of each operating season, areas of stockpiled soil (including silt removed from placer mining settling ponds, or removed topsoil) will be covered with at least 3 inches of certified weed-free straw.

R8. General specifications for revegetation, such as seed mixes, shrub types, and the rate of application or planting densities, will be developed by the time of Operating Plan approval. Actual seed mixes, shrub types, and the rate of application or planting densities will be finalized at the time reclamation begins in coordination with the Forest Service.

R9. Re-vegetated areas will initially be inspected for stocking and planting methods and then evaluated annually by the Forest Service to determine if the site’s original or surrounding densities have been maintained. Year to year improvement must occur in order for that portion of the bond, held for re-vegetation, to be returned. Annual improvement must show establishment of desired species and spread, equal to or greater than 10% each year such that by the end of year 3 there is at least 30% establishment in order to meet the objectives of this requirement (W-W LMP pg. 4-25)(UMA LMP 4-70 & 80)(BMP Min-8).

R10. The operator must follow the requirements of the State of Oregon 600 permit (General Water Pollution Control Facility Permit issued pursuant to ORS 468B.050) as it applies to use of ponds as settling ponds. Water shall be contained in settling ponds with no sediment discharge allowed. All ponds approved to be left open during seasonal shutdown shall be left dry or at the normal water table. The mine operator shall have certified weed-free straw bales or wattles or other material available on-site, that are approved by the Forest Service, to be used as a filtering agent should overtopping of ponds or significant soil movement from storm events occur.

Final Reclamation

R11. All mined areas included in Plan of Operation activities shall be returned to natural or near-natural contours; if located on the hillside, the areas will be benched for stability.

R12. Following re-contouring of the ground, the ground will be seeded with native seed species or locally appropriate native trees and shrubs, and certified weed-free straw shall be scattered over the reclaimed area.

R13. Mine access roads, landings, and terrace areas created under the mining operation shall scarified to a depth of 2 to 4 inches, seeded with seed certified free of noxious weeds, and covered with certified weed-free straw and wood, if available, to discourage vehicle access.
R14. Exposed cutbanks created by the operator (excluding streambanks and terrace banks) shall be sloped to a 2:1 slope to minimize soil movement wherever testing in these banks has taken place.

R15. In order to determine which ponds should be reclaimed or retained, and whether modifications are necessary for the retained ponds, refer to Table in EIS.

**Pond Reclamation:** Where ponds are identified for reclamation, the pond shall be backfilled, re-contoured and seeded as specified in R 12.

**Pond Retention AND modification required:** Where existing or newly constructed ponds are identified for retention and modification, the operator should slope sides from 0-18” deep along the north, west, and east edges. This sloped portion of the pond should be a minimum of 3 feet in width. These specifications were developed to provide spotted frog breeding habitat. Species of vegetation planted around the retained ponds will reflect the native species composition for the area. Pre-existing ponds that are occupied/suitable for amphibians shall be left for amphibian habitat.

**Pond Retention BUT no modification required:** Leave pond as is.

R16. After seeding, the mine operator will distribute certified weed-free straw, 3 inches thick over approximately two-thirds of the area in mid to late fall leaving patchy open areas.

R17. All stockpiled topsoil and/or other suitable fines, such as silt from the settling ponds, shall be spread over disturbed areas in an ongoing restoration program after consultation with the Forest Service as to placement of fines and/or topsoil, and will be consistent with the approved Plan of Operations and reclamation standards included in the WWNF Forest Plan and UNF Forest Plan (WWNF Forest Plan, 4-25 #27-29, UNF Forest Plan (4-80 #2).

R18. Final reclamation will be evaluated for success, with consideration given to variables such as the time of the year, how much topsoil was available, the density of the existing ground cover, and if native plants are establishing, and is consistent with the reclamation standards included in the WWNF Forest Plan (WWNF Forest Plan, 4-25 #27-29 and Umatilla NF Forest Plan (4-70 #1-6, and  4-81).

**Requirements for Working in Wetlands and Floodplains**

These requirements, along with the reclamation requirements above, are included to meet the intent of Executive Order 11990 – Protection of Wetlands, and Executive Order 11988 – Protection of Floodplains

W1. Mining in the floodplain or wetlands will be accomplished by placing equipment in dry areas located outside the floodplain or wetland. The wet areas and floodplain areas will be mined and reclaimed after July 1. Seasonal reclamation shall be accomplished by late fall in time to allow for the areas to revegetate and stabilize before winter (see R8 and R9 for specifications regarding revegetation).

W2. Where wetland vegetation is approved to be removed, it shall be kept wet by placing it in the ponds for up to 14 days while the area is being mined and reclaimed. The vegetation shall be replaced in the riparian area to approximately the original density and monitored for success for 3 years as described in R9 above. The success of final reclamation shall be evaluated as stated in R18 above.

W3. The size, location and function of wetlands after reclamation shall be similar to what now exists

**Road-related Requirements (Z-Requirements)**

**Definitions:**

**Open road:** Road designated for motorized travel on a Motor Vehicle Use Map and/or designated as a National Forest System Road Operating above a Maintenance Level 1. This includes roads seasonally open.

**Closed road:** Road listed in a forest transportation atlas and a National Forest System Road operating at a Maintenance Level 1 and/or not shown on a Motor Vehicle Use Map.

**Temporary access road:** Roads created by the operator whether by blading or continued travel. A road or trail necessary for emergency operations or authorized by contract, permit, lease, or other written authorization that is not a forest road or
Decommissioned road: A road that was listed in a forest transportation atlas and has had an action taken to eliminate use of the road, eliminate resource protection concerns, has no deferred maintenance needs, and requires no further maintenance. These roads have a route status of “decommissioned”. If specified in the operating plan, these roads may be utilized as temporary access roads, in lieu of new ground-disturbing construction.

Requirements:

The following requirements apply only during the dry season window (generally July 1 to October 1). During the dry season window, it would be unusual to get enough precipitation over a duration long enough to cause significant road damage. Outside the dry season window, weather and road conditions become variable daily. Operators working outside this window will be required to consult with the Forest Service to determine if special road Best Management Practices (BMPs) are required. The type of special BMPs required will vary and may range from timing of vehicular passage to full construction of erosion or drainage control structures.

The operator will be responsible for acquiring state, county and or local permits and activities shall be in accordance with the current edition of the National Forest Commercial Road Use Rules for hauling of mining equipment or excavated materials.

Z1. Use of closed and temporary access roads will be incidental to mining operations.

Z2. Temporary roads proposed in the Plan of Operations will be flagged by the operator and ground verified by the Forest Service prior to creation. The creation of these temporary roads should be with minimal impact to the environment, fit the terrain, limit the need for excavation by following natural contours, favor lower slope routes, and be consistent with other environmental protections.

Z3. Prior to use of existing closed or temporary access roads identified for use in the plan of operations, danger trees shall be identified by certified Forest Service personnel. The operator is responsible for felling of the danger trees and clearing any debris from the road prior to use. Danger trees shall be left on the ground in a stable manner, so as not to roll onto the road or encroach the traveled way, and left for wildlife purposes or dealt with as stated in the G6 requirement.

Z4. Existing closed and temporary access roads shall have brush and trees removed to the extent necessary to accommodate the movement of the operator’s equipment and vehicles only. All stumps and brush in the road bed to be removed shall be flush cut no more than 2 inches above the ground. Grubbing of roots and stumps shall only be allowed with prior written approval from the Forest Service. To minimize the potential for road damage, removal of trees and brush is limited to the dry season.

Z5. Disposal of trees/brush removed from proposed and existing closed and temporary access shall be accomplished in one of the following ways, based on site-specific characteristics determined in writing by the Forest Service: 1) Vegetation shall be scattered on the downhill side of the road, and shall not be placed in draws, catch basins, ditch lines, or stream channels. 2) Vegetation shall be moved to a Forest Service designated site, and left in piles of a size approved by the Forest Service.

Z6. The operator shall be responsible for reducing water flow concentrations resulting in road erosion on closed and temporary access roads. Traveled way maintenance activity shall be limited to the dry season to minimize the potential for road damage. Minor road work, such as slough removal, shall be in permitted areas where the fill slope materials have settled over time. Minor blading and shaping of the road shall be permitted to remove minor deformities (i.e. boulders, holes, gullies) in travel ways that impede the passage of high-clearance vehicles. A rocky-based material shall be applied to wet (i.e. seep areas) or eroded areas, as prescribed by the Forest Service, in order to minimize or prevent gullying of the road, concentration of flow, or rutting and pooling of water. All sources of rocky material shall be approved by the Forest Service in writing prior to application.

Z7. All closed roads and temporary access roads used by the operator shall be prepared for seasonal runoff during inactive periods (over winter). Water bars shall be constructed to provide effective surface drainage relief.

Z8. During the use and maintenance of all closed or temporary access roads, surface drainage and erosion control features or structures shall be maintained, repaired or installed. This work shall be accomplished in a manner to effectively control and/or prevent water concentrations upon the road bed and prevent or eliminate the movement of sediment from any activity or source from entering into streams. Examples of erosion control and drainage structures, and those to be maintained, repaired, or installed include silt fences, erosion control blankets, earthen berms, sediment catch basins, drain dips, armored grade sags, water
bars and corrugated metal pipes. New installation of these structures shall be agreed upon by the Forest Service prior to installation.

The above structures shall be positioned to optimize the use of existing filter strips (vegetated area of land between road/sediment sources and the stream, capable of providing filtering and confinement, reducing water velocity to prevent transport of sediment into the stream). All drainage and erosion control structures shall be maintained to function during actual use and throughout periods of seasonal non-use. Additional measures shall be employed, if necessary, to counteract additional drainage and erosion needs during traditional wet seasons. The additional structures shall be installed prior to a seasonal shut down. The Forest Service may direct additional measures be implemented prior to high-intensity drainage periods (i.e. winter, spring snow melt and rain).

Z9. Seasonal wet areas in access roads shall be avoided until they have dried up, unless otherwise approved in writing by the Forest Service. If a seasonal wet area must be crossed prior to drying up, the crossing site will be designed to permit continued subsurface diffuse flow (i.e. French drain) and prevent rutting or channel development. The design and materials to be used shall be reviewed and approved by the Forest Service in writing prior to construction.

Z10. Crossing of permanent wetlands to access a site will be avoided.

Z11. Crossing a channel with intermittent flow to access mining operations shall occur only at Forest Service approved locations. Additional measures (i.e., culvert, ford, etc.) may be required if determined necessary by the Forest Service.

Z12. During seasonal shutdowns, to restrict vehicular travel, the operator is responsible for closing roads not designated as open and all temporary access roads as identified in the Plan of Operations.

Z13. Proposed gate location as identified in the Plan of Operations shall be approved by the Forest Service District Ranger before installation. The gate shall be constructed according to the National Forest specifications.

Z14. Temporary access roads that have a road number ending with an “M”, shall be decommissioned or hydrologically obliterated by the operator (as defined below) when mining activities are completed. Methods are to be approved in writing by the Forest Service district ranger prior to decommissioning or hydrologically obliterating.

Decommission: To remove those elements of a road that reroute hill slope drainage and present slope stability hazards.

Hydrological obliteration: The reclamation and or restoration of land to resource production from that of a transportation facility. The roadbed is treated so that it no longer functions as a road. The wheel tracks or pathway is no longer continuous or suitable for traffic. This may involve some of the following activities: Closing entrances, scarifying road surfaces, decompacting (subsoiling) to establish vegetation and reduce run-off; seeding, partial to full restoration of the stream channel crossings by removing culverts.

Monitoring

M1. The operator will visually evaluate the clarity of the creek water upstream and downstream of their operation at a minimum prior to beginning work that day and after ceasing operations that day. If there is a change in water clarity below the mining site, the operation shall cease work until the cause of the sediment input is determined by the Forest Service (36CFR 261.11 (c)). Notification of the Forest Service of the change in water quality shall occur no later than the end of the first normal working day after the observation has been made.
Status of the Species

Columbia River Bull Trout (*Salvelinus confluentus*) – Bull Trout were listed as threatened by the US Fish and Wildlife Service under the authority of the Endangered Species Act (ESA) in 1998 and later designated CH in Sept. 2010. Historically bull trout inhabited most of the NFJD river drainage and its tributaries. Presently only small populations exist in isolated sections of the upper NFJD and its tributaries (Table 5). Migratory and resident bull trout subpopulations are found throughout the Granite Creek Subwatershed and listed CH can be found in Figure 2 (USDI FWS 2010). Spawning habitat in the Granite subwatershed is limited and whether there is possible brook trout hybridization is largely unknown. There is evidence of brook trout hybridization in the lower reaches and tributaries of the NFJD. Little is known about the current status of many of the bull trout subpopulations throughout Granite Watershed. Given existing conditions and information from the extensive 1990 ODFW surveys, most of these populations are considered at risk (2002 draft Bull Trout Recovery plan).

Surveys by Oregon Department of Fish Wildlife in the John Day basin show declines in bull trout redd counts. Streams surveyed include Baldy Creek, Upper Big Creek, Call Creek, and North Fork Reynolds Creek. (Anderson, personal communication 2014). See chart below.

Brook trout are a non-native fish species found in the Granite Watershed in Lake Creek, above and below Olive Lake (Jeff Neal, personal communication 2014).

Middle Columbia River Steelhead/Interior Redband Trout (*Oncorhynchus mykiss/gairdneri*) –

Mid-Columbia Steelhead were listed as Threatened by the National Marine Fisheries Service under authority of the Endangered Species Act (ESA) in 1999. Interior redband trout had previously been listed as Sensitive by the Forest Service in Region 6 and are on the State Sensitive/Critical list in Oregon. For practical purposes, juvenile resident redband trout cannot be distinguished from the anadromous form (steelhead) where the two occur together and so no distinction will be made here. This means that the more restrictive ESA “Threatened” classification would apply. Steelhead and redband trout are found throughout the Granite Watershed.
Steelhead display two broad life history patterns typically called summer-run and winter-run. Summer-run steelhead are found in the project area in the NFJD River Basin (Table 5). Summer-run steelhead (stream-maturing) enter freshwater at an early stage of maturation, usually from March to October. Steelhead spawning occurs between March and May. Prior to spawning, maturing adults hold in pools or in side channels to avoid high winter flows. Typically, they spawn in stream reaches with a moderate to high gradient. Fry typically emerge between April and June. Summer steelhead in the NFJD can rear in freshwater habitat up to four winters. Migration to the ocean typically occurs at age 2 for wild summer steelhead, while most hatchery smolts migrate at age 1 (Carmichael and Taylor, 2009).

The North Fork John Day (NFJD) summer steelhead population is distinct but, part of the larger John Day River Major Population Group (MPG), within the Mid-Columbia Steelhead ESU. This population of steelhead occupies the highest elevation, and wettest area in the John Day basin. According to the Oregon Mid-C Steelhead Recovery Plan (Carmichael and Taylor 2009), the NFJD River Summer Steelhead population is at very low risk based on current abundance and productivity. This analysis was based on population abundance/productivity and spatial structure/diversity. Abundance/productivity is based on adult spawner returns and smolt to adult ratios (SAR). Spatial structure/diversity is based on analysis of spatial extent or range of the population, genetic variation, spawner composition, population connectivity and major life history strategies. Although the NFJD summer steelhead population is rated as highly viable and meeting recovery goals, the John Day River MPG remains below viable status due to the “maintained” population status on the Lower John Day. Refer to Appendix B for MCR steelhead returns in the Upper North Fork John Day River.

Results of the estimates smolt-to-adult survival rates (SAR) and out-migrant abundance for summer steelhead *O. mykiss* and life history characteristics of summer steelhead for the John Day River subbasin were summarized by Wilson et al. (2010). Juvenile steelhead abundance estimate for the Mainstem and South Fork John Day abundance estimates were nearly double previous highest estimates reported in the last six years.

**Designated Critical Habitat for Middle Columbia River Steelhead**

Designated critical habitat for Middle Columbia River steelhead within the NFJD subbasin includes all rivers and stream reaches accessible to steelhead below long-standing natural barriers (*Federal Register* Vol. 70 (170); September 2, 2005). See Figure 2 below, for all streams designated as CH for Mid-Columbia Steelhead within the Granite Watershed.
Table 5. Miles of designated critical habitat and occupied habitat.

<table>
<thead>
<tr>
<th>SWS (HUC 6)</th>
<th>Steelhead DCH</th>
<th>Bull Trout DCH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Designated</td>
<td>Occupied</td>
</tr>
<tr>
<td>Beaver Creek¹</td>
<td>11.3</td>
<td>11.3</td>
</tr>
<tr>
<td>Bull Run Creek²</td>
<td>14.7</td>
<td>14.0</td>
</tr>
<tr>
<td>Clear Creek³</td>
<td>18.8</td>
<td>20.0</td>
</tr>
<tr>
<td>Upper Granite Creek⁴</td>
<td>8.0</td>
<td>7.1</td>
</tr>
<tr>
<td>Lower Granite Creek⁵</td>
<td>24.0</td>
<td>24.0</td>
</tr>
</tbody>
</table>

¹ Steelhead rearing and spawning stream mile 0-11.3.

² Steelhead rearing and spawning throughout the watershed. There is limited survey information for Bull Run Creek concerning bull trout presence. Bull trout rearing is assumed from stream mile 0-7.0 on Bull Run Creek. There is little spawning habitat in the headwater streams and warm summer temperatures limit rearing and spawning distribution.

³ Stream mile 0-7.0 on Clear Cr. is migratory and rearing habitat for steelhead and bull trout. Upper Clear Cr. and designated CH on tributaries is primarily spawning and rearing habitat for steelhead and bull trout. Lower Dry and Spring Creek are occupied non-designated CH.

⁴ Upper Granite Cr. is assumed rearing and spawning habitat for steelhead and bull trout.

⁵ Lower Granite primarily provides migratory and rearing habitat for steelhead and bull trout. Steelhead do spawn and rear throughout the watersheds listed habitat.
Figure 2. Map of Middle Columbia River Steelhead and Columbia River Bull Trout DCH and subwatersheds

Designated Critical Habitat
Granite Creek Watershed

Legend
- Critical Habitat Columbia River Bull Trout
- Critical Habitat Middle Columbia River Steelhead
- Major Stream
- Granite Mining Project Area
- Mining Claim
- Subwatershed Boundary

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Environmental Baseline

Mining in the Granite Watershed 1866 – present

Placer mining is defined as the extraction of alluvial ore that occurs as deposits of discrete grains called “placers”. Much of the focus of this document is around placer mining. Past mining in the Granite Watershed falls into four categories:

- Dredging – a form of placer mining
- Hydraulic – a form of placer mining
- Lode mining
- Suction dredge mining

Historically, there were two common types of placer mining in the Granite Watershed: dredging and hydraulic mining. Placer mining peaked during the mid-1860’s. Many acres were heavily impacted by these mining practices and over 30 miles of ditches were constructed in Upper Clear Creek subwatershed to deliver water to highbar areas.

Hydraulic mining was commonly practiced; hydraulic mining consists of spraying jets of water under high pressure onto ore-bearing alluvial gravels, many of which now form the banks of modern streams. Evidence of past hydraulic mining can be observed throughout the Granite Watershed and abandoned ditches still function in collecting snowmelt and rain to channel these waters.

Lode mining and several mills continued through the early 1900’s with the discovery of ore rich veins during placer operations. Still present in the Granite Watershed are relic mining shafts or underground mines that were used to extract minerals and ore. Overburden from some of these underground mines is still present on the landscape today. All lode operations in the Granite EIS analysis are “reopening” or maintaining these historic shafts.

With lode mining closing around 1911, instream dredging of alluvial deposits became popular and suction dredging is still actively practiced today in the Granite Watershed. Historic mining roads now make up a significant portion of the older Forest system roads.

Most of the operations proposed in the Granite Mining EIS involve surface mining. Surface mining alters the landscape by removing terrestrial vegetation and organic topsoil, thereby exposing areas of land surface to erosion. There are two types of surface mining in the Granite watershed: excavation in nonalluvial deposits, and excavation in alluvial deposits. With the exception of a couple lode operations, the majority of operations analyzed in the Granite Mining EIS are small placer operations. Placer mining is defined as the extraction of alluvial ore that occurs as deposits of discrete grains called “placers”.

Environmental Baseline

The environmental baseline conditions are presented as tables 7 – 11 based on the NMFS Matrix of Pathways and Indicators described in Making Endangered Species Act Determination of Effect for Individual or Grouped Actions at the Watershed Scale (NMFS 1996). For this document the environmental baseline discussion and discussion of effects used FS habitat stream survey data and ODFW stream survey data as well as GIS analysis. The environmental baseline has been updated where possible to reflect changes in the current environmental conditions at the sixth field watershed scale. All reports are on file at the North Fork John Day Ranger District.

Table 6 displays the miles of intermittent and perennial streams by sub-watershed found in Granite Project Area.
Existing Mines within the Granite Watershed

It is estimated that over 100 historic and/or abandoned mines exist in the Granite Creek Watershed. Inventory and assessment of these mines is an ongoing project not only for the UNF and WWNF but, other National Forests as well.

Given this watershed’s historical and extensive mining activities, inventories were started to assess the status and condition of abandoned mines and to plan for reclamation actions. Part of this process is the use of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) which was passed in December of 1980 (amended in 1986). This law created a tax on the chemical and petroleum industries and provided broad Federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. This act provides the funding for clean-up and remediation of these sites. In order to provide consistency, the CERCLA act provided a standard frame work and recording process for the evaluation of areas in order to determine if there was a need for reclamation and what that reclamation would consist of. The following is a short summary of the definitions and acronyms associated with the evaluation process. Tables 17 and 18 display summaries of known historic and/or abandoned mines as future cumulative effects projects if funding becomes available.

During lode mining there is a potential to intercept groundwater and create acid mine waste discharge. Examples of acid mine waste in the project area are the abandoned mines Redboy, Blue Bird and Black Jack as described in Tables 17 and 18. These mines are old, some were developed before the National Forest was established. The mines are now CERCLA sites and have acid drainage occurring year round, with ongoing piping of acid waste water to settling ponds and annual maintenance of the drainage pipes.

In August of 2015 the pipes in Blue Bird mine carrying acid mine waste plugged. Maintenance of the pipes corrected the drainage problem and returned the system to normal operations. Monitoring at the site found approximately 40 dead fish. In response to the spill the fish are being tested for cause of death and water samples are being tested for mineral content. An incident report is on file. There are two other known accidental discharges of acid mine drainage. In 2003 there was a discharge of acid mine drainage during maintenance at Blue Bird mine. In 2010 the retaining dam inside Black Jack mine overtopped, but acid mine discharge did not reach Clear Creek. The Forest Service will continue to work with National Marine Fisheries Service and US Fish and Wildlife Service to determine impacts of the 2015 Blue Bird mine discharge and follow-up as needed.

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2 GIS calculation, there is an associated error with stream miles mapped.
Table 7. Existing Conditions for the Bull Run Creek Subwatershed.

<table>
<thead>
<tr>
<th>Pathways and Indicators Water Quality</th>
<th>Environmental Baseline</th>
<th>Rationale (Existing condition)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PF&lt;sup&gt;3&lt;/sup&gt; FA&lt;sup&gt;4&lt;/sup&gt;</td>
<td>AR</td>
</tr>
<tr>
<td><strong>Water Quality</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sediment/turbidity</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Chemical contaminants/nutrients</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td><strong>Habitat Access</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical barriers</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td><strong>Habitat Elements</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large woody debris</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Pool frequency</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Pool quality</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Off-channel habitat</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Refugia</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td><strong>Channel Conditions/Dynamics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Width/depth ratio</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Streambank conditions</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Floodplain connectivity</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td><strong>Flow/Hydrology</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak/base flows</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Drainage network increase</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td><strong>Watershed Conditions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road density and location</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Disturbance history</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Riparian reserves</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>


<sup>3</sup> Pathways and Indicators defined by NMFS PF=Properly Functioning, AR=At Risk, NPR=Not Properly Functioning.
<sup>4</sup> Primary Constituent Elements defined by USFWS FA=Functioning Appropriately, FAR=Functioning At Risk, FAUR=Functioning At Unacceptable Risk.
Table 8. Existing Condition for Beaver Creek Subwatershed.

<table>
<thead>
<tr>
<th>Pathways and Indicators</th>
<th>Environmental Baseline</th>
<th>Rationale (Existing condition)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PF AR NPF FA FAR FAUR</td>
<td></td>
</tr>
<tr>
<td><strong>Water Quality</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>X X</td>
<td>56°-71°F, 13°-21°C for Olive, Beaver Cr. TMDL approved.</td>
</tr>
<tr>
<td>Sediment/turbidity/Substrate</td>
<td>X</td>
<td>No 303d lists, embeddedness&gt;35%</td>
</tr>
<tr>
<td>Chemical contaminants/nutrients</td>
<td>X</td>
<td>No 303d list for toxins</td>
</tr>
<tr>
<td><strong>Habitat Access</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical barriers</td>
<td>X</td>
<td>Barriers at base flow- dry channel units</td>
</tr>
<tr>
<td><strong>Habitat Elements</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large woody debris</td>
<td>X</td>
<td>Current levels are not at desired level on a majority of streams but further recruitment is available.</td>
</tr>
<tr>
<td>Pool frequency</td>
<td>X</td>
<td>&lt;47 pools/mile</td>
</tr>
<tr>
<td>Pool quality</td>
<td>X</td>
<td>Few pools &gt;1 m</td>
</tr>
<tr>
<td>Off-channel habitat</td>
<td>X</td>
<td>Little off-channel habitat &lt;1.4%</td>
</tr>
<tr>
<td>Refugia</td>
<td>X</td>
<td>Refugia exist and are adequately buffered but still suffer from some past mining efforts. There is little quality pool habitat and pool formation from LWM.</td>
</tr>
<tr>
<td><strong>Channel Conditions/Dynamics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Width/depth ratio</td>
<td>X</td>
<td>&lt;10</td>
</tr>
<tr>
<td>Streambank conditions</td>
<td>X</td>
<td>80-100%</td>
</tr>
<tr>
<td>Floodplain connectivity</td>
<td>X</td>
<td>Reduced linkage to riparian areas due historic mining efforts</td>
</tr>
<tr>
<td><strong>Flow/Hydrology</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak/base flows</td>
<td>X</td>
<td>Pronounced changes in peak/base flow due to past mining impacts and road density</td>
</tr>
<tr>
<td>Drainage network increase</td>
<td>X</td>
<td>No new temp roads crossing stream channel</td>
</tr>
<tr>
<td><strong>Watershed Conditions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road density and location</td>
<td>X</td>
<td>&gt;3.0 miles/sq miles, many valley bottom roads</td>
</tr>
<tr>
<td>Disturbance history</td>
<td>X</td>
<td>Past disturbance has been located in riparian areas along Olive Creek.</td>
</tr>
<tr>
<td>Riparian reserves</td>
<td>X</td>
<td>Significant impacts to riparian areas, channel shape and function given past mining disturbance</td>
</tr>
</tbody>
</table>

Stream Surveys: Olive Creek (1990, 2007 - only 0.6 miles), Beaver Creek (2007), South Fork Beaver Cr. (2007).
Table 9. Existing Conditions for the Clear Creek Subwatershed.

<table>
<thead>
<tr>
<th>Pathways and Indicators</th>
<th>Environmental Baseline</th>
<th>Rationale (Existing Condition)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PF FA AR FAR NPF FAUR</td>
<td></td>
</tr>
<tr>
<td><strong>Water Quality</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>X X X</td>
<td>Ranges 53°F-70°F or 11°C to 21°C</td>
</tr>
<tr>
<td>Sediment/turbidity</td>
<td>X</td>
<td>No 303d listings in the SWS</td>
</tr>
<tr>
<td>Chemical contaminants/nutrients</td>
<td>X</td>
<td>No 303d lists, but several abandoned mines in the watershed, see Table 14.</td>
</tr>
<tr>
<td><strong>Habitat Access</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical barriers</td>
<td>X</td>
<td>Presence of numerous diversion ditches</td>
</tr>
<tr>
<td><strong>Habitat Elements</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large woody debris</td>
<td>X</td>
<td>Current levels are not at desired level on a majority of streams but further recruitment is available. Large boulders in some of these streams create effective pool habitat.</td>
</tr>
<tr>
<td>Pool frequency</td>
<td>X</td>
<td>Pools are functioning appropriately for the size of stream</td>
</tr>
<tr>
<td>Pool quality</td>
<td>X</td>
<td>Few deep pools &gt;1m, depending on season, some water is diverted to the Pete Mann Ditch</td>
</tr>
<tr>
<td>Off-channel habitat</td>
<td>X</td>
<td>Some off-channel areas but, of high energy. Many streams are channelized from historic hydraulic mining efforts.</td>
</tr>
<tr>
<td>Refugia</td>
<td>X</td>
<td>Refugia exist and are adequately buffered but still suffer from some past mining efforts. The lower reaches of Clear Cr. can be a temperature barrier for resident bull trout.</td>
</tr>
<tr>
<td><strong>Channel Conditions/Dynamics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Width/depth ratio</td>
<td>X X</td>
<td>Range from 4-16</td>
</tr>
<tr>
<td>Streambank conditions</td>
<td>X</td>
<td>80-100%</td>
</tr>
<tr>
<td>Floodplain connectivity</td>
<td>X</td>
<td>Reduced linkage due historic mining efforts</td>
</tr>
<tr>
<td><strong>Flow/Hydrology</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak/base flows</td>
<td>X</td>
<td>Reduced base flows due to the Pete Mann diversion ditch, past mining activity and road density</td>
</tr>
<tr>
<td>Drainage network increase</td>
<td>X</td>
<td>No new temp roads crossing stream channel</td>
</tr>
<tr>
<td><strong>Watershed Conditions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road density and location</td>
<td>X</td>
<td>&gt;3.0 miles/sq miles, many valley bottom roads</td>
</tr>
<tr>
<td>Disturbance history</td>
<td>X</td>
<td>Past disturbance has been located in riparian areas.</td>
</tr>
<tr>
<td>Riparian reserves</td>
<td>X</td>
<td>Significant impacts to riparian areas, channel shape and function given past mining disturbance</td>
</tr>
</tbody>
</table>

Stream Surveys: Dry Creek (1997), Spring Creek (1997), Clear Creek (east fork and west fork, 1997), Salmon Creek (1997), Wolsey Creek (1997), Ruby Creek (1999).
Table 10. Existing Conditions for Upper Granite Creek Subwatershed.

<table>
<thead>
<tr>
<th>Pathways and Indicators</th>
<th>Environmental Baseline</th>
<th>Rationale (Existing Condition)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PF FA</td>
<td>AR FAR</td>
</tr>
<tr>
<td><strong>Water Quality</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Sediment/turbidity</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Chemical contaminants/nutrients</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td><strong>Habitat Access</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical barriers</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td><strong>Habitat Elements</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large woody debris</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Pool frequency</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Pool quality</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Off-channel habitat</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Refugia</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td><strong>Channel Conditions/Dynamics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Width/depth ratio</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Streambank conditions</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Floodplain connectivity</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td><strong>Flow/Hydrology</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak/base flows</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Drainage network increase</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td><strong>Watershed Conditions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road density and location</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Disturbance history</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Riparian reserves</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

Table 11. Existing Conditions for the Lower Granite Creek Subwatershed.

<table>
<thead>
<tr>
<th>Pathways and Indicators</th>
<th>Environmental Baseline</th>
<th>Rationale (Existing condition)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PF</td>
<td>FAR</td>
</tr>
<tr>
<td><strong>Water Quality</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Sediment/turbidity</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Chemical contaminants/nutrients</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td><strong>Habitat Access</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical barriers</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td><strong>Habitat Elements</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large woody debris</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Pool frequency</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Pool quality</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Off-channel habitat</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Refugia</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td><strong>Channel Conditions/Dynamics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Width/depth ratio</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Streambank conditions</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Floodplain connectivity</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td><strong>Flow/Hydrology</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak/base flows</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Drainage network increase</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td><strong>Watershed Conditions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road density and location</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Disturbance history</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Riparian reserves</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

Stream Surveys: Granite Creek (1982), Rabbit Creek (1999), Squaw Creek, Ten Cent Creek (2012).
Analysis of Effects

This section analyzes the direct and indirect effects of the proposed project on listed species under the ESA and their critical habitats. Direct effects are immediate impacts occurring at the same place and time as the action, both adverse and beneficial. Indirect effects occur at a different place or later time from the action. There are no interrelated and interdependent activities associated with, or scheduled to occur, within the action area associated with the proposed project; therefore, there are no anticipated effects from interrelated or interdependent activities.

Mining activities are closely managed to reduce the potential for impacts to ESA listed fish and their critical habitats. This is due primarily (but not exclusively) to Forest Service General Requirements, Site-Specific Water Resources Protection Measures, Site-Specific Fish Protection Measures and Best Management Practices applied uniformly across the project area.

The maximum disturbance possible in the Granite Mining project area is approximately 88 acres in the 94,526 acres of the Granite Creek Watershed (Table 15) (this does not include the additional 16 acres of disturbance from the “no effect” claims). The largest area of potential disturbance is ten acres in Belvadear, Bunch Bucket, Ruby Group and Yellow Gold; but the greatest area of active disturbance is .25 acres in any claim. Each area of activity within a claim must be reclaimed prior to working another area within the claim.

A full discussion of effects to soils and water resources at each mining site is found in the Granite Mining EIS and is not repeated here. Relevant findings of direct and indirect effects to soils and water resources which may affect ESA listed species and DCH are summarized below.

Background

Placer Mining

Placer mining is the mining of stream sand, rock and gravel deposits for minerals, or discrete grains called “placers”. The metal or gemstones were moved by stream flow from an original source such as a vein. Heavy metals like gold are considerably more dense than the sand, rock and gravel deposits they are found in, and they tend to accumulate at the base of placer deposits. As described in the Granite Mining Proposed Action the deposits are worked to find the precious metals. This is done by working the previously mined and disturbed existing surface deposits or by surface equipment excavating previously mined and disturbed areas.

Although hydraulic mining is uncommon today, previously degraded habitats have not yet recovered and still exhibit excessive sediment transport, downcutting, and instability. For example, hydraulic mining (e.g., gold) from stream deposits and hillslopes dramatically altered stream channels, riparian zones, and floodplains (Spence et al 1996). As described earlier, earlier hydraulic mining effects such as mounds on streambanks and abandoned ditches are still visible in the Granite Watershed.

The majority of mining proposed in the in the Granite Mining EIS is placer mining in old tailings. Some areas have recovered with mature vegetation. As described in the Plans, many sites will use heavy equipment such as backhoes and loaders to dig the material and transport to the processing equipment. Some sites will require stream fording or temporary bridges.

In areas adjacent to streams there is a potential for indirect effects from transport of sediments to streams as tailings are worked. Tailings are often composed of coarse sediment from previous processing and sorting of rock, and sediment may be transported subsurface through the porous cobble and rock. The impacts from placer mining activities in RHCAs is limited by limits on the size of the test holes and maximum area to be worked and disturbed at one time. Test holes range in size from 20’ x 10’ up to ½ acre, and the maximum area disturbed at one time is ½ acre (Table 15). Negative effects of sedimentation and turbidity on fish and aquatic species is well established (Henley et al 2000, Michel et al 2013) and includes alteration of food chains, decreases in primary productivity, mortality or behavior modification and depressed rates of growth, reproduction and recruitment.
Mining activities may directly effect riparian areas by removing established vegetation to access tailings. Many sites have poor conditions for vegetation growth from previous disturbance and have little to no established vegetation. Vegetation next to streams provides bank stability and shade and can trap transported sediments. Vegetation next to streams also provides organic inputs to streams with inputs of large and small wood, and is a source of food for fish if insects fall into streams. Fish and aquatic resources are indirectly affected by loss of riparian vegetation because of potential negative effects to bank stability, loss of shade, increased sedimentation and turbidity and loss of organic material.

**Lode Mining**

The type of mineral mined in lode operations influences the extraction method, processing techniques, and thereby the environmental impacts. As mentioned above, proposed lode mining in the Granite Mining Project area is strictly maintenance and re-opening of existing adits. These operations are only proposing extraction of minerals mechanically with heavy equipment. Operations are not extracting deposits using “solution mining”, which involves a chemical solvent that is pumped underground with resulting ore solution pumped to the surface for recovery. The main environmental concerns with lode operations in the Granite Mining Project are toxic chemicals leached from the existing mine tailings or overburden. This overburden can contain toxic metals such as arsenic, chromium, copper, lead, mercury and zinc. Pollution of streams by this acid mine drainage is generally considered to be the most serious water pollution aspect of mining operations. Acid waste is problematic because pyrite readily oxidizes in water to form sulfuric acid when it is exposed to atmospheric oxygen. Given proximity to certain streams, effluent waters under these conditions may have low pH, which is directly toxic to most forms of aquatic life (Nelson et al. 1991). This discharge is most often observed in underground mining operations, surface runoff from overburden or tailings piles, and leakage from settling ponds. Mortality to fish is usually associated with direct high metal concentrations but continuous exposure at sublethal amounts may cause behavioral changes and reproductive failure.

BMP’s and additional mitigations for lode mines in this project, reference L1-L11, are in place to prevent seepage or toxic effluent discharge (such as acid mine waste) into streams from any overburden produced from lode mine operations. Mitigations include prevention of acid waste discharge.

**Connected Actions**

Secondary activities associated with mining, such as the creating of access roads and the generation of chemical as well as solid wastes, can contribute to long-term environmental impacts before, during, and after mining operations. Mining sites are often occupied for long periods of time with camping in riparian areas. Annual inspections and implementation and effectiveness monitoring, and the project design criteria H1-H12 address these concerns. Table 4 outlines the existing structures within the RHCA’s.

Several of these mine operations have proposed stream fords that will be utilized in and outside of the instream work window (July 15th-August 15th), on open public and closed roads. These stream crossings can have direct and indirect effects to fisheries. Crossing of the fords with heavy machinery can modify fish behavior, movement and feeding behavior. The majority of these crossings are on existing fords with only one new proposed ford crossing (Table 15). Mitigations Z1-Z14 address indirect effects from the construction of these ford crossings and several of these operations must receive an ODEQ 401 certification before the Forest Service will authorize construction or improvements of temporary roads and associated fords. The majority of ford improvements will have short term effects associated with the hardening of fords and site specific mitigations for these operations will have conditioned ford crossing (reference project proposal and general requirements for site specific conditioned stream crossings) with heavy machinery to minimize direct effects to fisheries. Appendix D outlines existing road condition and any proposed temporary road activities.
Use of mechanized equipment (including large equipment such as excavators and dump trucks, and small equipment such as pumps) in riparian areas and fording streams creates a potential for contamination from petroleum products. Equipment operation, including excavation work in and adjacent to streams in the Granite Creek watershed, could introduce hazardous materials including fuel, lubricants, hydraulic fluids, and coolants into the waterway. These chemicals can be acutely toxic to fish at high levels of exposure and can cause acute and chronic effects to fish species, aquatic invertebrates, and aquatic and riparian vegetation.

**Reclamation**

Surface mining operations can involve drastic alteration of vegetation, soils, and subsurface materials, accompanying changes in surface and subsurface hydrology. Whether these effects will be temporary or long-term depends on reclamation techniques and site location. The hydrologic character of surface-mined lands and reclamation potential is determined by several variables, including precipitation, solar input, slope steepness, vegetation types and composition, and characteristics of the spoils or overburden (Nelson et al. 1991). Reclamation of mined areas is an integral part of mining operations. The Surface Mining Control and Reclamation Act (SMCRA, 1977) supplements state regulations, requires restoration of mined land to pre-mining condition and prohibits mining where mandated restoration would not be possible. SMCRA specifically calls for the restoration and, if possible, enhancement of fish and wildlife habitat, which, coincides with requirements of both the Multiple-Use Sustained Yield and Federal Land Policy and Management Acts.

In stating that, rehabilitation and reclamation processes for the Granite Mining Operations are part of the planning process. These mitigations are highlighted in ongoing and final reclamation, R1-R18. Restoration efforts are ongoing in the Granite and Bull Run Creek Watersheds. Watershed Restoration Action Plans (WRAPS) have been established for both of these watersheds to improve stream function and remove artificial barriers for fish passage. WRAPS prioritize aquatic organism passage projects, road decommission, riparian planting, stream reconnects, evaluation of water rights and uses, improved stream-valley floor for hydrologic connectivity, restoration of beaver habitat, maintenance of pipe systems of mine operations under CERCLA, and identification and removal of CERCLA actions.

**Direct and Indirect Effects from Granite Project Placer and Lode Mining**

When Forest Service General Requirements, Site-Specific Water Resources Protection Measures and Site-Specific Fish Protection Measures and Best Management Practices are followed, placer, and lode mining are predicted to have localized and short-term direct and indirect effects and impacts to fisheries and other aquatic organisms and aquatic habitat. Given the existing conditions of most subwatersheds within the Granite Project area, some placer mining in and adjacent to Granite and Clear Creeks could negatively affect ESA-listed and sensitive fish species and other aquatic organisms. Mechanisms for these effects are summarized:

**Direct Effects**

- Disturbance to fish from fording in some Plans
- Sedimentation from disturbed stream adjacent areas from fording (limited by rocking streambanks and other Protection Measures) in some Plans
- Possible fuel and lubricant leaking into waterways during fording.

**Indirect Effects**

- Sediment from disturbed areas (areas of mining or processing) could be transported to stream channels
- Small quantities of fuels and lubricants could be transported to stream channels
- Loss of riparian vegetation could affect bank stability in some areas
Forest Service Requirements and Protection Measures are predicted to reduce the potential for indirect effects to an insignificant and non-measureable amount. Direct effects are limited by the small magnitude of some activities across the Granite Creek watershed (a limited number of fords and stream crossings, which are also limited to the number of trips during the operating season).

**Water Quality**

The Granite Mining EIS is designed to meet all water quality regulatory requirements for the Umatilla and Wallowa-Whitman National Forest.

There are temperature and sediment water quality limited streams within the Granite Watershed (see Table 12). The State of Oregon Department of Environmental Quality has completed Total Maximum Daily Loads (TMDLs) for the North Fork John Day Subbasin (2010).

Water Quality Management Plans (WQMP) covering US Forest Service lands are in place in the North Fork John Day River Basin. Forestry WQMPs rely on current laws, management plans, and BMPs to provide the basis for improving water quality in the forested landscape. All federal land management activities must follow standards and guidelines found in the Umatilla National Forest Plan, as amended by PACFISH (USDA and USDI 1995). PACFISH provides management direction in the form of interim Riparian Habitat Conservation Areas (RHCAs) and Standards and Guides for Key Watersheds.

**Table 12. Oregon Water Quality Assessment on Streams within the Project Area.**

<table>
<thead>
<tr>
<th>Stream</th>
<th>Temperature</th>
<th>Sediment</th>
<th>Toxins</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear Creek</td>
<td>X</td>
<td>Insufficient data</td>
<td>Insufficient data</td>
<td>Temp. TMDL Approved</td>
</tr>
<tr>
<td>Bull Run Creek</td>
<td>X</td>
<td>stream mile 0 to 9.3</td>
<td>N/A</td>
<td>Temp. TMDL Approved</td>
</tr>
<tr>
<td>Beaver Creek</td>
<td>X</td>
<td>N/A</td>
<td>N/A</td>
<td>Temp. TMDL Approved</td>
</tr>
<tr>
<td>Granite Creek</td>
<td>X</td>
<td>stream mile 11.2 to 16.2</td>
<td>Insufficient data</td>
<td>Temp. TMDL Approved</td>
</tr>
</tbody>
</table>

The various basins’ WQMPs expect current policies, regulations, BMPs, and adaptive management techniques to minimize unwanted sedimentation from forest management activities. Habitat conditions are expected to be improved through implementation of BMPs developed for the temperature TMDL which, promote riparian conditions that improve channel stability and reduce erosion and promote the protection and recovery of channel morphology to the most stable forms.

The Granite Mining Project is an evaluation of 285 small actions (the largest is ten acres) in the 94,526 acre Granite Watershed. For ease of display relevant Plan information is summarized in tables and is used as the basis for the effects determinations displayed in Table 20.

**Compliance with PACFISH/INFISH**

There are three major components to the Granite Mining project: mining activity, road activities/use, and connected actions (camping, water diversion rights etc.). Each of these types of activities carries potential for effects to some components of aquatic habitat. Only those habitat components potentially affected by these types of activities or that are specifically addressed as PACFISH Riparian Management Objectives (RMOs) will be addressed in

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5 The EIS describes 28 plans, Tetra Group is split into Tetra Placer and Tetra Mill/Lode sites.
PACFISH compliance analysis. Table 13 summarizes reasons for including individual aquatic habitat parameters in this evaluation. The hydrology and aquatics report in the Granite Mining EIS displays the full analysis for the conclusion summarized below.

**Streams:** Compliance with S&Gs as it pertains to streams is determined by assessing whether use of existing structures, or construction and use of proposed structures, would impact 1) water quality, 2) inchannel complexity, or 3) channel morphology.

Potential impacts to water quality include 1) increases in water temperatures, 2) increases in heavy metal concentrations, and/or 3) reductions in water clarity. (all discharge related)

Potential impacts to inchannel complexity include 1) reduction in pool frequency or quality related to inputs of sediment, 2) change in substrate sediment related to inputs of sediment, and 3) loss of lower bank angle or undercuts related to bank failures. (mix of discharge related or placement of structure such that it destabilizes the banks)

Potential impacts to channel morphology include 1) loss of bank stability due to bank failures, 2) loss of lower bank angle due to bank failures (also known as bank undercuts) and 3) increases in width/depth ratio. (placement of structure such that it destabilizes the banks and results in channel widening and/or bed aggradation)

**RHCA impacts:** Compliance with S & Gs and RMOs as it pertains to activity inside the RHCAs is determined by assessing whether use of existing structures, or construction and use of proposed structures, would impact 1) short soil productivity, 2) long-term soil productivity, and 3) riparian vegetation.

Potential impacts to soil productivity include 1) new disturbance due to new roads and ponds which alters soil stratigraphy, groundwater flow paths, and infiltration capacity (short-term impacts), 2) lack of effective reclamation of these new roads and ponds (long-term impacts), and 3) increased soil erosion related to roads.

Potential impacts to riparian vegetation include reductions in the 1) amount, 2) distribution and 3) types of riparian vegetation.

Results of this analysis are fully displayed in the Water and Soil Resources and Fisheries reports in the Granite Mining EIS. With application of all General Requirements and other Protection Measures the project is in compliance with PACFISH.

**Table 13. Aquatic Habitat Components Potentially Affected by Mining Activities in the Granite Effects Analysis.**

<table>
<thead>
<tr>
<th>Habitat Component</th>
<th>Pacfish RMO</th>
<th>Habitat Could Potentially be Affected By</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mining</td>
<td>Road Construction/Improvement</td>
</tr>
<tr>
<td>Pool frequency</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Water quality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Suspended sediment</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Chemical contamination</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Large woody debris</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Stream Channel conditions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bank stability</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Lower bank angle</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Substrate</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>---------------</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Flow regime</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flow timing</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Flow volume</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Road density and location</td>
<td>Not a habitat parameter. Included because it could affect habitat quality</td>
<td></td>
</tr>
<tr>
<td>Disturbance history regime</td>
<td>Not a habitat parameter. Included because it could affect habitat quality</td>
<td></td>
</tr>
</tbody>
</table>

Tables 14 and 15 display the proximity and magnitude of activity of the individual mine operations/Plans. It is important to note that activities displayed are maximum possible disturbance. For purposes of this consultation the maximum amount of disturbance is displayed, but based on past administration of mining permits it is expected lower levels of activities will occur.

Table 16 displays low, medium and high risk to ESA listed species from proposed mining activities.
Table 14. Mine operation and proximity to Steelhead and Bull Trout Designated Critical Habitat (DCH). Refer to Figure 2 for location of DCH and proximity to mine operations.

<table>
<thead>
<tr>
<th>Mine Operation</th>
<th>Nearest Stream</th>
<th>Distance to Steelhead DCH</th>
<th>Distance to Bull Trout DCH (mi)</th>
<th>Mid-C Steelhead DCH</th>
<th>Mid-C Bull Trout DCH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Rearing</td>
<td>Spawning</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Altona</td>
<td>Quartz Gulch</td>
<td>1.0 mile</td>
<td>&gt; 5.0 mi.</td>
<td>Unknown*</td>
<td>Intermittent stream</td>
</tr>
<tr>
<td>Belvadear</td>
<td>Olive Creek</td>
<td>20 ft.</td>
<td>&gt;5.0</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Blue Smoke</td>
<td>Granite</td>
<td>&gt;300 ft.</td>
<td>&gt;300 ft.</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Blue-Sky/Bull Run</td>
<td>Bull Run</td>
<td>30 ft.</td>
<td>30 ft.</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Bunch Bucket</td>
<td>Clear Creek</td>
<td>150 ft.</td>
<td>150 ft.</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>City Limits</td>
<td>Granite</td>
<td>200 ft.</td>
<td>200 ft.</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>East Ten Cent</td>
<td>East Ten Cent Creek</td>
<td>10 ft.</td>
<td>2.0 miles</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Eddy Shipman</td>
<td>Granite</td>
<td>10 ft.</td>
<td>10 ft.</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Grubsteak</td>
<td>Clear Creek</td>
<td>20 ft.</td>
<td>20 ft.</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Hopeful 1</td>
<td>Granite</td>
<td>150 ft.</td>
<td>150 ft.</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Hopeful 2 &amp; 3</td>
<td>Granite</td>
<td>50 ft.</td>
<td>50 ft.</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>L&amp;H Placer</td>
<td>Olive Creek</td>
<td>0.5 miles</td>
<td>&gt;7.0 miles</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Lightning Creek</td>
<td>Lighting Creek</td>
<td>150 ft.</td>
<td>150 ft.</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Little Cross I</td>
<td>Granite</td>
<td>50 ft.</td>
<td>50 ft.</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Make It</td>
<td>Granite</td>
<td>100 ft.</td>
<td>100 ft.</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Old Eric 1&amp;2</td>
<td>Granite</td>
<td>150 ft.</td>
<td>150 ft.</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Olive Tone</td>
<td>Olive Creek</td>
<td>50 ft.</td>
<td>&gt;5.0 miles</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Rose Bud</td>
<td>Granite</td>
<td>200 ft.</td>
<td>200 ft.</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Ruby Group</td>
<td>Ruby Creek/Clear Creek</td>
<td>10 ft.</td>
<td>10 ft.</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Sunshine/McWillis</td>
<td>McWillis Gulch</td>
<td>0.25 mile</td>
<td>&gt;5.0 mile</td>
<td>N-Culvert barrier N-Culvert Barrier</td>
<td>N</td>
</tr>
<tr>
<td>Tetra Alpha/Tetra Grp</td>
<td>Boulder Creek</td>
<td>25 ft.</td>
<td>25 ft.</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Troy D</td>
<td>Granite</td>
<td>25 ft.</td>
<td>25 ft.</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Yellow Jacket</td>
<td>Orofino Gulch</td>
<td>0.25 miles</td>
<td>&gt;5.0 miles</td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>

*Unknown-Spawning not documented and few biological surveys to confirm absence/presence, with no barriers they are assumed present. **temperature concerns
Table 15. Summary of proximity of mines to Steelhead and Bull Trout DCH, maximum area disturbed by placer mine operation, total possible disturbed area over the duration of the BA, stream fording, miner identified no activity stream buffers, and pond information.

<table>
<thead>
<tr>
<th>Plan Name</th>
<th>Area of Disturbance Distance to Steelhead DCH</th>
<th>Area of Disturbance Distance to Bull Trout DCH</th>
<th>Maximum Area of Active Surface Disturbance (in acres)</th>
<th>Total Area Potentially Disturbed from Mining Activities* (in acres)</th>
<th>Number of Stream Fords</th>
<th>Width of No Activity Stream Buffer</th>
<th>Ponds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altona</td>
<td>1.0 mile</td>
<td>&gt;5.0 mi.</td>
<td>.02</td>
<td>3</td>
<td>0</td>
<td>20'</td>
<td>Build 2 10’x 20’ x 6’</td>
</tr>
<tr>
<td>Belvadear</td>
<td>20 ft</td>
<td>&gt;5.0</td>
<td>.25</td>
<td>3</td>
<td>0</td>
<td>20’</td>
<td>E</td>
</tr>
<tr>
<td>Blue Smoke</td>
<td>&gt;300 ft</td>
<td>&gt;300 ft</td>
<td>.01</td>
<td>1.75</td>
<td>0</td>
<td>n/a</td>
<td>E</td>
</tr>
<tr>
<td>Blue-Sky/Bull Run</td>
<td>30 ft</td>
<td>30 ft</td>
<td>.2</td>
<td>1.7</td>
<td>2</td>
<td>30’</td>
<td>E</td>
</tr>
<tr>
<td>Bunch Bucket</td>
<td>150 ft</td>
<td>150 ft</td>
<td>.01</td>
<td>10</td>
<td>0</td>
<td>n/a</td>
<td>Expand E</td>
</tr>
<tr>
<td>City Limits</td>
<td>200 ft</td>
<td>200 ft</td>
<td>.01</td>
<td>1</td>
<td>0</td>
<td>n/a</td>
<td>E</td>
</tr>
<tr>
<td>East Ten Cent</td>
<td>10 ft</td>
<td>2.0 miles</td>
<td>.01</td>
<td>2</td>
<td>0</td>
<td>10’</td>
<td>E</td>
</tr>
<tr>
<td>Eddy Shipman</td>
<td>10 ft</td>
<td>10 ft</td>
<td>.25</td>
<td>2.5</td>
<td>1</td>
<td>20’</td>
<td>Build 2 10’x 20’ x 6’</td>
</tr>
<tr>
<td>Grubstake</td>
<td>20 ft</td>
<td>20 ft</td>
<td>.25</td>
<td>2</td>
<td>1</td>
<td>20’</td>
<td>E</td>
</tr>
<tr>
<td>Hopeful 1</td>
<td>150 ft</td>
<td>150 ft</td>
<td>.01</td>
<td>1</td>
<td>0</td>
<td>15’</td>
<td>E</td>
</tr>
<tr>
<td>Hopeful 2 &amp; 3</td>
<td>50 ft</td>
<td>50 ft</td>
<td>.25</td>
<td>3.5</td>
<td>2</td>
<td>20’</td>
<td>2 E, 2 B 4’x 4’ x 6’</td>
</tr>
<tr>
<td>L&amp;H Placer</td>
<td>0.5 miles</td>
<td>&gt;7.0 miles</td>
<td>.01</td>
<td>8</td>
<td>1</td>
<td>10’</td>
<td>E</td>
</tr>
<tr>
<td>Lightning Creek</td>
<td>150 ft</td>
<td>150 ft</td>
<td>.12</td>
<td>5</td>
<td>1</td>
<td>n/a</td>
<td>E</td>
</tr>
<tr>
<td>Little Cross I</td>
<td>50 ft</td>
<td>50 ft</td>
<td>.25</td>
<td>1</td>
<td>0</td>
<td>15’</td>
<td>none</td>
</tr>
<tr>
<td>Make It</td>
<td>50 ft</td>
<td>50 ft</td>
<td>.01</td>
<td>2</td>
<td>0</td>
<td>50’</td>
<td>E</td>
</tr>
<tr>
<td>Old Eric 1&amp;2</td>
<td>150 ft</td>
<td>150 ft</td>
<td>.01</td>
<td>1</td>
<td>0</td>
<td>10’</td>
<td>E</td>
</tr>
<tr>
<td>Olive Tone</td>
<td>50 ft</td>
<td>&gt;5.0 miles</td>
<td>.02</td>
<td>2</td>
<td>1</td>
<td>40’</td>
<td>Build 2 10’x 20’ x 6’</td>
</tr>
<tr>
<td>Rose Bud</td>
<td>200 ft</td>
<td>200 ft</td>
<td>.01</td>
<td>5</td>
<td>0</td>
<td>n/a</td>
<td>2 B 150’ x 10’ x 6’</td>
</tr>
<tr>
<td>Ruby Group</td>
<td>10 ft</td>
<td>10 ft</td>
<td>.01</td>
<td>2.5</td>
<td>2</td>
<td>10’</td>
<td>None</td>
</tr>
<tr>
<td>Sunshine/Mc Willis</td>
<td>0.25 mile</td>
<td>&gt;5.0 mile</td>
<td>.25</td>
<td>2.5</td>
<td>0</td>
<td>30’</td>
<td>E</td>
</tr>
<tr>
<td>Tetra Alpha Placer</td>
<td>25 ft</td>
<td>25 ft</td>
<td>.5</td>
<td>8</td>
<td>2</td>
<td>25’</td>
<td>E</td>
</tr>
<tr>
<td>Tetra A Lode &amp; Mill</td>
<td>25 ft</td>
<td>25 ft</td>
<td>.5</td>
<td>2</td>
<td>0</td>
<td>25’</td>
<td>E</td>
</tr>
<tr>
<td>Troy D</td>
<td>25 ft</td>
<td>25 ft</td>
<td>.01</td>
<td>8</td>
<td>0</td>
<td>25’</td>
<td>E</td>
</tr>
<tr>
<td>Yellow Jacket</td>
<td>0.25 miles</td>
<td>&gt;5.0 miles</td>
<td>.25</td>
<td>7.5</td>
<td>0</td>
<td>20’</td>
<td>Build 3 15’x 20’ x 6’</td>
</tr>
</tbody>
</table>

Total | 3.22 acres | 88 acres |

*This is potential total area disturbed over the duration of the BA - due to operational size limits displayed in the column to the left, this entire area will not be disturbed at one time; n/a no new activities proposed in riparian area
Table 16. Determination of risk (high, moderate, low) to ESA listed species from proposed mining activities.

<table>
<thead>
<tr>
<th>Mine Plan and Rationale</th>
<th>Direct Effects to Fish</th>
<th>Risk of Indirect/Direct Effects to Each Matrix Indicator (evaluated at the reach scale)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Temp</td>
<td>Sediment</td>
</tr>
<tr>
<td>Altona</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>General Requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belvadear</td>
<td>L</td>
<td>M</td>
</tr>
<tr>
<td>General Requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L&amp;H</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>General Requirements, Site Specific Protection Measures, Occasional use of heavy machinery (stream crossing 2-4 times)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Olive Tone</td>
<td>L</td>
<td>H</td>
</tr>
<tr>
<td>General Requirements, Site Specific Protection Measures, Occasional use of heavy machinery (stream crossing 2-4 times)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Royal White</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>General Requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sunshine/McWillis</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>General Requirements, Site Specific Protection Measures, Occasional use of heavy machinery (stream crossing 2-4 times)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yellow Jacket</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>General Requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>City Limits</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>General Requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eddy Shipman</td>
<td>M</td>
<td>L</td>
</tr>
<tr>
<td>General Requirements, Site Specific Protection Measures, Occasional use of heavy machinery (stream crossing 2-4 times)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Make It</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>General Requirements, Site Specific Protection Measures.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muffin</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>General Requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Old Eric 1&amp;2</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td>General Requirements, Site Specific Protection Measures.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yellow Gold</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>General Requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tetra Group</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td>General Requirements, Site Specific Protection Measures.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blue Sky-Bull Run</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td>General Requirements, Site Specific Protection Measures, Occasional use of heavy machinery (stream crossing 2-4 times)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bunch Bucket</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>General Requirements.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grubsteak</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>General Requirements, Site Specific Protection Measures.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lightning Creek</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td>General Requirements, Site Specific Protection Measures, Occasional use of heavy machinery (stream crossing 2-4 times)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lucky Strike</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>General Requirements.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ruby Group</td>
<td>M</td>
<td>L</td>
</tr>
<tr>
<td>General Requirements, Site Specific Protection Measures.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blue Smoke</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td>General Requirements, Site Specific Protection Measures.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>East Ten Cent</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>General Requirements, Site Specific Protection Measures.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hopeful I</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>General Requirements, Site Specific Protection Measures.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mine Plan and Rationale</td>
<td>Direct Effects to Fish</td>
<td>Risk of Indirect/Direct Effects to Each Matrix Indicator (evaluated at the reach scale)</td>
</tr>
<tr>
<td>------------------------</td>
<td>-----------------------</td>
<td>-------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Temp</td>
<td>Sediment</td>
</tr>
<tr>
<td>Hopeful 2&amp;3</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td>Little Cross</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td>Rose Bud 1-4</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>Troy D</td>
<td>L</td>
<td>L</td>
</tr>
</tbody>
</table>

General Requirements, Site Specific Protection Measures. Occasional use of heavy machinery (stream crossing 2-4 times).

General Requirements, Site Specific Protection Measures.

L=No potential for an adverse effects on habitat. The action is controlled by seasonal or spatial restrictions and is not likely to adversely affect habitat.

M= A moderate rating assumes potential adverse effects on habitat. The action is not completely controllable, and administration of the action is needed to prevent adverse effects on habitat.

H= A high rating assumes possible adverse effects on habitat. The action is not completely controllable, and a high level administration of the activity is needed. With protection measures to minimize effects, a low magnitude of adverse effects on the habitat are likely to occur.

Overall effects to the NMFS Matrix of Pathways and Indicators for the Granite Mining EIS is displayed by sub-watershed in Table 19. Watersheds summarized include Granite SWS, Beave SWS, Bull Run SWS, Clear Creek SWS, Lower Granite, SWS and Upper Granite SWS.

Determination of effects is summarized in Table 20.
**Cumulative Effects**

Cumulative effects include the effects of future state, tribal, local or private actions that are reasonably certain to occur in the action area considered in this BA. Future federal actions that are unrelated to the proposed action, and have not already undergone consultation under the ESA, are not considered here because they require separate consultation pursuant to Section 7 of the ESA. Tables 17 and 18 display Forest Service and State of Oregon identified mining areas with environmental hazards. There currently is not funding available to further evaluate hazards and take remedial actions.

**Table 17. Forest Service identified existing and/or abandoned mines within the Granite Watershed and associated environmental hazards. Reports include engineering evaluation and cost analysis (EE/CA) and site investigation (SI). Refer to Appendix H for a map of abandoned mines.**

<table>
<thead>
<tr>
<th>Mining Area</th>
<th>Reports</th>
<th>SWS</th>
<th>Potential Hazards Recommended Action</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monumental</td>
<td>EE/CA</td>
<td>Upper Granite</td>
<td>Elevated metal concentration in waste rock and tailings and at mill. Provide on-site containment, excavation / containment in onsite repository, and water treatment.</td>
<td>No proposal in EIS</td>
</tr>
<tr>
<td>Cap Martin</td>
<td>EE/CA</td>
<td>Upper Granite</td>
<td>Metal concentrations near clean-up level in mine waste; no metals leaching from tailings into creek. No further action needed.</td>
<td>No proposal in EIS</td>
</tr>
<tr>
<td>Sheridan</td>
<td>EE/CA</td>
<td>Upper Granite</td>
<td>No elevated metals in waste rock. Remote site and limited access. No further action needed.</td>
<td>No proposal in EIS</td>
</tr>
<tr>
<td>Tillicum</td>
<td>EE/CA</td>
<td>Upper Granite</td>
<td>Metal concentrations near clean-up level in waste rock. Remote site and limited access. No further action needed.</td>
<td>No proposal in EIS</td>
</tr>
<tr>
<td>Central</td>
<td>EE/CA</td>
<td>Upper Granite</td>
<td>Metal concentration near clean-up level in waste rock, tailings and soil. Provide on-site containment.</td>
<td>The lower central adit is adit A in the proposed plan. The other adits in this plan are upstream of this proposal.</td>
</tr>
<tr>
<td>Granite Creek</td>
<td>EE/CA</td>
<td>Upper Granite</td>
<td>Below clean-up level to elevated metal concentrations in waste rock pile and soil. Provide on-site containment.</td>
<td>No proposal in EIS</td>
</tr>
<tr>
<td>Golden Fraction</td>
<td>EE/CA</td>
<td>Upper Granite</td>
<td>Elevated metal concentration in waste rock. Provide on-site containment.</td>
<td>No proposal in EIS</td>
</tr>
<tr>
<td>Pyx</td>
<td>SI</td>
<td>Beaver Creek</td>
<td>Elevated metal concentrations in waste rock pile and tailings impoundment.</td>
<td>No proposal in EIS</td>
</tr>
<tr>
<td>Rabbit</td>
<td>SI</td>
<td>Beaver Creek</td>
<td>Elevated metal concentrations in waste rock pile and soil at mill. Completion of EE/CA recommended.</td>
<td>No proposal in EIS</td>
</tr>
<tr>
<td>Mining Area</td>
<td>Reports</td>
<td>SWS</td>
<td>Potential Hazards Recommended Action</td>
<td>Comments</td>
</tr>
<tr>
<td>---------------------</td>
<td>---------</td>
<td>-----------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Ajax &amp; Magnolia EE/CA</td>
<td>Upper Granite</td>
<td>Elevated metal concentrations in mine waste and soil. Provide on-site excavation / containment and treat adit discharge. The 2004 Engineering Evaluation/Cost Analysis of Ajax and Magnolia Mines found that there were ecological accidents of arsenic, copper, cadmium, manganese, mercury, nickel, selenium, zinc, barium, iron in soil and water samples only in adit discharge and rock pilings. The report conclusions from field water quality parameters found that there was low elevated risk to ecological receptors exposed to surface water in Lucas Gulch.</td>
<td>No proposal in EIS. Site is withdrawn from mineral entry.</td>
<td></td>
</tr>
<tr>
<td>Blue Bird EE/CA Clear Creek (1707020 20203)</td>
<td>Clear Creek</td>
<td>Ongoing remediation at site. Long term monitoring and maintenance plan in place. The EE/CA completed by Cascade Earth Systems found that arsenic concentrations on lower Clear Creek are slightly above Oregon DEQ criteria for toxic pollutants. Other dissolved metal concentrations in surface water were below the minimum detection level (MDL) of 50µg/L. Sediment concentrations of arsenic are above the EPA Threshold Effect Levels. Sediment concentrations of copper, cadmium, manganese, nickel and zinc are also in excess of state and/or federal comparison criteria. The Clear Cr. WRAPS addresses essential project work for ongoing water quality monitoring.</td>
<td>No proposal in EIS. Site is withdrawn from mineral entry.</td>
<td></td>
</tr>
<tr>
<td>Blackjack EE/CA Clear Creek</td>
<td>Clear Creek</td>
<td>Ongoing remediation at site. Long term monitoring and maintenance plan in place. Cascade Earth Systems completed a Mine Seep Discharge and Settling Pond Assessment on Blackjack mine located on Clear Creek. Assessment determined Clear Creek surface water conditions are influenced by upgradient abandoned mine sites. The pipe system and settling ponds at Black Jack are functioning appropriately. Metal concentrations at the confluence of Clear Creek were below federal and state standards.</td>
<td>No proposal in EIS. Site is withdrawn from mineral entry.</td>
<td></td>
</tr>
<tr>
<td>Buffalo (FS portion) SI Upper Granite</td>
<td>None expected based on current remediation at site. Long term monitoring and maintenance plan in place.</td>
<td></td>
<td></td>
<td>No proposal in EIS</td>
</tr>
</tbody>
</table>

For more information on these sites visit the Forest Service National web page at [http://www.fs.usda.gov/detail/umatilla/landmanagement/planning/?cid=stelprdb5208004](http://www.fs.usda.gov/detail/umatilla/landmanagement/planning/?cid=stelprdb5208004) for the Umatilla NF and, [http://www.fs.usda.gov/detail/wallowa-whitman/landmanagement/projects/?cid=stelprdb5287229](http://www.fs.usda.gov/detail/wallowa-whitman/landmanagement/projects/?cid=stelprdb5287229) for the Wallowa Whitman NF. Not all sites listed on these web pages are within the Granite watershed, so please refer to the above list when reviewing the information.

The Oregon State Department of Environmental Quality (DEQ) maintains an Environmental Cleanup Site Information (ECSI) database to track sites in Oregon with known or potential contamination from hazardous substances, and to document sites where DEQ has determined that no further action is required. Complete information can be found at [http://www.deq.state.or.us/lq/ecsi/ecsi.htm](http://www.deq.state.or.us/lq/ecsi/ecsi.htm).

Table 18. Oregon Department of Environmental Quality (DEQ) mine sites identified for investigation with associated environmental hazards.

<table>
<thead>
<tr>
<th>Mine Name</th>
<th>State ID</th>
<th>Location</th>
<th>Potential Hazards</th>
<th>Recommended Action</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buffalo</td>
<td>3417</td>
<td>Upper Granite</td>
<td>The state has voiced concerns over water quality from existing portals and tailings impoundments. Possible soil contamination at or below current tailings impoundments.</td>
<td>Site Evaluation done.</td>
<td>Private land No proposal in EIS</td>
</tr>
<tr>
<td>Cougar Mine</td>
<td>808</td>
<td>Upper Granite</td>
<td>The state has voiced concerns over water quality from existing portals and tailings impoundments. Possible soil contamination at or below current tailings impoundments.</td>
<td></td>
<td>Private land No proposal in EIS</td>
</tr>
<tr>
<td>Ben Harrison Mine &amp; Mill</td>
<td>3382</td>
<td>Clear Creek</td>
<td>The state has voiced concerns over elevated arsenic and other metals in the waste rock and wetland sediment. Site Investigation (SI) done and site placed on Confirmed Release List in 2005.</td>
<td></td>
<td>Private land No proposal in EIS</td>
</tr>
<tr>
<td>Bi-Metallic Mine</td>
<td>3405</td>
<td>Clear Creek</td>
<td>Suspect site requires further investigation. Site Screening recommended.</td>
<td></td>
<td>No proposal in EIS</td>
</tr>
<tr>
<td>Independence Mine</td>
<td>2581</td>
<td>Upper Granite</td>
<td>The state has voiced concerns over water quality from existing portals and tailings impoundments. Possible soil contamination at or below current tailings impoundments. Site Evaluation was done 1996 and the site was placed on the confirmed release list in 2004.</td>
<td></td>
<td>No proposal in EIS</td>
</tr>
<tr>
<td>Lower Clear Creek Mines</td>
<td>2147</td>
<td>Clear Creek</td>
<td>The state has voiced concerns over the potential for heavy metals in the Clear creek area due to the past mining history. A preliminary assessment was done to provide a base line and develop background level for the subwatershed in 2005. The Oregon State DEQ has requested funding for Phase II.</td>
<td></td>
<td>No proposal in EIS</td>
</tr>
<tr>
<td>Magnolia Mine</td>
<td>3439</td>
<td>Upper Granite</td>
<td>The state expressed concern over metals contamination of soil, sediment and surface water. Site Investigation (SI) done 1996 and site placed on Confirmed release list in 2004.</td>
<td></td>
<td>No proposal in EIS</td>
</tr>
<tr>
<td>Middle Reach of East 10 Cent Creek</td>
<td>2149</td>
<td>Lower Granite (1707020206)</td>
<td>The EPA did a Site evaluation in 1997 and no further remedial action is planned under a federal program. The state lists it as a suspected site needing further investigation.</td>
<td>Same area as East 10 Cent proposal proposed</td>
<td></td>
</tr>
<tr>
<td>New York Mine</td>
<td>3418</td>
<td>Upper Granite</td>
<td>The state expressed concern over metals contamination of soil, sediment and surface water. Site Investigation (SI) done 1996 and site placed on Confirmed release list in 2004.</td>
<td></td>
<td>No proposal in EIS</td>
</tr>
<tr>
<td>Pride of Oregon Mine</td>
<td>3420</td>
<td>Clear Creek</td>
<td>The state expressed concern over metals contamination of soil, sediment and surface water. Site Investigation (SI) done 1996 and site placed on Confirmed release list in 2004.</td>
<td></td>
<td>No proposal in EIS</td>
</tr>
<tr>
<td>Pyx Mine</td>
<td>3421</td>
<td>Beaver Creek</td>
<td>The state expressed concern over metals contamination of soil, sediment and surface water. Site Investigation (SI) done 1996 and site placed on Confirmed release list in 2004.</td>
<td></td>
<td>No proposal in EIS</td>
</tr>
<tr>
<td>Rabbit Mine</td>
<td>3422</td>
<td>Beaver Creek</td>
<td>The state expressed concern over metals contamination of soil, sediment and surface water. Site Investigation (SI) done 1996 and site placed on Confirmed release list in 2004.</td>
<td></td>
<td>No proposal in EIS</td>
</tr>
<tr>
<td>Mine Name</td>
<td>State ID</td>
<td>Location</td>
<td>Potential Hazards</td>
<td>Recommended Action</td>
<td>Comments</td>
</tr>
<tr>
<td>-------------------</td>
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<td>-------------------------------------</td>
</tr>
<tr>
<td>Red Boy Mine</td>
<td>2467</td>
<td>Clear Creek</td>
<td>The state expressed concern over the amount and placement of the mine tailings along Congo Gulch. In 2013 the piping system to move the water from the adit to the settling ponds was upgraded and replaced. The EE/CA completed by Cascade Earth Systems found that arsenic concentrations on lower Clear Creek are slightly above Oregon DEQ criteria for toxic pollutants. Other dissolved metal concentrations in surface water were below the minimum detection level (MDL) of 50µg/L. Sediment concentrations of arsenic are above the EPA Threshold Effect Levels. Sediment concentrations of copper, cadmium, manganese, nickel and zinc are also in excess of state and/or federal comparison criteria. The Clear Cr. WRAPs addresses essential project work for ongoing water quality monitoring. Additional evaluations are needed and the site was placed on Confirmed Release list in 2003.</td>
<td>Private land No proposal in EIS</td>
<td></td>
</tr>
<tr>
<td>Upper Granite Creek</td>
<td>2150</td>
<td>Upper Granite</td>
<td>EPA screening and a site evaluation were done in 1997. In 2011 a contractor conducted an EE/CA for the Forest Service on the mines in this site, Table 1.</td>
<td>Worchester is on private land.</td>
<td></td>
</tr>
</tbody>
</table>

Source: Oregon DEQ ECSI data base June 03 2013  [http://www.deq.state.or.us/lq/eesi/ecsi.htm ]
Table 19. NMFS Matrix of Pathways and Indicators for the Granite Mining EIS:
Granite SWS, 203 Beaver, 202 Bull Run, 204 Clear, 206 Lower Granite, 201 Upper Granite

<table>
<thead>
<tr>
<th>Pathways and Indicators</th>
<th>Environmental Baseline</th>
<th>Effects of the Actions</th>
<th>Rationale*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Quality</td>
<td>PF AR NPF</td>
<td>Restore Maintain Degrad</td>
<td></td>
</tr>
<tr>
<td><strong>Temperature</strong></td>
<td>204, 206 202, 203,204,206,20 202, 203,206</td>
<td>X</td>
<td>Refer to water quality FWS PCE Appendix E</td>
</tr>
<tr>
<td><strong>Sediment /turbidity</strong></td>
<td>204 202,203,206,20</td>
<td>X</td>
<td>Refer to Suitable Substrate and sediment water quality FWS PCE Appendix E</td>
</tr>
<tr>
<td><strong>Chemical contaminants/ nutrients</strong></td>
<td>202, 203, 204,206, 201</td>
<td>X</td>
<td>Refer to obstruction water quality FWS PCE</td>
</tr>
<tr>
<td><strong>Habitat Access</strong></td>
<td>Physical barriers 206 203, 201 202,204</td>
<td>X</td>
<td>Refer to obstruction FWS PCE**</td>
</tr>
<tr>
<td><strong>Habitat Elements</strong></td>
<td>Substrate 202,204, 206,201 203</td>
<td>X</td>
<td>Refer to Suitable Substrate and sediment water quality FWS PCE</td>
</tr>
<tr>
<td></td>
<td>Large woody debris 202 203,204,206,20 201</td>
<td>X</td>
<td>Refer to Complex Condition FWS PCE</td>
</tr>
<tr>
<td></td>
<td>Pool frequency 202,204, 206 203,201</td>
<td>X</td>
<td>Refer to Complex Condition FWS PCE</td>
</tr>
<tr>
<td></td>
<td>Pool quality 206 201,206,204,20 3,202</td>
<td>X</td>
<td>Refer to Complex Condition FWS PCE</td>
</tr>
<tr>
<td></td>
<td>Off-channel habitat 202,203,204,20 6,201</td>
<td>X</td>
<td>Refer to Complex Condition FWS PCE</td>
</tr>
<tr>
<td></td>
<td>Refugia 201,206,204, 203,202</td>
<td>X</td>
<td>Refer to Complex Condition FWS PCE</td>
</tr>
<tr>
<td><strong>Channel Conditions/Dynamics</strong></td>
<td>Width/depth ratio 203,204,2 06,201 202</td>
<td>X</td>
<td>Refer to Complex Condition FWS PCE</td>
</tr>
<tr>
<td></td>
<td>Streambank conditions 203,204 202,206</td>
<td>X</td>
<td>Refer to Complex Condition FWS PCE</td>
</tr>
<tr>
<td></td>
<td>Floodplain connectivity 202,203,204,20 1,206</td>
<td>X</td>
<td>Refer to Floodplain Connectivity FWS PCE</td>
</tr>
<tr>
<td><strong>Flow/Hydrology</strong></td>
<td>Peak/base flows 202,203,20 4,201,206</td>
<td>X</td>
<td>Refer to FWS PCE Water Quality flow/hydrology</td>
</tr>
<tr>
<td></td>
<td>Drainage network increase 202,203,204,20 6, 201</td>
<td>X</td>
<td>Refer to FWS PCE Water Quality flow/hydrology</td>
</tr>
<tr>
<td><strong>Watershed Conditions</strong></td>
<td>Road density and location 204,206 202,203, 201</td>
<td>X</td>
<td>Refer to Water Quality flow/hydrology FWS PCE</td>
</tr>
<tr>
<td></td>
<td>Disturbance history 202,203,204,20 6,201</td>
<td>X</td>
<td>Refer to FWS PCE Water Quality flow/hydrology</td>
</tr>
<tr>
<td></td>
<td>Riparian reserves 202,203,206,20 1 204</td>
<td>X</td>
<td>Refer to FWS PCE Water Quality flow/hydrology</td>
</tr>
</tbody>
</table>

*A full explanation is found in Appendix E **The Granite and Bull Run Watershed Restoration Action Plans continue to address existing culvert barriers in the Granite WS
Critical Habitat

Pacific Salmon

Primary constituent elements of critical habitat for Pacific salmon species have been identified (from 70 FR 52360 9/2/05). Each of the elements applicable to this project, as described below, are addressed by indicators in the Matrix of Pathways and Indicators tables above.

The Primary Constituent Elements include sites essential to support one or more life stages of the evolutionarily significant units (ESUs; sites for spawning, rearing, migration, and foraging). In turn, these sites contain physical or biological features essential to the conservation of the ESUs (e.g., spawning gravels, water quality and quantity, side channels, prey species). Refer to Appendix E for specific types of sites and the features associated with them.

Bull Trout

Analysis of effects to designated critical habitat for bull trout is displayed in Appendix E.
**Determination of Effects**

Table 20. Determination of Effects to Mid-C Steelhead and Bull trout for each Plan of Operations.

<table>
<thead>
<tr>
<th>Mine Plan</th>
<th>Direct Effect Concerns</th>
<th>Determination of effects on steelhead and their DCH</th>
<th>Determination of effects on bull trout and their DCH</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altona</td>
<td>N</td>
<td>NLAA</td>
<td>No Effect</td>
<td>General Requirements and low probability of effects due to distance from perennial fish bearing waters and DCH No bull trout DCH. Area of active disturbance is .02 acres (Table 4).</td>
</tr>
<tr>
<td>Bunch Bucket</td>
<td>N</td>
<td>NLAA</td>
<td>NLAA</td>
<td>Distance of activity and existing dredge tailings between the activity and Clear Cr. Existing roads and ponds would be used. No proposed actions would further impact site stability i.e. sedimentation concerns, and no measureable impacts to temperature and instream structures or habitat. General Requirements apply. Area of active disturbance is .01 acres (Table 4).</td>
</tr>
<tr>
<td>City Limits</td>
<td>N</td>
<td>NLAA</td>
<td>NLAA</td>
<td>Distance of activity and area of pre-disturbance. There are existing dredge tailings and USFS 7300 RD between the project site and Granite Cr. and DCH. Existing roads and ponds would be used. No proposed actions would further impact site stability i.e. sedimentation concerns, and no measureable impacts to temperature and instream structures or habitat. General Requirements apply. Area of active disturbance .01 acres.</td>
</tr>
<tr>
<td>East Ten Cent</td>
<td>N</td>
<td>NLAA</td>
<td>No Effect</td>
<td>No bull trout or bull trout DCH. Test digs would be in existing tailings. A large existing waste rock berm separates mining activity from Ten Cent Cr. Waste rock would continue to improve this existing berm. Additionally, a small bench (~15 ft. wide) separate the activity from the creek. General Requirements (Appendix 2) and site specific protection measures (Appendix 1A) PDC’s apply. Area of active disturbance is .01 acres.</td>
</tr>
<tr>
<td>Hopeful 1</td>
<td>N</td>
<td>NLAA</td>
<td>NLAA</td>
<td>Activity is in a hillslope on an already developed recreation site. A backhoe would only be used twice during the operating season with the majority of work with pick and shovel. There are historic tailings and an old cabin between mining activity and Granite Cr. No proposed actions would further impact site stability i.e. sedimentation concerns, and no measureable impacts to temperature and instream structures or habitat.</td>
</tr>
</tbody>
</table>

77
<table>
<thead>
<tr>
<th>Mine Plan</th>
<th>Direct Effect Concerns</th>
<th>Determination of effects on steelhead and their DCH</th>
<th>Determination of effects on bull trout and their DCH</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>L&amp;H</td>
<td>N</td>
<td>NLAA</td>
<td>No Effect</td>
<td>There would only be occasional use of heavy machinery. One test hole would be open at a time. Existing roads and landings would be used. There are historic dredge tailings between placer and lode claims and Olive Creek. Steelhead DCH is 0.5 miles downstream and there is no bull trout or bull trout DCH. General Requirements and site specific protection measures apply. Area of active disturbance is .01 acres (Table 4).</td>
</tr>
<tr>
<td>Make It</td>
<td>N</td>
<td>NLAA</td>
<td>NLAA</td>
<td>Mining activity is greater than 50 ft from Granite Cr. Only 15-20 cubic yds. would be processed in an operating season. Operator would use existing roads and pond. General Requirements and site specific protection measures apply. Area of active disturbance is .01 acres (Table 4).</td>
</tr>
<tr>
<td>Old Eric 1&amp;2</td>
<td>Y</td>
<td>NLAA</td>
<td>NLAA</td>
<td>Placer operations are &gt;150 ft away from Upper Granite Cr. Active area of disturbance is 0.01 acres (Table 4). They would move no more than 5 yards in an operating season. General Requirements and site specific protection measures apply.</td>
</tr>
<tr>
<td>Rose Bud 1-4</td>
<td>N</td>
<td>NLAA</td>
<td>NLAA</td>
<td>Distance of Granite Cr. and DCH from mining activity. Existing dredge tailings and County 24 RD and FS 1035 RD are located between project activity and Granite Cr. Existing roads and ponds would be used. No proposed actions would further impact site stability i.e. sedimentation concerns and no measureable impacts to temperature and instream structures or habitat. General Requirements and site specific protection measures apply. Area of active disturbance is .01 acres (Table 4).</td>
</tr>
<tr>
<td>Sunshine/ McWillis</td>
<td>N</td>
<td>NLAA</td>
<td>No Effect</td>
<td>Activity is located 0.25 miles upstream of steelhead DCH. There is a culvert barrier at the confluence of McWillis Gulch and Olive Cr. This area has previously been heavily mined, General Requirements and site specific protection measures are in place No bull trout or bull trout DCH. Active area of disturbance is 0.25 acres (Table 4).</td>
</tr>
<tr>
<td>Troy D</td>
<td>N</td>
<td>NLAA</td>
<td>NLAA</td>
<td>Excavation would be in old dredge tailings, activity would be 25 feet away from the creek with a large berm of historic tailings separating activity from Granite Cr. Only one test hole would be open at a time. Operators would use existing roads and settling ponds. The trailer and processing plant are self-contained. General Requirements and site specific protection measures. Active area of disturbance is 0.01 acres (Table 4).</td>
</tr>
<tr>
<td>Mine Plan</td>
<td>Direct Effect Concerns</td>
<td>Determination of effects on steelhead and their DCH</td>
<td>Determination of effects on bull trout and their DCH</td>
<td>Rationale</td>
</tr>
<tr>
<td>-------------------</td>
<td>------------------------</td>
<td>------------------------------------------------------</td>
<td>-----------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Yellow Jacket</td>
<td>N</td>
<td>NLAA</td>
<td>No Effect</td>
<td>Distance of activity from occupied steelhead habitat and DCH during season of operation (Table 8 and 9). Activity is in old dredge tailings. There is a large berm of mine tailings between activity and stream channel. No proposed actions would further impact site stability i.e. sedimentation concerns, and no measureable impacts to temperature and instream structures or habitat. Given intermittent stream flow, activity and impacts would be isolated. All processing is on Private lands. No bull trout or bull trout DCH. Active area of disturbance is 0.25 acres (Table 4).</td>
</tr>
<tr>
<td>Belvadear</td>
<td>N</td>
<td>LAA</td>
<td>No Effect</td>
<td>Potential for discharge and disturbance to the RHCA from removal of existing vegetation. There are concerns with subsurface sediment discharge and downstream water temperature effects with water withdrawal. There is no bull trout presence or bull trout DCH. Active area of disturbance is 0.25 acres (Table 4). General Requirement measures apply.</td>
</tr>
<tr>
<td>Blue Sky-Bull Run</td>
<td>Y</td>
<td>LAA</td>
<td>LAA</td>
<td>Potential discharge and direct effects due to fording of the stream. Additionally Bull Run is a 303d listed stream for sediment impairment. Active area of disturbance is 0.2 acres (Table 9). General Requirements and site specific protection measures apply.</td>
</tr>
<tr>
<td>Blue Smoke</td>
<td>Y</td>
<td>NLAA</td>
<td>NLAA</td>
<td>Active area of placer disturbance is 0.25 acres (Table 4). Placer operations are isolated. Historic dredge tailings and County Rd 24 and FS 1350 separate mining activity from Granite Cr. and DCH. General Requirements and site specific protection measures apply.</td>
</tr>
<tr>
<td>Eddy Shipman</td>
<td>Y</td>
<td>LAA</td>
<td>LAA</td>
<td>Potential for minor discharge and disturbance to RHCA and indirect effects due to fording. Active area of disturbance is 0.25 acres (Table 4). General Requirements and site specific protection measures apply.</td>
</tr>
<tr>
<td>Grubsteak</td>
<td>Y</td>
<td>LAA</td>
<td>LAA</td>
<td>Potential for direction effects from fording. Activity would be in existing dredge tailings that are not vegetated. Given the flat topography and existing tailings there is no risk of surface discharge into the Creek with General Requirements and site specific protection measures. The ford would be used occasionally and site A and B must be reclaimed at the end of the season. The ford would be constructed over hardened dredge tailings. Active area of disturbance is 0.25 acres (Table 4)</td>
</tr>
<tr>
<td>Mine Plan</td>
<td>Direct Effect Concerns</td>
<td>Determination of effects on steelhead and their DCH</td>
<td>Determination of effects on bull trout and their DCH</td>
<td>Rationale</td>
</tr>
<tr>
<td>-------------------</td>
<td>------------------------</td>
<td>-----------------------------------------------------</td>
<td>-----------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Hopeful 2&amp;3</td>
<td>Y</td>
<td>LAA</td>
<td>LAA</td>
<td>Direct effects to due to stream fording. Active area of disturbance is 0.25 acres (Table 4). General Requirements and site specific protection measures apply.</td>
</tr>
<tr>
<td>Lightning Creek</td>
<td>Y</td>
<td>LAA</td>
<td>LAA</td>
<td>Placer activities are &gt;150 away from Lightning Cr. Active area of disturbance is 0.12 acres (Table 4). There are historic tailings and a closed road that separate activity from Lightning Cr. Operator would use existing ponds and roads. General Requirements and site specific protection measures apply.</td>
</tr>
<tr>
<td>Little Cross 1</td>
<td>Y</td>
<td>LAA</td>
<td>LAA</td>
<td>Placer operations are &gt;50 ft away from Granite Cr. Large historic tailings separate mining activity from Granite Cr. and DCH. Active area of disturbance is 0.25 acres (Table 4). General Requirements and site specific protection measures apply.</td>
</tr>
<tr>
<td>Olive Tone</td>
<td>N</td>
<td>LAA</td>
<td>No Effect</td>
<td>No bull trout DCH, however, indirect temperature effects to steelhead and DCH with maximum water withdrawal (8 CFS) from Olive Creek during time of operation. Active area of disturbance is 0.02 acres (Table 4) on a previously disturbed landing. Activities are 50 ft away from Olive Cr. General Requirements and site specific protection measures apply.</td>
</tr>
<tr>
<td>Ruby Group</td>
<td>Y</td>
<td>LAA</td>
<td>LAA</td>
<td>Potential for direct effects due to fording of the stream. Active area of disturbance is 0.01 acres (Table 4). General Requirements and site specific protection measures apply.</td>
</tr>
<tr>
<td>Tetra Alpha Placer</td>
<td>Y</td>
<td>LAA</td>
<td>LAA</td>
<td>Potential for direct effects due to fording of the stream and disturbance to the RHCA with temporary road construction. Active area of disturbance is 0.50 acres (Table 4). A 25 ft. buffer would be maintained. A historic berm of tailings is located between mining activity and Boulder Cr. General Requirements and site specific protection measures apply. A fisheries biologist or hydrologist would monitor the stream crossings to ensure that constructed fords do not create a fish barrier during low flows.</td>
</tr>
<tr>
<td>Tetra Alpha Mill and Lode</td>
<td>Y</td>
<td>LAA</td>
<td>LAA</td>
<td>Existing mill site from a previous plan. Water comes from Last Chance Creek and is recycled during operations. Potential direct effects to Boulder Creek from water withdrawal if water right is exercised. Fish protection measures requires no withdrawals after August 15 to protect spawning bull trout.</td>
</tr>
</tbody>
</table>

*Muffin, Lucky Strike, Royal White and Yellow Gold have a “No Effect” determination for Mid-C Steelhead, bulltrout and their DCH given distance to designated critical habitat and perennial fish bearing streams.*
References

Peer Reviewed Literature


Technical Reports


Clear Creek and Bull Run Watershed Restoration Action Plans (WRAPS) can be found at http://apps.fs.usda.gov/WCFmapviewer/.


Neal, Jeff. 2014. Personal Communication. Oregon Department of Fish and Wildlife, John Day Oregon.

Appendix E-Pacific Salmon and Bull Trout Critical Habitat

Pacific Salmon

The Primary Constituent Elements include sites essential to support one or more life stages of the evolutionarily significant units (ESUs; sites for spawning, rearing, migration, and foraging). In turn, these sites contain physical or biological features essential to the conservation of the ESUs (e.g., spawning gravels, water quality and quantity, side channels, prey species). These specific types of sites and the features associated with them are described below:

1. **Freshwater spawning sites with water quality and quantity conditions and substrate supporting spawning, incubation, and larval development.**
   a) *Water quantity* is addressed by the Change in Peak/Base flows indicator. This would address regulated flows and flows potentially changed by land management activities.
   b) *Water quality* is addressed by three indicators. Assessment of the Water Temperature Indicator will determine if temperatures are in appropriate ranges to support spawning, incubation, and larval development of Pacific salmon. The Sediment and Turbidity indicator addresses percent fines <.85 mm in gravels (excessive fine sediments in gravel can impede oxygenated water flow through redds and physically block swim-up fry from moving out of the redd) and suspended sediment (which can affect respiration and ability to find food items). Evaluation of the Chemical Contamination and Nutrients indicator can determine if an action will result in lethal or sub-lethal effects to adult spawners, incubating embryos or larva.
   c) Evaluation of the *Substrate* indicator is somewhat redundant to the Sediment/Turbidity indicator. It evaluates for the dominant particle sizes in the streambed, while also evaluating percent embeddedness, another means to evaluate for concentrations of fine sediments in the streambed. As the proportion of fine sediment increases, percent embeddedness typically increases.

2. **Freshwater rearing sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development; and natural cover such as shade, submerged, and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.**
   a) *Water quantity* is addressed by the Change in Peak/Base flows indicator. This would address regulated flows and flows potentially changed by land management activities.
   b) *Floodplain connectivity* is evaluated by the Floodplain Connectivity indicator. Access to floodplains provides low-velocity, complex habitats that serve as important summer rearing areas for species, and important winter refuges for overwintering juveniles.
   c) *Water quality* is addressed by three indicators. Assessment of the Water Temperature Indicator will determine if temperatures are in appropriate ranges to support rearing juveniles, particularly during the critical summer period. The Sediment and Turbidity indicator addresses percent fines <.85 mm in gravels (excessive fine sediments in gravels can reduce living space for aquatic invertebrates, an important source of food items for juvenile fish) and suspended sediment (which can affect respiration and ability to find food items). Evaluation of the Chemical Contamination and Nutrients indicator can determine if an action will result in lethal or sub-lethal effects to rearing juveniles.
   d) *Forage* is indirectly assessed by habitat indicators. The primary food items for juvenile salmonids are aquatic and terrestrial invertebrates. Production of aquatic invertebrates is influenced by water quality. Different types of aquatic invertebrates prefer different temperature ranges. Fine sediments in gravels limit living space for aquatic invertebrates, and sustained turbidity may not only reduce aquatic invertebrate production but reduce the ability of juvenile fish to find them in the water column or on bed particles. Chemical contamination may reduce or eliminate production of specific aquatic invertebrates. Introduction of nutrients may be beneficial (increase primary production and aquatic invertebrate production) or in excess may lead to lethal or sublethal effects to aquatic invertebrates.
e) *Forage* is also influenced by the condition of riparian vegetation as evaluated by the Riparian Reserve indicator. Shade canopy influences water temperatures, which in turn affects aquatic invertebrate biota. Organic matter from vegetation (leaves, wood) serves as food sources for aquatic invertebrates. Small and large wood debris are substrate for aquatic invertebrates. Riparian vegetation provides food and substrate for terrestrial invertebrates. Terrestrial insect drop from riparian vegetation to streams is a significant food source for fish.

f) Substrate particles and embeddedness, as evaluated in the Substrate Indicator, influence the amount of physical living space available for aquatic invertebrates and therefore indirectly address *Forage*. Large Woody Debris (LWD) also addresses *Forage* in that LWD provides substrate and a food source for aquatic invertebrates.

g) *Natural cover* is addressed by a host of indicators. Shade is discussed under the Riparian reserve indicator and also in part addressed by the Water Temperature indicator. Submerged and overhanging large wood, as well as log jams, are addressed by evaluating the Large Woody Debris indicator. The Substrate indicator analysis describes the effects of the action to a range of particle sizes, including large rocks and boulders. Analysis of the Pool Frequency indicator addresses numbers of pools available (providing cover) as well as how they are influenced by large woody debris recruitment. Analysis of the Pool Quality indicator reveals how an action may influence the depths of deeper pools, which provide quality cover. Width-Depth ratio influences cover because larger ratios indicate shallow depths associated with wide channels, and less cover. Analysis of the Floodplain Connectivity indicator should reveal the extent to which an action may cause channel downcutting or aggradation of the streambed, which would reduce or increase proximity to riparian vegetation and the cover it provides. Effects to Off-channel Habitats provide insights to effects to cover because off-channel habitats are often more narrow and at lower gradients than main channels. These conditions increase the potential for large wood accumulations and increase the potential for cover provided by overhanging riparian condition. Finally, the criterion for evaluating Streambank Conditions is bank stability. Stable, well-vegetated banks typically provide more cover than eroding banks, and influence the stream’s ability to create undercut banks. The riparian vegetation community and its composition are important to providing sources of material to establish and maintain beaver dams.

3. **Freshwater migration corridors free of obstruction with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival.**

a) Analysis of the Physical Barrier indicator directly addresses *freshwater migration corridors free of obstruction*. There is no corresponding habitat indicator that evaluates for *excessive predation*. However, this criterion of PCE 3 is a biological issue that is not influenced by land management activities.

b) *Water quantity* is addressed by the Change in Peak/Base flows indicator. This would address regulated flows and flows potentially changed by land management activities.

c) *Water quality* is addressed by three indicators. Assessment of the Water Temperature Indicator will determine if temperatures are in appropriate ranges to support migration of juveniles and adults. The Sediment and Turbidity indicator addresses percent fines <.85 mm in gravels (which is not particularly relevant to migration of either juveniles or adults, although smaller juveniles may use larger gravels for cover at times) and suspended sediment. High concentrations of suspended sediment for extended periods of time may cause upstream migrating adults to seek clear water tributaries as temporary refuge, thereby delaying upstream migration. Turbidity may affect downstream migration of juveniles by causing respiratory stress as well as reducing the ability to find food items. Analysis of the Chemical Contamination and Nutrients indicator can determine if an action may present chemical barriers to upstream or downstream migration.

d) The relationship between the *natural cover* component of this PCE to habitat indicators is identical to that for PCE 2, above. The *freshwater migration corridors free of excessive predation* component of the PCE is addressed by the same indicators as natural cover. Negative effects to cover are generally unfavorable to prey species.

<table>
<thead>
<tr>
<th>PCE Feature</th>
<th>Matrix Pathway</th>
<th>Matrix Indicator</th>
<th>Baseline Condition</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia</td>
<td>Floodplain Connectivity</td>
<td>Channel Condition and Dynamics</td>
<td>Floodplain connectivity</td>
<td>FAR, FAUR-All Watersheds</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Past mining activities have degraded floodplain connection in the Granite Watershed. There have been restoration efforts but, most operators are working existing dredge tailings. In some instances, tailings or existing artificial berms have separated the active stream channel from surrounding floodplain. Designated stream buffers are to be undisturbed. No mining activities, storage equipment or overburden or vegetation removal is permitted within these buffers, see G15 (General Requirements for Protection of Surface Resources). Reclamation requirements R1-R18 apply to all operations.</td>
</tr>
<tr>
<td>Water Quantity</td>
<td>Flow/ Hydrology</td>
<td>Change in peak/base flows</td>
<td></td>
<td>FAR – All watersheds</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Pronounced changes in peak/base flow due to past mining impacts and road density. There are &gt;3.0 miles/sq miles, and many valley bottom roads. Past disturbance has been located in riparian areas. There is no new proposed activity that would change peak/base flows. There is minimal temp road construction and no new temp road construction across stream channels.</td>
</tr>
</tbody>
</table>

This project may affect but is not likely to adversely affect PCE 1.
<table>
<thead>
<tr>
<th>PCE</th>
<th>PCE Habitat Feature</th>
<th>Matrix Pathway</th>
<th>Matrix Indicator</th>
<th>Baseline Condition</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>2)</td>
<td>Migratory habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.</td>
<td>Obstruction</td>
<td>Water Quality</td>
<td>Chemical contaminants/ nutrients, temperature</td>
<td>FAR, FAUR-202, 203, 204, 206, 201 FA-204, 201</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Flow/ Hydrology</td>
<td>Change in peak/base flows</td>
<td>FAR– All Watersheds</td>
</tr>
</tbody>
</table>

This project may affect but is not likely to adversely affect PCE 2.
### Table 1: PCE Habitat Feature Matrix

<table>
<thead>
<tr>
<th>PCE</th>
<th>PCE Habitat Feature</th>
<th>Matrix Pathway</th>
<th>Matrix Indicator</th>
<th>Baseline Condition</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>3)</td>
<td>An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.</td>
<td>Forage Water Quality, Habitat Elements, Channel Condition and Dynamics, Habitat Access</td>
<td>All 13 associated with these 4 pathways</td>
<td>FA-204 FAR-203, 202, 204, 206</td>
<td>Designated stream buffers are to be undisturbed. No mining activities, storage equipment or overburden or vegetation removal is permitted within these buffers, see G15 (General Requirements for Protection of Surface Resources). Reclamation requirements R1-R18 apply to all operations. BMPs and site specific mitigations are designed to limit potential sediment mobilization and transport, reference road-related requirements “Z1-Z14” mitigations and general requirements “G7”. Operations with potential subsurface or surface discharge will be required to obtain a 401 certification from ODEQ and DSL before the FS approves their plan of operation. Effects of the placer and load operations within the project are limited to isolated or site-specific impacts. There would likely be non-measurable increases in sedimentation on a subwatershed scale. The project may adversely affect PCE 3 due to small magnitude of sediment. LAA</td>
</tr>
<tr>
<td>4)</td>
<td>Complex river, stream, lake, reservoir, and marine shoreline aquatic environments and processes with features such as large wood, side channels, pools, undercut banks and substrates, to provide a variety of depths, gradients, velocities, and structure.</td>
<td>Complex Condition Habitat Elements</td>
<td>Large woody debris</td>
<td>FAR-203, 204, 206, 201 FA-202</td>
<td>There will be no removal of large woody material from the riparian reaches or stream channel. There is no causal mechanism to alter large woody recruitment or instream structure. Existing off channel habitat is limited to due to past mining disturbances in the Granite Watershed. BMPs and site specific mitigations are designed to limit potential sediment mobilization and transport. Operations with potential subsurface or surface discharge will be required to obtain a 401 certification from ODEQ and DSL before the FS approves their plan of operation.</td>
</tr>
<tr>
<td>PCE</td>
<td>PCE Habitat Feature</td>
<td>Matrix Pathway</td>
<td>Matrix Indicator</td>
<td>Baseline Condition</td>
<td>Rationale</td>
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</tr>
<tr>
<td></td>
<td>Off channel habitat</td>
<td></td>
<td>FAR-All Watersheds</td>
<td></td>
<td>This project may affect but is not likely to adversely affect PCE 4.</td>
</tr>
<tr>
<td></td>
<td>Refugia</td>
<td></td>
<td>Far-All Watersheds</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5). Water temperatures ranging from 2 to 15°C (36 to 59°F), with adequate thermal refugia available for temperatures at the upper end of this range. Specific temperatures within this range will vary depending on bull trout life-history stage and form; geography; elevation, diurnal and seasonal variation; shade such as that provided by riparian habitat; and local groundwater influence.

Water Quality

Water Quality

Temperature

FAR, FAUR-202, 203, 204, 206, 201 FA-204, 201

Water quality is temperature limited in parts of the Granite Watershed; however, Oregon Department of Environmental Quality (ODEQ) has completed Total Maximum Daily Loads (TMDLs) for the North Fork John Day Subbasin (2010). There will be no removal of shade bearing trees within RHCAs and there is no mechanism to change pool frequency on a scale that would measurably alter stream temperatures on the stream or subwatershed scale. Olive Tone and Belvadear have shared water rights (4 cfs) however, water will be recycled during processing and Olive Creek seasonal water levels must be maintained when drafting water.

This project will not affect PCE 5.

6). Substrates of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount (e.g. less than 12 percent)

Suitable Substrate

Water Quality

Sediment

FA-204 FAR-203, 202, 206, 206

BMPs and site specific mitigations are designed to limit potential sediment mobilization and transport, reference road-related requirements “Z1-Z14” mitigations and general requirement “G7”. Operations with potential subsurface or surface discharge will be required to obtain a 401 certification from ODEQ and DSL before the FS
<table>
<thead>
<tr>
<th>PCE</th>
<th>PCE Habitat Feature</th>
<th>Matrix Pathway</th>
<th>Matrix Indicator</th>
<th>Baseline Condition</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>89</td>
<td>PCE Habitat Feature</td>
<td>Matrix Pathway</td>
<td>Matrix Indicator</td>
<td>Baseline Condition</td>
<td>Rationale</td>
</tr>
<tr>
<td>72</td>
<td>of fine substrate less than 0.85 mm (0.03 in) in diameter and minimal embeddedness of these fines in larger substrates are characteristic of these conditions.</td>
<td>Habitat Elements</td>
<td>Substrate Embeddedness</td>
<td>FA-204, 201 FAR-203, 202, 206</td>
<td>approves their plan of operation. Fording across stream channels will be on existing hardened fords and constructed fords shall only occur at Forest Service approved locations to avoid adverse impacts to fisheries.</td>
</tr>
<tr>
<td>72</td>
<td>7). A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, they minimize departures from a natural hydrograph.</td>
<td>Water Quantity</td>
<td>Flow/ Hydrology</td>
<td>Change in peak/base flows</td>
<td>FAR– All Watersheds</td>
</tr>
<tr>
<td>72</td>
<td>8). Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.</td>
<td>Water Quality</td>
<td>Water Quality</td>
<td>Temperature</td>
<td>FAR, FAUR-202, 203, 204, 206, 201 FA-204, 201</td>
</tr>
<tr>
<td>PCE</td>
<td>PCE Habitat Feature</td>
<td>Matrix Pathway</td>
<td>Matrix Indicator</td>
<td>Baseline Condition</td>
<td>Rationale</td>
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<td>-------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Sediment</td>
<td></td>
<td>FA-204</td>
<td>FAR-203, FAR-203, FAR-202, FAR-206, FAR-206</td>
<td>BMPs and site specific mitigations are designed to limit potential sediment mobilization and transport, reference road-related requirements “Z1-Z14” mitigations and general mitigations G7. Operations with potential subsurface or surface discharge will be required to obtain a 401 certification from ODEQ and DSL before the FS approves their plan of operation.</td>
<td></td>
</tr>
<tr>
<td>Chemical Contam./ Nutrients</td>
<td>All PF</td>
<td>A Fuel Spill Prevention Plan is required for every mechanical operation. Hazardous materials mitigations H1-H12 apply.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in Peak/Base Flows</td>
<td>FAR– All Watersheds</td>
<td>There are pronounced changes in peak/base flow due to past mining impacts and road density. Past disturbance has been located in riparian areas. There is no new proposed activity that would change peak/base flows at a subwatershed scale.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Because of the small amount of sediment potentially transported to stream channels from some placer mining and effects from fording likely to adversely affect PCE 8.</td>
</tr>
<tr>
<td>PCE</td>
<td>PCE Habitat Feature</td>
<td>Matrix Pathway</td>
<td>Matrix Indicator</td>
<td>Baseline Condition</td>
<td>Rationale</td>
</tr>
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</tr>
<tr>
<td>9)</td>
<td>Few or no nonnative predatory (e.g., lake trout, walleye, northern pike, smallmouth bass; inbreeding (e.g., brook trout); or competitive (e.g. brown trout) species present.</td>
<td>Species</td>
<td>Subpopulation characteristics</td>
<td>Persistence and Genetic Integrity</td>
<td>FAR</td>
</tr>
</tbody>
</table>

This project will not affect PCE 9.